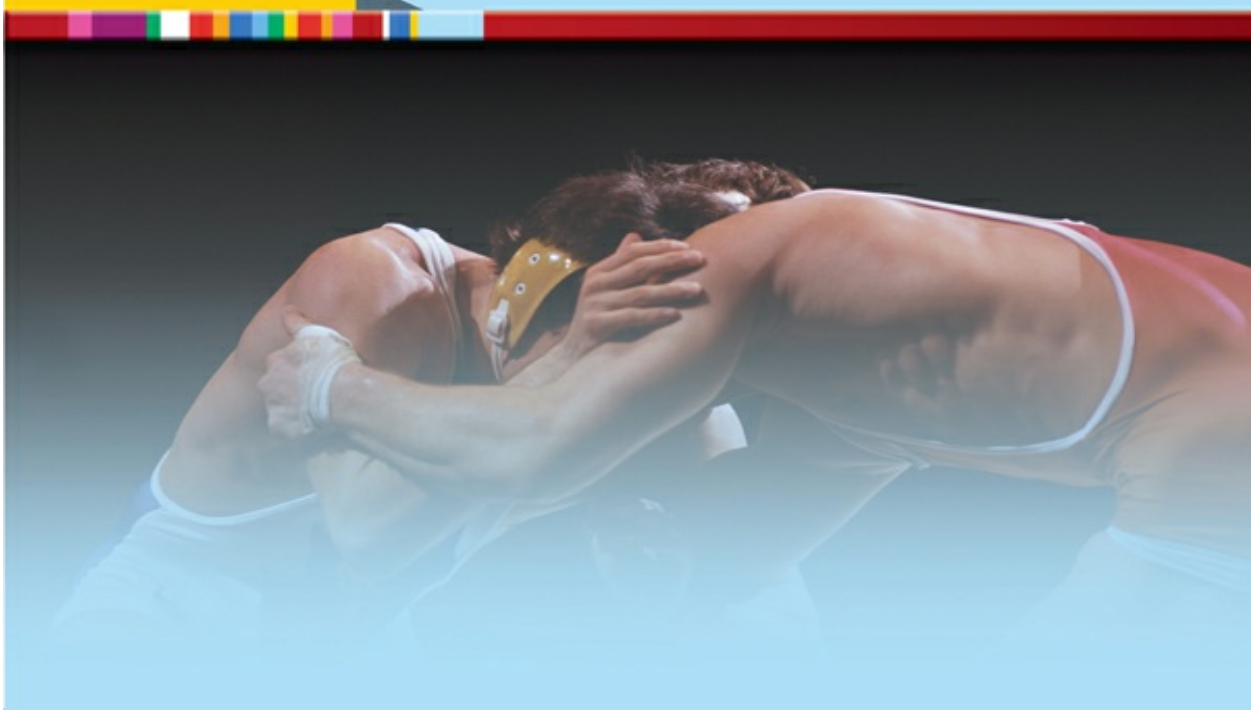
Basic Athletic Training
Course Pack D

CHAPTER

32

Dermatology



STUDENT OUTCOMES

1. Describe the common skin lesions.
2. List the signs and symptoms of an abscess, acne, onychia, paronychia, folliculitis, furuncles, carbuncles, cellulitis, and impetigo contagiosa.
3. List the signs and symptoms of tinea unguium, tinea pedis, tinea cruris, tinea corporis, tinea capitis, tinea versicolor, and candidiasis.
4. List the signs and symptoms of herpes gladiatorum, herpes zoster, verrucae, and molluscum contagiosum.
5. Describe the general management of bacterial, fungal, and viral skin infections.

6. Describe the common skin irritations caused by mechanical reactions, such as intertrigo, athlete's nodules, acne mechanica, and striae distensae, and explain the management of each condition.
7. List the signs and symptoms of sunburn, pernio, miliaria, eczema, psoriasis, and hyperhidrosis, and explain the management of each condition.
8. List the signs and symptoms of bites or stings from a mosquito, bee, wasp, ant, spider, flea, tick, and lice.
9. Explain the management of an insect bite or sting.
10. Differentiate between allergic contact dermatitis and irritant contact dermatitis, and explain the management of both conditions.
11. Describe the three types of urticaria and explain the management of each.

INTRODUCTION

Dermatology is the study of the skin. Any individual can occasionally contract skin conditions, but several are more commonly seen in the physically active population. Skin infections may be caused by bacteria, fungi, or viruses. Related inflammatory skin conditions may result from mechanical, environmental, allergic, or chemical skin reactions. Early identification of the ensuing lesions and specific treatment minimize the healing time and prevent both the spread and the recurrence of the condition.

This chapter first provides an overview of the various types of skin lesions and then discusses the more common skin infections and conditions that are seen in the physically active population. When appropriate, individual management plans are provided. Many of these conditions can be seen in the color plates included with this chapter. It is important to note that many systemic diseases are manifested in skin lesions or rashes. Therefore, it is critical for the athletic trainer to identify potentially serious lesions and refer

the patient immediately to a physician, particularly if any uncertainty exists regarding the nature of the skin lesion.

TYPES OF SKIN LESIONS

? A soccer player has a transient, elevated lesion caused by local edema. What type of skin lesion is suggested, and what are the potential causes of this type of lesion?

The skin is the largest organ of the body. It serves four major functions:

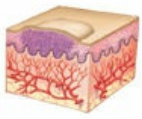
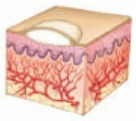
1. The skin protects the body from bacteria, fungi, various viruses, and other germs in the outside environment.
2. The skin helps to regulate body temperature.
3. The skin prevents the loss of fluids and nutrients through the cutaneous surface.
4. The skin aids in the transmission of information from the outside environment to the brain.

The outer layer of skin, called the epidermis, contains the germinal layer, in which the production of new skin cells occurs and **sebum** is produced. The underlying dermis contains the sweat glands, hair follicles, sebaceous glands, blood vessels, and a complex array of nerve endings (see **Fig. 10.6**). The deepest layer, called the subcutaneous tissue, is composed primarily of fat (for insulation and energy storage).

The skin can be damaged by direct trauma, allergic reactions, chemical irritants, heat, cold, bacteria, fungi, and viruses. Whenever the skin is damaged, a lesion appears. These lesions are identified by their size and by their depth (**Table 32.1**).

TABLE 32.1 Basic Types of Skin Lesions

PRIMARY LESIONS (MAY ARISE FROM PREVIOUSLY NORMAL SKIN)

Circumscribed, flat, nonpalpable changes in skin color	Palpable, elevated, solid masses	Circumscribed, superficial elevations of the skin formed by free fluid in a cavity within the skin layers
		
Macule—small, flat spot up to 1 cm (freckle, mole, rubella)	**Papule**—solid, elevated lesion less than 10 mm (wart, psoriasis)	**Vesicle**—up to 1 cm; filled with serous fluid (contact dermatitis, herpes simplex, herpes zoster)
Patch—flat spot; 1 cm or larger	**Plaque**—elevated superficial lesion 1 cm or larger, often formed by coalescence of papules	**Bulla**—1 cm or larger; filled with serous fluid (second-degree burn)
	Nodule—marble-like lesion; larger than 0.05 cm; often deeper and firmer than a papule (lipoma, cysts, tumors)	**Pustule**—elevated lesion containing pus (acne, furuncle [boil], carbuncle)
	Wheal—transient, irregular superficial area of localized skin edema (mosquito bite, hive, sunlight, or pressure)	

SECOND LESIONS (RESULT FROM CHANGES IN PRIMARY LESIONS)

		
Erosion—Loss of the superficial epidermis; surface is moist but does not bleed (moist area after the rupture of a vesicle, as in chickenpox).	**Ulcer**—deeper loss of epidermis and dermis; may bleed and scar (stasis ulcer of venous insufficiency, syphilitic chancre)	**Fissure**—a linear crack in the skin (athlete's foot)
		
Crust—dried residue of serum, pus, or blood (impetigo, scab)	**Scales**—a thin flake of exfoliated epidermis (dandruff, psoriasis, tinea versicolor)	

The soccer player has a transient, elevated lesion caused by local edema. This indicates a possible wheal. The wheal could be a common allergic reaction to an insect bite, sunlight, or pressure.

SKIN INFECTIONS

A wrestler received treatment for an open sore on the right thigh. Three days later, observation reveals a honey-colored crust with surrounding

erythema. Impetigo is suspected. What signs and symptoms would confirm this suspicion?

Skin infections may stem from bacteria, fungi, or viruses. Bacterial or fungal infections can cause pustules on or within the skin or its associated structures, such as the sweat glands and the hair follicles. Although most infections tend to be painful, superficial irritations also can be extremely itchy. The three main bacteria are staphylococci, streptococci, and bacilli. Staphylococci commonly appear in clumps on the skin, in upper respiratory tract infections, and in lesions which contain pus. Streptococci are associated with serious systemic diseases, such as scarlet fever. Many bacilli are not pathological, but some can lead to major systemic diseases, such as tetanus. Fungi, such as yeast and molds, often attack the skin, hair, and nails. Fungi fall into three basic categories: dermatophytes, candidiasis (moniliasis), and tinea versicolor. Viruses invade the living cells and may multiply until they kill the cell, burst out to reinfect other cells, or lie dormant within the cell without ever causing an infection.

Skin infections can preclude an individual from participating in physical activity. Participation should not be permitted if open wounds or infectious skin conditions cannot be adequately protected, thus preventing exposure to others. The National Collegiate Athletic Association (NCAA) has identified several skin infections that would lead to medical disqualification from practice or competition if not adequately protected. As per the NCAA definition, the skin condition or open wound must be noninfectious, appropriately covered, and treated. These include bacterial infections (i.e., impetigo, erysipelas, carbuncles, staphylococcal disease, folliculitis, and hidradenitis suppurativa), viral skin infections (i.e., herpes simplex, herpes zoster [chickenpox], and molluscum contagiosum), fungal skin infections (i.e., tinea corporis), and parasitic skin infections (i.e., pediculosis and scabies).[1]

Bacterial Skin Conditions

Bacterial lesions typically are caused by a staphylococcal or streptococcal

infection. Hot tubs or whirlpools that are not adequately chlorinated may harbor *Pseudomonas* sp.; most infections are self-limiting and need no treatment other than regulating pool chlorination. The more common bacterial infections in the physically active population are abscesses, acne vulgaris, onychia and paronychia, folliculitis, furuncles (boils) and carbuncles, hidradenitis suppurativa, erysipelas, cellulitis, and impetigo contagiosa.

Abscess

Etiology

An **abscess** is a circumscribed collection of pus appearing in an acute or chronic, localized infection. The abscess may be a cavity formed by liquefaction necrosis within solid tissue and may affect any tissue of the body, such as bone, tooth root, appendix, brain, gums, lungs, abdominal wall, gastrointestinal tract, ears, tonsils, sinuses, breasts, kidneys, and prostate gland.

Signs and Symptoms

An abscess usually is associated with tissue destruction, so the lesion appears as an encapsulated pocket of pus (Fig. 32.1). Pain, redness, swelling, and a fever typically are present.

Figure 32.1. Abscess. This walled-off lesion began as folliculitis that became a furuncle and then an abscess. Note the older scar from previous furuncles and cystic acne lesions.

Acne

Etiology

Nearly all adolescents experience acne at one time or another. Although the etiology is unknown, acne is believed to be caused by excessive sebum production secondary to a hormonal imbalance, abnormal follicular keratinization that results in follicular blockage, proliferation of *Propionibacterium acnes*, and inflammation. At 8 or 9 years of age, the adrenal glands begin producing increasing amounts of an androgen that causes the sebaceous glands to enlarge and produce more sebum. Sebum secretion peaks during adolescence and declines after the teenage years. Two types of lesions occur in acne: noninflammatory lesions, such as open or closed comedones, and inflammatory (popular, nodular, or cystic) lesions.[2]

Signs and Symptoms

The obstructed follicle may become apparent as a blackhead (i.e., open follicle) or whitehead (i.e., closed follicle). The blackhead is not dirt, so scrubbing or washing will not remove it. Whiteheads represent follicles that have become dilated with cellular debris but possess only a microscopic opening to the skin surface. When the oil and other material in the whitehead break through the pore wall and cause irritation under the skin, a pimple results. Pimples can be erythematous papules, pustules, or nodules and commonly are seen on the face, neck, and back. Papules and pustules are small (diameter, 5 mm), whereas nodules are larger. The superficial pustules eventually dry, whereas the deeper nodules may become chronic and form disfiguring scars.

Onychia and Paronychia

Etiology

Onychia is inflammation of the matrix of the nail plate, whereas **paronychia** involves only the lateral border or nail fold (**Fig. 32.2**). The conditions may develop from staphylococcal, streptococcal, or fungal organisms; with fungal organisms, the infection is called onychomycosis. The conditions also may

occur secondary to diabetes or vaginal candidal infection or, occasionally, from endocrine problems, such as hypoparathyroidism, hypothyroidism, and adrenocortical deficiency.[3]

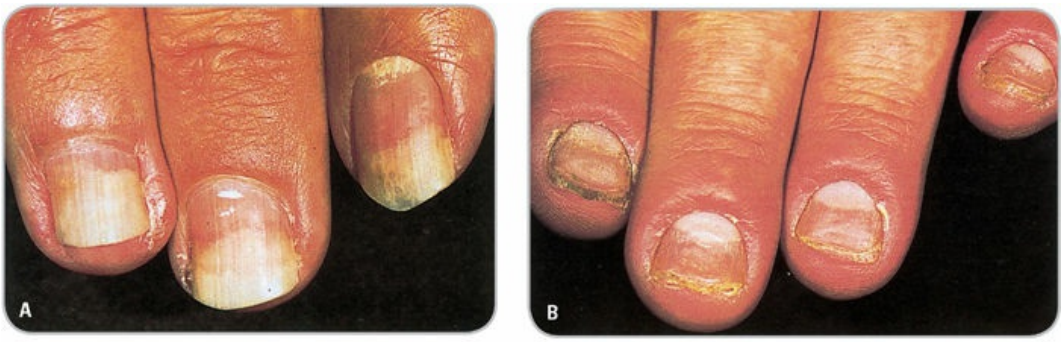


Figure 32.2. Nail conditions. A, Onycholysis is a painless separation of the distal nail plate from the nail bed. **B,** Paronychia is an inflammation of the proximal and lateral nail folds and may be acute or chronic.

Signs and Symptoms

If onychia is present, the nail fold becomes red, swollen, and painful and can produce purulent drainage. Paronychia often follows a hangnail and is seen in individuals whose hands frequently are immersed in water or mud (e.g., football linemen, chefs, and nurses). Occasionally, the feet may be affected if they are immersed frequently. Inflammation and swelling is centralized on the lateral border of the nail plate or nail fold. Small amounts of pus may be extruded from the nail fold, particularly with secondary infection.

Folliculitis

Etiology

Folliculitis is an infection of the upper portion of the hair follicle and surrounding areas caused by staphylococci. Commonly referred to as an "ingrown" hair, the hair grows inward and curls up to form an infected nodule (Fig. 32.3). It tends to occur in areas with short, coarse hair (e.g., facial hair, nape of the neck, chest, back, buttocks, thighs, or skin under protective padding) and can develop from friction with pads or during shaving. Pustular rashes on the trunk have been reported where occlusive bathing suits are worn. Chemical irritants, inadequate chlorination, and superhydration of the skin caused by high water temperatures (i.e., hot tubs) also are causative factors.[4,5]

Figure 32.3. Folliculitis. A, Folliculitis commonly is called an "ingrown" hair, whereby the hair grows inward and curls up to form an infected nodule. **B,** Pustular rashes can occur where occlusive bathing suits are worn. **C,** Hot tub folliculitis can result from high water temperatures in the presence of *Staphylococcus*.

Signs and Symptoms

The inflammation begins with a pustule forming at the mouth of the hair follicle; a crust forms and, eventually, sloughs off, along with the hair. This relatively painless pustule heals without scarring. If associated with staphylococci, swelling and erythema with or without a pustule may be present on the skin surface. These lesions are painful and may scar. "Hot tub" folliculitis, caused by *Pseudomonas aeruginosa*, may present with multiple pustular lesions on the trunk and extremities within 6 hours to 2 days after exposure.[6] Mild fever and malaise also may occur.

Furuncles and Carbuncles

Etiology

Furuncles (boils) and carbuncles are complications of folliculitis that stem from friction or repeated blunt trauma. The infection progresses deeper and extends out from the follicle and the lesions usually contain pus. Common sites include the buttocks, belt line, anterior thigh, back of the neck, face, and axilla.

Signs and Symptoms

Commonly called an abscess or boil, a furuncle is a large, well-defined, deep erythematous nodule that progresses into a pustule of walled-off, purulent material, turning hard and tender when staphylococci invade the subcutaneous tissue (**Fig. 32.4**). The furuncle develops into a fluctuant mass and, eventually, opens to the skin surface, allowing the purulent contents to drain, either spontaneously or following incision of the furuncle. A carbuncle is several furuncles that have merged into a deep, communicating purulent mass.

Figure 32.4. Furuncle. This patient has a painful, "pointing" furuncular nodule on the thigh.

Hidradenitis Suppurativa

Etiology

Hidradenitis suppurativa is a potentially serious, chronic inflammatory, **suppurative** disorder affecting the follicles and apocrine sweat glands (Fig. 32.5). The condition is not present before puberty, because the sweat glands are not active. At a later age, however, it can appear. *Staphylococcus aureus* usually is involved in the condition, but in chronic cases, *Proteus* sp. may be involved. Seen more commonly in women than in men, it develops primarily in the sweat glands located in the armpits, in the groin, around the breasts, and in the anal region. The condition also is seen at a higher rate in extremely overweight individuals and cigarette smokers.[7]

Figure 32.5. Hidradenitis suppurativa. This chronic inflammatory, pus-producing disorder affects the follicles and apocrine sweat glands.

Signs and Symptoms

Stage 1 hidradenitis suppurativa presents with solitary or multiple isolated, firm, red nodules without scarring or sinus tract. In stage 2, pustules and abscesses may discharge pus spontaneously and heal slowly, resulting in scar tissue. Stage 3 is characterized by extensive, multiregion involvement, with multiple interconnected sinus tracts and scarring. The appearance of nodules recurs periodically throughout the year. Heat, perspiration, and being overweight can aggravate the condition.

Pain is a common symptom in chronic conditions. Over time, extensive scarring can lead to restrictive, tight skin and vaginal, urethral, and anal strictures. If the sweat glands in the armpits or groin are involved, this can limit motion of the arms or legs. Secondary bacterial infection with staphylococci, streptococci, pseudomonas, and *Escherichia* sp. is common and produces a foul-smelling odor.[7] Infection and inflammation can spread beyond the sweat glands into the deep layers of the skin and muscle tissue, leading to cellulitis. Patients with hidradenitis suppurativa often feel socially isolated, suffering severe psychological impact because of this physically painful and

disabling disease.

Cellulitis

Etiology

Cellulitis is a painful infection of the deep dermis caused by group A β-hemolytic streptococci (GABHS) or *S. aureus*. Some people are at risk for infection by other types of bacteria. They include people with weak immune systems and those who handle fish, meat, poultry, or soil without using gloves.

Signs and Symptoms

Lesions appear as an ill-defined area of tender erythema on the trunk or extremities, usually around a break in the skin, such as surgical wounds, trauma, tinea infections, or ulcerations (Fig. 32.6). Intense pain may be present, as may malaise, fever, and lymphangitis. Sport participation is contraindicated, because trauma to the site can cause bacteremia.

Figure 32.6. Cellulitis. This painful infection of the deep dermis and subcutaneous tissue usually occurs around a break in the skin.

Erysipelas

Etiology

Erysipelas is an acute, superficial, bacterial infection of the dermis and hypodermis that characteristically extends into the cutaneous lymphatics. It is considered to be a specific clinical type of cellulitis caused more frequently by streptococcal bacteria.[8] The leg is the clinical site most frequently encountered; other common sites are the face, arm, and upper thigh.

Bacterial inoculation into an area of skin trauma is the initial event in developing erysipelas. A common portal of entry is athlete's foot. Other portals include superficial wounds, stasis ulcerations, inflammatory dermatoses, dermatophyte infections, insect bites, and surgical incisions. Other predisposing factors include diabetes, alcohol abuse, infection with HIV, nephrotic syndrome, other immunocompromising conditions, and vagrant lifestyle.

Cases of erysipelas have been reported in all age groups, but it appears that infants, young children, and elderly patients are the most commonly affected groups. The peak incidence has been reported to occur between 60 and 80 years of age, especially in patients who are considered to be high risk and immunocompromised or in those with lymphatic drainage problems (e.g., after mastectomy, pelvic surgery, and bypass grafting).[8]

Signs and Symptoms

Erysipelas usually has a sudden onset with patients unable to recall an inciting event but can report a history of recent trauma or pharyngitis. Prodromal symptoms, such as malaise, chills, and high fever, often begin before onset of the skin lesions and usually are present within 48 hours of cutaneous involvement. Initially, a small erythematous patch progresses to a fiery-red, indurated, tense, and shiny plaque. Pruritus, burning, and tenderness are typical complaints. A well-demarcated plaque may extend by 2 to 10 cm each day. The infection rapidly invades and spreads through the lymphatic vessels, producing overlying skin "streaking" and regional lymph node swelling and tenderness. Systemic symptoms may include drowsiness or disorientation, tachypnea, tachycardia, hypotension, and oliguria.

Impetigo Contagiosa

Etiology

Impetigo is a highly contagious, bacterial skin inflammation most often seen in those participating in wrestling, football, rugby, swimming, and gymnastics (Fig. 32.7). Caused by *S. aureus* either alone or in combination with GABHS, the condition may be transmitted by direct contact; through sharing unclean towels, clothing, and equipment; or after a minor skin injury, such as an insect bite, abrasion, or dermatitis.[5,9]

Figure 32.7. Impetigo. This highly contagious skin condition often is seen in wrestlers, swimmers, and gymnasts.

Signs and Symptoms

Impetigo has two different presentations—namely, bullous and nonbullous.[5,6] The bullous type, linked to *S. aureus*, begins as multiple, fluid-filled vesicles that either combine or individually enlarge to form blister-like lesions that eventually collapse centrally. The center has the characteristic of a honey-crusted lesion that, when removed, reveals reddened plaques draining serous fluid. Nonbullous impetigo caused by GABHS begins as small vesicles or pustules with erythematous bases and honey-colored crusts, which also drain fluid. The lesions may itch or burn but generally are painless. Eventually, the crust disappears, leaving a red mark that heals without scarring. Common sites are the face, buttocks, extremities, or perineum.

Ecthyma, a more serious form of impetigo, occurs when the infection penetrates deep into the skin's second layer (i.e., the dermis). Signs and symptoms include painful, fluid- or pus-filled sores that turn into deep ulcers,

usually on the legs and feet. A hard, thick, gray-yellow crust covers the sores. Lymph glands may be swollen in the affected area. Scars may remain after the ulcers heal. Several conditions can be complicated by impetigo, including the following:

- Abrasions
- Atopic dermatitis
  - Individuals with a history of asthma, hay fever, or eczema
  - Frequent crusts on the face, popliteal region, or antecubital fossae
  - Contact dermatitis (especially from shoe materials and rubberized pads)
  - Irritant dermatitis (hands chapped from frequent immersion in or handling of irritating substances)

Methicillin-Resistant Staphylococcus aureus

Etiology

Methicillin-resistant *Staphylococcus aureus* (MRSA) is caused by a strain of staph bacteria that has become resistant to antibiotics commonly used to treat ordinary staph infections. Individuals who develop MRSA infections in hospitals or other health care settings, such as nursing homes and dialysis centers, are said to have a health care–associated MRSA (HA-MRSA). Another type of MRSA occurring in the wider community among healthy people is called community-associated MRSA (CA-MRSA).[5] Under normal conditions, *S. aureus* colonizes on the skin and inside the nose of an estimated 20% to 40% of healthy people.[10] Individuals who have no symptoms are called carriers. When a breakdown of the skin occurs, this bacterium invades the body, producing a skin infection (e.g., abscess or cellulitis) or a systemic infection (e.g., pneumonia and blood infection).[11] The infection is spread by skin-to-skin contact. At-risk populations include groups such as high school wrestlers, child care workers, and people who live in crowded conditions.

Signs and Symptoms

The most common presentation is small red bumps that resemble pimples, boils, or spider bites. These can quickly turn into deep, painful abscesses that require surgical draining. Sometimes, the bacteria remain confined to the skin, but although rare, they can also burrow deep into the body, causing potentially life-threatening infections in bones, joints, surgical wounds, the bloodstream, heart valves, and lungs.

General Management of Bacterial Infections

Most infectious bacterial skin conditions (e.g., folliculitis, acne, cellulitis, furuncles, and carbuncles) should be cleansed with soap, water, and **astringents** and are treated initially with over-the-counter (OTC) topical antibacterial agents that are applied several times per day. A physician referral may be necessary for incision, drainage, and in some instances, debridement. Patients with any suspicious lesions should be immediately referred to a physician to culture and test the lesion for any antimicrobial sensitivity. If the condition is more severe, systemic antibiotics may need to be prescribed.

Patients should be withheld from physical activity and competition if satellite lesions, cellulitis, purulent conjunctivitis, weeping lesions, or large or multiple, honey-crusted lesions are present. Patients who have cellulitis, furuncles, or carbuncles are not significantly contagious to others but should not participate in sports, because continued trauma to the involved areas can lead to systemic complications, such as bacteremia and progressive soft-tissue infections. Prior to being cleared for return to play, patients should have no new skin lesions for 48 hours, have completed a 72-hour course of directed antibiotic therapy, and have no further drainage or exudate from any lesion.[5] **Application Strategy 32.1** summarizes the general treatment of bacterial infections.

APPLICATION STRATEGY 32.1

Management of Bacterial Skin Conditions

Noninfectious Bacterial Skin Conditions

- Wash the region four to five times daily and after physical exertion.

- Rinse all soap residues from the region and completely dry the area by patting gently.
- When dry, apply OTC topical antibacterial agents two to three times daily.
- If the condition is more severe, refer to a physician. Incision, drainage, or debridement may be necessary. Systemic antibiotics may be prescribed for 7 to 10 days.

Suspected Impetigo

- Isolate the infected patient from other players, as well as from athletic clothing and towels, to prevent the spread of the disease.
- Localized impetigo can be treated with mupirocin ointment applied to the skin three times a day.
- With diffuse or multiple areas of impetigo, refer to a physician. Systemic antibiotics may be indicated for 5–7 days.
- Gentle cleansing with soap and water helps to remove the crusts.

Participation Guidelines

- Satellite lesions, cellulitis, purulent conjunctivitis, large or multiple honey-crusted lesions, and weeping lesions warrant withholding the athlete from competition.
- With impetigo, no participation until the crusts have dried to a thick, coagulated crust.
- Patients with cellulitis, furuncles, or carbuncles should not participate in sports because of possible systemic complications, such as bacteremia and progressive soft-tissue infections.

Fungal Skin Conditions

Fungal skin infections are quite common among physically active individuals. Fungus grows and thrives in dark, warm, moist environments, such as the areas between the toes or between the skin of the groin and scrotum. During activity, perspiration often accumulates in these areas. Augmented with the wearing of constrictive clothing, such as an athletic supporter, tight shorts, or spandex, the

perspiration often enhances and encourages fungal growth.

Fungal infections are identified by small patches of erythema, scaling, and severe itching. Dermatophytes, also known as ringworm (tinea) fungi, and yeasts cause most fungal infections, including tinea unguium (nails), tinea pedis (feet), tinea cruris (groin), tinea corporis (body), tinea capitis (scalp), candidiasis, and tinea versicolor (Fig. 32.8). All but tinea versicolor are contagious and spread from person to person by sharing towels or socks and by walking with no shoes in the locker rooms and shower stalls. Fungal infections can be prevented by taking several precautionary measures (Box 32.1).

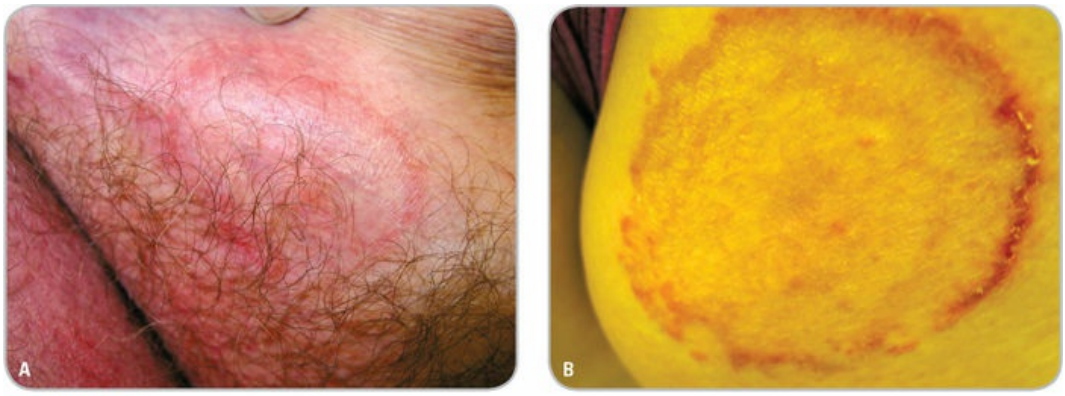


Figure 32.8. **Fungal infections. A,** Tinea cruris. **B,** Tinea corporis.

BOX 32.1 Prevention of Fungal Infections

- Shower after every practice and competition.
- After each shower, thoroughly dry the feet, groin, and areas between the toes as well as under the arms and breasts.
- Apply absorbent antifungal powder to the shoes, socks, and feet, between the toes, under the arms and breast, and in the groin area.
- Change socks and underwear daily; allow wet shoes to dry thoroughly before wearing them.
- Wear street shoes that allow some ventilation to the feet.
- Clean and disinfect the floors in the shower room, dressing room, and athletic training room daily.
- Never go barefoot in a shower or locker room.

Tinea Unguium

Etiology

Tinea unguium (nail), or onychomycosis, as it is more properly known, is a fungal infection of the nail beds and nails. It is common among physically active individuals, particularly those who swim in pools, use communal showers, or have chronic tinea pedis and wear occlusive footwear.[10] The fungus invades the hyponychium at the most distal attachment of the nail plate or a lateral nail fold. It migrates to the undersurface of the nail plate, leading to a nail bed infection that causes discoloration of the nail plate. The most common form, distal subungual onychomycosis, usually is associated with athlete's foot (tinea pedis).

The fingernails are more commonly affected by the fungus *Candida albicans*, which leads to *Candida* onychomycosis. Although the fungus can cause primary nail infection in people with chronic mucocutaneous candidiasis or other immunological disorders, it usually occurs as a secondary infection in otherwise healthy nails.

Signs and Symptoms

Infections usually start distally, with yellow streaks in the nail plate that gradually extend to include the entire nail. The nails become thickened, with a marked subungual hyperkeratosis that can be painful and can separate the nail plate from the bed. Over time, the nail plate becomes brittle and crumbles. Clinically, *Candida* onychomycosis may be similar in appearance to distal subungual onychomycosis, except that the entire thickness of the nail plate is affected and appears yellow, green, or opaque. The patient usually will complain of pain with activity and have some aesthetic concerns.[12]

Tinea Pedis

Etiology

Tinea pedis (i.e., athlete's foot) is the most frequent fungal infection in the

physically active population. It can spread in the locker room during casual handling of contaminated socks, or it can be picked up by another player on the floor or shower stall. Infection is based on individual susceptibility, however, and may not affect certain people. Although 1% to 3% of the population are carriers of tinea pedis, prepubertal children rarely are affected.

Signs and Symptoms

Tinea pedis is divided into three types. The most common type is found in the intertriginous web spaces as a scaly, peeling eruption with or without erythema, maceration, or fissuring. When the toe webs are **macerated** and infected, *Candida* yeast usually is present in addition to the original dermatophyte. It is common for the eruptions to extend to the plantar or dorsal surface of the toe. The second type includes an eruption of vesicles and bullae on the midfoot. Dry, vesicular lesions may exude a yellowish serum. Scratching the area leads to scaling, peeling, and cracking fissures in the skin, particularly if the condition extends between the toes and can spread the problem to other parts of the body. The third type produces a hyperkeratotic scale with minimal erythema on the plantar surface. All three types are recognized by extreme **pruritus**, redness, and scaling on the sole of the feet and between the toes.

Tinea Cruris

Etiology

Tinea cruris (i.e., jock itch) involves the genitalia but often originates in the feet; therefore, the feet should always be examined when this condition is present.[13] Although typically seen in obese adult men and male athletes, women are reporting an increase in the incidence of the condition because of the increased use of panty hose, spandex, and other tight, restricting clothing. It rarely is seen in children. *Trichophyton rubrum* is the most common source of tinea cruris.

Signs and Symptoms

Perspiration can accumulate between the genitals and skin of the thigh. The crural or perineal folds between the scrotum and inner thighs usually are the first areas to exhibit small patches of erythema and scaling. Other signs and symptoms include diffuse, thick, dark lesions; weeping vesicles or pustules on the margins of inflammation; and severe itching. The infection can spread to the thighs, perineal area, buttocks, and abdomen. When scrotal redness or scaling occurs, it typically is the result either of an allergic reaction to skin medications used before seeing a physician or of chronic skin inflammation caused by scratching or long-term irritation. It is important to note that a patient with tinea cruris can infect bedding, towels, and clothing; these should be changed daily and thoroughly washed in hot water.

Tinea Corporis

Etiology

Tinea corporis (i.e., tinea of the body) is caused by dermatophytes, usually of the genus *Trichophyton*. It affects both humans and animals.

Signs and Symptoms

The condition is characterized by one or more circular, pruritic patches that are slightly erythematous, dry, scaly, and usually, hypopigmented.[5,14] The lesions may be slightly elevated at the border, where they are more inflamed and scaly compared with the central part of the lesion. A well-defined, central ring generally is found on the upper extremities, axillae, and trunk. Certain individuals can carry the spores without the rash; the degree of rash depends on the host's cellular-based immune response, which can vary widely. Tinea corporis is common in prepubertal children, because they often contract the condition from infected pets. Wrestlers are at a high risk for outbreaks because of improper or inadequate cleansing of the mats and uniforms, skin-to-skin contact, occlusive equipment, and macerated skin.[5,15] Among wrestlers, the condition is referred to as tinea gladiatorum.

Tinea Capitis

Etiology

Tinea capitis, or ringworm of the scalp, is very common in children. Primary sources of the infection are contaminated hair brushes, combs, and animals.

Signs and Symptoms

The condition begins as a small papule on the scalp and then spreads peripherally. The lesions appear as small, gray scales resulting in scattered bald patches.[5]

Tinea Versicolor

Etiology

Tinea versicolor, also known as pityriasis versicolor, is one of the most common pigmentary disorders worldwide. It stems from a yeast, known as *Malassezia furfur*, that is a normal part of the skin flora. Excessive heat, humidity, and oily skin promote the growth of this organism in the stratum corneum. It is seen more often on the trunk, primarily the back, and on the upper extremities rather than on the lower extremities. It is commonly seen during adolescence and young adulthood when sebaceous activity is high.

Signs and Symptoms

Referred to as "sun spots," tinea versicolor is best noticed after exposure to the sun. Although the rest of the skin tans, the area with tinea versicolor does not. The patient usually will have many irregularly shaped, slightly scaling macules and patches, generally covering large areas of the body and separated by normal skin. The macules are yellowish-brown, pale yellow, or dark-brown, and occasionally reddish or pinkish, appearing to be either hypopigmented or hyperpigmented.[16] In dark-skinned individuals, the infection appears as well-defined, white patches. The area may be asymptomatic or mildly pruritic. Scratching detaches sheets of epidermis, leaving patches of raw base. The patches develop and resolve without treatment. Unlike other fungal infections, it is not contagious.

Candidiasis

Etiology

Candidiasis, which is caused by the yeast fungus *C. albicans*, can produce infections on the skin or mucous membranes or in the vagina. Skin infections tend to be found in skinfolds, such as the axillae, groin, and below the breasts, when friction occurs within a hot, moist, humid environment. The condition is more common in women who wear a swimsuit or a competition uniform for long periods of time.

Signs and Symptoms

The lesion appears as a deep, beefy-red color and is bordered with small, red, satellite pustules. In skinfolds, a white, macerated border may surround the red area. Later, deep and painful fissures may develop where the skin creases. If left untreated, the infection can lead to a life-threatening systemic disease.

General Management of Fungal Skin Infections

Treatment of fungal skin infections involves antifungal medication and changing the warm, moist environment. The two main classes of antifungals are allylamines and azoles. Use of either an allylamine or azole antifungal treatment depends on patient compliance and cost; allylamines are more costly but allow shorter treatment periods. Dry infections of athlete's foot, jock itch, and tinea capitis respond well to OTC topical azoles, such as clotrimazole (e.g., Lotrimin and Mycelex), one of the oldest antifungal treatments. Others include miconazole (e.g., Mictrin and Monistat) or tolnaftate (e.g., Tinactin). These typically are applied twice daily for at least 1 month. Moderate cases are best treated with allylamines, such as terbinafine, butenafine, or naftifine, twice daily for 2 to 4 weeks.[5,12,13] For individuals who continue the type of activity that can lead to the infection, topical treatment should continue for 2 weeks after signs of the infection are gone. During treatment, the area should be kept clean and dry. Loose, absorbent clothing (e.g., cotton socks and underwear) should be worn, and shower and locker rooms should be kept clean.[1,5]

Patients with widespread fungal infections (e.g., tinea corporis or tinea capitis) should be treated with griseofulvin, but this agent is not always effective. Resistant cases may respond better to systemic ketoconazole, fluconazole, and itraconazole; however, long-term use of these drugs, especially ketoconazole, may cause liver toxicity. Patients with tinea corporis should not return to play until completing a minimum of 72-hour topical fungicide treatment. The lesions must be covered with a gas-permeable dressing followed by underwrap and stretch tape. Patients with tinea capitis should complete a minimum of 2-week systemic antifungal therapy.[5] The general management of fungal skin conditions can be seen in **Application Strategy 32.2**.

APPLICATION STRATEGY 32.2

Management of Fungal Skin Conditions

- Wash the involved region four to five times daily and after physical exertion.
- Rinse all soap residue from the region and completely dry the area. With dry tinea infections, apply antifungal powder liberally before an exercise period.
- Apply topical antifungal agents, such as Halotex, Lotrimin, Mycelex, and Tinactin, twice daily for 1 month.
- If the condition does not clear up, see a physician to rule out candidiasis, dermatitis, psoriasis, or other skin disorders.
- In resistant infections, prescribed allylamines, such as terbinafine, butenafine, or naftifine, may be used twice daily for 2–4 weeks.
- Follow proper personal hygiene as listed in **Box 32.1**.

Viral Skin Conditions

Skin lesions caused by viruses, such as herpes simplex, herpes gladiatorum, herpes zoster (i.e., shingles), verrucae (i.e., warts), and molluscum contagiosum, can be difficult to treat, because they often require long-term

therapy and activity restrictions. Routine hygienic measures, such as showering immediately after activity and keeping individuals with open lesions on exposed skin from participating in contact sports, may reduce or eliminate transmission of these pathogens.

Herpes Simplex

Etiology

Herpes simplex virus (HSV) encompasses more than 80 different viruses and is extremely contagious. The two most common types are HSV-1 and HSV-2. HSV-1 (i.e., cold sores) normally infects the area of the lips, nose, and chin and orally recurs, on average, one to three times per year (**Fig. 32.9**). It has been known to be transmitted by direct skin-to-skin contact during participation in sports such as wrestling, in which it is called herpes gladiatorum.[17] It also causes approximately one-third of new cases of genital herpes and is transmitted most often through oral sex. HSV-2 causes two-thirds of all new genital herpes cases and 95% of recurrences of genital herpes.[18] HSV-1 recurs genitally approximately once every other year, whereas on average, HSV-2 recurs genitally approximately five times per year.

Figure 32.9. Herpes simplex. Lesions are evident on the vermillion border of the lip and beyond.

Signs and Symptoms

The incubation period for primary infection (2 to 12 days) usually begins with

a burning and stinging pain, tenderness, or itching at the infected site, followed by clusters of vesicles on an erythematous base. The lesions are capable of latency as they migrate to the dorsal ganglions in the spinal cord. There may be no other symptoms, or there may be fever, localized lymphadenopathy, malaise, myalgia, dysuria, pharyngitis, or rarely, keratoconjunctivitis. Preexisting abrasions or other underlying skin conditions will increase the likelihood of transmission.[5,18]

It is critical to identify the condition at an early stage and immediately refer the patient to a physician for care. During the latent state, the patient has no blisters, sores, or other symptoms. During the shedding stage, the virus begins to multiply in the nerves and can enter into body fluids, such as saliva, semen, or vaginal fluids. No symptoms are present at this stage, but the virus can be easily spread during this time.

A tendency exists to recur regularly—even monthly—at the site of the primary lesion. Several factors can trigger recurrences, particularly of the HSV-1 strain. These include sunlight exposure (especially on the lips), stress, fatigue, food allergies, other infections (e.g., cold or influenza), impaired immune system, hormonal changes caused by a woman's menstrual cycle, or pregnancy.[18]

Herpes Zoster

Etiology

Herpes zoster, or shingles, as it is more commonly known, is rare. Local trauma that occurs during contact sports occasionally can precipitate reactivation of the varicella virus, which, after a case of chickenpox, can retreat into the nerve roots, where it lies dormant. Participation should be prohibited, both for pain relief and to lessen transmission to others who have never had chickenpox.

Signs and Symptoms

Herpes zoster is characterized by unilateral, blister-like lesions that erupt along dermatomes, usually T3–L3 in the trunk or, less commonly, in the area of

the 5th cranial nerve.[19] Migrating along the dermatomes, the condition initially causes pain, burning, tingling, or itching, followed by eruptions of fluid-filled vesicles in strips on one side of the body 1 to 3 days later (Fig. 32.10). Other signs and symptoms include headache, malaise, swollen lymph nodes near the site of the eruption, and a low-grade fever. A few days after the vesicles form, they burst and crust over. Fluids from the lesions contain live viruses, so the patient remains infectious until the lesions crust over. The rash and blisters also can occur around the eye, on the face or scalp, inside the mouth, or down an arm or leg. Although the rash and blisters may resemble chickenpox, shingles typically is limited to a small area on one side of the body.

Figure 32.10. Herpes zoster. These grouped vesicles of various sizes are on an erythematous base.

Verrucae Virus

Etiology

More than 60 types of the human papillomavirus can lead to a rapid growth of cells on the outer layer of skin, resulting in a wart, of which verrucae plana (i.e., flat wart) and verrucae plantaris (i.e., plantar wart) are only two of the more common ones. Incubation is several weeks to 5 years after exposure.

Signs and Symptoms

The common wart is prevalent on the hands and appears as a small, round, elevated lesion with a rough, dry surface (Fig. 32.11). They do not retain the normal fingerprint lines on the hands and feet that corns and calluses do.[20]

Pressure on the wart increases the pain. Because of its location, the common wart often is subjected to secondary bacterial infection. A plantar wart, which grows into the thick stratum corneum of the foot, has tiny, dark red or black dots, representing thrombosed capillaries that have been penetrated by the root of the wart. Verrucae plantaris likely is transmitted from swimming pool decks or shower rooms.

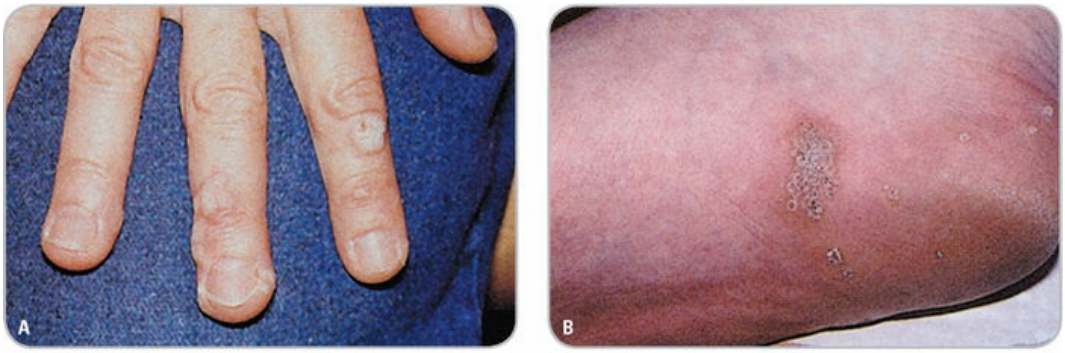


Figure 32.11. Verrucae virus. A, Verruca vulgaris produces dry, rough warts on the hands. **B,** Verruca plantaris leads to plantar warts.

Molluscum Contagiosum

Etiology

A poxvirus, molluscum contagiosum, is commonly reported by swimmers, wrestlers, gymnasts, and younger children who have immature immune systems. The virus is spread by personal contact and by contaminated swimming pools and gymnastic equipment.

Signs and Symptoms

Lesions, which are multiple, pearly papules 1 to 10 mm in diameter, appear flesh-colored to yellow and have a tiny, round spot on the surface (Fig. 32.12).[5] They commonly are found on the trunk, axilla, face, thighs, and genital areas. The condition is primarily a cosmetic problem; however, blunt trauma can rupture a papule, causing a disabling local inflammatory reaction that can mimic cellulitis. It is moderately contagious and is spread by skin-to-skin contact and autoinoculation. The lesions usually resolve in 6 to 12 months.

Figure 32.12. Molluscum contagiosum. This highly contagious poxvirus produces characteristic dome-shaped, shiny, waxy papules with a central white core.

General Management of Viral Skin Infections

Some viral conditions will dry up and heal without treatment. The virus, however, cannot be eradicated from the body. For herpes simplex and herpes zoster, treatment with oral antiviral medications should begin promptly. Patients with herpes simplex should not be cleared for return to play until they are free of systemic symptoms (e.g., fever, malaise), have no new lesions for at least 72 hours, have no moist lesions, and have completed a minimum of 120 hours of systemic antiviral therapy.[5] Although painful, a case of shingles usually heals entirely within a month with or without treatment. Because infection with HIV can precipitate herpes zoster in a young person, an HIV test is appropriate.

Recurrences of verrucae virus are frequent, and no single method of treatment is effective for all lesions. Options include mechanical, chemical, or immunological methods. Within 6 months, most young people develop an immunological reaction to the virus, and the wart may disappear with or without treatment. For others, any treatment will be ineffective. During the competitive season, a doughnut pad can be worn to alleviate some of the pressure to the area. After the season, under the direction of a physician or podiatrist, treatment may involve injections into the wart to kill the virus, cryosurgery (liquid nitrogen), electrocautery, excision, or laser treatment. Immunological methods used to induce an immune response to suppress warts

include injected agents (e.g., *Candida* or mumps antigen), topical agents, or oral agents.[5,20]

Treatment for molluscum contagiosum involves immediate referral to a physician who may employ a destructive mechanical modality (e.g., curettage, electrotherapy, or cryotherapy with liquid nitrogen), chemical treatments (e.g., physician-applied trichloroacetic acid), or immunological methods (e.g., topically applied immune enhancer that stimulates cytokines).[20] Full activity can be resumed 2 to 4 days after resolution of the curetted or removed lesions. Any localized lesions may be covered with a gas-permeable dressing followed by underwrap and stretch tape.[5]

The open sore that presented on the right thigh of the wrestler 3 days earlier has a honey-colored crust with surrounding erythema. The signs and symptoms that would indicate impetigo include itching or burning, but the area is not usually painful. The sore ruptures quickly, oozing either fluid or pus that forms a honey-colored crust, and eventually, the crust disappears, leaving a red mark that heals without scarring. Common sites for impetigo are the face, most often around the nose and mouth, body folds, and areas subject to friction and occlusion (e.g., thighs and axillae).

OTHER SKIN REACTIONS

During a summer field hockey camp for high school girls, one of the players comes off the field and reports being stung by a bee. This is the first time the individual has ever been stung. What signs and symptoms would suggest an allergic reaction to the venom?

Unlike skin infections caused by bacteria, fungi, and viruses, other skin problems caused by mechanical, environmental, allergic, or chemical reactions are not infectious and generally are mild in nature. Once identified, they can be treated easily with topical medications.

Chafing of the Skin

Etiology

Chafing of the skin, or **intertrigo**, is a superficial dermatitis more often caused by the friction of fabric rubbing against moist, warm skin rather than by skin rubbing against skin. The condition may occur between the creases of the neck, in the axillary and buttocks area, or beneath large breasts but is seen primarily in the groin region of individuals with muscular thighs or in obese individuals.

Signs and Symptoms

The condition is characterized by erythema, maceration, burning, and itching (Fig. 32.13). In severe cases, the skin becomes eroded and weeping. The condition can be prevented by wearing loose, soft, cotton underwear to keep the skin dry, clean, and free of friction or by wearing shorts with longer legs made of low-friction fabric.

Figure 32.13. Intertrigo. Intertrigo, or chafing of the skin, is a superficial dermatitis more often caused by the friction of fabric rubbing against moist, warm skin rather than by skin rubbing on skin. This condition often is confused with tinea cruris and cutaneous candidiasis.

Management

Treatment involves initial application of a cold compress. The area should be cleansed daily with mild soap and water, followed by application of a soothing ointment. Talcum powders should be avoided, because they can be abrasive and do not effectively absorb moisture.

Athlete's Nodules

Etiology

Also referred to as surfer's nodules, athlete's nodules are asymptomatic, dermal nodules found at various sites of the body that encounter repeated minor trauma, such as the feet of surfers and runners, knees of canoeists, and knuckles of boxers.

Signs and Symptoms

They generally occur at sites of recurrent trauma or friction and present as a solitary dermal nodule that is asymptomatic, symmetrical, and flesh-colored; they range in size from 0.5 to 4.0 cm. Location is dependent on the particular sport that the patient participates in. For example, boxers have them located on their knuckles from hitting the speed bag and they are referred to as "knuckle pads," surfers have them on the dorsal aspect of the feet and they are referred to as "surfer's nodules," and they are found on football players' ankles.

Management

Protective pads at the trauma sites can help to decrease pain. Otherwise, high-potency topical or intralesional corticosteroids can be applied. If this does not provide relief, the nodules can be incised.

Acne Mechanica

Etiology

Characterized by a local exacerbation of acne vulgaris caused by heat, occlusion, pressure, and friction, acne mechanica presents with erythematous crops of papules and pustules in areas of mechanical trauma.

Signs and Symptoms

Sometimes referred to as football acne, the acne develops wherever skin is exposed to prolonged causative factors, such as under chin straps, forehead bands, shirt collars, football shoulder pads, backpack straps, automobile seats, bras, wide belts, and orthopaedic casts and braces. Like regular acne, the signs

are whiteheads, blackheads, and pimples in the affected area (Fig. 32.14). If left unattended, the acne may develop into a cyst—a thick lump beneath the surface of the skin formed by the buildup of secretions deep within hair follicles.

Figure 32.14. Acne mechanica. This young male developed acne-like lesions that appeared under his football chin strap. The bacterial culture was positive for *S. aureus*.

Management

Treatment and prevention include thoroughly cleansing the area after activity with a mildly abrasive cleanser and back brush. Application of a topical astringent or 10% benzoyl peroxide agent, a topical antibiotic, and in severe cases, a systemic antibiotic may be prescribed. The condition usually improves or resolves after the season. Prevention involves wearing a clean, absorbent t-shirt under the football pads and treating any underlying acne vulgaris. If an exercise leotard is worn during exercise, it should be removed immediately after the workout.

Striae Distensae

Etiology

Stretch marks, or **striae distensae**, often are seen in individuals who participate in high-intensity weight training. Although the origin is unclear, it is most often seen after rapid growth of a body part, which is believed to result in fragmented elastic skin fibers.

Signs and Symptoms

The condition is characterized by linear pink or flesh-colored patches most often seen on the chest, shoulders, and upper outer arms (Fig. 32.15).

Figure 32.15. Striae. Striae occurs after rapid growth of a body part, such as during high-intensity weight training or during pregnancy. The initial purplish color will fade over time, but the striae are permanent.

Management

No treatment exists for striae distensae.

Sunburn

Etiology

Sunburn is an inflammatory response of the skin to excessive exposure to the ultraviolet radiation in the sun's rays. Repeated overexposure can lead to an increased risk of premature aging, cutaneous melanoma, and cancer.[21] Sunscreens applied to the skin prior to sun exposure can prevent many of the damaging effects of ultraviolet radiation. The effectiveness of the sunscreen is based on the SPF. For example, an SPF of 15 indicates that an individual can be exposed to ultraviolet light 15-fold longer than without a sunscreen before the skin will begin to burn. Higher numbers provide better protection: SPF 15 is good, SPF 30 is better, and SPF 50 provides a complete sun block. A minimum SPF of 15 is recommended. The degree of sunburn depends on the length of exposure to the sun, the sun's relative level of intensity, and personal

skin type. Although sunburns are easily treated, it is best to prevent them from occurring (Box 32.2).

BOX 32.2 Prevention of Sunburn

- Use a sunscreen with an appropriate sun protection factor (SPF) for your skin type (preferably one with an SPF of 15 or higher).
- Apply sunscreen 20–30 minutes before exposure to the sun.
- Apply sunscreen evenly over all exposed skin to avoid isolated areas of sunburn.
- Reapply sunscreen every 2–4 hours, especially if sweating profusely.
- Select sunscreen that has a high rate of efficacy when subjected to moisture.
- Be careful when applying the sunscreen around the eyes.
- Sunscreen sprays work well for the top of the head; lip protectors also should be used.
- Avoid midday exposure to the sun (10:00 a.m.–4:00 p.m.).
- While in the sun, wear loose, woven, light, cotton clothing.
- Hats with brims are much better than caps or visors.
- Sunburn can occur on cloudy days, so sunscreen should be worn at all times.
- Be aware of the reflective photo-energy potential when around water or snow.
- Several medications (e.g., antibiotics, antiseptics, anesthetics, and certain nonsteroidal anti-inflammatory drugs) increase sensitivity to the sun. Read the instructions for use of any medications before sun exposure. If there are questions, consult a pharmacist or physician.
- Drink plenty of nonalcoholic beverages to prevent dehydration.

Signs and Symptoms

Sunburns are classified as first, second, or third degree. The full extent of the

injury may not be assessed until 24 to 48 hours after exposure. First-degree sunburns have mild erythema throughout the area of exposure and may have associated pain and discomfort (Fig. 32.16). Second-degree sunburns have vesicles or blisters in addition to the erythema. Peeling of the skin usually begins after 2 to 3 days, and the skin is dry and itchy. Third-degree sunburns will exhibit skin ulcerations. Systemic symptoms of burns, regardless of their degree, include fever, chills, nausea, and exhaustion. Acute sunburn (i.e., actinic dermatitis) can be painful and disfiguring and, depending on the severity, can prevent participation in sport and physical activities.[1,21]

Figure 32.16. Sunburn. A, First-degree sunburn. **B,** Second-degree sunburn with substantial blisters.

Management

If sunburn occurs, apply a cold compress, topical hydrocortisone 1% cream or spray, and aloe vera to decrease pain and discomfort. If systemic aspirin or nonsteroidal anti-inflammatory drugs (NSAIDs) are used, they must be taken immediately after exposure to the sun to be effective. Serious second- and third-degree sunburns require immediate referral to a physician to ensure proper treatment and prevention of infection. Oral corticosteroids may be prescribed to relieve the pain.

Pernio (Chilblains)

Etiology

Excessive exposure to cold can lead to **pernio**, a condition whereby the skin tissue does not freeze but, rather, reacts with erythema, itching, and burning. This happens especially on the dorsa of the fingers and toes and on the heels, nose, and ears. More commonly seen in young women, the condition often occurs with the first exposure to lower temperatures in highly humid conditions.

Signs and Symptoms

The affected area appears reddish, and it itches and burns (Fig. 32.17). Lesions may be single or multiple and, in severe cases, may appear blistered or ulcerated.

Figure 32.17. Chilblains. Excessive exposure to cold can lead to pernio, in which the tissue does not freeze, but, rather, appears reddish, itches, and burns.

Management

Treatment involves gradual warming of the body part. Topical steroids may help to reduce inflammation, but the potency must be low enough to prevent further vasoconstriction. Heavy woolen socks may need to be worn at all times, including when indoors and while sleeping.

Miliaria Rubra

Etiology

Miliaria, or "prickly heat," is caused when active sweat glands become blocked by organic debris, leading to an inflamed and pruritic skin eruption. It was discussed in detail in Chapter 29.

Management

Treatment involves cooling and drying the skin, controlling the itching, and watching for infection. Individuals should avoid occlusive topical ointments and close-fitting, poorly absorbent fabrics on the skin.

Dry (Xerotic) Skin

Etiology

Dry skin is common during the winter months. Individuals who must shower frequently are particularly prone to this condition. Xerotic skin can be caused by a number of factors, but decreased skin lipids appear to be the major cause (Box 32.3). In the winter, dry and cold winds increase evaporation from convection, and low temperatures decrease skin flexibility and, in doing so, exacerbate the condition.

BOX 32.3 Causes of Dry (Xerotic) Skin

- Genetic predisposition to dry skin
- Repetitive trauma from scratching already dry skin
- Decreased skin lipids because of the following:
  - Age
  - Chronic illness
  - Malnutrition
- Environmental factors, such as the following:
  - Decreased humidity
  - Winter weather (dry, cold winds)
  - Indoor heating and air conditioning
  - Dry environments (airplanes)

- Use of industrial or domestic cleansers or solvents
- Frequent bathing

Signs and Symptoms

The skin appears dry, with variable erythema and scaling. Usually appearing first on the shins, it is also common on the forearms and dorsum of the hands. For individuals who exercise outdoors in the winter, the face can also be affected. Localized or generalized pruritus is the most common symptom. When severe, the dry skin loses its suppleness and cracks, fissures, and erythema appear.

Management

Treatment is focused on preventing skin dehydration. Tepid, rather than hot, water should be used for bathing, and time spent in the shower should be limited. Moisturizing soaps may be used; however, xerotic areas should be avoided. If possible, use of soap should be limited to the genitalia, underarms, hands, feet, and face. Bubble baths and brisk scrubbing should be avoided. Emollient lotions containing high concentrations of lipids increase and maintain hydration by occluding the skin surface and help to insulate against the cold. These should be applied frequently and liberally, especially after each hand washing and immediately after bathing to minimize water loss from evaporation. Swimmers should moisturize the whole body after bathing. In severe cases, antipruritics may be used to decrease pruritus and scratching, thus enabling the outer skin layer to heal. α-Hydroxy acids and topical corticosteroids can be used to decrease the inflammation associated with fissures and severely dry skin.

Eczema

Etiology

Eczema is a generic term for acute or chronic inflammatory conditions of the skin. The condition can have an onset during the first few years of life, and a history of asthma or hay fever may be reported.[22] Eczema can take a physical

as well as an emotional toll.

Signs and Symptoms

The condition is characterized by poorly marginated erythema with scaling and exudate (Fig. 32.18). Persistent itching and burning can lead to evidence of excoriation. The condition is aggravated by an increase in body heat and perspiration, both of which occur during physical activity. Patients may report that the itching and scratching disrupt their sleep.

Figure 32.18. Eczema. This inflammatory condition of the skin is characterized by poorly marginated erythema with scaling and exudate. In this patient, the vesicles are beginning to dry, and the lesions are becoming scaly.

Management

Topical corticosteroids in an emollient cream or ointment base can serve as a substitute for soap, bath oils, and moisturizers. These are active ingredients intended to support the dermal layer and reduce itching. Consistent use of the steroid should be applied to the affected area after bathing. Use of very potent steroid applications should not exceed 3 weeks; use of moderate to mild steroid application should not exceed 3 months at a time without reexamination of the affected region.[22] Antihistamines may provide relief from the itching but, during acute flares, systemic corticosteroids most often are used.

Psoriasis

Etiology

Psoriasis is a chronic, distressing skin disorder that can affect the skin, tendons, ligaments, and joints and is characterized by a rapid buildup of rough, dry, dead skin cells, forming thick scales. Normally, it takes approximately a month for new skin cells to move from the lowest layer of skin, where they first form, to the outermost layer, where they die and scale off in flakes. In psoriasis, the life cycle of skin cells speeds up, resulting in a multitude of dead cells on the outermost layer of skin. The scales tend to flare periodically and may go into remission, but they usually remain active for years. The most common form of psoriasis, plaque psoriasis, occurs in more than 80% of affected individuals.[23]

Factors that may trigger psoriasis include a systemic infection (e.g., strep throat), an immune system response to disease, injury to the skin, certain medications (e.g., lithium, β-blockers, antimalarial drugs, NSAIDs, and oral steroid withdrawal), alcohol, and environmental factors, such as overexposure to sun or prolonged contact with chemicals (e.g., disinfectants and paint thinners).[23,24]

Signs and Symptoms

Plaque psoriasis is characterized by sharply demarcated, dry, red patches of skin covered with silvery scales that typically affect the elbows, knees, scalp, and intergluteal cleft (**Fig. 32.19**). Scales from scalp patches of psoriasis may resemble dandruff. In some cases, there may be pitting, ridging, and discoloration of fingernails and toenails. Individuals lose many of the protective functions of skin, including its ability to protect against infection, regulate body temperature, and prevent loss of fluids and nutrients through the cutaneous surface.[25]

Figure 32.19. Psoriasis. This chronic skin condition is characterized by a rapid buildup of rough, dry, dead skin cells forming thick scales.

Management

Psoriasis is difficult to control because of the wide variation in type, severity, and response to treatment. It is a chronic disease without a cure. Three broad categories of treatment options exist, including topical modalities, phototherapy, and systemic therapy. Topical therapies are effective for mild to moderate cases, whereas phototherapy and systemic medications are more appropriate for more severe cases. Topical treatments include topical steroids, tar, anthralin, vitamin D derivatives, retinoids (e.g., tazarotene), immunosuppressants (e.g., tacrolimus and pimecrolimus), and salicylic acid. Newer topical treatments (e.g., Elidel cream and Protopic) have been especially effective in treating children with the disorder.[24] Phototherapy with broadband ultraviolet B light, narrowband ultraviolet B light, and psoralen with ultraviolet A light as well as oral acitretin, methotrexate, and cyclosporin also are highly effective.[23] Alefacept (e.g., Amevive) is a treatment option for more severe cases of psoriasis or for those cases that do not respond to other treatments.

Hyperhidrosis

Etiology

Hyperhidrosis is a condition involving excessive perspiration, particularly on the palms and axillary region. The condition can interfere with sports that require holding various objects (e.g., balls, discus, bars, oars, and sticks) or that require gripping (e.g., tennis and racquetball). The plantar sweat glands often are stimulated when the extremities are used and during times of emotional excitement, which also stimulates the axillary apocrine glands.

A number of factors can affect how much an individual sweats and even how the sweat smells. Some people sweat more than others for no apparent reason; however, other factors can cause intense sweating. These may include heredity, certain foods (i.e., spicy foods, hot beverages, and beverages containing caffeine or alcohol), and certain drugs (i.e., some antipsychotic medications, morphine, excess doses of the thyroid hormone thyroxine, and overdoses of analgesics [e.g., aspirin and acetaminophen]). Women going through menopause may experience hot flashes (i.e., a rise in skin temperature accompanied by sweating and a feeling of intense heat) because of a drop in estrogen levels. Some menopausal women also may be awakened at night by soaking sweats followed by chills.

Signs and Symptoms

Patients describe excessive perspiration triggered by emotion that began in childhood or adolescence. It is most likely to occur on the face, underarms, palms, and soles of the feet. Palmar hyperhidrosis usually is accompanied by plantar hyperhidrosis, which is easier to conceal, but may cause **bromhidrosis**, infection, and skin maceration. Excessive palm perspiration can make it difficult to grasp common objects and, if one avoids handshakes or chooses not to touch other individuals, can lead to professional embarrassment.

Management

For some individuals, OTC antiperspirants used on the underarms, hands, and feet may limit the production of perspiration. Antiperspirants block the sweat ducts with aluminum salts, thereby reducing the amount of perspiration that reaches the skin. Deodorants, which can eliminate odor but not perspiration, turn the skin acidic, which makes it less attractive to bacteria. Antiperspirants

can cause irritation or contact dermatitis. For more severe cases, an individual may apply, as prescribed, 20% aluminum chloride hexahydrate with anhydrous ethyl alcohol. The solution must be applied to dry skin, typically before sleep, and washed off 6 to 8 hours later.[26] Physically active individuals may wish to wear gloves to help absorb the sweat, or they may choose not to participate in activities that require a prolonged hand grip. If OTC products are not strong enough, other recommended treatments may include iontophoresis, botulinum toxin (e.g., Botox) injections to block the nerves that trigger the sweat glands, or surgery to remove troublesome sweat glands.

Bites and Stings

Bites and stings come from a variety of insects, including mosquitoes, flies, spiders, ants, bees, fleas, and ticks. Although many are just annoying pests that can be discouraged with standard insect repellent, their bites and stings can be painful or even life threatening if the individual develops an allergic reaction to the venom (i.e., anaphylaxis).

Anaphylaxis

Etiology

Anaphylaxis is an immediate, shock-like, and frequently fatal hypersensitivity reaction that occurs within minutes of administration of an allergen unless appropriate first-aid measures are taken immediately. The condition is characterized by contraction of smooth muscle and dilation of capillaries because of the release of pharmacologically active substances (e.g., histamine, bradykinin, and serotonin).

Signs and Symptoms

Signs and symptoms include respiratory distress, cyanosis, rapid and weak pulse, weakness, low blood pressure, localized urticaria or edema, paresthesia, dilated pupils, choking, wheezing, sudden collapse, involuntary loss of bowel and bladder control, headache, dizziness, seizures, and unconsciousness.

Management

A patient with a history of such reactions may wear a medical identification tag and have a self-administered epinephrine device (Epipen). An Epipen auto-injector is an epinephrine-delivery system with a spring-activated needle. It is used to treat severe allergic reactions to insect bites or stings, foods, drugs, and other allergens. It also may be used as treatment for basic life support of individuals suffering from a severe asthma attack.

Epipen comes in two strengths—namely, Epipen Jr. for children up to 33 lb and Epipen Adult. It is best used when injected directly into the skin, preferably the thigh, but it can be injected through clothing if necessary. Once in the system, epinephrine constricts blood vessels to improve blood circulation and blood pressure and relaxes smooth muscles to improve breathing. Epinephrine also stimulates the heartbeat and reverses swelling and hives. The effects of epinephrine take place within seconds and can last for 10 to 20 minutes. Epipen should not be stored in extreme heat or direct sunlight, be refrigerated, or be used if the liquid is cloudy or discolored or the expiration date has passed. Application Strategy 32.3 describes the proper use of a self-administered epinephrine device.

APPLICATION STRATEGY 32.3

Use of an Epipen Auto-Injector

1. Check the expiration date to make sure the pen is usable.
2. Check the fluid for cloudiness or discoloration (discard if cloudy or discolored).
3. Remove the gray safety cap.
4. Hold the Epipen firmly with the black tip against the skin of the thigh.
5. Push the pen into the thigh and apply moderate pressure for 10 seconds to inject the fluid.
6. Discard the used pen using universal precautions.
7. Call emergency medical assistance to provide further care for the injured party.

Mosquitoes, Gnats, and Flies

Etiology

Mosquitoes, gnats, and a variety of flies feed on human blood and are considered to be biting insects.

Signs and Symptoms

Most bites appear as erythematous, macular or papular, pruritic, painful lesions. The lesion may not be apparent immediately but may appear as a delayed hypersensitive response to the saliva of the biting organism.

Management

Immediate application of a cold compress can relieve pain, or an OTC topical corticosteroid or systemic antihistamine may be used. Systemic corticosteroids are used in severe cases. Once a lesion has appeared, it should be monitored closely for secondary infection.

Bees, Wasps, and Ants

Etiology

It is estimated that more than 20% of the U.S. population is allergic to the hymenopteran venom from bees, wasps, and ants, which in turn carries a higher risk of allergic and anaphylactic reactions. Individuals involved in outdoor activities are at special risk for insect stings. Yellow jackets and honeybees, for example, are fond of sweets and can be drawn to rehydration stations stocked with sugar-containing sport drinks. Fire ants, especially in the southern United States, can be found on practice and game fields where individuals may sit on the ground.

Signs and Symptoms

The sting results in a painful wheal or hive caused by the venom. The site rapidly becomes pruritic, and itching can last for several hours. Occasionally, an exaggerated local reaction can occur in which the swelling and itching extend beyond the sting site to the involved extremity and may be associated

with dyspnea, tachycardia, hypotension, and anaphylaxis.

Management

This situation may result in a medical emergency. When a sting occurs, the guidelines in Application Strategy 32.4 should be followed.

APPLICATION STRATEGY 32.4

Management of a Bee Sting

Prevention Note

For sensitive athletes who participate outdoors, suggest that they do the following:

1. Refrain from wearing bright, colorful, or floral clothing.
2. Refrain from using scented soaps, lotions, or aftershaves.

After Sustaining a Bee Sting

1. Immediately refrain from strenuous exercise.
2. Remove the stinger with a fingernail. Do not squeeze it, because this will inject more venom.
3. Apply ice to the site.
4. Systemic antihistamines may help with local reactions.
5. Observe closely for signs of anaphylactic shock:
   - Faintness, deteriorating consciousness, or other signs of shock
   - Generalized urticaria or edema
   - Paresthesia
   - Choking or signs of laryngeal edema
   - Pupillary dilation
   - Wheezing, coughing, or difficulty breathing

If Anaphylaxis Occurs

1. Place the patient supine with the feet elevated.

2. Apply a constricting band a few inches proximal to the sting site that
   - Occludes superficial venous and lymphatic return.
   - Does not obstruct arterial flow.
3. Continue ice application to further reduce venom absorption.
4. Check for a medical identification tag.
5. If the person has an Epipen or other allergy kit, inject the epinephrine into the thigh as instructed.
6. If respiratory or cardiac arrest occurs, begin cardiopulmonary resuscitation.

Spiders

Etiology

The venom from several spiders also can lead to painful lesions (Fig. 32.20).

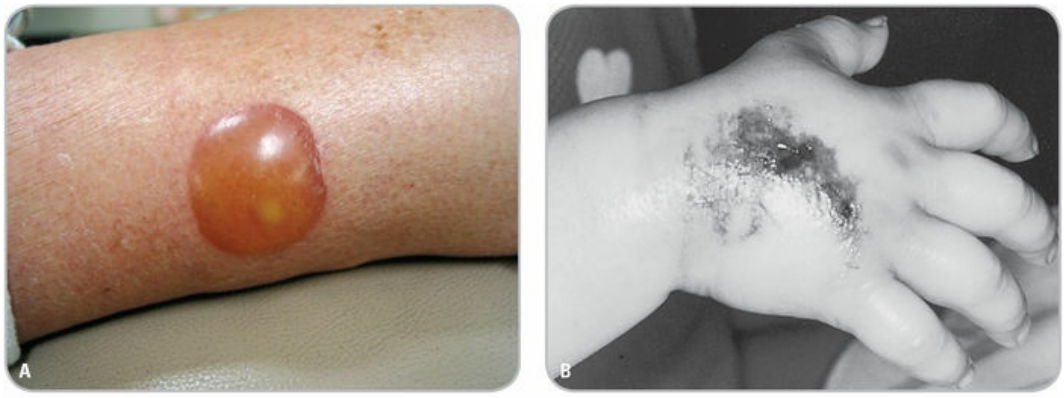


Figure 32.20. Spider bites. A, This spider bite resulted in a large, fluid-filled bullous. **B,** Necrotizing skin damage resulted from a brown recluse spider bite.

Signs and Symptoms

Black widow spiders are found throughout the United States; however, only the female—a dark-black, globular-shaped spider with the characteristic ventral, reddish marking (typically an "hourglass") on her abdomen—is large enough to bite through human skin. Because the webs typically are built in relatively undisturbed, protected areas, most sport-related bites occur in storage areas for equipment. The bite often is felt as a "pinprick" and may be slightly red. Significant symptoms usually start 1 hour after the bite, with the most common symptom being spasmodic muscle pain. The spasms may progress to regional

muscle groups of the trunk, with pain and spasm lasting from 12 to 48 hours. Other reactions may include an increased respiratory rate, tachycardia, hypertension, fever, headache, nausea, vomiting, restlessness, and anxiety.

Activate the emergency plan, including summoning emergency medical services (EMS).

The brown recluse spider is found predominantly in the Southern and Midwestern United States. Bites cause the most severe form of arthropod-induced tissue necrosis, yet these bites are relatively painless at first and may go undetected. In the ensuing hours, the site becomes pruritic, red, and mildly swollen. Local pain, resulting from vasospasm and ischemia, begins within 2 to 8 hours. After 12 to 18 hours, a small, central vesicle develops, surrounded by an irregular border of erythema, ecchymosis, and edema. If the blister ruptures, the erythema darkens and may spread distally. After 5 to 7 days of progressive aseptic necrosis, the bite area becomes depressed and covered with a black crust that eventually sloughs off, leaving an open ulcer that tends to heal over a period of several weeks. Healing is slow, requiring 2 to 4 months.[27]

The bark scorpion, which is native to Arizona and adjacent regions, is a nocturnal spider that tends to hide in dark areas during the day. The small tooth at the base of its stinger distinguishes the bark scorpion from other less toxic species. Individuals involved with outdoor activities are most at risk. Individuals who are stung by a scorpion feel immediate, intense pain that significantly worsens with light pressure over the site. The pain may radiate throughout the extremity. Systemic reactions include restlessness, hypersalivation, dysphagia, visual changes, roving eye movements, respiratory distress (with stridor or wheezing), hypertension, fever, loss of bowel or bladder control, muscle spasms, and paralysis.

Management

The majority of spider bites and stings occurring in healthy, young adults can be managed on-site. Management includes cleaning the site with soap and

water, application of ice, elevation of the affected limb to approximately heart level, and administration of aspirin or Tylenol as needed for minor discomfort. Application of ice or cold packs to bite sites has been shown to significantly reduce inflammation and slow the evolution of the lesion.[27] Prophylactic antibiotics usually are given to prevent secondary infection. Antihistamines are administered mainly to relieve pruritus and swelling. Children who have been stung or any patient who is experiencing severe symptoms, such as respiratory distress, should be transported immediately to the nearest medical facility for evaluation and management.

Fleas and Ticks

Etiology

Bites from fleas cause only minor discomfort. Ticks are parasites that attach their heads onto people or animals and then absorb blood. Deer ticks, in particular, are frequent carriers of **Lyme disease**, whereas other wood ticks carry a specific type of bacteria that leads to an infectious disease called Rocky Mountain spotted fever. Ticks are easily picked up on clothing when the individual is in tall grass, shrubs, or a wooded area.

Signs and Symptoms

Most fleas bite in patterns of three and tend to attack the ankle and foot. Scratching the area could complicate the condition by developing a secondary infection.

Common symptoms from a tick bite include generalized malaise, myalgia (especially in the back and legs), fever, frontal headaches, nausea, and vomiting. Other symptoms may include nonproductive cough, sore throat, pleuritic chest pain, and abdominal pain.[28] An allergic reaction to tick saliva will occur at the bite site. The resulting rash usually occurs within hours to a few days after the bite, usually does not expand, and disappears within a few days.

Deer ticks are considerably smaller than an American dog tick, but the deer tick needs to stay attached to the host for 24 to 36 hours to transmit the disease-

causing bacteria. The disease occurs in two stages: localized and disseminated.[28] The localized stage is characterized by a bull's-eye rash (a round ring with central clearing that may expand to a diameter of up to 50 cm) (**Fig. 32.21**). Common sites for the rash are the thigh, groin, trunk, and armpit. Other possible symptoms include low-grade fever, fatigue, headache, arthralgia, cough, and regional lymphadenopathy. Flulike symptoms including malaise, myalgia, arthralgia, headache, and fever may occur. Lymphadenopathy is also likely to occur during the localized stage. The disseminated stage is seen a few weeks after the initial infection when symptoms progress to multiple secondary cutaneous annular lesions, fever, cough, pharyngitis, adenopathy, and changes in the central nervous system symptoms. For dark-complexioned individuals, the rash looks like a bruise. During this stage, rheumatological (pain in tendons, bursae, muscle, and bones), cardiac (conduction abnormalities, myocarditis, and pericarditis), neurological (Bell palsy, meningitis, encephalitis, and cognitive difficulties), and additional manifestations (conjunctivitis, splenomegaly, and keratitis) may occur.[28]

Figure 32.21. Lyme disease. The characteristic bull's-eye rash appears 3 days to 1 month after infection and presents itself as multiple annular lesions of erythema with central clearing.

In Rocky Mountain spotted fever, a bacterium is unlikely to be transmitted to a person by a tick that is attached for less than 20 hours. Symptoms develop 2 to 14 days after the bite and include chills, fever, severe headache, muscle pain, mental confusion, and a rash initially appearing on the wrists and ankles

as spots that are 1 to 5 mm in diameter and then spreading to most parts of the body. About one-third of infected people do not get a rash. Other symptoms may include photophobia, diarrhea, excessive thirst, hallucinations, loss of appetite, nausea, and vomiting.[28]

Management

For flea bites, treatment is limited to applying an antipruritic lotion over the area. For tick bites, the tick should be removed by applying a substance that blocks the tick's access to the air (e.g., petroleum jelly, mineral oil, or fingernail polish). The substance should make the tick withdraw its head. No attempt should be made to pull the tick from the body because doing so may leave the head embedded under the skin. If signs and symptoms of Rocky Mountain spotted fever or Lyme disease appear, the patient should be referred immediately to a physician for treatment. Routine antibiotic prophylaxis is not indicated; however, if symptoms develop, antibiotic treatment for 14 to 21 days is curative in most cases.[28]

Scabies

Etiology

Scabies is a skin disease caused by a tiny, eight-legged burrowing mite, *Sarcoptes scabiei*, that produces severe, intensely itching lesions in the area of its burrows. The condition can lead to a "miniepidemic" in sports that involve physical contact, such as wrestling, rugby, or football. The mite can be spread on towels, uniforms, or equipment. Once on the skin surface, the mite burrows into the epidermis, but symptoms may not arise until 3 to 4 weeks after exposure.[12] Because of the contagious nature, physicians often recommend treatment for entire families, sexual partners, athletic teams, groups, or school classes to eradicate the mite.

Signs and Symptoms

The affected area appears as small, dark burrows and tiny vesicles in a linear distribution between the fingers and in toe web spaces, in axillary skinfolds,

around the waist, or on the elbows, wrist, ankles, lateral foot, breasts, buttocks, periumbilical skin, and genitalia (Fig. 32.22). Intense itching, which often is severe, is usually worse at night. In first-time infections, pruritus may not develop for several weeks, whereas recurring infections may lead to symptoms within 24 hours.[15]

Figure 32.22. Scabies. Scabies is caused by a burrowing mite, which produces severe, intensely itching lesions in the area of its burrows.

Management

Immediate referral to a physician is essential. Treatment involves eliminating the scabies infestation with medications. Topical creams and lotions, such as permethrin (e.g., Acticin) and lindane (e.g., Kwell), can be applied over the body and left on for 8 to 12 hours before being washed off. Lindane is not recommended for infants, small children, women who are pregnant or nursing, or people who have seizures or other neurological disorders. The locker room and game equipment should be disinfected. Bedding and clothing must be washed daily in hot water. Although these medications kill the mites, the itching may not subside for several weeks.

Lice (Pediculosis)

Etiology

Pediculus corporis (i.e., body lice), pediculus capitis (i.e., head lice), and

pediculus pubis (i.e., genital lice) affect 6 to 12 million people each year and are spread by close physical contact, which makes outbreaks among those who participate in physical activities and sports problematic.[12]

Signs and Symptoms

Once infected, it can take up to 10 days for the nit (louse egg) to hatch. Based on the location of the infestation, patients may describe nighttime itching and, through subsequent scratching, pustules and excoriation. Head lice cause itching when they bite the skin of the scalp and neck. Egg sacks, or nits, can adhere firmly to the hair shafts and be seen behind the ears, on the back of the neck, and on the head. Body lice (length, 2 to 4 mm) are clearly visible, live in the folds of clothing, and tend to bite in areas of close contact with clothing. Pubic lice (e.g., crab lice [length, 1 to 2 mm]) typically are seen in the genitals, anal region, and lower abdomen but also can be found on the chest or axillary hair (**Fig. 32.23**).

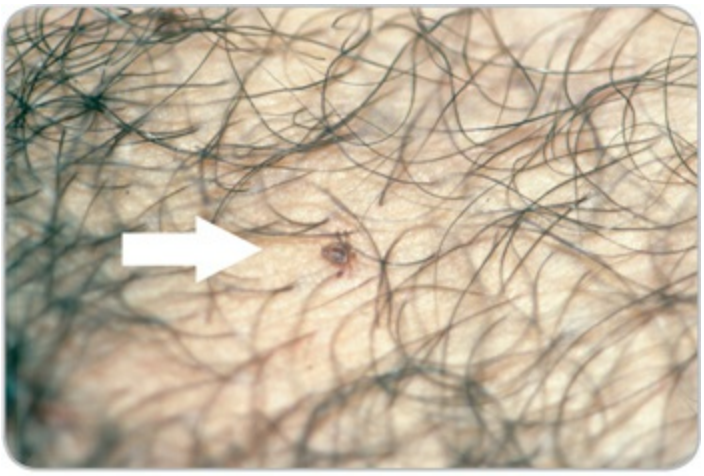


Figure 32.23. Lice. A pubic louse is a small, brown, living crab louse that can be seen here at the base of the pubic hairs (*arrow*).

Management

Treatment of head and pubic lice involves a 7-day regimen of permethrin lotion (either 1% or 5%), lindane 1% shampoo, petrolatum for eyelashes, and/or shampoo containing pyrethrin and piperonyl butoxide. Nit combs are available to help remove nits from hair, and all clothing, bed linens, and

sporting equipment should be washed in boiling water and dried in a hot dryer or discarded.

Contact Dermatitis

Etiology

Contact dermatitis is classified as either allergic or irritant dermatitis (Fig. 32.24). **Allergic contact dermatitis**, which accounts for almost one-third of all contact dermatitis, results when a substance comes in direct contact with the skin, leading to a simple inflammatory reaction. Common agents that contribute to the condition include adhesive tape, rubber articles (e.g., straps, pads, swim goggles, swim fins, swim caps, and shoes), tape adherent and remover, soap, detergent, and deodorant. In contrast, **irritant contact dermatitis** results when the substance causes direct skin damage, pain, or ulceration. Contact dermatitis affects only the area in direct contact with the causative agent, leading to a sharp line of demarcation between normal skin and affected skin. For example, reacting to a watch band or swimming goggles leads to characteristic patterns of erythema and irritation.

Figure 32.24. Contact dermatitis. A, Allergic contact dermatitis results when a substance comes in direct contact with the skin, leading to a simple inflammatory reaction. **B,** Irritant contact dermatitis results when the substance causes direct skin damage, pain, or ulceration, such as with tight shoes or prolonged used of latex gloves.

Signs and Symptoms

Allergic dermatitis remains localized to the affected area and is identified by dry vesicles that are accompanied by pain, erythema, and pruritic conditions. Heat, whether internal or external (e.g., hot bath), intensifies symptoms and

accelerates the skin's reaction. Irritant dermatitis also presents with erythema, pruritus, pain, and swelling. It often occurs secondary to physical and mechanical agents, such as burns from dry ice, abrasions from artificial turf, friction burns caused by poorly fitted equipment, **striae**, or increased sweating between skinfolds (e.g., groin or under breast tissue), as well as during skin loss secondary to an application of a causative agent (e.g., adhesive tape). Diagnosis of either type of contact dermatitis relies on the history and distribution of the rash.

Management

During acute reactions, a cold compress should be applied to the affected area. Systemic antihistamines are used to reduce itching and inflammation along with topical agents (e.g., corticosteroids) for acute cases. Topical antihistamines and benzocaine products never should be used for these conditions. In more severe cases with vesiculation and blistering, oral prednisone therapy may be prescribed.[29] The causative agent should be identified and contact with the agent eliminated. Disqualification from activity is dependent on the degree of skin involvement, severity of symptoms, and type of sport (i.e., contact versus noncontact).

Urticaria

Etiology

Urticaria (i.e., hives) usually is systemic in origin. It is caused by a hypersensitivity to foods or drugs, infection, physical agents (e.g., heat, cold, light, and friction), or psychic stimuli (**Fig. 32.25**).

Figure 32.25. Urticaria. Hives may result from hypersensitivity to foods or drugs, infection, physical agents, or psychic stimuli.

Signs and Symptoms

The condition may present with superficial swellings of the dermis, called **wheals**, or deeper swellings of the dermis, subcutaneous, or submucosal tissues, known as **angioedema**. Wheals are smooth, slightly elevated areas on the body that appear red with a pale center and are accompanied by severe itching. They may mature into pink, superficial plaques that usually resolve within 24 hours without sequela. Angioedema tends to be pale and painful and to last longer than wheals, and it also may affect the mouth and, rarely, the bowel.[30] Urticaria commonly is seen in allergies to mechanical or chemical irritants.

Cholinergic urticaria, also known as generalized heat urticaria, presents as lesions within 15 minutes of sweat-inducing stimuli, such as physical exertion, a hot bath, fever, alcohol, or sudden emotional stress. Clinical presentation reveals small papules that appear first in the upper thorax and neck, then spread inferiorly to involve the entire body. Systemic symptoms, although rare, include generalized sweating, abdominal cramps, dizziness,

wheezing, and bradycardia. The inner aspects of the arms, legs, and lateral flanks are common sites. Some medical experts believe that **exercise-induced urticaria** may be a variation of cholinergic urticaria, but the lesions are much larger. Systemic signs are limited to wheezing and hypotension. **Cold urticaria** is very common in those who are physically active, is nonallergic, and is characterized by localized or generalized wheals that develop in minutes in response to cold exposure. The condition often becomes apparent when a cold pack is placed on an individual who is hypersensitive to cold.

Management

Based on the cause, aggravating factors should be identified and eliminated. Currently, no cure is available for heat urticaria, but antihistamines, such as hydroxyzine and cyproheptadine, generally are used to relieve symptoms. Although individuals are symptomatic, they may wish to avoid physical activity and sports participation. Simple cooling lotions, such as menthol in aqueous cream, often are used. Unlike heat urticaria, exercise-induced urticaria can be successfully treated with prescribed antihistamines, anticholinergics, or β-agonists. Epinephrine generally is the treatment of choice when systemic signs are present. Avoid NSAIDs and aspirin in favor of acetaminophen, because analgesics can aggravate the symptoms.[30] In cold urticaria, the condition responds well to small doses of oral corticosteroids.

If the field hockey player is having an allergic reaction to the venom, she could experience anaphylactic shock. The signs and symptoms of anaphylaxis include respiratory distress, cyanosis, weakness, rapid and weak pulse, low blood pressure, localized urticaria or edema, paresthesia, dilated pupils, choking, wheezing, sudden collapse, involuntary loss of bowel and bladder control, headache, dizziness, seizures, and unconsciousness. This condition is life threatening and represents a medical emergency.

SUMMARY

1. Whenever skin is damaged, a lesion appears. Skin lesions are identified by their size and depth. Recognizing the type of lesion can help to identify the cause of the skin damage.
2. Skin infections may stem from fungi, bacteria, or viruses.
3. Bacterial lesions typically are caused by a staphylococcal or streptococcal infection. Impetigo is highly contagious and is characterized by small vesicles that form pustules and, eventually, honey-colored, weeping crustaceans. Bacterial skin conditions are treated with OTC antibacterial topical agents.
4. Fungi thrive in dark, warm, moist environments and often attack the fingernails, toenails, foot, groin, body, and scalp. Common signs and symptoms include pruritus, redness, and scaling. Antifungal medication is used to treat the condition.
5. Viral skin conditions can range from the common wart to the highly contagious herpes gladiatorum and molluscum contagiosum, which can infect an entire team. Any lesions on the trunk, axilla, face, and thigh should be referred immediately to a physician.
6. Sunburns are classified as first, second, or third degree. Prevention involves using a sunscreen with an SPF of 15 or higher and avoiding exposure to the sun during the midday.
7. Miliaria, or prickly heat, occurs when active sweat glands become blocked by organic debris. Treatment involves cooling and drying the skin, controlling the itching, and watching for secondary infection.
8. Bites and stings from insects can be painful and itchy. Immediate application of cold can relieve pain, or a topical corticosteroid or systemic antihistamine may be used. In severe cases, systemic corticosteroids are used. The patient should be watched carefully for signs of anaphylactic shock.
9. Allergic contact dermatitis results when a substance comes in direct contact with the skin and causes a simple inflammatory reaction. Irritant

contact dermatitis results when the substance causes direct skin damage, pain, or ulceration. Treatment involves removal of the substance, application of a cold compress, possible use of topical corticosteroids, and systemic antihistamines to reduce itching and inflammation.

10. Urticaria, or hives, is caused by hypersensitivity to foods or drugs, infection, physical agents, or psychic stimuli. The resulting wheal is accompanied by severe itching and is treated with antihistamines, anticholinergics, or β-agonists.

APPLICATION QUESTIONS

1. There has been an outbreak of impetigo among members of the high school wrestling team. How would you manage this situation? What strategies could be implemented to prevent the condition from recurring?
2. An 18-year-old football player has several small, raised, pus-filled skin lesions on the underside of his jaw. Based on the location and appearance, what type of skin lesion may be present? What can be done to treat this condition?
3. A lacrosse player is complaining of an irritating itch on the bottom of the feet and between the toes. The skin appears red and scaly. What condition should be suspected? Is this condition preventable? What can be done to treat this condition and prevent the spread of the infection?
4. A gymnast notices small itching bumps covering her lower leg and foot after removing tape applied to her sprained ankle. The area is extremely red and itchy. What condition might you suspect? What can be done immediately for this condition? What strategies can be used to prevent the condition from recurring?

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