

UNIT THREE



CHAPTERS

12. The Integument
13. Mouth and Oral Cavity
14. Sensation: Hearing, Vision, Taste, Touch, and Smell
15. Cardiovascular System
16. The Respiratory System
17. Genitourinary and Renal Systems
18. Musculoskeletal System
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20. The Gastrointestinal System
21. The Hematologic System
22. Neurologic Disorders
23. The Immune System
24. Multisystem Problems: Caring for Frail Elders with CoMorbidity

Physiological Basis of Practice

The Integument

Rita Olivieri



CHAPTER OBJECTIVES

Upon completion of this chapter, the reader will be able to:

1. Describe normal skin changes associated with aging.
2. Identify risk factors related to common skin illnesses of older persons.
3. Delineate skin changes associated with benign and malignant skin changes.
4. List nursing diagnoses related to common skin illnesses.
5. Discuss the nursing responsibilities related to pharmacological and nonpharmacological treatment of common skin illnesses.
6. Explain the nursing management principles related to the care of pressure ulcers.

KEY TERMS

actinic keratotic lesions 336
 autolytic debridement 355
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- NCLEX Review
- Assessment Tools

COMPANION WEBSITE

- Additional NCLEX Review
- Resource Links
- MediaLink Applications:

The skin comprises between 15% and 20% of body weight. It has three layers, the epidermis, dermis, and subcutaneous layers. The epidermal accessory structures, or appendages, are downgrowths of the epidermal layer and include the hair, nails, and sweat glands. The skin, along with the accessory structures, is considered the integumentary system. The skin covers the entire body and protects it from external forces such as microorganisms, traumatic injury, and sun exposure. In addition, it prevents loss of body fluid, synthesizes vitamin D, regulates normal body temperature, and provides both touch and pressure neuroreception. The overall health of a person is often reflected by assessment of skin color, texture, warmth, general appearance, and overall grooming. Obvious changes in the skin and hair are an inevitable part of aging that lead to changes in a sense of self as well as how the individual is perceived by others. When these changes, such as graying of hair and wrinkling of the skin, are viewed as negative, considerable time and money may be spent on efforts to alter these outward appearances by using cosmetics and hair coloring. An important part of the nurse's role is to teach the older person techniques that will minimize and treat changes that are associated with aging and the skin's exposure to environmental hazards.

Usual Structure and Function

The skin is the largest organ of the body and is formed in major layers. These layers include the epidermis, dermis, and hypodermis.

EPIDERMIS

The epidermis of the skin has up to five layers and is continually regenerating and shedding in a process called **desquamation**. The major cells of the epidermis, the keratinocytes, produce keratin, which provides the tough outer barrier of the skin. Langerhans' cells reside in the keratinocytes and provide immune protective function. Ultraviolet radiation may damage Langerhans' cells, decreasing their ability to protect the skin against cancer. At the junction of the epidermis and dermis are melanocytes. These produce melanin, which gives the skin its color and shields the body from the harmful effects of the sun. Skin tone results from the size and quantity of melanosomes (granules in the melanocyte) and the melanin activity rate. Persons with dark skin have larger melanosomes and more active melanin production than those with lighter skin. Skin also derives a reddish tone from the vascular bed that is located in the dermis (Corwin, 2000; Huether & McCance, 2000).

DERMIS

The dermis, the second layer of the skin, is made up of connective tissue and is rich in blood supply, lymph, and neurosensory receptors. The dermis provides nourishment and support for the epidermis, which does not have its own blood supply. This is the thickest skin layer and contains fibroblasts, mast cells, and lymphocytes. The white elastin fibers and yellow fibrous collagen produced by the fibroblasts provide strength to the skin and give it the ability to stretch during movement. Dermal ground substances retain water and play a role in skin turgor. Sensory nerve endings in the dermis provide responses to temperature, touch, pressure, and pain.

HYPODERMIS

The subcutaneous layer, or superficial fascia, is specialized connective tissue that lies beneath the dermis and attaches to the muscles below. This layer also contains blood

vessels, lymphatic channels, hair follicles, and sweat glands that extend from the dermis as well as adipose or fat tissue. Fat tissue gives shape to the body and provides cushioning for the bones, protection for delicate internal organs, and insulation from extremes in temperature. Subcutaneous fat is most abundant on the lower back and buttocks and is absent on areas such as the eyelids and tibia. The amount of fat tissue is dependent on age, gender, and hereditary factors. This layer also contains blood vessels, lymphatic channels, hair follicles, and sweat glands that extend from the dermis.

Dermal Accessory Structures

Accessory structures of the skin include the hair, nails, and glands and together with the skin account for 20% of the body's weight. Each accessory structure has a unique purpose and function.

HAIR

Hair color, distribution, thickness, and texture vary greatly based on age, gender, and race as well as overall health. Hair is located on all skin surfaces except the soles of the feet and the palms of the hands. Each strand of hair grows independently in a cyclic fashion and can differ in its rate of growth depending on its location on the body. At any given time, about 10% of the hair on the scalp is in the resting phase. Hair develops from the mitotic activity of the hair bulb that is located in the dermal layer of the skin. As hair grows up the follicle, it becomes differentiated and is fully hardened by the time it reaches the skin surface. Hair growth occurs up the dermis at an angle. When the body temperature drops, the erector pili muscles contract and hair “stands up on end,” creating “goose bumps.” Hair color, like skin color, is related to the melanin production in the hair follicle (Corwin, 2000).

NAILS

Nails are rapidly dividing extensions of the keratin-producing epidermal layer of the skin. The crescent-shaped portion of the nail that is located at the proximal end of the nail plate is the nail matrix. In the nail matrix, specialized, nonkeratinized cells differentiate into keratinized cells, which form nail protein. Fingernail protein grows up the nail from the nail matrix at about .1 mm per day. Toenails grow at a slower rate.

GLANDS

Sebaceous glands are found on most skin areas with the exception of the palms of the hands and the soles of the feet. They are most abundant on the face, head, and chest. Sebaceous glands are usually associated with a hair follicle, forming a pilosebaceous unit. These glands secrete **sebum**, an oily substance that keeps hair supple and lubricates the skin. Sebum protects the skin from water loss and provides protection against infection.

Apocrine sweat glands are large glands that produce a milky substance that causes odor when bacteria that is present on the skin act upon it. These glands begin functioning after puberty and require a high level of sex hormone activity for functioning. They are found primarily in the axillary, perineum, and breast areolae.

Eccrine glands produce sweat, a dilute form of plasma. Sweat production from the eccrine glands is stimulated by exercise, heat (forehead, neck, chest), and psychic origins (palms of the hands, soles of the feet, axillae). Thus, they play an important role in regulating the heat and cooling of the body.

Usual Functions of the Skin

The skin is an amazing organ that protects the entire body from external environmental hazards. It contributes to the immune function, regulates temperature, and provides the vehicle for vitamin synthesis and sensory reception for the central nervous system.

REGULATION OF BODY FLUIDS AND TEMPERATURE

The skin contains epithelial cells that provide a barrier that prevents insensible loss of body fluids from the deeper layers of the skin and the internal organs. The epithelial cells also provide selective transport of nutrients and body wastes, and have a semi-regulated permeability to water. Damage to the skin, due to injuries such as burns, may result in life-threatening loss of this protective function.

The epidermis of the skin provides the vehicle for radiation, conduction, and convection of heat from the body. Blood vessels in the dermis help to regulate body temperature by dilating during warm temperatures and constricting during cold. The hypothalamus plays a role in maintaining an approximate core temperature of 37 °C by regulating dermal blood flow to the extremities, as well as some facial areas. Body temperature in an older person is usually lower. During periods of intense exercise, or periods of increased external temperature, additional cooling mechanisms are needed. At these times, the eccrine glands produce large volumes of sweat that contribute greatly to the overall ability of the body to regulate temperature. The subcutaneous tissue provides insulation to retain body heat.

REGULATION OF THE IMMUNE FUNCTION

Intact skin is an important barrier to prevent infection from bacterial invasion and other microorganisms. Skin is not only a physical barrier, but also an important part of the body's immune response against various antigens. The cells that provide this specialized function are Langerhans' cells and keratinocytes in the epidermis, and lymphocytes in the dermis. These cells make it possible for a healthy skin surface to neutralize an attack against various antigenic substances. However, if the skin is damaged or diseased, it may be possible for an antigen to induce an immune response and cause inflammation or infection to occur (Huether & McCance, 2000).

PRODUCTION OF VITAMIN D

The epidermal layer of the skin provides the vehicle for the synthesis of vitamin D. A complex steroid called a sterol is present in the malpighian cells (7-dehydrocholesterol) and is activated by ultraviolet light to produce vitamin D. Vitamin D is important in the absorption of calcium and phosphorus from food.

SENSORY RECEPTION


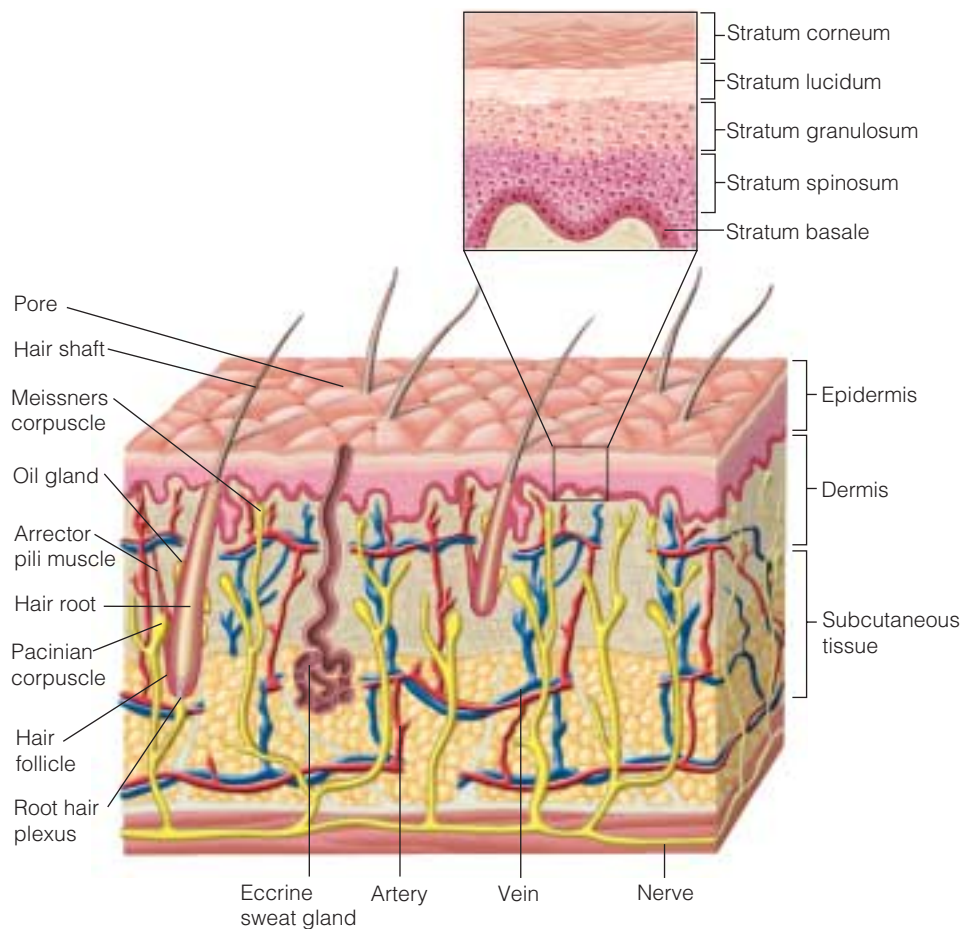
General sensory receptors located in the skin provide the central nervous system with information about changes in the external environment. When stimulated, these specialized receptors detect touch, pressure, temperature, and pain. For example, Merkel disks in the epidermis detect light pressure, Meissner's corpuscles in the dermis detect light and discriminative touch as well as vibration, and Pacini's corpuscles in the subcutaneous tissue detect deep pressure. Figure 12-1  illustrates these corpuscles and their distribution in the skin.

FIGURE 12-1

Corpuscles and Their Distribution in the Skin



Normal Changes of Aging

Although changes occur in all of the body systems throughout life, skin and hair changes are the most visible and therefore greatly contribute to a person's self-perception and self-esteem. With normal aging, there is a decrease in the thickness and elasticity of the skin. These changes occur slowly, but by the seventh and eighth decade of life, they contribute to the appearance of wrinkled and sagging skin in the face, neck, and upper arms. The age-related changes in the skin's appearance correlate with changes in function. Exposure and damage by the sun, known as *actinic damage*, also affect the aging appearance of the skin. It is important for the older person to understand the normal changes, as well as environmentally induced damage, to decrease risk factors and minimize negative consequences. The decrease in melanocytes and a person's genetic makeup determine the graying pattern of hair. Figure 12-2 illustrates normal changes of aging in the integumentary system.

EPIDERMIS

The epidermal cells of the older person contain less moisture. This contributes to a dry, rough skin appearance. After 50 years of age, epidermal mitosis slows by 30%, resulting in a longer healing time for the older person. This increased healing time also may be a contributing factor for infection. Rete ridges, which connect the dermis and epi-

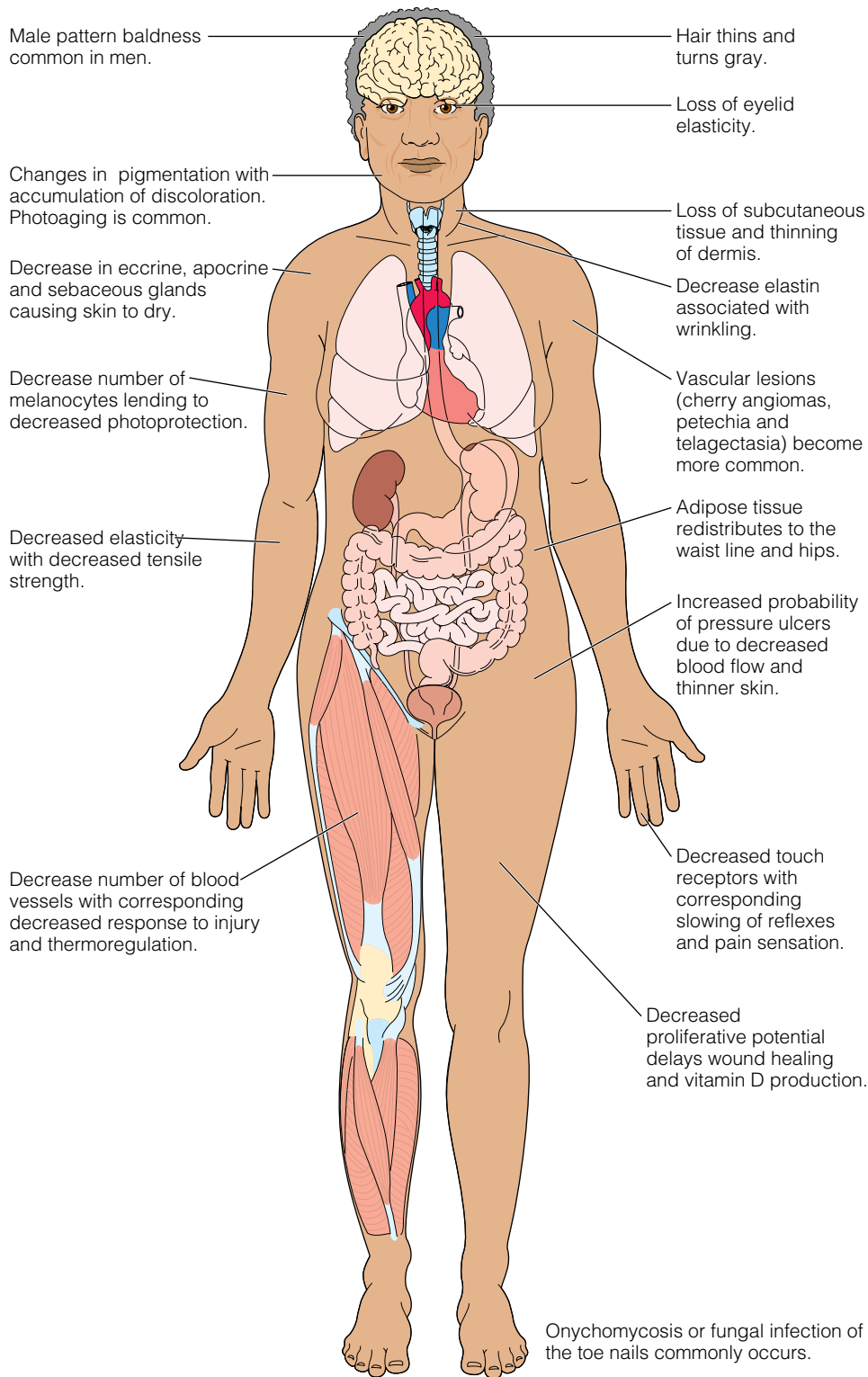


FIGURE 12-2
 Normal Changes of Aging
 in the Integumentary
 System

dermis, flatten, resulting in fewer contact areas between these two layers. This increases the risk for skin tears when seemingly slight **friction** occurs against the skin. Melanocytes decrease in number and activity with age. This contributes to a paler complexion and an increased risk for damage from ultraviolet radiation for the light-skinned older person. The remaining cells may not function normally, resulting in scattered pigmented areas such as nevi, age spots, or liver spots and an increase in the number and size of freckles.

DERMIS

The dermis decreases in thickness and functionality beginning in the third decade. Elastin decreases in quality but increases in quantity, resulting in the wrinkling and sagging of the skin. Collagen become less organized and causes a loss of turgor. Men have a thicker dermal layer than women, which explains the more rapidly apparent age-associated changes in the female facial appearance. The vascularity of the dermis decreases and contributes to a paler complexion in the light-skinned older person. The capillaries become thinner and more easily damaged, leading to bruised and discolored areas known as **senile purpura** as depicted in Figure 12-3. There is a gradual decline in both touch and pressure sensations, causing the older person to be at risk for injury such as burns and pressure sores.

SUBCUTANEOUS LAYER

With increasing age, there is a gradual atrophy of subcutaneous tissue in some areas of the body, and a gradual increase in others. Subcutaneous tissue becomes thinner in the face, neck, hands, and lower legs, resulting in more visible veins in the exposed areas, and skin that is more prone to damage. Some other areas of the body have a gradual hypertrophy of subcutaneous tissue that leads to an overall increase in the proportion of body fat for the older person. Overall, with aging, fat distribution is more pronounced in the abdomen and thighs in women, and in the abdomen in men.

FIGURE 12-3
Senile Purpura



HAIR

The hair of the older person looks gray or white due to a decrease in the number of functioning melanocytes and the replacement of pigmented strands of hair with nonpigmented ones. The texture and thickness of the hair also changes, becoming coarse and thin. Hormones decline, resulting in gradual loss of hair in the pubic and axillary areas and the appearance of facial hair on women and hair in the ears and nose of men. By age 50, many older men have experienced a gradual loss of hair and often develop a symmetrical W-shaped balding pattern. Women have less pronounced hair loss than men. The actual age when graying and hair loss begins, as well as the pattern of baldness, is determined in part by a person's genetic makeup. However, many 50-year-olds have gray, or partly gray, scalp hairs.

NAILS

The nails of the older person become dull, and yellow or gray in color. Nail growth slows, which results in thicker nails that are likely to split. Longitudinal striations also appear due to damage at the nail matrix.

GLANDS

With aging, there is a decrease in the size, number, and function of both eccrine and apocrine glands. The decrease in eccrine or sweat glands results in a decrease in the older person's ability to regulate body temperature through perspiration and evaporation from the skin. As the ability to sweat decreases, the older person may be unable to control body temperature by the normal sweating mechanism, and therefore is at a high risk for heat exhaustion.

SEBACEOUS GLANDS

The sebaceous glands increase in size with age, but the amount of sebum produced is decreased. The decrease in sebum hastens the evaporation of water from the stratum corneum, which results in cracked, dry skin.

Common Illnesses of Older Persons

Some of the common illnesses of the older person include skin cancer, skin tears, **pressure ulcer**, delayed skin healing, **cellulitis**, and fingernail and toenail problems.

SKIN CANCER

Although a tan is often admired and the person with it is thought to look attractive and healthy, a tan is a protective response of the body to damage caused by the sun. Tanning is a sign of skin damage. The skin never “forgets” the damage done by exposure to ultraviolet radiation (UVR). In fact, several sunburns over the course of a lifetime can double the risk for developing melanoma later in life (Skin Cancer Foundation, 2001a). A tan may be attractive, but the cumulative effect of sun exposure throughout a lifetime leads to premature aging and increases the risk for skin cancer. UVR is responsible for approximately 90% of nonmelanoma skin cancers (Skin Cancer Foundation, 2005).

The combination of normal age-related changes and UVR-related damage is a complex issue and not entirely understood. However UVR-related skin damage is thought to be distinct from the normal aging process. UVR may also accelerate the extrinsic and intrinsic skin changes of aging.

There are two important types of UVR: UVA and UVB. Both have been implicated in skin cancer. UVA rays are responsible for deep skin penetration, cause premature aging, and may also decrease immune system function. One source estimates that up to 90% of skin changes attributed to aging are caused by sun exposure (Centers for Disease Control, 2002).

The older person who has spent a lot of time outdoors, either working or at leisure, may have long-term UVR damage known as **photoaging**. These changes occur on exposed areas such as the face, neck, arms, and hands and include freckling, loss of elasticity, damaged blood vessels, and a general coarse and weathered appearance. Continued damage may result in the development of a precancerous lesion, actinic **keratosis**, which can progress to skin cancer.

Skin cancer is the most common type of cancer in the United States (Greenlee, Murray, Boldem, & Wingo, 2000). As a person ages, the incidence of skin cancer increases, especially for those between 50 and 80 years of age. This is because older persons have had more time to be exposed to UVR, and the ability to repair damage caused by the sun has diminished. Both basal cell carcinoma and squamous cell carcinoma are more common in individuals over 55 years of age. Pigmented spots that bleed easily and are enlarging characterize these carcinomas.

Skin cancers that primarily result from sun exposure are basal cell carcinoma, squamous cell carcinoma, and malignant melanoma (Schober-Flores, 2001). The risks for skin cancer seem to be associated with the type of sun exposure. Intense, intermittent exposures, such as severe sunburns, are associated with both basal cell carcinoma and malignant melanoma. The risk for squamous cell carcinoma is strongly associated with chronic sun exposure but not with intermittent exposure (Centers for Disease Control, 2002).

ACTINIC KERATOSIS

The most common precancerous lesion is actinic keratosis, also known as solar keratosis and senile keratosis. **Actinic keratotic lesions** are more common in men than women. It is estimated that 1 in 1,000 will progress to skin cancer, usually squamous cell carcinoma, in a 1-year period. Erythematous actinic keratosis is the most common type and appears as a sore, rough, scaly, erythematous papule or plaque. Other types of actinic keratosis include hypertrophic and cutaneous horn. The most common sites for all types of actinic keratosis are sun-exposed areas such as the hands, face, nose, tips of the ears, and bald scalp (Leber, Perron, & Sinni-McKeehan, 1999).

Basal cell carcinoma is the most common form of skin cancer in White people and accounts for about 80% of nonmelanoma skin cancers. Basal cell carcinoma can extend below the skin to the bone, but metastasis is rare. This cancer originates in the lowest layer of the epidermis and appears as small fleshy bumps (Figure 12-4). Basal cell carcinoma can occur on any exposed skin surface but is frequently found on the head, neck, nose, and ears.

Squamous cell carcinoma is the second most common form of skin cancer in White people and represents the remaining 20% of nonmelanoma skin cancers. It is the most common form of skin cancer in persons with dark skin. Squamous cell carcinoma originates in the higher levels of the epidermis. It appears as flesh colored to erythematous, indurated scaly plaques, papules, or nodules and may have ulceration or erosions in the center (Figure 12-5). Metastasis can occur and is more common in lesions of the mucous membranes, such as the lips, and in individuals with a history of inflammatory



FIGURE 12-4
Basal Cell Carcinoma

disease, immune suppression, or exposure to chemicals and other hazardous substances (Schober-Flores, 2001).

Melanoma is the most serious of skin cancers. It is estimated that 53,000 persons were diagnosed with melanoma in 2001, accounting for 7,400 deaths. Melanoma is responsible for more than three quarters of all skin cancer deaths (American Cancer Society, 2002). About one half of melanomas occur in those over 50 years of age. Melanoma originates in the **melanocytes** and may grow from an existing mole or a new lesion. The moles or lesions may enlarge; become brown, black, or multicolored; develop nodules or plaques; and have a black, irregular outline that spreads. The lesions may crust or bleed and are usually greater than 6 mm in diameter. The most common type of melanoma, the superficial spreading type, accounts for 70% of the melanomas and is commonly found on the upper back on men and women and the lower legs of women. The risk factors for melanoma include a family or past history of melanoma, light skin and hair, a history of severe sunburns, or numerous atypical moles.



FIGURE 12-5
Squamous Cell Carcinoma

SKIN TEARS

A skin tear is a traumatic separation of the epidermis from the dermis, occurring primarily on the extremities of older persons. Skin tears can be caused by friction alone, or by a combination of **shearing forces** and friction. The nurse caring for a frail older person may remove an adhesive dressing from an intravenous insertion site, which may result in a skin tear on the thin vulnerable epidermis. These painful injuries can also occur with simple activities such as dressing, transferring, turning, or lifting. Independent older persons frequently sustain skin tears in the lower legs by bumping into chairs, beds, tables, or open dresser drawers in their home environment. Skin tears may be accompanied by ecchymosis and edema because of subcutaneous tissue atrophy. This is particularly true in those areas of the skin at risk such as the face, hands, shins, and feet. A three-category system, the Payne-Martin Classification for Skin Tears, can be used to assess, plan, and document outcomes of skin tear care. The categories, which are based on the amount of epidermal loss, are:

1. Skin tears without tissue loss.
2. Skin tears with moderate to large tissue loss.
3. Skin tears with complete tissue loss (Baranoski, 2001).

PRESSURE ULCERS IN THE OLDER PERSON

Pressure ulcers affect more than 1 million people each year. The majority of pressure ulcers occur on persons over 70 years of age. The costs associated with treatment of these millions of pressure ulcers is between \$5 billion and \$8.5 billion each year (Beckrich & Aronovitch, 1999). Based on a comprehensive review of the literature, the Agency for Health Care Policy and Research (AHCPR) published guidelines for all clinicians (AHCPR, 1992; Bergstrom et al., 1994). Van Rijswijk and Braden provided a review and update of the guidelines in 1999. The AHCPR guideline panel advises each agency to develop a team to monitor the quality of pressure ulcer prevention and care (Bergstrom et al., 1994). One of the first tasks of the team is to determine the scope of the pressure ulcer problem by measuring pressure ulcer incidence and prevalence. Incidence reflects the number of patients who develop a pressure ulcer while at a specific agency. Prevalence reflects the total number of patients with pressure ulcers on any given day at the agency. AHCPR reported that the incidence of pressure ulcers in hospital settings was from 2.7% to 29.5%. The prevalence rates were from 3.5% to 29.5% (Agency for Healthcare Research and Quality, 2003). Prevalence rates increase dramatically for high-risk groups of hospitalized patients. These include patients with quadriplegia, orthopedic patients with fractures, patients admitted to the critical care unit, and older patients admitted with a fracture of the neck or femur. In all patient care environments, individuals more than 65 years old are considered at high risk for developing pressure ulcers. One source reports that over 66% of older people with hip fractures develop pressure ulcers (Boynton, P. R., Jaworski, D., & Paustian, C. (1999)).

DEFINITION AND STAGES OF PRESSURE ULCERS

A pressure ulcer is defined as a lesion caused by unrelieved pressure that results in damage to underlying tissue. Pressure ulcer formation often occurs on the soft tissue over a bony prominence, although it can occur on any tissue that is exposed to external pressure for a length of time that is greater than capillary closing pressure.

TABLE 12-1**Pressure Ulcer Stages and Management**

Stage	Wound Cleaning/ Definition	Debridement	Change Dressing Choices	Frequency*
I	Nonblanchable erythema of intact skin		Transparent film; adherent hydrocolloid	q3–7 days prn
II	Partial-thickness skin loss involving epidermis, dermis, or both	Normal saline or approved cleaner	Transparent film, hydrogel, hydrocolloid	q3–7 days prn 3× week q3–7 days prn
III	Full-thickness skin loss involving damage or necrosis of subcutaneous tissue that may extend down to, but not through, underlying fascia	Normal saline or approved cleaner If necrotic tissue present, debridement must be done	1. Wet-to-dry saline dressings; or hydrogel, moistened gauze or calcium alginate 2. Cover with gauze, or foam wafer 3. Use least irritating taping method	q4–6 h prn q3–7 days prn q12 h prn
IV	Full-thickness skin loss with extensive destruction, tissue necrosis, or damage to muscle, bone, or supporting structures	Same as stage III	Same as stage III	

*Change frequency depends on amount and type of drainage present. Read specific product instructions.

Source: AHCPR, 1994.

The stages of pressure ulcers and the general guidelines for nursing management are presented in Table 12-1. The actual layers of the skin and depth of each stage are presented in Figure 12-6 ■.

The purpose of defining the specific stages of pressure ulcers is to have a standard for the documentation of clinical data in order to study the best practices and outcomes. Although the stages of a pressure ulcer describe a lesion that begins on the external surface of the skin and progresses inward, this is not always the case in clinical practice.

A review of the research literature by Nixon (2001) clarified the three different types of pressure ulcers and three different pathophysiological mechanisms that lead to pressure ulcers. The three types of pressure ulcers are:

1. A necrosis of the epidermis or dermis, which may or may not progress to a deep lesion.
2. A deep or malignant pressure ulcer where necrosis is observed initially in the subcutaneous tissue and tracks outward.
3. Full-thickness wounds of dry black eschar (Nixon, 2001).

The three types of pressure ulcers are thought to be distinct. The first, necrosis of the epidermis or dermis, may be caused by friction against the skin. An example might be if a sheet is pulled from under a patient, causing damage to the epidermis. The second type of pressure ulcer, malignant or deep pressure ulcers, occurs from an unrelieved

FIGURE 12-6Layers of the Skin and
Depth of Each Ulcer

pressure over a long period of time. This type of ulcer begins deep in the subcutaneous tissue and tracks outward toward the dermis. Studies have shown that a significant number of pressure ulcers occur on patients undergoing surgical procedures lasting 3 hours or more. For example, hip fractures are largely a problem for older adults and have a 30% occurrence of pressure ulcers (Beckrich & Aronovitch, 1999). The third type of pressure ulcer, full-thickness wounds of dry black eschar, appear in areas that were previously normal, and occur due to chronic arterial narrowing and inadequate tissue perfusion. Figure 12-7 illustrates the appearance of a stage IV pressure ulcer. In this case, it is not clear which tissue layer has the primary ischemic injury (Nixon, 2001).

PATHOPHYSIOLOGICAL MECHANISMS

Three mechanisms lead to tissue breakdown, although research in this area is limited because of the difficulty in replicating the clinical situation. The first mechanism is the occlusion of blood flow to the skin and the subsequent injury when the occlusion is removed and there is an abrupt reperfusion of the ischemic vascular bed. The second mechanism is caused by damage to the lining of the arterioles and smaller vessels due to the application of disruptive and shearing forces. This mechanism seems to be consistent with the most common body sites affected by pressure ulcers, the sacrum and trochanter. Sliding down in the bed from a sitting position causes disruptive shearing forces and results in damage to the underlying subcutaneous muscle or deep dermis in the sacral area. The trochanter site may be exposed to long periods of external pressure if the patient has not been moved or turned at appropriate times or is in the same position for a long time during surgery. The third cause of pressure ulcers is direct occlusion of the blood vessels by external pressure for a prolonged time period, resulting in cell death. The development of black eschar is usually seen in the lower limbs of patients where the skin is thin, and close to a bony prominence. These individuals usually have a history of arterial narrowing over a long period of time (Nixon, 2001).

ETIOLOGY OF PRESSURE ULCERS

The general etiology of a pressure ulcer is the intensity and duration of pressure as well as the tolerance of the skin and its supporting structures to pressure. Changes in the skin and supporting structures due to the aging process are significant predictors for a pressure ulcer. In addition to normal age-related skin changes, older people have to cope with a myriad of both acute and chronic illnesses. Over 80% of people over 65 have one or more chronic diseases. Many patients over 75 have to cope with three or more chronic health problems (Boynton et al., 1999). Chronic health problems such as immobility, malnutrition, or declining mental status increase the risk for pressure ulcers. However, the particular variables that determine the actual development of a pressure ulcer will be unique to each person.

Tissue Tolerance: Extrinsic Factors

Extrinsic factors that affect the skin tolerance to pressure forces include shear, friction, moisture, and skin irritants. Pressure is the primary force that occludes blood flow and causes tissue damage, but shearing forces are also an important factor in the development of pressure ulcers. Shearing, the sliding of parallel surfaces against each other, occurs most commonly when the patient slides down in the bed. Shearing forces reduce the amount of pressure needed to occlude the blood vessels by up to 50%. Friction, which occurs with the lateral movement of pulling sheets or clothing from under a person's weight, may remove the stratum corneum, which could disrupt the epidermis and lead to a pressure ulcer. Various skin irritants, such as starch, soaps, and detergents, affect tissue tolerance by removing sebum, which normally protects the skin. The skin then may become dehydrated, decreasing its resistance to other irritants and bacteria.

Tissue Tolerance: Intrinsic Factors

Intrinsic factors that affect tissue tolerance and lead to skin breakdown include two major areas. The first is the structure and function of the skin and surrounding structures, and the second is the ability of the vascular system to provide circulation to the skin. Intrinsic factors that affect skin integrity include changes in collagen, advancing age, poor nutrition, and steroid administration. Factors that affect the ability of the vascular system to provide adequate perfusion to the skin include blood pressure, smoking, skin temperature, and vascular disease. Collagen seems to play an important role within the skin structure by protecting microcirculation and preventing damage from pressure. The total collagen content of the skin falls gradually after the age of 30, with a dramatic loss of collagen after 60 years of age. Nutritional factors associated with pressure ulcer development include decreased body weight, decreased serum albumin, and anemia (McLaren & Green, 2001).

WOUND HEALING

The process of wound healing is complex and continuous. It involves three major phases or stages:

1. Inflammation and destruction
2. Proliferation
3. Maturation

Inflammatory Phase

The inflammatory phase of healing in partial- and full-thickness wounds lasts about 5 days and is characterized by the classic symptoms of inflammation: redness, heat, pain,

and edema or swelling. The damaged tissues release histamine and other chemicals, resulting in vasodilation. This enhances blood supply to the area, provides additional nutrients, and promotes tissue rebuilding. Neutrophils and macrophages control bacteria and remove debris from the wound. Macrophages also secrete growth factors, such as growth factor beta, that are essential for the initiation and control of wound repair.

Proliferation Phase

Proliferation, the second phase of healing, begins soon after injury and continues for up to 3 weeks. This phase is responsible for rebuilding the damaged tissue by three processes: epithelialization, granulation, and collagen synthesis. In a shallow or partial-thickness wound, viable hair follicles often provide the main source for epidermal regeneration. Epidermal cells migrate across the wound surface and cover and protect it from bacteria. This process of reepithelialization continues to cover the wound base in layers until the area has a normal epidermal thickness. For deeper wounds, healing takes much longer because hair follicles are lost and the wound margins provide the only source for epidermal cell regeneration.

In full-thickness wounds, granulation tissue is formed by new blood vessels and collagen strands. The support matrix of collagen provides strength to the new tissues. Oxygen, vitamin C, dietary amino acids, and trace elements are essential in this process. Granulation tissue becomes beefy red and grainy in appearance as the capillary bed builds. Wound healing usually fills in from the wound bottom so the depth decreases before the wound width is decreased (Stotts, 2001).

Maturation Phase

The last phase of healing for a full-thickness wound is maturation. This phase begins about 3 weeks after the injury and may last for up to 2 years. The process of collagen synthesis continues and the wound becomes thicker and more compact. Another part of the healing process, called contraction, results in a healed scar much smaller in size than the original wound. This process, initiated by myofibroblasts, is an important healing mechanism for wounds with tissue loss because it decreases the area to be healed. The wound is initially dark red in color and, over time, fades to a silver-white color. The scarred area never reaches the strength of the prewound tissue and is therefore more prone to reinjury than normal tissue.

Delayed Healing

The following are signs of delayed healing:

- Wound size is increasing.
- Exudate, slough, or eschar is present.
- Tunnels, fistula, or undermining has developed.
- Epithelial edge is not smooth and continuous and does not move toward wound.

A wound that does not heal within 6 weeks is considered a chronic wound. Common problems that often lead to chronic wounds are diabetes, peripheral vascular disease, and pressure ulcers. Normal aging and chronic disease factors that are often present in older persons will affect their ability to heal.

Some of the considerations related to delayed or impaired wound healing for the older person are (Boynton, Jaworski, & Paustian, 1999; Demling & De Santi, 2001):

- Inadequate blood supply.
- Inadequate nutrition.

- Immunocompetence.
- Damage to the wound.

Adequate blood volume and cardiac output are the most important components of wound blood flow and oxygen delivery. Oxygen is needed for every phase of the healing process. Chronic cardiac disease, smoking, dehydration, hypovolemia, and the vascular complications of diabetes cause a decrease in blood supply to the tissues, which delays wound healing.

Wound healing cannot take place without large amounts of energy (glucose) and protein (amino acids) as well as other substances. Many older persons have protein-energy malnutrition, in which the intake of protein and energy is inadequate to meet the body's demand. In the malnourished person, the amino acids must come from muscle and other stores. The body can deal with this demand until there is a loss of 15% of lean body mass. After that, the supply of protein is inadequate to provide muscle replacement and wound healing, thus compromising the healing process.

Older persons have delayed immune function, which impairs the natural ability to fight infection. This delays the normal inflammatory response. Wounds cannot heal without the inflammatory process. Medications that further diminish the immune response include steroids and anti-inflammatory drugs. Weight loss due to an acute and chronic illness results in loss of body protein (lean body mass) and also compromises immune function.

The wound can be damaged by both too much and too little moisture. A dry wound surface impairs epithelial migration and leads to tissue injury and necrosis. The buildup of tissue exudates is toxic to new growth and leads to tissue hypoxia, which impairs healing. The older person may also be subject to wound maceration due to urine or fecal contamination, which will further damage the wound. Nursing interventions used to treat the pressure ulcers or chronic wounds can also cause damage. Topical antibiotics, cleansing solutions, and mechanical trauma during dressing changes may all contribute to damage to the wound bed.

CELLULITIS

Cellulitis is an acute bacterial infection of the skin and subcutaneous tissue that may cause an older person a great deal of pain and distress. Cellulitis, which occurs most frequently on the lower legs and face, is characterized by symptoms of inflammation, which include intense pain, heat, redness, and swelling. It may appear in a localized area as a complication of a wound infection, or it may involve an entire limb. In severe infections, fever may be present, as well as an increase in white blood cells and tender lymph nodes (lymphadenopathy). An elevated temperature, although a common sign of infection, may not be present in the older person. The organisms most commonly responsible for cellulitis are hemolytic streptococci (group G streptococci and *Streptococcus pyogenes*), and *Staphylococcus aureus* (Baddour, 2000). Older persons at risk for cellulitis include those with any break in the skin such as a leg ulceration or pressure ulcer. In addition, those with predisposing factors such as diabetes, obesity, a previous history of cellulitis, peripheral vascular disease, or tinea pedis are at risk (Baxter & McGregor, 2001; Dupuy et al., 1999; Koutkia et al., 1999). Many normal changes of aging increase the older person's risk for developing cellulitis. Changes in the thickness of the skin make the older person more susceptible to breaks in the skin. After the skin is broken, the older person is at higher risk for infection since wound healing is often delayed.

FINGERNAIL AND TOENAIL PROBLEMS

The distal phalanges are protected from injury and trauma by the nails. Changes in the nail plate occur with aging, and are also affected by trauma, systemic diseases such as diabetes and circulatory disorders, as well as dermatological conditions.

Onychomycosis, a fungal infection (i.e., *Trichophyton rubrum*, *T. mentragrophytes*) of the toenail, most commonly occurs on the big toe. The toenail appears thick, discolored, and protruding from the nail bed (Fielo, 2001). Older persons may complain of severe pain when their shoe presses on the deformed toe, often causing them to reduce their activity or wear open shoes and sandals. The older person should see a doctor for treatment to prevent the condition from spreading to the other parts of the foot.

Onychia is inflammation of the nail matrix; paronychia is inflammation of the matrix, plus the surrounding and deeper structures. This is a common condition in older adults and is caused by bacteria or fungus. Older persons who have been exposed to wet work such as dishwashing, cleaning, or fishing for many years are at high risk. Trauma caused by tight shoes may also be the source of the problem. This disorder is characterized by separation of the cuticle from the nail, which allows organisms to enter. The organisms may cause swelling, redness, and tenderness of the nail fold, accompanied by purulent drainage.

Onychogryphosis is a chronic hypertrophy of the nail plate characterized by a hooked or curved nail. Any pressure on the nail may cause severe pain. The deformed nail may cause pressure on an adjacent toe, leading to a dangerous pressure necrosis in a vulnerable older person. Diabetes and circulatory conditions are predisposing factors for these complications (Collett, 2000).

NURSING DIAGNOSES

Nursing diagnoses appropriate to the older person with problems of the skin may include any of the following (North American Nursing Diagnosis Association, 2002):

- Impaired skin integrity related to lesions and inflammatory response*
- Risk for impaired skin integrity related to physical immobility*
- Risk for impaired skin integrity related to decreased skin turgor*
- Risk for impaired skin integrity related to the effects of pressure, friction, or shear*
- Risk for impaired tissue integrity related to decreased circulation*
- Risk for infection related to pressure ulcer*
- Pain related to destruction of tissue due to pressure and shear*

The two major nursing diagnoses related to integumentary problems are *impaired tissue integrity*, and *impaired skin integrity*.

Impaired tissue integrity is defined as “a state in which an individual experiences, or is at risk for damage to the integumentary, corneal, or mucous membrane tissues of the body.” Defining characteristics (major) that must be present include “disruptions of integumentary tissue or invasion of body structure (incision, dermal ulcer)” (Carpenito, 2002 p. 696). *Impaired skin integrity* is defined as “a state in which the individual experiences, or is at risk for damage to the epidermal and dermal tissue (Carpenito, 2002, p. 705).” The major defining characteristic that must be present is disruption of epidermal and dermal tissue. There is both overlap and possible confusion as to when to use these diagnoses. According to Carpenito (2002), *impaired tissue integrity* is the broad category under which more specific diagnoses fall. *Impaired skin integrity*

should be used to describe pressure ulcers that have damaged the epidermal and dermal tissue only. *Impaired tissue integrity* would describe pressure ulcers that are deeper than the dermis (i.e., connective tissue, muscle).

The nursing diagnoses terminology for pressure ulcers can cause conceptual confusion because of the lack of specificity in the diagnosis as well as the etiologies. Franz (2001) has suggested the formulation of a nursing diagnosis that correctly identifies a pressure ulcer by giving it the label *pressure ulcer*. This label would correctly identify the problem and would be consistent with the terminology accepted by experts in skin and wound care. The signs and symptoms of pressure ulcer could address the patterns of partial-thickness pressure ulcer (which involves the epidermis and dermis) and full-thickness pressure ulcer (which involves damage to subcutaneous tissue and may extend to underlying tissue) (Franz, 2001).

LABORATORY AND TESTING VALUES

Total body photography, skin surface microscopy, machine vision, and skin biopsy are the current modalities that can be used to diagnose malignant melanoma.

Total Body Photography

A series of 24 slides are taken of high-risk patients and used during subsequent visits to identify changes in nevi (Oliviero, 2002). Skin surface microscopy uses a handheld instrument to provide a 10× illuminated review of the skin. This process is very time intensive to learn and requires training.

Machine Vision

This is a newly developed technology that provides a computerized analysis of a lesion and gives a quantitative score. The score reflects whether the lesion is benign or malignant.

Skin Biopsy With Histologic Examination

A skin biopsy is indicated in all skin lesions that are suspected of being neoplasms. A variety of techniques are available for the examination of the tissue, including immunofluorescence and electron microscopy. A biopsy is indicated for any lesion that has been present for longer than a month.

Wound Cultures to Determine Infection

Wound cultures and microscopic examination can identify infectious organisms. Wound cultures should be obtained by the aspiration method or a tissue biopsy. The swab method is not considered useful for obtaining a wound culture since it examines bacteria present on the wound surface, not in the wound bed itself. The tissue that is obtained must be healthy, viable tissue to ensure capturing the greatest number of microorganisms. If there is eschar or exudate visible, it must be removed so that the healthy tissue is accessible. The wound is then washed with saline and dried gently with sterile gauze.

The wound biopsy is considered the gold standard for culture (Robson, Mannari, Smith, & Payne, 1999). This is done by the removal of a small piece of tissue from the ulcer, which is then sent to the laboratory. The disadvantage of the wound biopsy, however, is that the removal of tissue from the ulcer will delay healing.

The aspirate method requires inserting a needle with a 10-cc syringe into the wound and aspirating fluid from the site while moving the needle around the wound base. All

air must be removed from the syringe before injecting it into the container. The container must be labeled clearly with the location of the pressure ulcer (e.g., sacral area). The final results are available in 48 hours, but preliminary results can identify if an infection is present and whether it is gram negative or gram positive. This will allow antibiotic treatment to begin if indicated. Some of the common organisms found in wounds are *S. aureus*, group A streptococci, gram-negative bacilli, and fungi. Deep wounds may produce anaerobic bacteria such as clostridia or anaerobic streptococci (Corbett, 2000).

LABORATORY VALUES TO DETERMINE RISK FOR PRESSURE ULCER

Serum albumin and serum transferrin, as well as lymphocyte count, are useful values that will help to determine nutritional status. These values will be decreased in protein-energy malnutrition. They may also be affected by other illnesses.

Serum albumin indicates the level of protein stores. A serum albumin level below 3.5 g/dl is considered low, and below 2.5 g/dl is a serious depletion in protein.

Serum transferrin is considered a more accurate indicator of protein stores since it is more responsive to acute changes. A serum transferrin level below 200 mg/dl is considered low, and below 100 mg/dl is a serious depletion in protein.

A total lymphocyte count below 1,500 mm³ indicates loss of energy to skin. A moderate decrease is 800 to 1,200/mm³. The synthesis of lymphocytes is depressed when protein-energy malnutrition exists, which contributes to the decreased ability of the white blood cells to fight infection.

Pharmacology and Nursing Responsibilities

Pharmacological treatment of skin problems may include topical or systemic administration of medications. The following agents are used extensively in the clinical setting for management of dermatological problems in the older adult.

TOPICAL ANTIFUNGAL AGENTS

Antifungal agents such as itraconazole are used in the treatment of onychomycosis of the toenails and fingernails. The topical preparation is applied to the affected area and has few side effects. The suggested dosage for treatment of onychomycosis of the toenails is itraconazole 200 mg po daily for 12 weeks. Adverse effects include renal and hepatic damage.

TOPICAL ANTIBIOTICS

The use of topical antibiotics on local pressure ulcers has met with some debate. If the wound has foul-smelling exudate and is not healing after 2 to 4 weeks of optimal care, a short course of topical antibiotics should be instituted. Some other wounds without local signs may have a high level of bacteria and may also benefit from topical antibiotic therapy.

The topical antibiotics of choice for the nonhealing ulcer, or one with high bacterial levels (10⁵/g of tissue) are silver sulfadiazine and triple antibiotic (combination of polymyxin B, neomycin, and bacitracin). These agents have a broad spectrum and have been found to be effective against gram-negative, gram-positive, and anaerobic organisms (NPSOURCE, 2001). Topical antibiotics are indicated for short-term use and are reevaluated in 2 weeks. Patient teaching includes limiting the product to the number of

applications and the condition prescribed. Overuse of topical antibiotics can lead to bacterial resistance.

SYSTEMIC ANTIBIOTICS

If a pressure ulcer shows signs of infection, such as cellulitis, osteomyelitis, or septicemia, appropriate systemic antibiotics should be instituted. Common offending organisms of bacteremia and sepsis include *S. aureus*, gram-negative rods, and *Bacteroides fragilis*. A blood culture will allow the causative organisms to be identified, and antibiotics can be directed at the offending organisms. These are very serious complications of pressure ulcers, and immediate medical attention is advised.

SELECTED ANTIMICROBIALS

Penicillinase-resistant penicillins (methicillin, nafcillin, oxacillin) are indicated against staphylococcal and beta-hemolytic streptococci infections of soft tissue. These drugs have a high degree of safety, but the dose should be adjusted for older persons with renal impairment to prevent nephrotoxicity.

AMINOGLYCOSIDES

Gentamicin, tobramycin, and streptomycin are rapidly bactericidal against staphylococci and gram-negative aerobic bacteria. The dose of these drugs should be reduced in the elderly person because of the risk of renal impairment. Risk of ototoxicity increases with age and is more likely in older persons with pre-existing hearing problems.

PRESCRIPTION CREAMS AND LOTIONS FOR DRY SKIN

Often corticosteroids are prescribed as topical treatment for dermatological problems in older people. These creams should be applied sparingly in thin layers to maximize therapeutic outcome and minimize the risk of side effects.

Hydrocortisone 1% or 2.5% is a low-potency topical corticosteroid, that can be applied for short-term treatment of inflamed dry skin. Long-term use may cause systemic absorption.

Drug Alert



Older persons have a high rate of adverse reactions to corticosteroids and antihistamines, both of which are frequently prescribed for skin problems. Older persons should be reminded not to buy over-the-counter preparations of these drugs without specific instructions from their primary care provider. If these medications are prescribed, directions should be strictly followed and any unusual symptoms reported promptly.

Nonpharmacological Treatment of Skin Problems in Older Persons

Prevention and early treatment of skin problems in older people may also include non-pharmacological interventions and patient education. Identification and correction of factors that may contribute to pathological skin changes is a key nursing responsibility.

**BOX
12-1 ABCDs of Skin Cancer**

- A**symmetrical. One half of the lesion is different from the other half.
- B**orders are ragged or irregular.
- C**olor is varied within the same lesion.
- D**iameter is larger than 6 mm (and size is enlarging).

Source: Hwang, 1999.

SKIN CANCER AND PRECANCER CONDITIONS

The nurse's role in the nonpharmacological treatment of skin cancer focuses on giving the older person and family members the correct knowledge they need for the prevention and early diagnosis of this disease. Teaching the family and older person the correct methods for self-assessment, as well as practices for daily life, will empower them to focus on self-care and primary prevention.

Older persons should be taught the ABCDs of skin cancer, as listed in Box 12-1. If they have any skin changes, such as moles or pigmented lesions, the ABCDs should be noted.

Patients should also be taught the guidelines on protection from the sun, as listed in Box 12-2. The nurse should emphasize the importance of adhering to these guidelines and assist older persons in adapting the guidelines to their daily lives.

When assessing the skin of people of color, the nurse should become familiar with the characteristics of darker skin. Nurses and other healthcare professionals may find the assessment of darker skin to be more challenging because the traditional hallmarks of redness and color changes may be obscured by the darker skin tone. Box 12-3 illustrates guidelines for assessment of darker skin.

**BOX
12-2 Guidelines on Sun and Wearing Protective Clothing**

- Avoid the sun during midday (10 a.m. to 4 p.m.).
- Seek shade during midday (trees, umbrella, hats).
- Wear hats that protect the face:
 - Hats with at least a 3" brim
 - Legionnaire hats (baseball hat with ear and neck flaps)
- Wear protective clothing:
 - Fabrics with tighter weave transmit less UVR.
 - Darker colors transmit less UVR than lighter ones.
 - Wet or stretched fabrics transmit more radiation.
- Use a broad-spectrum sunscreen (UVA and UVB) with a sun protection factor of 15 or above.
- Use 1 to 2 oz of sunscreen and reapply after leaving the water, sweating, or drying off.

Source: Adapted from Centers for Disease Control and Prevention, 2002.

The Integument: Considerations for People of Color**BOX
12-3**

- Some dark-skinned persons have bluish lips or gums.
- Black persons have freckle-like pigmentation of gums, buccal cavity, and borders of the tongue.
- A dark-skinned person may lose reddish tones if pallor is present.
- Cyanosis is difficult to assess in a dark-skinned person. The nurse should check soles and heels for color.
- Erythema is an area of inflammation on the skin. On a dark-skinned person, the skin assumes a purplish color when inflammation is present. To assess erythema in a dark-skinned person, the nurse should palpate for warmth and check for hardness and smoothness.
- Ecchymotic lesions are large bruises. Purple or dark color usually can be seen.
- To determine if an area of concern is erythema or ecchymosis, the nurse should use a glass slide and press gently over the area. If the color changes and becomes lighter, it is an erythema. If no change occurs, it is an ecchymotic area.
- Dermatitis papulosa nigra is a type of seborrheic keratoses that occurs only in Blacks. It is characterized by the appearance of many dark, small papules on the face.

Source: Gilchrist & Chiu, 2000.

NONPHARMACOLOGICAL TREATMENT OF SKIN CANCER

The treatment of skin cancers may include any of the following techniques and are appropriate interventions for older people.

Basal Cell Carcinoma and Squamous Cell Carcinoma

The diagnosis of basal cell carcinoma and squamous cell carcinoma must be confirmed by biopsy. Treatment options for basal cell carcinoma and squamous cell carcinoma depend on the size, depth, and location of the tumor. Electrodesiccation and curettage can be used for small tumors. Surgical excision has the highest cure and can be done on an outpatient basis. Mohs' surgery, a microscopically controlled surgical technique, is used for high-risk or large basal cell carcinoma, especially of the head and neck (Leber et al., 1999). Mohs' surgery helps to prevent tissue loss by sparing uninvolved tissue. Less common treatment includes cryosurgery and radiotherapy. Radiotherapy may be chosen for the older person who cannot tolerate surgery. Follow-up is anywhere from 3 to 12 months, and should include a complete skin check.

Malignant Melanoma

Excisional biopsy is done to confirm diagnosis, and prognosis depends on the vertical (depth) thickness of the lesion in millimeters. Treatment of melanoma is excision, with surgical margins dependent on tumor thickness. Adjuvant therapies may be offered depending on the stage of the tumor. Therapy for metastatic disease may include chemotherapy, chemoimmunotherapy, and regional radiation therapy (Leber et al., 1999). Advanced melanoma with metastasis is usually incurable, thus supportive care is offered. Focus should be on determining the wishes of the patient in relation to end-of-life care and pain management.

PREVENTION AND MANAGEMENT OF SKIN TEARS

Skin tears are common in the older person, with 1.5 million occurring each year. A preventive approach is therefore the key to decrease the risk for skin tears. Older persons, caregivers, and family members should be aware of the following preventive interventions:

- Do not use any pulling or sliding movements when assisting older persons with a change in their position.
- Protect the older person by padding any surfaces that come in contact with leg and arm movements such as side rails, wheelchair arm and leg supports, and table corners.
- Keep the environment free of obstacles and well lit.
- Keep skin moist with adequate fluids and skin moisturizing creams.
- Use paper tape and remove it cautiously, or substitute tape with gauze or stockinette.
- Encourage long sleeves and long pants to add a layer of protection over the skin.

The depth of the skin tear, and the agency protocol, will determine the management of skin tears. As yet, there is no evidence-based method for skin tear care. The recommended clinical care of a skin tear would include the following (Baranoski, 2001):

1. Clean with normal saline or other nontoxic cleaner.
2. Pat or air dry.
3. Gently place the torn skin in its approximate normal position.
4. Apply dressing (saline, foam, gels) and change per protocol or product requirements.
5. Document the assessment and intervention. Photograph if permitted.

NONPHARMACOLOGICAL TREATMENT OF PRESSURE ULCERS

The nonpharmacological treatment of pressure ulcers has evolved over the last two decades. Research that supports practice has provided nurses and other healthcare workers with evidence-based practice guidelines as well as a synthesis of current expert opinion. The AHCPR *Clinical Practice Guideline: Treating Pressure Ulcers* (Bergstrom et al., 1994) provides the clinical community with a synthesis of research and expert opinion of the treatment options for pressure ulcer and wound healing. It is a great resource for both nurses and physicians. Areas of nursing responsibility that will be addressed for pressure ulcers include risk assessment for pressure ulcers, prevention and modification of pressure ulcer risk factors, and treatment of pressure ulcers.

Risk Assessment for Pressure Ulcers

The nursing care of the older person should begin with an assessment of the risk for pressure ulcers. The Hartford Institute for Geriatric Nursing (1999) recommends the use of the Braden Scale for Predicting Pressure Sore Risk. The Hartford Institute recommends this scale be used for risk assessment in the following categories of older patients:

- All bed- or chair-bound patients, or those whose ability to reposition is impaired
- All at-risk patients on admission to healthcare facilities and regularly thereafter
- All older patients with decreased mental status, incontinence, and nutritional deficits

Accepted risk factors that form the basis of this scale generally include mobility, incontinence, nutrition, and mental status. Some of the variables used to develop these scales are “expert derived” and not based on accepted research evidence.

Best Practices

Braden Scale for Predicting Pressure Sore Risk

The Braden scale (Braden & Bergstrom, 1994) is a widely used tool that assesses mobility, activity, sensory perception, skin moisture, friction, shear, and nutritional status. Each dimension is rated from 1 to 4 on a Likert type scale, and the total score range is from 6 to 23. A score of 16 or less indicates a pressure sore risk and a need for a prevention plan. The Braden scale has been subjected to several validation studies and is considered the most valid of the available risk assessment tools. Once a risk assessment is completed, and a deficit exists, the nursing care plan should reflect on-going prevention as well as complete documentation of the older person's progress.

BRADEN SCALE FOR PREDICTING PRESSURE SORE RISK

Patient's Name _____		Evaluator's Name _____		Date of Assessment				
SENSORY PERCEPTION ability to respond meaningfully to pressure-related discomfort	1. Completely Limited Unresponsive (does not moan, flinch, or grasp) to painful stimuli, due to diminished level of consciousness or sedation. OR limited ability to feel pain over most of body	2. Very Limited Responds only to painful stimuli. Cannot communicate discomfort except by moaning or restlessness OR has a sensory impairment which limits the ability to feel pain or discomfort over ½ of body.	3. Slightly Limited Responds to verbal commands, but cannot always communicate discomfort or the need to be turned. OR has some sensory impairment which limits ability to feel pain or discomfort in 1 or 2 extremities.	4. No Impairment Responds to verbal commands. Has no sensory deficit which would limit ability to feel or voice pain or discomfort.				
MOISTURE degree to which skin is exposed to moisture	1. Constantly Moist Skin is kept moist almost constantly by perspiration, urine, etc. Dampness is detected every time patient is moved or turned.	2. Very Moist Skin is often, but not always moist. Linen must be changed at least once a shift.	3. Occasionally Moist: Skin is occasionally moist, requiring an extra linen change approximately once a day.	4. Rarely Moist Skin is usually dry, linen only requires changing at routine intervals.				
ACTIVITY degree of physical activity	1. Bedfast Confined to bed.	2. Chairfast Ability to walk severely limited or non-existent. Cannot bear own weight and/or must be assisted into chair or wheelchair.	3. Walks Occasionally Walks occasionally during day, but for very short distances, with or without assistance. Spends majority of each shift in bed or chair	4. Walks Frequently Walks outside room at least twice a day and inside room at least once every two hours during waking hours				
MOBILITY ability to change and control body position	1. Completely Immobile Does not make even slight changes in body or extremity position without assistance	2. Very Limited Makes occasional slight changes in body or extremity position but unable to make frequent or significant changes independently.	3. Slightly Limited Makes frequent though slight changes in body or extremity position independently.	4. No Limitation Makes major and frequent changes in position without assistance.				
NUTRITION usual food intake pattern	1. Very Poor Never eats a complete meal. Rarely eats more than ½ of any food offered. Eats 2 servings or less of protein (meats or dairy products) per day. Takes fluids poorly. Does not take a liquid dietary supplement OR is NPO and/or maintained on clear liquids or IV's for more than 5 days.	2. Probably Inadequate Rarely eats a complete meal and generally eats only about ½ of any food offered. Protein intake includes only 3 servings of meat or dairy products per day. Occasionally will take a dietary supplement. OR receives less than optimum amount of liquid diet or tube feeding	3. Adequate Eats over half of most meals. Eats a total of 4 servings of protein (meat, dairy products) per day. Occasionally will refuse a meal, but will usually take a supplement when offered OR is on a tube feeding or TPN regimen which probably meets most of nutritional needs	4. Excellent Eats most of every meal. Never refuses a meal. Usually eats a total of 4 or more servings of meat and dairy products. Occasionally eats between meals. Does not require supplementation.				
FRICTION & SHEAR	1. Problem Requires moderate to maximum assistance in moving. Complete lifting without sliding against sheets is impossible. Frequently slides down in bed or chair, requiring frequent repositioning with maximum assistance. Spasticity, contractures or agitation leads to almost constant friction	2. Potential Problem Moves feebly or requires minimum assistance. During a move skin probably slides to some extent against sheets, chair, restraints or other devices. Maintains relatively good position in chair or bed most of the time but occasionally slides down.	3. No Apparent Problem Moves in bed and in chair independently and has sufficient muscle strength to lift up completely during move. Maintains good position in bed or chair.					
					Total Score			

Prevention and Modification of Pressure Ulcer Risk Factors

Mobility and activity are important considerations in preventing and modifying risk factors as well as allowing healing to occur. Topics that will be discussed include position schedules, activities, and bed surface devices. All of these interventions will protect against external mechanical forces, including friction, shearing, and pressure. The older person who is at risk for a pressure ulcer should have a turning and activity schedule. Nurses and nurse assistants should consistently document their interventions in the flow sheet or progress notes. Mobility and activity considerations for preventing pressure ulcers include the following:

- Reposition q2h. Use a pull sheet to prevent shear and friction. If redness occurs, consider a 1½-hour turning schedule.
- Ensure proper positioning. Use pillows or wedges to prevent the skin from touching the bed on trochanter, heels, and ankles (Figure 12-7)■. Do not use rings or donuts.
- Avoid sitting. The sitting position, either in bed or in the chair, should be limited to 2 hours. Time in the chair should be scheduled around meal times. The person in bed should not be left in the 90-degree position except during meals.
- Increase activity. Encourage older persons to change positions by making small body shifts. This will redistribute weight and increase perfusion. Range of motion exercises should be done every 8 hours, and the techniques should be taught to family and patients.
- Choose a mattress surface based on the assessment and diagnosis:
 - A low-air-loss bed or air-fluidized bed is indicated for any stage pressure sore, and for persons having grafts or surgery.
 - A water mattress is indicated for high-risk persons, and for stage I, II, and III pressure ulcers.
 - An alternating pressure mattress is indicated for high-risk persons and for stage I and II pressure ulcers.
 - A convoluted foam pad is indicated for short-term use (AHCPR, 1994).

Practice Pearl

High-risk older persons should not be placed in a 90-degree side-lying position. This position places intense weight on the trochanter. Older persons at risk should be turned from supine to the right or left 30-degree oblique position. This position relieves pressure on the bony prominences of the trochanter and lateral malleolus.

Skin care practices for older persons include correct bathing procedure, prevention of injury, and dietary support. These skin care interventions are important to maintain healthy tissue as well as to improve the tissue tolerance to decrease further risk of injury. Adequate skin care should be considered a high priority for all patients at risk for pressure ulcers. Older persons and their families should be given educational materials and demonstrations when appropriate. Skin care considerations to prevent pressure ulcers in older persons at risk include the following:

- Keep the skin clean and dry.
- Lubricate the skin with a moisturizer. Massage the area around the reddened area or bony prominence. Do not massage any reddened area. Then apply a thin layer of a

**FIGURE 12-7**

It is Important to Use Pillows or Wedges to Prevent the Skin from Touching the Bed on Trochanter, Heels, and Ankles

petroleum-based product, followed by a baby powder/cornstarch product, to reduce friction and moisture.

- Evaluate and manage incontinence. A bowel and bladder management program should be in place. If soiling occurs, skin should be cleansed per routine. Underpads should be used that absorb moisture and present a quick drying surface to the skin. Plastic-lined bed pads should not be in contact with the person's skin. Use minimal pads and cover them with a sheet or pillowcase.

Practice Pearl

The area at risk for pressure sores should be washed gently with tepid water, with or without minimal soap. Soap removes natural oils from the skin, and cleaning the soap off may cause additional friction damage.

- Monitor nutrition. Determine factors that might cause inadequate nutrition. Obtain laboratory data. Provide additional canned supplements, vitamin C, and zinc to promote skin healing. Consider alternative methods such as total parenteral nutrition as needed (see Chapter 5 for further information).

TREATMENT OF PRESSURE ULCERS

The AHCPR *Clinical Practice Guideline, Treating Pressure Ulcers* (Bergstrom et al., 1994) provides a review of research on all aspects of treating pressure ulcers. The first step in effective pressure ulcer care is to assess the wound. This assessment should include the history of the wound, the pressure ulcer size and depth, and any evidence or signs of tunneling, undermining, exudate, and infection. Once the wound is assessed and documented, an effective pressure ulcer care plan should be established. The specific treatment of pressure ulcers is determined by the ulcer stage. The AHCPR has adopted a four-stage criteria for the assessment of pressure ulcers (see Table 12-2), which is widely used in healthcare institutions in the United States.

The nursing care related to pressure ulcers is an important part of nursing practice. Therefore, many agencies have established protocols that offer specific nursing care

TABLE 12-2**Staging of Pressure Ulcers and Characteristics**

Stage	Characteristic
I	Skin does not blanch but is intact.
II	Partial-thickness skin loss of the dermis and epidermis.
III	Full-thickness skin loss involving damage or necrosis of the subcutaneous tissue that may extend down to but not through the underlying fascia.
IV	Full-tissue skin loss with extensive destruction extending to muscle, bone, or supporting structures.

guidelines for each stage of the ulcer. If an ulcer is covered by eschar, it is usually removed. An ulcer cannot be staged until the eschar is removed. The following are the components of the nursing care of a pressure ulcer:

- Assessing and staging the wound
- Debriding necrotic tissue
- Cleansing the wound
- Applying dressings to provide a moist wound bed
- Preventing and treating infection

Practice Pearl

For a pressure ulcer to heal, the wound must be free from infection and necrotic tissue. Moist, devitalized tissue supports the growth of bacteria, delaying the healing process. Necrotic tissue is avascular; therefore, treatment with systemic antibiotics is not effective.

Debriding of Necrotic Tissue

Debridement is the removal of devitalized necrotic (black) tissue or yellow slough tissue. Four methods are available for debridement: sharp, mechanical, enzymatic, and autolytic debridement.

Sharp debridement involves the use of a scalpel or other sharp instrument to remove necrotic tissue. It is the quickest form of debridement and is indicated when a dangerous sepsis or cellulitis is imminent. Large extensive ulcers, such as stage IV ulcers with thick adherent eschar, often require sharp surgical debridement in the operating room.

Mechanical debridement is the removal of stringy exudate by the use of wet-to-dry dressings, wound irrigations, and hydrotherapy. Wet-to-dry dressings are a common method of mechanical debridement. They are effective for wounds with a small to moderate amount of exudate and are usually changed every 4 to 6 hours. For a wet-to-dry dressing, gauze pads are moistened with saline and placed in the open wound, covering the necrotic tissue only. The wet dressing adheres to the dead tissue and is allowed to dry. When the dry dressing is removed, the dead, devitalized tissue is removed with it. The dry dressing should not be moistened before removal or the purpose of the wet-to-dry dressing is defeated. The wet dressing should not be in contact with any intact skin, or it will cause maceration. It is important to use a skin sealant to protect the ulcer border. Once the wound is clean and dry, wet-to-dry dressings are not appropriate. Instead, moist dressings are used to promote tissue healing.

Wound irrigations are done using gentle pressure, about 4 to 5 psi, to clean the wound and soften eschar. The nurse should use a 35-ml syringe with a 19-gauge angiocatheter to deliver the cleaning agent. A bulb syringe does not deliver adequate pressure for debridement.

Chemical debridement is the use of topical enzymatic agents to break down devitalized tissue. It can be used alone, after sharp debridement, or with mechanical debridement.

Autolytic debridement involves the use of a moisture retentive dressing to cover the wound and allow the enzymes in the wound bed to liquefy selective dead tissue.

Practice Pearl

The purpose of debridement is to remove dead, devitalized tissue from the wound bed to allow healing to progress. Therefore, debridement is discontinued once all the dead tissue is removed and the wound is clean (no necrotic tissue). Continuing debriding of any kind will cause damage to delicate new tissue.

Cleansing the Wound

The purpose of cleansing the wound is to remove bacteria, debris, and small amounts of devitalized tissue to allow optimal healing. Cleansing should not be confused with disinfection or antisepsis, both of which relate to the killing of microorganisms. Topical antiseptics such as povidone-iodine, acetic acid, hydrogen peroxide, and Dakin's solution should not be used on a wound because these products have been found to be toxic to the wound fibroblasts and macrophages (Ovington, 2001). The safest, most cost-effective and most common cleansing agent for wounds is isotonic saline (0.9%). Wound cleansing can be done by (1) pouring a saline solution over the wound, (2) applying saline-soaked gauzes to clean the debris, or (3) squeezing a saline-filled bulb syringe over the wound. For a wound that requires the removal of small areas of nonadherent devitalized tissue, irrigation may be needed. To irrigate for the purpose of cleansing, the nurse should use saline in a catheter tip syringe (60 cc) and apply gentle pressure (4 psi) (Thompson, 2000). Wounds with large adherent areas of necrotic tissue or yellow slough should be irrigated (debrided) with a higher pressure stream between 8 and 15 psi. Pressure should not exceed 15 psi, or tissue damage and edema could result (Krasner & Sibbald, 1999).

Dressings to Provide a Moist Wound Bed

To heal a pressure ulcer, a clean, moist environment must be maintained. A moist wound environment promotes cellular activity in all phases of wound healing, provides insulation, increases the rate of epithelial cell growth, and reduces pain. A dry wound environment has been found to result in further tissue death, or dry necrosis, beyond the cause of the wound (Ovington, 2001). Since scientific research demonstrated that a moist wound bed provided the best environment for wound healing, a thriving industry has emerged with hundreds of products developed to promote moist wound healing. Although many of these advanced products are appropriate, many common conventional dressing materials have the advantage of being readily available, effective, and less expensive. These products have been reviewed in the literature, and useful evaluations can be found elsewhere (Krasner & Sibbald, 1999; Moore, 2000).

The frequency of dressing change will be determined by the manufacturer's recommendations for the product selected and the type and amount of exudate and drainage.

The amount of wound moisture may change during the healing stages, so the wound may need added absorption during one period, and added moisture during another (Thompson, 2000).

Preventing and Treating Infection

One of the most complex and controversial aspects of wound care has been the use of antibiotics. The presence of an infection is determined by the microbial state of the wound. In order to apply clinical reasoning to the treatment of wound infection, it is important to understand and differentiate between the three microbial states of a wound.

Contamination is the presence of microorganisms on the wound. All open wounds are contaminated. The human body has various organisms living both on and in it. Thus, the skin is never sterile.

Colonization is the presence and proliferation of organisms (bacteria) in the wound but with no signs of local infection, thus no host response. Stage II, III, and IV pressure ulcers are generally considered to be colonized. Therefore, wound cleansing and debriding are instituted to prevent the development of infection.

Infection is the proliferation of bacteria in healthy cells that produces symptoms of local redness, pain, fever, and swelling. Examples of serious infections that can be complications of pressure ulcers are bacteremia, sepsis, osteomyelitis, and advancing cellulitis.

Use of Topical and Systemic Antibiotics

Urgent care is required for older persons with systemic signs of infection. This care includes obtaining wound cultures and blood cultures, and providing treatment with appropriate systemic antibiotics that will cover the offending organism. All of these conditions could cause delayed healing or further complications from tissue destruction, and may result in death.

Certain local conditions would warrant the use of topical antibiotics:

- A clean pressure ulcer that has not shown signs of healing over a 2-week period
- A pressure ulcer that has increased local discharge but shows no local signs of infection (See the section titled Pharmacology and Nursing Responsibilities for selected antibiotic information.)

Management of Cellulitis

Interventions for cellulitis focus on the immediate treatment of the acute infection and prevention of further complications such as abscess formation and tissue damage. The treatment includes appropriate antibiotics, prevention of further infection, immobilization and elevation of the affected limb, pain relief, and possibly anticoagulant therapy.

Appropriate antibiotics are the priority of treatment. They are usually given intravenously until the infection begins to resolve, and then they are changed to an oral route. Any existing wounds should be assessed, and a wound culture obtained if an infection is suspected. Bed rest should be maintained. If the cellulitis is on the lower extremities, the foot of the bed should be elevated to decrease swelling and allow the leg to be fully supported. The nurse should encourage active foot exercises and calf pumping to decrease pain and swelling and allow the older person to maintain normal function. Pain should be assessed with a 0 to 10 visual analog scale and medicated with appropriate analgesics. Sheets and blankets must not be allowed to rub against the area and cause friction and added pain.

NONPHARMACOLOGICAL TREATMENT OF FINGERNAIL AND TOENAIL PROBLEMS

Nonpharmacological treatment of fingernail and toenail problems focuses on the immediate treatment of the problem and prevention of further complications.

The treatment of onychomycosis will include relief of pain, patient education, and oral antifungal agents as appropriate. As a temporary measure, older persons should be advised to reduce the pressure on the toe by cutting a hole in their slipper or shoe. In addition, the podiatrist should be consulted periodically for reduction of the nail plate. Patient education includes frequent treatment to prevent the condition from spreading to the other parts of the foot. Oral antifungal agents may provide a cure (O'Dell, 1998).

The treatment of chronic paronychia will include keeping affected nails dry and perhaps antibiotics. The older person should be advised to keep the affected nails out of water and to keep the area protected. Drainage is sometimes needed. A physician or nurse practitioner should be consulted for appropriate antibiotic treatment.

The treatment of onychogryphosis will include a podiatry consultation and perhaps surgical intervention for refractory problems. The podiatrist should trim thickened toenails with an electric drill and burrs, or a carbon dioxide laser. Nails should be kept short. Proper foot care and hygiene are essential. If all conservative measures fail, the older person who is disabled by this disorder should consider surgery.

Nursing Management Principles

Nursing care and documentation of the older person with a skin problem should focus on careful assessment of the risk factors, provision of nursing interventions to minimize the risk of skin breakdown, documentation of care, and evaluation of the older patient's status.

NURSING PROCESS AND DOCUMENTATION

Nursing care of the older patient should focus on the prevention of pressure ulcers. This goal is difficult to achieve, but research has shown that a large majority of pressure ulcers can be prevented. For the older person who has a pressure ulcer, the nursing care plan should be a guide for nursing interventions. Ongoing nursing process and clinical reasoning should be reflected in each step. Documentation is necessary to ensure that the care plan is appropriate.

The wound is assessed initially, and an evaluation is done with each dressing change. If the nurse assesses that the wound has improved, documentation should reflect the actual changes that the nurse evaluated to make that decision. Wound healing is a process. As the wound changes and evolves, there may be a need to make changes in the dressing protocol. If the wound does not show signs of healing in 2 weeks, the treatment should be reevaluated.

KNOWLEDGE-BASED DECISION MAKING

In order to make knowledge-based decisions, the nurse should have access to all appropriate current knowledge regarding research on pressure ulcer care, pressure-relieving devices, and current products for topical treatment. Access to current literature will support decision making and provide information for families and other staff. Product information is helpful, but independent controlled trials of the product provide the needed unbiased results.

The following questions are useful when assessing wound care products:

1. What is the wound assessment? What is the stage, drainage, moisture, eschar?
2. What does the wound need? This will depend on the assessment and is ongoing. Does it need absorption, debridement, moisture?
3. What products are available in the setting? Many similarities exist between products, and all agencies will not have every product. It is important to understand what the product does.
4. What is the evaluation of the product? What materials are available? Is there a resource manual at the agency that will assist this process? If not, the nurse should begin the process.
5. What is practical? If the nurse is in the home or if a family member has to do the dressing, the process will have to be as simple as possible to ensure correct technique.

EVALUATION AND REVISION OF NURSING CARE PLAN

Critical evaluation of the care plan is the key to excellence in nursing practice. It is important to determine what practices were successful for the individual patient and what practices need to be modified. Careful, ongoing evaluation of nursing care is the key to a practice base that is constantly being changed to update skills and education that will benefit the older patient. The evaluation step of nursing process provides the opportunity to determine if the client goals were met. Possible outcome criteria for an older person with a pressure ulcer are the prevention of further tissue damage and the promotion of normal wound healing. The goals and outcome criteria are individualized for each older person. In the evaluation and revision of the care plan, the needs and opinions of the older person should always be considered. The nurse should evaluate if the goals were realistic for the older person's age and condition. If the older person was at home, were resources sufficient to make success possible? The evaluation of the family situation, resources available, and needs and desires of the older person will determine the revision of the care plan and the goals and outcome criteria that can be successful. Suggested patient-family teaching guidelines are included to assist the nurse in the process of educating patients and families.

Patient-Family Teaching Guidelines

PREVENTION OF SKIN CANCER

1. What can older persons do to decrease their risk of skin cancer?

- Remember that the sun penetrates through clouds, water, and shade throughout the year.
- Use the appropriate sunscreen protection, at least 15 SPF. It is never too late to protect yourself against further damage.
- Do a total body check, using a mirror if needed, and record any spots so that change can be noted.

RATIONALE:

Education is the key to decrease the older person's risk of skin cancer. On a cloudy day, 80% of the damaging UVR still penetrates to the skin. Sand and snow are equally risky, reflecting 85% to 95% of the sun's rays. It is important to know one's skin type and apply the

Patient-Family Teaching Guidelines, *cont.*

- Be aware that many drugs can cause increased photosensitivity and accelerate damage to the skin.
- Reapply sunscreen when needed. Be aware of ears and bald scalp areas when applying sunscreen. These areas are often the sites of skin cancer.

2. What causes dry skin (xerosis) in the older person?

Factors that are thought to contribute to dry skin include:

- Age-related changes in circulation (vasculature), sebum secretion, and decreased perspiration.
- Systemic variables such as vitamin A deficiency, hormones, and stress.
- Environmental factors such as smoking, sun damage, and low humidity.
- Personal practices such as excess bathing or the use of harsh bath products (Sheppard & Brenner, 2000).

3. What treatment is most effective for dry skin?

Personal practices to improve or relieve dry skin include the following:

- Bathe once a day, using superfatted soaps such as Dove or Caress. Avoid any drying agents such as alcohol.
- Dry with a soft towel, including between the toes.
- Apply emollients liberally to the skin immediately after bathing, while skin is moist. Reapply frequently.
- Use white petroleum for an effective emollient for dry skin treatment. It is inexpensive and does not contain irritating additives such as perfumes.
- Keep humidity as high as possible, especially during the winter months.
- Wear soft, nonirritating clothing next to the skin.
- Prescription creams may also be useful (see Pharmacological Interventions).

appropriate sunscreen so that burning is avoided. If actinic keratotic lesions have developed, avoidance of the sun may be sufficient therapy for the regression of mild cases. Self-examination is the key. Any precancerous lesions should be checked every 6 months.

Older persons often take multiple medications. All drug labels should be checked for photosensitivity precautions. Examples of common medications that can cause photosensitivity include Bactrim, tetracycline, and ibuprofen.

RATIONALE:

The main source of skin hydration or moisture is provided from the underlying vasculature of the tissues. Sebum also helps to maintain hydration by adding a protective lipid layer to the skin that prevents loss of water through the epidermis. The changes of aging slowly decrease these features. The result is dry skin from a lack of moisture in the stratum corneum, resulting in less pliable epidermis. This decrease in pliability results in the rough texture and flaking of dry skin.

RATIONALE:

Research findings indicate that dry skin increases with age and is more severe in winter. Excess bathing depletes the older person's skin of moisture and increases dryness. The use of superfatted soap for bathing helps to retain moisture in the older person's skin. The skin should not be rubbed with a towel; it will increase irritation. Applying emollients after bathing retains the moisture in the skin. It also helps to keep home temperature low and use a humidifier, especially in the winter.



Care Plan

A Patient With a Pressure Ulcer

Case Study

A registered nurse who works for a home health agency has been assigned to Mrs. Krebs, a 75-year-old patient with a chronic stage III ulcer on her heel that has not shown any progress in the last 3 months. The nurse notes that Mrs. Krebs has a smoking history of 40 pack years and has not followed her diet instruction. The supervisor of the home health agency has warned the nurse that if Mrs. Krebs does not improve, the insurance company will not continue to provide payment for the visits and treatment. Mrs. Krebs has refused to be admitted for ulcer care and feels the nurses and physician do not understand her situation.

Applying the Nursing Process

ASSESSMENT

On the first visit, the nurse did a complete assessment and discussed the patient's history, which includes peripheral vascular disease and hypertension. Mrs. Krebs's physical examination showed blood pressure 140/82, pulse 76, respirations 20, and temperature 98 °F. On examination of the heel ulcer, the nurse noted a 4 cm by 6 cm stage III ulcer with a minimal amount of serous drainage and no local signs of inflammation.

Mrs. Krebs is eating poorly, mostly freezer and canned foods with little protein and high sodium. She admits that she is smoking and not following her diet. She states, "I lost my husband 6 months ago and have not been able to take care of things. I tried to quit smoking but it only lasted 5 days. I have been smoking for 40 years and it is just too hard to stop. I'm doing the best I can."

DIAGNOSIS

The current nursing diagnoses for Mrs. Krebs include the following:

- *Impaired skin integrity*, stage III ulcer, related to prolonged pressure, inadequate nutrition, decreased vascular perfusion
- *Ineffective management of therapeutic regimen related to complex regimen*, limited resources and impaired adjustment as manifested by patient self-assessment of poor dietary intake, inability to rest and elevate foot, and smoking behavior
- *Risk for altered nutrition: less than body requirements* related to lack of physical and economic resources, and increased nutritional requirements related to ulcer

A Patient With a Pressure Ulcer *(continued)*

EXPECTED OUTCOMES

The expected outcomes for the plan specify that Mrs. Krebs will:

- Describe measures to protect and heal the tissue, including wound care.
- Report any additional symptoms such as pain, redness, numbness, tingling, or increased drainage.
- Demonstrate an understanding of nutritional needs, including the need for supplemental protein drink and vitamins.
- Collaborate with the nurse to develop a therapeutic plan that is congruent with her goals and present lifestyle.

PLANNING AND IMPLEMENTATION

The following nursing interventions may be appropriate for Mrs. Krebs:

- Establish a trusting relationship with Mrs. Krebs.
- Begin to explore what the patient's goals are in relation to her healthcare.
- Determine her daily habits and schedule and find some small measures that can be started for health improvement.
- Begin to determine ways to work with Mrs. Krebs's family to motivate her toward a healthy lifestyle (i.e., nutrition, smoking, foot care).
- Set priorities of care that Mrs. Krebs will agree to such as (1) ulcer improvement, (2) diet adjustments, and (3) smoking reductions.

EVALUATION

The nurse hopes to develop a long-term relationship with Mrs. Krebs and make an impact on her health and well-being. The nurse will consider the plan a success based on the following criteria:

- Mrs. Krebs will develop a trusting relationship and report that she will develop a plan with the nurse to improve her health.
- A family member will agree to assist Mrs. Krebs with her wound care and shopping issues.
- Mrs. Krebs will begin a smoking reduction effort.
- Mrs. Krebs will agree that if the ulcer is not healing in 4 weeks, she will seek inpatient treatment.

Ethical Dilemma

The primary ethical dilemma that evolves from this situation is the conflict between the moral obligation of the nurse to respect the autonomy of the patient and the principle of beneficence. The patient has a right to self-determination, independence, and freedom. It is important to allow patients to make their own decisions, even if the healthcare provider does not agree with them. On the other hand, the nurse has a responsibility to “do good” and “do no harm” based on the principles of beneficence and nonmaleficence. These ethical obligations are outlined in the American Nurses Association Code for Nurses. A second ethical dilemma is the conflict between the nurse's obligation to the patient and to the home health agency.

(continued)

A Patient With a Pressure Ulcer *(continued)*

The nurse hopes to work with Mrs. Krebs and the supervisor to set new goals and priorities and make progress toward them. The nurse understands that the patient has a right to make any final decisions.

Critical Thinking and the Nursing Process

1. What are the intrinsic and extrinsic factors that can cause skin problems in elderly adults? Make a list with two columns and see how many factors you can identify.
2. How important is nutrition to the dermatological health of your skin?
3. What type of dressings do you see used in your clinical rotations with older people? Are they consistent with current guidelines and recommendations?
4. What positioning techniques have you seen used in your clinical rotations?



EXPLORE MediaLink

NCLEX review, case studies, and other interactive resources for this chapter can be found on the Companion Website at <http://www.prenhall.com/tabloski>. Click on Chapter 12 to select the activities for this chapter. For animations, video tutorials, more NCLEX review questions, and an audio glossary, access the accompanying CD-ROM in this textbook.

Chapter Highlights

- The most common precancerous lesion is actinic keratosis, also known as solar keratosis and senile keratosis. Erythematous actinic keratosis is the most common type and appears as a sore, rough, scaly, erythematous papule or plaque. The most common sites for all types of actinic keratosis are sun-exposed areas such as the hands, face, nose, tips of the ears, and bald scalp.
- Basal cell carcinoma is the most common form of skin cancer in White people and accounts for about 80% of nonmelanoma skin cancers.
- Melanoma is the most serious of skin cancers. It is estimated that 53,000 persons were diagnosed with melanoma in 2001, accounting for 7,400 deaths.
- A wound that does not heal within 6 weeks is considered a chronic wound. Common problems of older persons that often lead to chronic wounds are diabetes, peripheral vascular disease, and pressure ulcers.
- The wound can be damaged by both too much and too little moisture. A dry wound surface impairs epithelial migration and leads to tissue injury and necrosis. The buildup of tissue exudates is toxic to new growth and leads to tissue hypoxia, which impairs healing.

- Wound cultures should be obtained by the aspiration method or a tissue biopsy. The swab method is not considered useful for obtaining a wound culture, since it examines bacteria present on the wound surface, not in the wound bed itself.
- Skin care practices for older persons include correct bathing procedure, prevention of injury, and dietary support. These skin care interventions are important to maintain healthy tissue as well as to improve the tissue tolerance to decrease further risk of injury.
- The nurse should encourage older persons to change or shift positions by making small body shifts. This will redistribute weight and increase perfusion. Range of motion exercises should be done every 8 hours and the techniques taught to family and patients.
- Topical antiseptics such as povidone-iodine, acetic acid, hydrogen peroxide, and Dakin's solution should not be used on a wound, since they have been found to cause damage.
- To heal a pressure ulcer, a clean, moist environment must be maintained. A moist wound environment promotes cellular activity in all phases of wound healing, provides insulation, increases the rate of epithelial cell growth, and reduces pain. A dry wound environment has been found to result in further tissue death.
- Colonization is the presence and proliferation of organisms (bacteria) in the wound but with no signs of local infection, thus no host response. Stage II, III, and IV pressure ulcers are generally considered to be colonized. Therefore, wound cleansing and debriding are instituted to prevent the development of infection.
- Infection is the proliferation of bacteria in healthy cells that produces symptoms of local redness, pain, fever, and swelling. Examples of serious infections that can be complications of pressure ulcers are bacteremia, sepsis, osteomyelitis, and advancing cellulitis.

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