

# Chapter 1

## HISTORICAL OVERVIEW AND PRINCIPLES OF DIAGNOSIS

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### HISTORICAL OVERVIEW

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### SUMMARY

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## HISTORICAL OVERVIEW

Skin diseases are of major importance in military operations. Although they cause few fatalities, they are a significant cause of combat ineffectiveness, troop morbidity, and poor morale. Widespread scabetic infestation, as detailed in Chapter 8, Arthropod and Other Animal Bites, is an excellent example of a skin disease with these repercussions; successful completion of unit missions has been compromised repeatedly. Louse-borne rickettsial infections have incapacitated entire armies since the 16th century, as discussed in depth in Chapter 11, Rickettsial Diseases. The loss of soldiers to the line commander, whether due to missile injury, accident, systemic infection, or skin disease, has the same effect: fewer soldiers available to accomplish the mission.

Certain skin diseases such as immersion foot (discussed in Chapter 4, Immersion Foot Syndromes) or tropical acne (Chapter 3, Skin Diseases Associated with Excessive Heat, Humidity, and Sunlight) often require extended recovery periods or evacuation, thus compounding the problem. While diarrheal illness accounted for the highest number of admissions during the Vietnam conflict (skin diseases ranked third), the average hospital stay for diarrhea was only 3 days, compared to an 8-day average for dermatologic conditions.<sup>1</sup> Because of poor institutional memory, the history of dermatology in military operations tends to repeat itself. The commentary in Chapter 2, Cold-Induced Injury, exemplifies this fact. We must relearn after every conflict that early diagnosis and treatment of skin diseases, combined with close supervision, constant education, preventive measures, and adequate equipment, clearly are vital to preserving the fighting strength.

### World War I

A. N. Tasker wrote, in 1928:

Diseases of the skin, exclusive of dermatological manifestations of venereal diseases, though ordinarily considered to be of minor importance in so far as danger to life is concerned, are of great importance to an army operating in the field, by reason of the noneffectiveness they cause.<sup>2(p551)</sup>

This assertion is strongly supported by statistics from World War I. Although outpatient data are

not available, from 1 April 1917 to 31 December 1919, 126,365 U.S. Army soldiers were hospitalized for skin disease.<sup>2</sup> Recorded diagnostic categories and case frequencies for these admissions included scabies, 34,134; other (unclassified), 20,270; furuncle, 19,958; abscess, 16,329; cellulitis, 12,824; eczema, 4,035; ectoparasitism, 3,269; herpes, 3,141; trichophytosis, 2,813; impetigo, 2,735; carbuncle, 2,330; psoriasis, 1,506; erythema, 1,495; dermatitis, 858; pityriasis, 579; and lichen, 89.<sup>2</sup> Over 2 million days of service are estimated to have been lost by reason of skin disease alone.<sup>3</sup>

In World War I, skin diseases became notorious because of the sickness and lost man-hours they caused. In the British army in 1915, in the United Kingdom, 40.88/1,000 men were admitted for diseases of the skin and areolar tissue. In France and Flanders, the rate was 126.13/1,000.<sup>4</sup> For one British army in France during the later stages of the war, the more common diseases were scabies, infections of the skin, and pyrexia of unknown origin, and these conditions accounted for 90% of all sickness.<sup>5</sup> Because insect bites and infestations are commonly secondarily infected, pyoderma and pyrexia often arose as related problems. Troops with lice infestations were not admitted to sick call because disinfection was practiced as a routine among field forces; nevertheless, the majority of troops had pediculosis.<sup>2</sup>

In the U.S. Army in the United States and in the American Expeditionary Forces in France, dermatology was combined with urology. In The Surgeon General's Office, a section of the Division of Infectious Diseases and Laboratories was devoted to these combined areas.<sup>2</sup> Specialists were assigned to each camp and large hospital in the United States. The American Expeditionary Forces' Division of Urology and Diseases of the Skin had a senior consultant in urology and two consultants in dermatology.<sup>2</sup>

In general, both in the United States and in France, hospitalized patients with skin diseases were treated on the general wards or on the venereal disease wards.<sup>2</sup> In a few hospitals in the United States, wards were set aside solely for treating skin diseases. During the spring and summer of 1918, some field hospitals attached to combat divisions of the American Expeditionary Forces operated as skin hospitals.<sup>2</sup>

## **World War II**

During World War II, because many nondermatologic physicians failed to appreciate the importance of correct early diagnosis and early adequate care of skin diseases, dermatoses frequently developed to a stage at which weeks or sometimes months of duty time were lost before the soldier could return to duty.<sup>6</sup> The correct decision as to the disposition of a soldier with a cutaneous disease (evacuation, limited duty, or return to combat duty) was often difficult to make. In these circumstances, a well-qualified dermatologist would have been of immense value.<sup>6</sup>

However, prior to mobilization in 1940, not a single qualified dermatologist served in the U.S. Army Medical Corps, and army hospitals did not include a department of dermatology<sup>6</sup> or even have a single medical officer with a cursory knowledge of dermatology assigned.<sup>7</sup> Tables of Organization of army hospitals had no provision for a dermatologist.<sup>7</sup> A Consultant in Dermatology to the Office of The Surgeon General was not appointed until April 1945, shortly before the end of the war, although many theaters had excellent consultants who played very important roles in organizing dermatologic services and outpatient care.<sup>7</sup> As the U.S. Army Medical Corps grew to a total of 48,319 physicians, it included 107 board-certified dermatologists, 30 fully trained but not board-certified dermatologists, and 151 officers with some dermatologic training.<sup>6</sup>

During the early phases of U.S. involvement in World War II, Major General James C. Magee stated:

Skin diseases are of greater importance in military service than in civil life. Although there are few fatalities from these diseases they result in a considerable loss of effective manpower and partial incapacity of a material number of the personnel of many commands.<sup>8(pvi)</sup>

Conservative estimates hold that between 15% and 25% of visits to an outpatient department were for skin disease in a temperate climate. This proportion increased to 60% to 75% in a tropical climate.<sup>6</sup>

In May 1945, in the southwest Pacific, numerous dispensaries show as many as three fourths of those reporting to sick call were suffering from diseases of the skin.<sup>6</sup> From 1 November 1944 to 1 November 1945, approximately 14% to 16% of all patient evacuations to the United States from the southwest Pacific were due to diseases of the skin.<sup>6</sup> During all

months, skin disease was a more frequent cause of evacuation than battle casualties.<sup>6</sup> In many general hospitals located in tropical overseas areas, 15% to 20% of admissions were for skin diseases.<sup>6</sup> In one evacuation hospital in the Pacific, 54.8% of the evacuations for general medical causes were for skin diseases.<sup>9</sup>

Among the Royal Air Force, Royal Australian Air Force, Royal New Zealand Air Force, and Royal Canadian Air Force training in Canada during the war, diseases of the skin and cellular tissue were among the top six causes of both morbidity and wastage (time loss).<sup>10</sup> In the two New Zealand Expeditionary Forces in the Middle East, skin disease accounted for 10% of total hospitalizations.<sup>11</sup> For the Royal New Zealand Air Force in the Pacific Theater, more men were unfit and more time was lost from skin diseases than from any other type of disease. Twenty-eight percent of the medical admissions in the area were on account of skin disease.<sup>11</sup> To put this in perspective, during the first 8 months of 1945, 1,000 cases of skin disease were reported in a force of 7,800. Nearly 100 of these soldiers were hospitalized for more than 3 weeks, and 79 had to be repatriated to New Zealand.<sup>11</sup>

Few prevalence figures from World War II are available. An excellent prospective study of British soldiers in Malaya and Hong Kong shortly after the war revealed that of 1,694 soldiers examined, 79.5% had dermatoses of the feet; 33.5% had tinea corporis, tinea cruris, or both; 28% had prickly heat; 13.9% had acne; and 1.9% had nonbullous impetigo.<sup>12</sup>

## **Vietnam Conflict**

Statistics for hospital admissions and outpatient visits are more complete for the Vietnam conflict than for any other in which the United States has been involved,<sup>1</sup> although many experts believe substantial underreporting of outpatient information took place because of political pressures on commanders during the war.

Skin diseases were the single greatest cause of outpatient visits to U.S. Army medical facilities during the entire Vietnam conflict.<sup>1,13</sup> There were 1,412,500 recorded visits for skin diseases, twice as many as for any other category of disease.<sup>1</sup> Skin disease was probably significantly underreported because most troops suffering from pyoderma and fungal infections were placed on light duty and never appeared in reported statistics. One of the greatest medical causes of combat ineffectiveness in Vietnam was cutaneous disease.<sup>1,13,14</sup> In some line

units in the Mekong Delta, man-days lost from combat duty secondary to cutaneous disease exceeded losses from all other causes combined.<sup>14</sup> Skin disease had far greater impact on front-line military units, with relative sparing of troops in garrison. Hot, humid conditions and poor hygiene magnified this disparity. The U.S. Ninth Infantry Division operated in the Delta region in southern South Vietnam and suffered the greatest impact. Forty-seven percent of the total man-days lost to the division in a 1-year period (1968–1969) were due to skin disease.<sup>1</sup> This figure includes battle wounds, nonbattle injuries, and disease.<sup>1</sup> More significantly, in actual infantry battalions, 80% of the man-days lost in this division were due to skin disease.<sup>1</sup>

Of all soldiers seeking medical treatment for skin diseases during the Vietnam conflict, fewer than 1% were hospitalized. Cases were selected for hospitalization based on the disease severity, refractoriness to outpatient treatment, and interest to the physician. This procedure was in direct contrast to such diseases as malaria and hepatitis, for which hospitalization was routinely practiced. In this context, the following hospital statistics are even more impressive. By category of disease, skin disease was the third leading cause for admission, ranking behind diarrheal disease and respiratory infections.<sup>1</sup> Malaria was the fourth leading cause.<sup>1</sup> From 1965 through 1972, 45,815 soldiers were admitted by all medical officers for skin disease. Pyoderma, eczema, cystic acne, and tinea led the list of diagnoses for admission.<sup>1</sup> Of soldiers hospitalized by dermatologists, 20% to 25% were evacuated from Vietnam: a total of 4,166 soldiers.<sup>1</sup> This figure represents 9.7% of all evacuations from Vietnam for disease.<sup>1</sup>

### **Lessons Not Learned**

Lessons not learned relating to skin disease have arisen from inadequate organization and training. The following section contains quotations from the official histories of warfare in this century that convey many common themes. We clearly have not learned or have not acted on lessons relating to the dermatologic problems from one conflict to the next.

### **Organization**

The Table of Organization and Equipment (TOE) of today's army hospitals in almost all instances does not contain a position for a dermatologist, a

situation identical to that at the onset of World War II. Furthermore, no positions exist for dermatologists in division, corps, or army medical staffs. Outpatient dermatologic care is almost totally neglected at division level and below. Corps assets are severely lacking.

In 1947, Pillsbury and Livingood warned, concerning the U.S. Army in World War II, that in any military organization of greater than 100,000 troop strength, the surgeon in charge should have an advisor in dermatology. They envisioned that the dermatologist would be assigned to a hospital but should be called on for advice regarding the overall policies relating to cutaneous diseases in the command, and should visit units at intervals to determine the incidence of dermatologic disease and be of assistance to the unit medical officers.<sup>6</sup>

Cautionary advice was not directed solely at the United States. In 1953, W. R. Feasby, in commenting on Canadian forces in World War II, wrote that each command should have the service of a dermatologist, as should each large concentration of personnel of all three services. He further stated that each corps or army should have a senior dermatologist, with one or two junior specialists available per division.<sup>15</sup> Duncan and Stout,<sup>11</sup> in an official history of New Zealand in World War II, remarked that each hospital unit in an overseas force should have a skin specialist on its staff.

The British army was better organized for dermatologic care than other Allied forces in World War II. The British followed their consultant's recommendations in organizational structure. He advised that on the staff of the Director of Medical Services of each army there should be an advisor or consultant in dermatology. A fundamental part of the policy adopted in organizing a dermatologic service was that fully equipped centers, each under the aegis of a trained dermatologist, were available, and that evacuation of cases to these centers was rapidly achieved. Further, in each corps a dermatologist was available whose activity was not entirely confined to work in a skin clinic. He had authority to travel about the corps area and to instruct unit medical officers on the prevention, diagnosis, and treatment of cutaneous disease.<sup>4</sup>

### **Training**

With today's emphasis on specialization, the ever-decreasing number of flexible or rotating internships, and the lack of required rotations in derma-

tology in the medical education of a large majority of physicians and medical students, we remain poorly trained to care for dermatologic diseases. Regarding diagnostic skills in the U.S. Army in World War II, it was noted that many physicians had so little opportunity for dermatologic training in medical school and internship that they were unable to arrive at a diagnosis of even the simplest conditions of the skin.<sup>6</sup>

Up-to-date, specialized publications on dermatologic diagnosis and care in a field environment are important to supplementing the knowledge base of all military physicians and physician assistants. In Washington, D.C., in 1942, at the instigation of the U.S. Army and the Committee of Medicine of the National Research Council, the preparation of a simple manual dealing with the diagnosis and treatment of cutaneous diseases commonly encountered was completed.<sup>6,8</sup> This small textbook manual was distributed to nearly all medical corps officers in the U.S. Army, Army Air Corps, and Navy. Many wartime hospital reports carry the statement that dermatologic disabilities could have been cut in half if treatment methods had been improved and patients had been brought into early contact with a dermatologist.<sup>7</sup>

R. M. B. MacKenna, writing about the British army in World War II, remarked that a poorly trained healthcare provider could do more harm than good:

It is important to realize that usually the greatest hazard to which a patient who is suffering from a cutaneous disease is exposed during the first stages of his malady is that he is treated by a unit (regimental) medical officer who, as he has had no specialized training in dermatology, may be uncertain of the diagnosis, and therefore may conduct treatment by a method of trial and error. This method is successful only in a few cases. In the majority it leads to an aggravation of the disability or dermatitis medicamentosa and eventually to an unnecessarily prolonged period of hospitalization.<sup>4(p159)</sup>

Commenting on skin diseases in the U.S. Army in Vietnam, A. M. Allen observed that the lack of emphasis on education and training in dermatology was undoubtedly responsible for a large portion of the morbidity caused by skin diseases. This lack of emphasis was not apparent in other medical fields of importance in tropical warfare, such as malaria and enteric diseases, but seemed to be attributable to a general lack of appreciation for the enormous losses of manpower that can result from

cutaneous diseases. He concluded that, with the exception of dermatologists, the medical personnel who were called upon to diagnose, treat and prevent skin disease in Vietnam had little if any training in dermatology.<sup>1</sup> In Vietnam, until the appearance of a field manual on skin disease in 1969, very little relevant information was available, and some of what was available was misleading. The manual published in 1942 was long outdated.

## **Recommendations**

To provide first-rate military medical care and to preserve the fighting strength of our soldiers by preventing as well as treating skin diseases, we must address three areas of weakness that have been important historically: organization, training, and research. We must reorganize our TOEs, upgrade our training efforts to train healthcare providers adequately about the importance of skin care in the field, and reestablish significant research efforts to solve lingering and recurrent dermatologic problems.

## **Organization**

Working closely with the Combat Developments Division of the U.S. Army Medical Department Center and School, we must reexamine TOEs for medical forces. A dermatologist should be on the staff of all larger TOE hospitals. Corps-level assets should have a dermatology team with adequate vehicle support to travel about the corps and division areas to evaluate, teach, and treat. One senior consultant dermatologist should be assigned to corps staff and should direct teams that provide outpatient care to divisional level troops, ensuring that two dermatologists are available in each corps team for each division supported. A theater consultant in dermatology and a dermatology team should be assigned for all troop deployments greater than division level, unless deployment is to a tropical area, in which case a consultant and team should be assigned for brigade-size and larger deployments. Early prevention and outpatient treatment can prevent many of the medical casualties experienced in prior conflicts. A change in the Professional Filler System (PROFIS) approach to designating dermatology specialists is necessary, in which dermatologists would be assigned to dermatology teams or consultant positions. While this change is being instituted, consideration should be given to assigning dermatologists to Division Preventive

Medicine Officer positions in the PROFIS system. Sets, kits, and outfits (SKOs) must be updated to ensure appropriate dermatologic therapeutics and supplies for all levels, from the company aidman's bag through dermatology team sets.

### **Training**

Mandatory rotations in dermatology should be established for all military nonsurgical interns and residents to provide a significant base of knowledge for the diagnosis and treatment of common skin diseases. Military medical training centers must ensure that a core curriculum for dermatology residents and medical students covers the common skin diseases and does not emphasize only the rare and unusual diseases. There should be continued work with the American Academy of Dermatology in establishing a core curriculum in dermatology for nondermatologists. A manual of dermatology for physicians patterned after the National Research Council's World War II manual<sup>8</sup> covering common dermatologic problems and their treatment should be published, widely distributed, and periodically updated. Universal distribution to military physicians of such a manual should be ensured as is done for the *The Emergency War Surgery* NATO Handbook.<sup>16</sup>

The dermatology consultant's input into basic medical training for corpsmen should be ensured.

### **Research**

Since the demise of the Department of Dermatology Research at the Letterman Army Institute of Research, The Presidio, San Francisco, California, in 1980, almost no research relating to field problems and skin disease has been conducted by the services. Research efforts should be reestablished through the U.S. Army Medical Research and Development Command to address better field diagnosis and treatment of common disabling dermatologic conditions such as pyoderma, fungal infections, and miliaria. An in-depth review of bathing availability and requirements and their relationship to skin disease should take place. A method of funding should be developed to allow military training programs in dermatology to send small research teams to locations such as the Jungle Warfare School in Panama, where field studies can address real-time problems. The military should resurrect, further develop, and field better protective and preventive items of issue such as shower thongs for wear by troops in base camps to decrease susceptibility to foot problems.<sup>1,9</sup>

## **PRINCIPLES OF DIAGNOSIS**

The advantage a medical officer has in caring for the soldier with skin disease is that the abnormalities about which the complaint revolves are usually visible, and may also be palpable. In the performance of the direct examination, key clues must be carefully noted by a discerning, educated detective. Additional observations that can aid in solving the diagnostic mystery are easily gained by examining the skin and mucous membrane sites not directly called into question by the soldier, and through directed questioning. Laboratory tests taken as standard of care in a hospital, such as potassium hydroxide preparations, Tzanck preparations, cultures, and skin biopsies, may not be readily available in the field. Thus, maximum use of information gained by close, educated inspection is necessary.

### **Anatomy**

Knowledge of the normal anatomy is essential before the healthcare provider can understand der-

matologic terminology and principles of diagnosis. The skin is composed of three basic layers: the epidermis, the dermis, and the subcutaneous tissue. The epidermis is the most superficial and thinnest of the three; however, it is the principal site available for inspection. A key finding in proceeding through differential diagnostic possibilities will be based on the pivotal answer to this question: Is there epidermal involvement? Normal epidermis is smooth-surfaced and has skin lines running through it at regular intervals. With the notable exception of the palms and soles, most areas have small, regularly placed openings through which hairs grow. It should be appreciated that most cells that compose the epidermis are keratinocytes, whose primary role is to provide a physical barrier to external forces. A smaller subset of cells is concerned with pigment production. These cells—melanocytes—give the skin its normal color but can be damaged after inflammation or may proliferate, leading to the potentially deadly growth, melanoma. Although a third group of cells exist, the Langerhans cells,

which provide immunological surveillance, these cells are rarely important in observational diagnosis of the conditions discussed in this text.

The dermis is the site of residence of most components of the skin. Within this 1- to 4-mm area lie blood vessels, nerves, glands, hair follicles, and structural matrix. This tough but flexible layer of tissue provides for temperature regulation, sensation, and natural lubrication, and gives to the skin many of the cosmetically important characteristics valued by all of us. Abnormalities of the dermis that will provide clues to the diagnostic dilemmas posed most commonly in the field environment involve vascular dilation and inflammation. A blanchable redness of the skin implies that one or both of these changes have occurred. A nonblanching redness usually results from extravasation of erythrocytes into the dermis secondary to vascular damage.

A noninflammatory thickening or growth confined to the dermis (with normal overlying epidermis) usually occurs from a benign or malignant tumor of existing normal structures or from an infiltrative disease. In most cases, a biopsy is required to make a definitive diagnosis. The importance of these sporadic conditions to military medicine is minor. The key diagnostic intervention, the skin biopsy, is often deferred unless the lesion is growing rapidly or numerous sites are involved. Dermal tumors and infiltrative diseases will generally not be discussed in this textbook.

The third layer of the skin, the subcutaneous tissue, is composed primarily of fat cells and provides insulation, cushioning, and a reserve energy source. In general, disorders of the fat are of lesser importance in the field due to their sporadic nature. Skin biopsy is usually required for definitive diagnosis.

### **Physical Examination**

Of the numerous diagnostic clues available to the physician, the morphologic characteristics of the lesions are often the most helpful. They provide a useful means of categorizing disease states and allow generation of a meaningful differential diagnosis. Once the primary lesion is recognized, other characteristics obtained by observing secondary changes, configuration, regional distribution, and associated nondermatologic signs as well as historical information will quickly narrow the possibilities. To use this approach, physicians should employ the basic vocabulary that defines primary and secondary skin changes as well as

special lesions and configurations, as presented in Figures 1-1 through 1-19. It is in these words the healthcare provider needs to tell the story of skin disease because, if the end of the diagnostic trail cannot be successfully reached, consultation couched in these terms will be most rapidly and reliably regarded.

Such obvious information as age, sex, race, and regional distribution (covered vs sun-exposed, flexural vs extensor, truncal vs extremity) needs to be consciously noted and included for consideration. Finally, inspection of the skin is not complete unless details of any alteration in color, consistency, or growth pattern of hair and nails are noted. The mucous membranes are to be viewed as important sites of ancillary clues to the diagnosis and should be examined closely in all soldiers who present with skin disorders.

### **Patient History**

Although the physical characteristics of skin lesions provide the most critical information leading to diagnosis, a historical account of the evolution of the disease is important not only to understand the disease process better but, often more vital, to allow soldiers to express their unique, individual concerns to the physician. All soldiers desire a correct diagnosis and effective medication for their condition, but equally crucial in most cases is the individualized education given to them by a sincere, concerned, thoughtful physician. Only by allowing soldiers to tell their stories can this be accomplished.

In nearly every encounter, the duration and evolution of the disorder, as well as any previous therapy that may have altered the natural course, need to be elicited. Skin-related symptoms, particularly with regard to itching or pain, as well as associated, concurrent, systemic symptoms; past medical history (especially as related to oral medication and allergies); family history; and social history may be important in individual cases. The medical officer needs to understand (a) how the disease affects the soldier (does it impair function, alter sleep, or cause cosmetic concern?); (b) the reason the soldier sought care; (c) suggested causes, diagnoses, or therapies; and (d) the main concern of the soldier (eg, "Is it cancer?" "Am I going to give this to my friends?" "What did I do to cause this?" "Can I avoid [anything] to make myself better?"). All of these are of paramount importance in history-taking.

## Differential Diagnostic Considerations

The algorithms included in this chapter (Figures 1-20 through 1-25) are presented for the nondermatologist in the field who is tasked with the care of soldiers without laboratory or skin biopsy capability. The algorithms address only some of the most commonly seen skin diseases. These diagnostic road maps make use of classic characteristics of the disease categories depicted. Many variations from

the standard presenting physical findings exist; therefore, these algorithms are not foolproof. They depend on the medical officer's recognition of the primary or predominant physical findings. Once a diagnosis is reached, the appropriate section of this book can be referred to for further information. Useful tests or additional information that will help to confirm the diagnosis have been added next to the algorithm endpoints; the tests can be obtained when support is, or becomes, available.

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**Fig. 1-1.** Primary versus secondary lesions. Primary lesions are the earliest alterations present. With the passage of time, changes may occur leading to less diagnostic secondary lesions. Reprinted from the AAD Library of Teaching Slides with permission from the American Academy of Dermatology.

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**Fig. 1-2.** Macule. A flat change in color of the skin. Reprinted from the AAD Library of Teaching Slides with permission from the American Academy of Dermatology.

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**Fig. 1-3.** Vesicle and bulla. Blisters containing clear fluid. Vesicles are the smaller of the two, with bullae being 0.5 cm or larger. Reprinted from the AAD Library of Teaching Slides with permission from the American Academy of Dermatology.

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**Fig. 1-4.** Pustule. Yellowish cloudy fluid is present. Reprinted from the AAD Library of Teaching Slides with permission from the American Academy of Dermatology.



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**Fig. 1-5.** Papules, nodules, and tumors are palpable skin lesions of varying size. Papules are less than 0.5 cm in diameter, nodules larger. Tumors are very large growths. Reprinted from the AAD Library of Teaching Slides with permission from the American Academy of Dermatology.

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**Fig. 1-7.** Wheal. Edema causes a transient papule or plaque to occur. Reprinted from the AAD Library of Teaching Slides with permission from the American Academy of Dermatology.

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**Fig. 1-6.** Plaque. An elevated, flat-topped lesion whose width exceeds its height. Reprinted from the AAD Library of Teaching Slides with permission from the American Academy of Dermatology.

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**Fig. 1-8.** Scale. Dry, usually whitish flakes on the surface of the epidermis. Reprinted from the AAD Library of Teaching Slides with permission from the American Academy of Dermatology.

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**Fig. 1-9.** Oozing and crusts. Oozing consists of tissue fluid, often with cellular debris, exuding from acutely inflamed skin. Crusts are usually moist, yellowish debris and appear when the fluid from vesicles, bullae, pustules, or oozing dries. Reprinted from the AAD Library of Teaching Slides with permission from the American Academy of Dermatology.

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**Fig. 1-10.** Fissure, erosion, ulcer. Fissures are thin linear tears in the epidermis. An erosion is a wider-based loss of a portion of the epidermis, while an ulcer is larger and deeper. Reprinted from the AAD Library of Teaching Slides with permission from the American Academy of Dermatology.

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**Fig. 1-11.** Lichenification. A thickening of the epidermis leading to accentuated skin markings.

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**Fig. 1-12.** Atrophy. A thin, wrinkled, often depressed area resulting from loss of skin tissue.

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**Fig. 1-13.** Comedo. Commonly called blackheads or whiteheads, these keratin-filled hair follicles are the earliest lesions of acne. Reprinted from the AAD Library of Teaching Slides with permission from the American Academy of Dermatology.

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**Fig. 1-14.** Telangiectasia. Enlarged superficial blood vessels. Reprinted from the AAD Library of Teaching Slides with permission from the American Academy of Dermatology.

Fig 1-15 is not shown because the copyright permission granted to the Borden Institute, TMM, does not allow the Borden Institute to grant permission to other users and/or does not include usage in electronic media. The current user must apply to the publisher named in the figure legend for permission to use this illustration in any type of publication media.

**Fig. 1-15.** Burrow. The scabies mite will leave a linear track as she moves through the epidermis. Reprinted from the AAD Library of Teaching Slides with permission from the American Academy of Dermatology.

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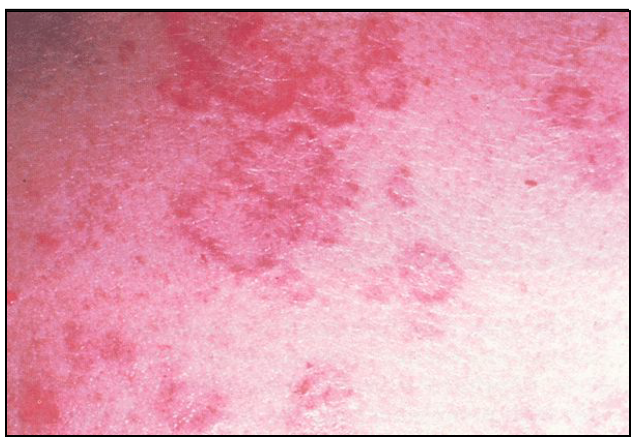
**Fig. 1-16.** Scar. New formation of connective tissue as a reparative process due to damage to the dermis or deeper tissues. Reprinted from the AAD Library of Teaching Slides with permission from the American Academy of Dermatology.



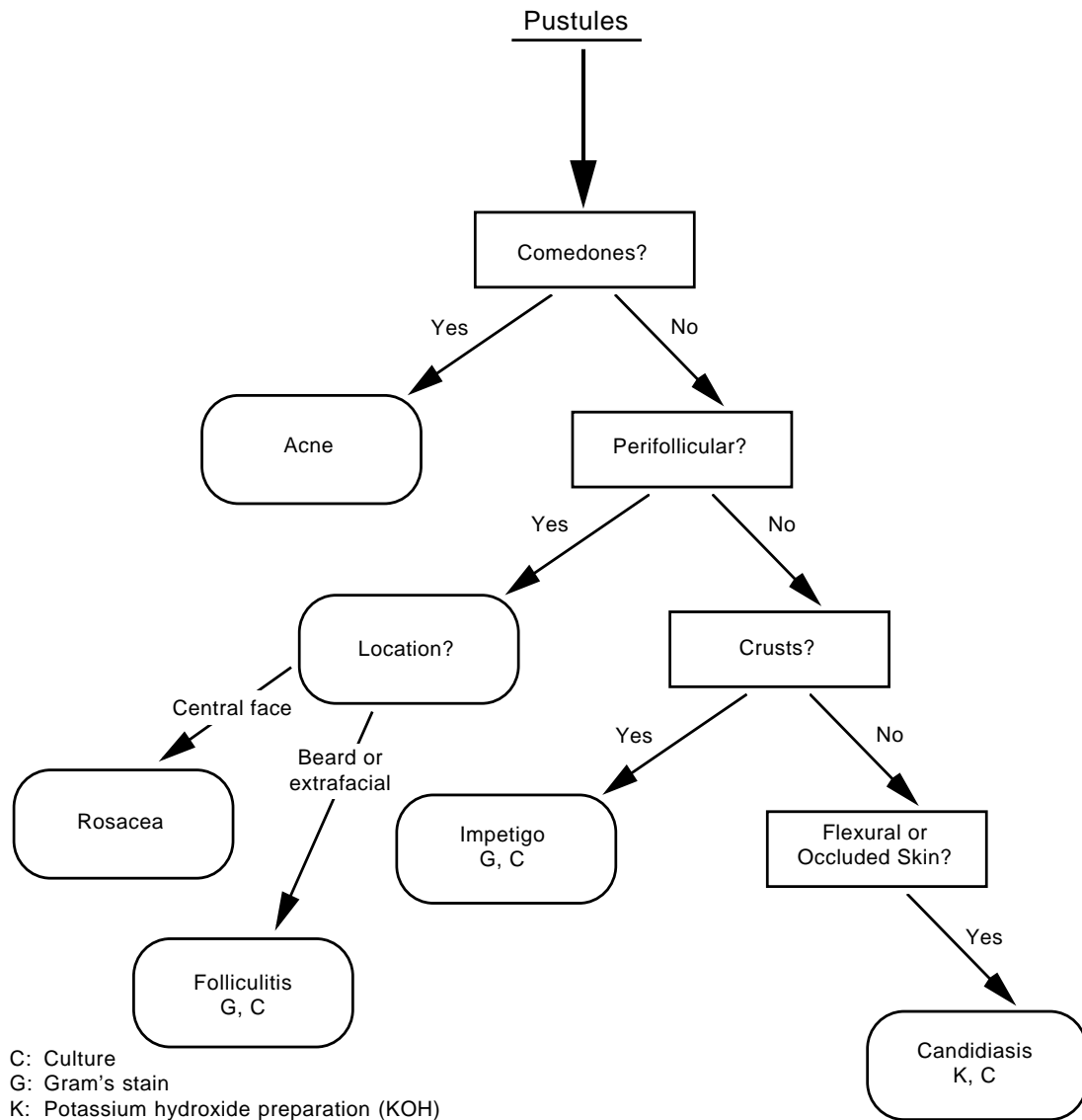
**Fig. 1-17.** Poison ivy will often cause linear lesions due to brushing of the plant against the skin or spreading of the allergen by scratching.



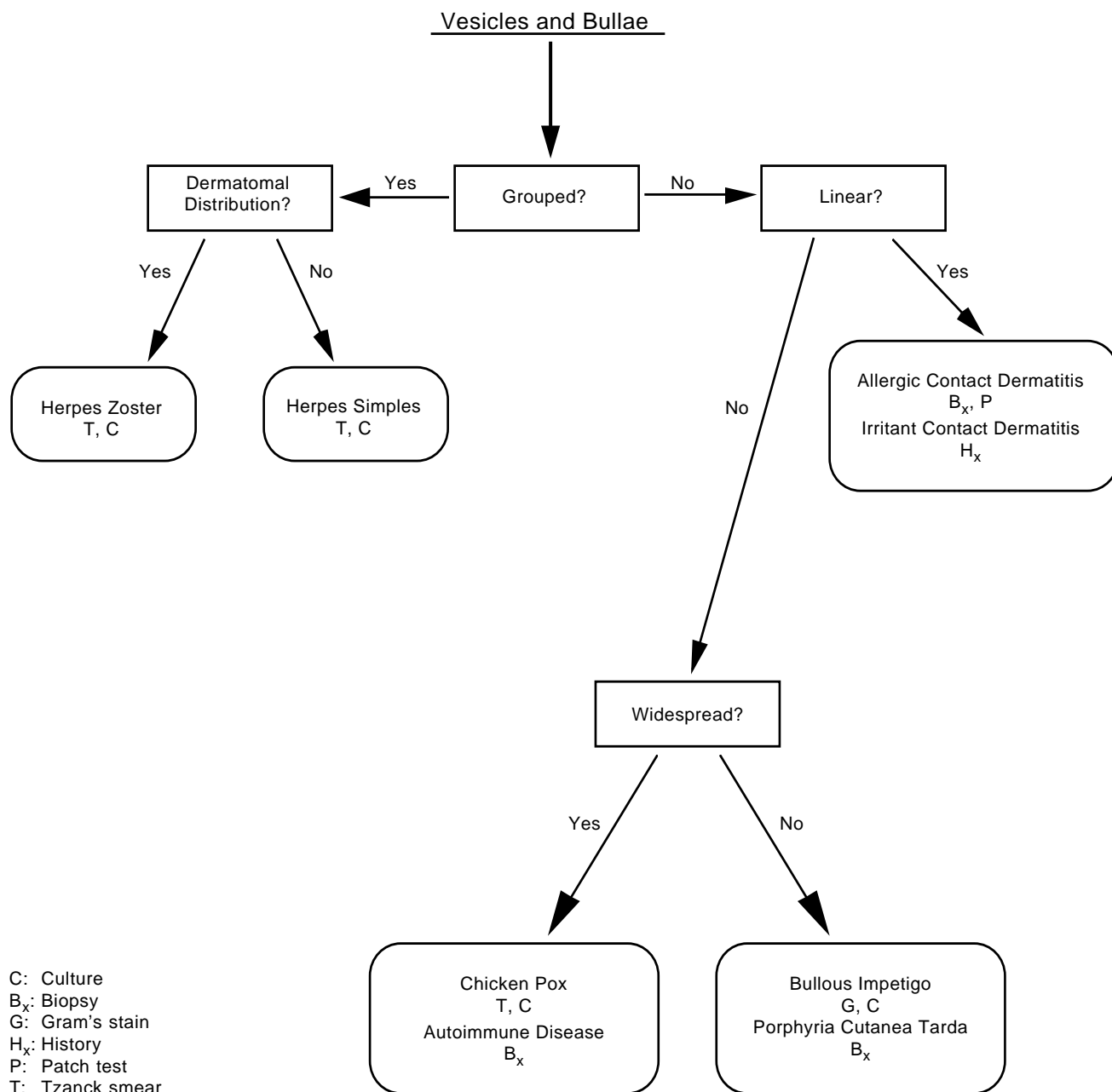
**Fig. 1-18.** Grouped vesicles on an erythematous base characterize herpes simplex as well as herpes zoster.



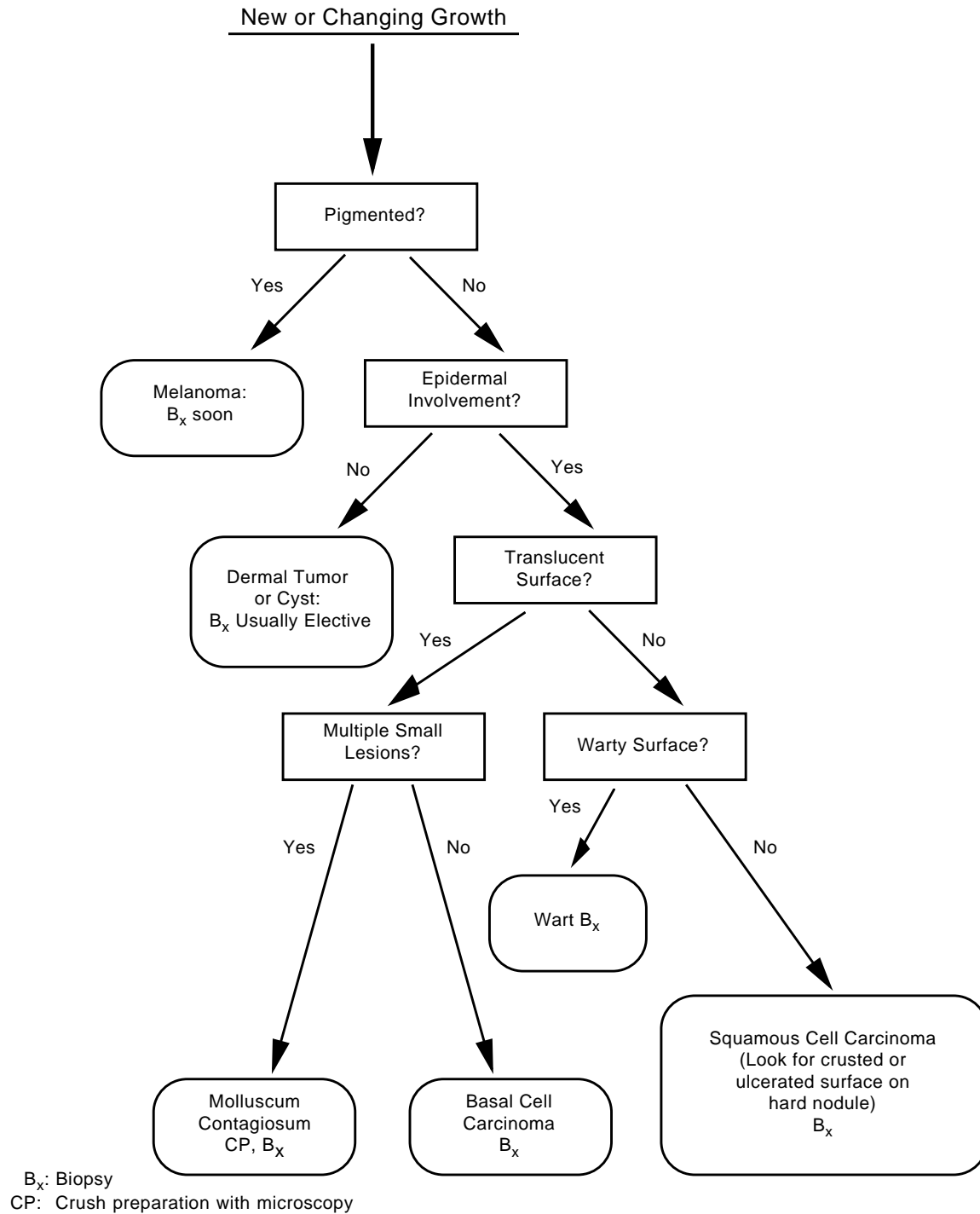
**Fig. 1-19.** An annular arrangement describes a ringlike lesion that surrounds a central area of more normal-appearing skin.



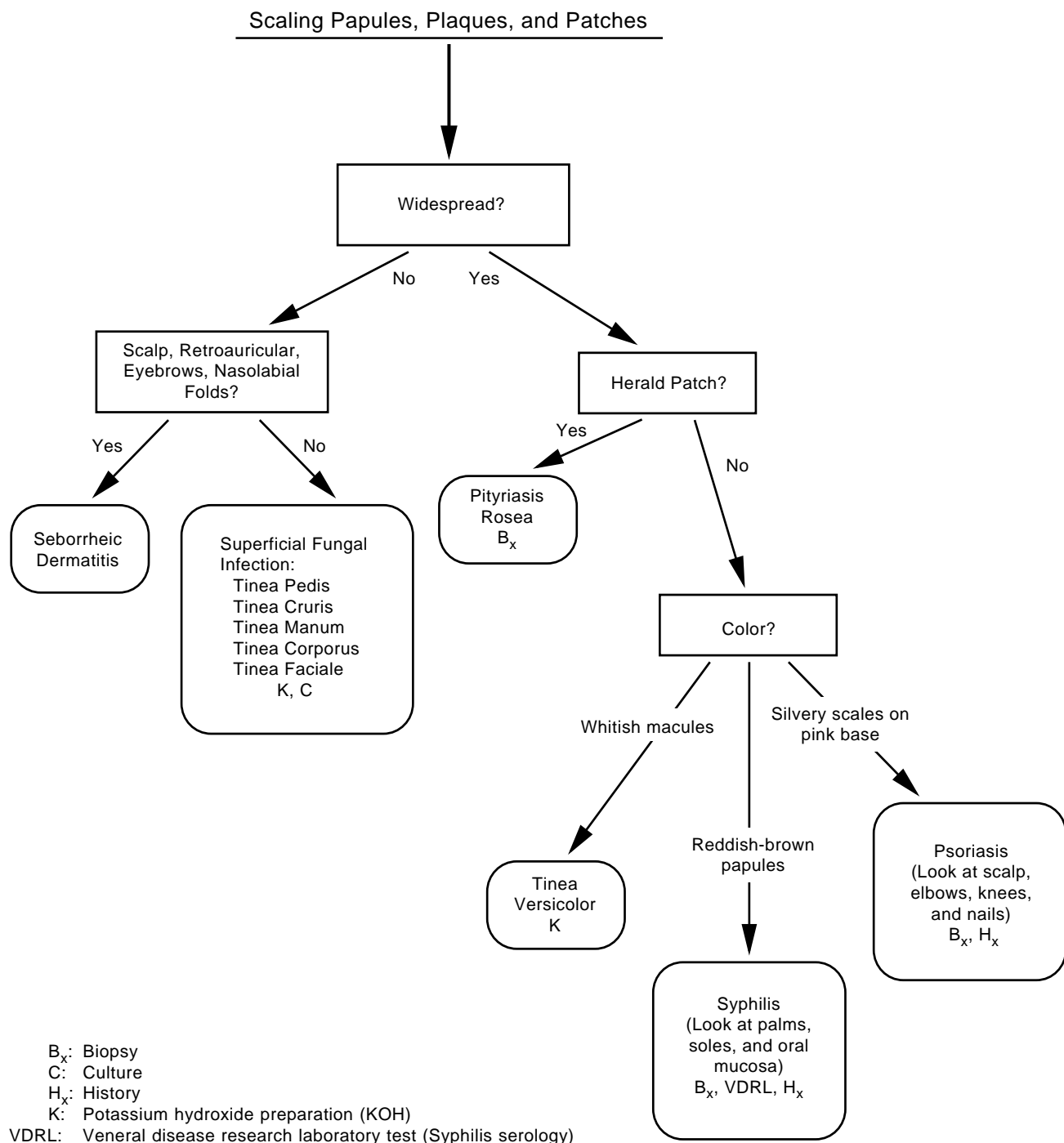
**Fig. 1-20.** Pustular lesions are often a sign of bacterial or fungal infection. Gram's stain, culture, and potassium hydroxide analysis will aid in the diagnosis of these conditions.



**Fig. 1-21.** Blisters may be a sign of infection; however, in a field environment they are likely to be secondary to irritant or allergic contact dermatitis.

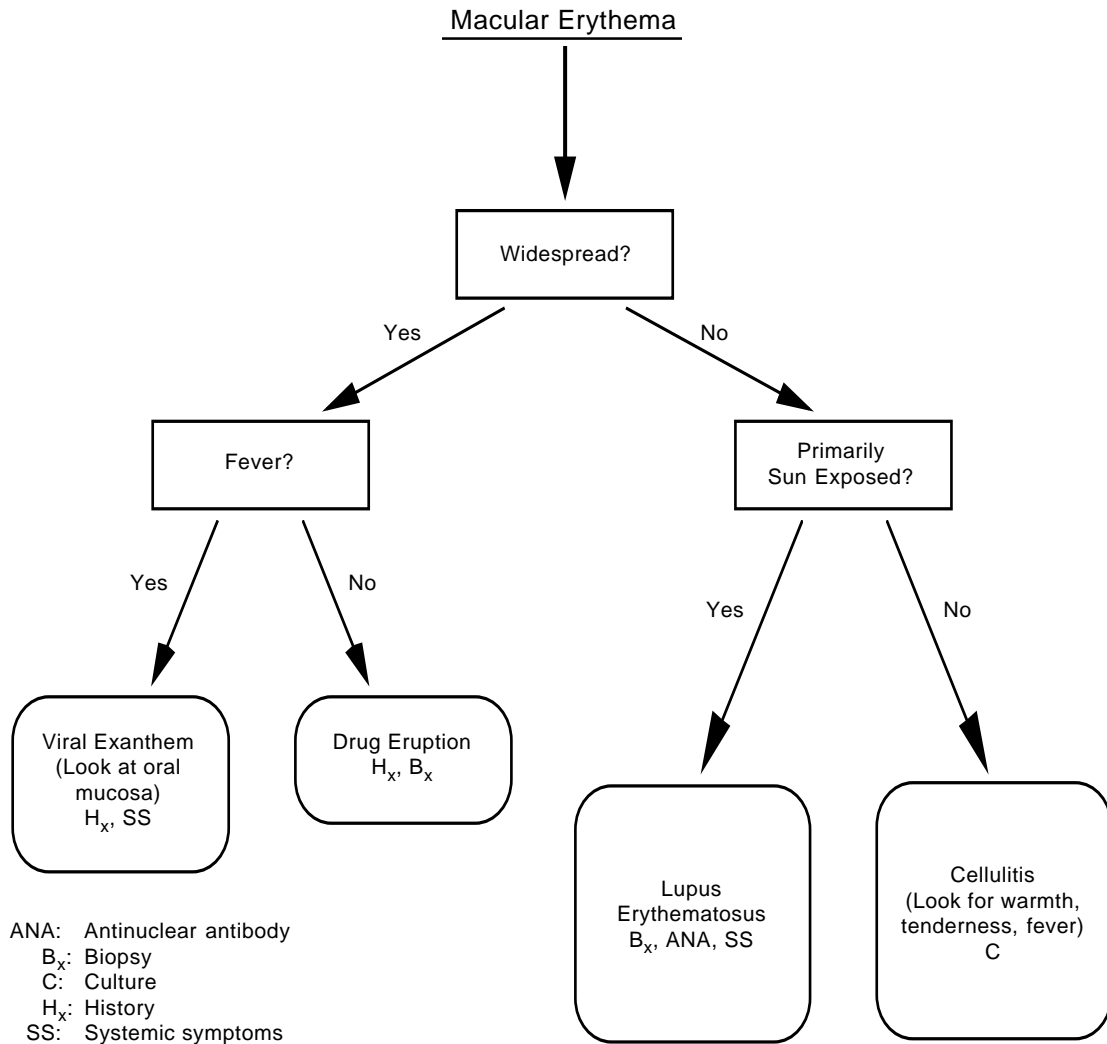


**Fig. 1-22.** New or changing growths do not often require immediate attention in the field, as they are usually slow in their development.

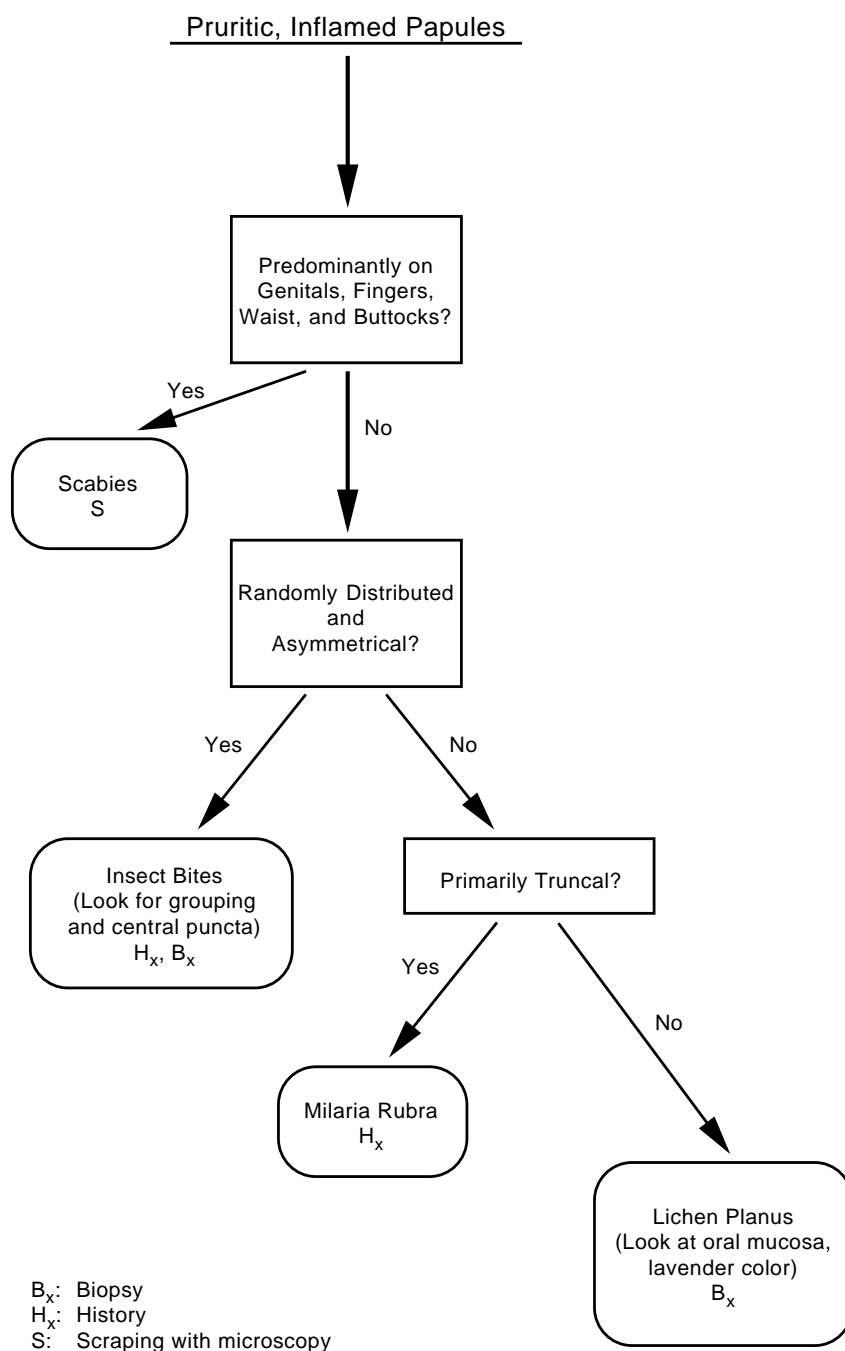


**Fig. 1-23.** A number of disorders exhibit scaling papules, plaques, and patches. Superficial fungal infections are extremely common in tropical environments. Syphilis is important to recognize because treatment will prevent long-term sequelae and spread of disease.





**Fig. 1-24.** Macular erythema is a usually acute event that may worsen and even cause death if not recognized. A papular component may sometimes be present.



**Fig. 1-25.** Pruritic, inflamed papules are among the most common types of skin lesions. Itching is intense, and the lesions commonly show secondary changes such as excoriations and crusts.

## SUMMARY

Skin diseases are a significant cause of combat ineffectiveness, morbidity to soldiers, and poor morale. Their importance to military operations is most pronounced in tropical and subtropical climates, where over half the man-days lost to front-line troops are directly related to skin disease. Although these facts have been repeatedly observed and recorded in official histories from World War I, World War II, and the Vietnam conflict, the U.S. Army today remains largely unprepared to prevent

skin disease or provide expert dermatologic medical care in tropical operations.

Reevaluation of Tables of Organization and Equipment and Professional Filler System policies is highly recommended. Increased research on the prevention and early treatment of skin diseases is sorely needed. Finally, training of non-dermatologists in the basics of skin care, preventive policies, and dermatologic diagnosis needs to be accomplished.

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