

# ACADEMY GUIDELINES

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This report reflects the best data available at the time the report was prepared, but caution should be exercised in interpreting the data; the results of future studies may require alteration of the conclusions or recommendations set forth in this report.

## Guidelines of care for superficial mycotic infections of the skin: Tinea corporis, tinea cruris, tinea faciei, tinea manuum, and tinea pedis

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### I. Introduction

The American Academy of Dermatology's Guidelines/Outcomes Committee is developing guidelines of care for our profession. The development of guidelines will promote the continued delivery of quality care and assist those outside our profession in understanding the complexities and scope of care provided by dermatologists. For the benefit of members of the American Academy of Dermatology who practice outside the jurisdiction of the United States, the listed treatments may include agents that are not currently approved by the U.S. Food and Drug Administration.

### II. Definition

"Guidelines of Care for Superficial Mycotic Infections of the Skin: Tinea Corporis, Tinea Cruris, Tinea Faciei, Tinea Manuum, and Tinea Pedis" is one of six documents addressing superficial mycoses. Companion documents in this series include:

Guidelines of Care for Superficial Mycotic Infections of the Skin: Mucocutaneous Candidiasis

Guidelines of Care for Superficial Mycotic Infections of the Skin: Tinea Capitis and Tinea Barbae

Guidelines of Care for Superficial Mycotic Infections of the Skin: Onychomycosis

Guidelines of Care for Superficial Mycotic Infections of the Skin: Pityriasis Versicolor

Guidelines of Care for Superficial Mycotic Infections of the Skin: Piedra

Tinea corporis, tinea cruris, tinea faciei, tinea manuum, and tinea pedis are fungal infections of the stratum corneum caused by certain species of the genera *Epidermophyton*, *Microsporum*, and *Trichophyton*.

The standard terminology used in this document is as follows:

Tinea corporis

Dermatophytosis of the glabrous skin of the trunk and extremities, characterized by both inflammatory and noninflammatory lesions

Tinea cruris

Dermatophytosis of the proximal medial thighs and buttocks, characterized by inflammatory and noninflammatory lesions often with invasion of hair follicles; cutaneous candidiasis in this region can mimic dermatophytic infection, but is usually associated with scrotal lesions.

Tinea faciei

Dermatophytosis of the nonbeard areas of the face,

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characterized by inflammatory and noninflammatory lesions

#### Tinea manuum

Dermatophytosis of the interdigital and palmar surfaces of one or both palms; the differential diagnosis includes infection caused by nondermatophyte fungi such as *Scytalidium hyalinum* and *Scytalidium dimidiatum* (*Hendersonula toruloidea*)

#### Tinea pedis

Dermatophytosis of the plantar surface and interdigital spaces of the foot, characterized by both inflammatory and noninflammatory lesions; the differential diagnosis includes infection by nondermatophyte fungi such as *S. hyalinum* and *S. dimidiatum* (*H. toruloidea*)

### III. Rationale

#### A. Scope

Ten percent to 20% of the population is estimated to be infected by a dermatophyte. Of these infections, tinea pedis is the most common, occurring in up to 70% of adults. The most common organisms in the United States are *T. rubrum*, *T. mentagrophytes*, and *T. tonsurans*. *T. verrucosum*, *M. canis*, *M. gypseum*, and *E. floccosum* also cause numerous infections.

Dermatophytoses can be acquired from other people (anthropophilic), animals (zoophilic), and soil (geophilic). The most common source in the United States is infected people. *Trichophyton rubrum* is the most common dermatophyte both in the United States and the world and causes the majority of nonscalp skin infections. Peak prevalence of dermatophytosis occurs after puberty. This is especially the case for tinea pedis, tinea manuum, and tinea cruris. Tinea corporis and tinea faciei may occur in the preadolescent period. Risk factors include contact with infected animals such as cats and cattle. Another risk factor for infection is the occurrence of anthropophilic tinea capitis, which may produce tinea corporis and tinea pedis in family members and persons in contact with the patient.

Dermatophytes invade, infect, and persist in the stratum corneum and rarely penetrate below the surface of the epidermis or its appendages. The skin responds to the superficial infection by increased proliferation, which eventuates in scale and epidermal thickening.

#### B. Issue

When infection is caused by zoophilic organisms, the infection may spontaneously resolve after a period of pronounced inflammation.

This is best demonstrated by *Trichophyton verrucosum* infections of the glabrous skin acquired by contact with infected cattle. The host response to the infection determines the physical changes on the skin.

When dermatophytosis is caused by an anthropophilic dermatophyte, the lesion on the skin tends to be more chronic, persistent, and recalcitrant to therapy. This is especially true in tinea pedis caused by *T. rubrum*, which may persist for many years. After topical or systemic therapy, recurrence occurs in up to 70% of patients. Infections often require prolonged therapy with systemic and topical agents. Recurrence is caused partly by reinfection and the failure to eradicate the original infection. The persistence of infective fungal elements (spores) on the skin is probably a major factor in recurrence. Another issue with recurrence is incomplete eradication because patients may stop applying topical therapy when their symptoms are alleviated. With some infections the presence of a reservoir, such as the nail, may also explain frequent relapse and recurrence after a cessation of therapy.

Dermatophytoses affect the quality of life. This is especially true for those who are HIV positive or otherwise immunocompromised because significant symptoms of pruritus or pain generally occur with infection. Subtle changes of dermatophytosis on the skin may allow an early diagnosis of HIV infection. Tinea pedis and tinea cruris are a major cause of symptomatic complaints including pruritus, pain, and in some instances disability. If untreated, tinea pedis may be complicated by onychomycosis. Dermatophytosis has been a problem in war time as combat troops have been disabled because of severe tinea pedis.

Dermatophytosis can mimic many cutaneous diseases including psoriasis, parapsoriasis, eczema, and candidiasis. Because dermatophyte infections tend to be chronic, the annual cost for treatment in the United States exceeds \$400 million. It is important to diagnose infection as early and as accurately as possible.

### IV. Diagnostic criteria

#### A. Clinical

##### 1. History may include

- a. General medical condition, especially, but not limited to
  - 1) Hepatic disease
  - 2) Renal disease
  - 3) Immunocompromised state

- 4) Endocrine disease—diabetes mellitus
- 5) Use of systemic medications
- 6) Other
- b. Previous occurrences
- c. Duration of condition
- d. Current treatment(s), topical and systemic of
  - 1) Dermatophyte infections
  - 2) Other disease
- e. Past treatment(s), topical and systemic of
  - 1) Dermatophyte infections
  - 2) Other disease
- f. Other skin disorders, especially atopy and contact sensitivity
- g. Occupational exposure
  - 1) Farm worker
  - 2) Zookeeper
  - 3) Laboratory worker
  - 4) Veterinarian
  - 5) Other
- h. Environmental and recreational exposure
  - 1) Gardening
  - 2) Contact sports
  - 3) Use of sports facilities
  - 4) Animals
  - 5) Other
- i. Drug allergies
- j. Chronic urticaria
- k. Other
2. Physical examination may include
  - a. General physical examination as indicated
  - b. Location
  - c. Extent of involvement
  - d. Type of lesions
    - 1) Noninflammatory scaly
    - 2) Acute or subacute eczematous-like
    - 3) Chronic lichenified
    - 4) Nodular or granulomatous
    - 5) Bullous
    - 6) Pustular or resembling pyoderma
  - e. Associated findings
    - 1) Infection involving the hair follicle and nail
    - 2) Persistent hyperpigmentation and/or hypopigmentation
    - 3) Secondary bacterial infection
    - 4) Other
  - f. Other
- B. Diagnostic tests

After review of the patient history and physical examination, the diagnosis can often be estab-

lished. Greater diagnostic accuracy occurs if the clinical diagnosis is verified by laboratory tests. This verification is especially important when the use of systemic therapy is anticipated. Simple inexpensive tests that can be performed in the physician's office at the time of the patient visit may yield immediate results. Such tests include, but are not limited to the following:

1. Potassium hydroxide preparation (KOH)
 

Scale is obtained from the site of infection. The active border or the edge of a lesion is suitable for obtaining scale. In blistering lesions, the roof of the vesicle is an appropriate specimen. In pustular lesions, the purulent debris is appropriate. The material is placed on a glass slide and 10% to 15% KOH is added with or without dimethyl sulfoxide (DMSO). If DMSO is added to the KOH, heating is generally not necessary. A fungal stain such as Chlorazol Black E or Parker's blue black ink may be added to highlight the hyphae. A positive KOH will show numerous septate hyphae. A note whether the hyphae are nonpigmented or pigmented can be made because certain nondermatophyte infections (e.g., *Exophiala werneckii*) have pigmented hyphae.
2. Fungal culture
 

The standard fungal culture medium is Sabouraud's glucose agar. The addition of an antibiotic, such as chloramphenicol, inhibits bacterial overgrowth that may inhibit the growth of pathogenic dermatophytes or nondermatophyte molds. Media containing cycloheximide are useful when selectively screening for dermatophytes. Appropriate agar choices include dermatophyte test medium (DTM), Mycosel, and Mycobiotic. DTMs have a color indicator that changes the medium from yellow to red in the presence of a dermatophyte. However, the color reaction will obscure the features used to identify the colony morphology of many organisms. For those media in which a color change indicates the presence of dermatophytes, it is important to follow the manufacturer's instructions in terms of the number of days between culture inoculation and reading.
3. When a nondermatophyte mold is a possible pathogen, as may occur in certain cases of tinea pedis and tinea manuum, media that do not contain cycloheximide are useful. For example, *S. dimidiatum* and *S. hyali-*

- num* can be causative pathogens in tinea pedis and tinea manuum. These organisms generally do not grow on media containing cycloheximide; therefore the use of noncycloheximide media can be helpful in these circumstances.
4. Studies for differential diagnosis may include the following:
    - a. Bacterial culture to rule out secondary infection
    - b. Wood's light examination to rule out erythrasma, especially in intertriginous disease and involvement of the scrotum
    - c. Skin biopsy to differentiate a dermatophyte infection from other dermatoses
    - d. Other
    - e. Other
  - C. Inappropriate diagnostic tests
    1. Routine allergy testing
    2. Other
  - D. Exceptions  
Not applicable
  - E. Evolving diagnostic tests  
Not applicable
  - V. Recommendations
    - A. Treatment
      1. Medical
        - a. Topical therapy  
Topical treatment alone may be indicated for the following types of dermatophytoses: noninflammatory tinea corporis, tinea cruris, tinea faciei, tinea manuum, and tinea pedis. Topical antifungal products include, but are not limited to, the following:
          - 1) Imidazoles
            - a) Clotrimazole
            - b) Econazole
            - c) Ketoconazole
            - d) Miconazole
            - e) Oxiconazole
            - f) Sulconazole
            - g) Other
          - 2) Allylamines
            - a) Naftifine
            - b) Terbinafine
            - c) Other
          - 3) Ciclopirox olamine
          - 4) Miscellaneous
            - a) Benzoic acid preparations (Whitfield's ointment)
            - b) Tolnaftate
            - c) Haloprogin
            - d) Drying agents
        - e) Powders
        - f) Antibiotics (where applicable)
        - g) Salicylic acid and other keratolytic agents
        - h) Other
      - 5) Combination topical corticosteroid antifungal mixtures can be used, but may need restrictions on duration of therapy and location of application. Caution must be exercised in the use of combination products, which contain potent fluorinated corticosteroids.
      - 6) Other
    - b. Systemic therapy  
Inflammatory dermatophytoses may require systemic antifungal therapy. Oral therapy may be required to treat hyperkeratotic areas as on the palms and soles, patients with disabling and/or extensive disease, patients intolerant to topical therapy or those for whom topical therapy has failed, patients with chronic infection, and patients immunosuppressed by disease or by therapy. Systemic therapy includes, but is not limited to, the following:
      - 1) Griseofulvin
      - 2) Ketoconazole
      - 3) Evolving systemic therapy
        - a) Terbinafine
        - b) Itraconazole
        - c) Fluconazole
        - d) Other
      - 4) Other
  2. Surgical  
Usually not indicated, except for drainage of superficial vesicles, bullae, and pustules
  3. Other
    - a. Elimination of risk factors such as avoidance of infected animals, soil, and people
    - b. Preventive measures such as wearing protective footwear in public facilities
    - c. If applicable, appropriate treatment of infected animals
    - d. Other
- B. Miscellaneous
  1. Follow-up  
Follow-up examinations may be indicated, depending on extent, severity, and tolerance to medications, as well as the need to augment or alternate treatment based on clinical response. Intervals between visits will vary, depending on, but not limited to, the

severity of the problem and the intensity of the treatment.

2. Monitoring of patients receiving systemic therapy

Periodic monitoring of hepatic, renal, and hematopoietic function may be indicated in patients treated with systemic antifungals.

3. Drug interactions

Oral antifungals have the potential for significant drug interactions and toxicities. The package insert and the *Physicians' Desk Reference (PDR)* should be consulted.

4. Contraindications and precautions for use of systemic antifungal therapy

- a. Hypersensitivity to medication
- b. Precautions (see package insert and the *PDR*)
- c. Other

VI. Supporting evidence

See Bibliography (Appendix)

VII. Disclaimer

Adherence to these guidelines will not ensure successful treatment in every situation. Further, these guidelines should not be deemed inclusive of all proper methods of care or exclusive of other methods of care reasonably directed to obtaining the same results. The ultimate judgment regarding the propriety of any specific procedure must be made by the physician in light of all the circumstances presented by the individual patient. For the benefit of members of the American Academy of Dermatology who practice outside the jurisdiction of the United States, the listed treatments may include agents that are not currently approved by the U.S. Food and Drug Administration.

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