

Identifying and Treating Superficial Fungal Infections in the Urgent Care Setting

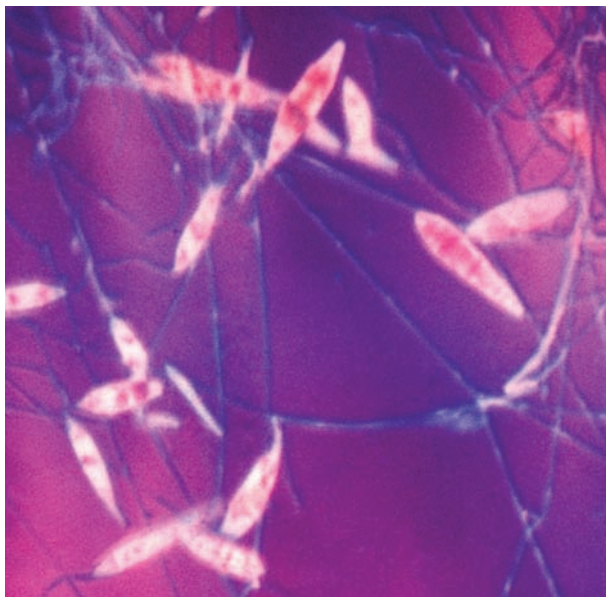
Urgent message: Rashes often lead patients to seek relief in the urgent care center. The ability to differentiate among common, superficial fungal infections and to select the most appropriate treatment or refer is an important skill to master.

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Introduction

Superficial fungal infections are among the most common skin conditions seen in the urgent care setting. Dermatophytes are the most common type of fungi that infect and survive on dead keratin (i.e., skin, hair follicles, nails), but certainly not the only type the clinician is likely to be presented with. Candidiasis, primarily due to *Candida albicans*, affects not only mucous membranes, but also skin (skin folds and moist areas). Finally, tinea versicolor (also known as pityriasis versicolor or, more colloquially, as yeast infection) is caused by the lipophilic yeast *Pityrosporum*, also known as *Malassezia furfur*.

In this article, we will review common causative organisms and discuss presenting characteristics, differential diagnoses, and available treatments.



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Overview: Dermatophyte (Tinea) Infections

Three types of dermatophytes account for the majority of superficial fungal infections:

- *Trichophyton*
- *Epidermophyton*
- *Microsporum*

Dermatophytes can be classified according to the place of origin (anthropophilic, zoophilic, or geophilic), according to the tissue mainly involved (epidermomycosis, trichomycesis, or onychomycosis), or by body region affected (tinea faciale, corporis, cruris, manus, pedis).

It is not uncommon for dermatophyte infections to affect healthy individuals, but immunocompromised patients are particularly susceptible.

Dermatophytes tend to present in children as scalp infections, while young adults are likely to have intertriginous infections. Gupta, et al, reported in the *Journal of the*

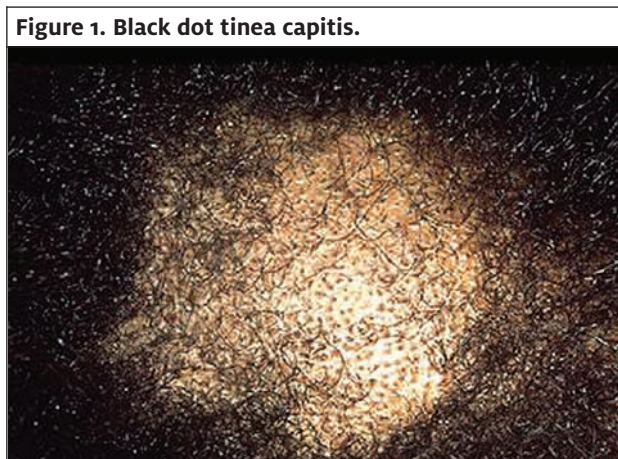
Infection	Methods
Tinea capitis	<i>Black dot type</i> Visualization of hyphae under the microscope or by fungal cultures. <i>Gray patch type</i> Direct visualization of hyphae under the microscope or by Wood's lamp. Hairs infected with <i>Microsporum spp</i> fluoresce.
Tinea cruris	Direct visualization of hyphae under the microscope or by cultures (on Sabouraud's medium).
Tinea pedis	Direct microscopy or fungal cultures.
Cutaneous candidiasis	Clinical diagnosis can be confirmed by potassium hydroxide (KOH) preparation or culture of scrapings.
Tinea versicolor	Identify round yeast and elongated hyphae "spaghetti and meatballs" on direct microscopic examination of scales prepared with KOH or by the blue-green fluorescence of the scales under the Wood's lamp.

American Academy of Dermatology that the prevalence of fungal nail infections is 0.7% in patients <19 years of age, compared with 18% in patients 60 to 79 years of age.

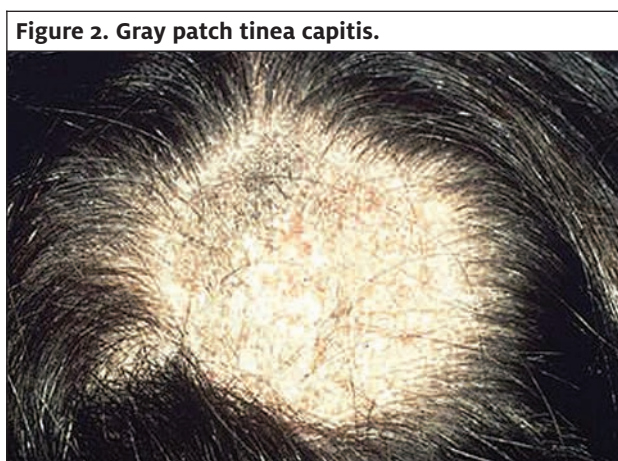
The single most important test for diagnosis of dermatophytosis is the direct visualization of the hyphae under the microscope. (See **Table 1.**) Cultures are usually unnecessary, since most species respond to many of the same agents.

Tinea Capitis

Tinea capitis affects children almost exclusively, and is much more common in



Source: George Skandamis, MD.



Source: George Skandamis, MD.

African-Americans than in Caucasians. In adults, seborrheic dermatitis can mimic tinea capitis. Clinically, tinea capitis presents as two distinctly different forms:

- *Black dot tinea capitis* (BDTC) is the most common form of tinea capitis in U.S. and spreads from person to person by fomites (hats, combs, brushes, etc). Small patches of asymptomatic, erythematous, scaling lesions can go unnoticed until alopecia develops. Broken-off hairs near the surface give the appearance of "dots" in dark-haired persons (hence, the name). (See **Figure 1.**)

Without treatment, BDTC progresses, leaving permanent scars. A secondary infection and transition to kerion may occur.

Diagnosis is only by visualization of hyphae under the microscope or by fungal cultures. A Wood's lamp is not helpful.

- *Gray patch tinea capitis* (GPTC), caused by *Microsporum canis*, is usually contracted from dogs or cats and, rarely, from another person.

The infection starts as an erythematous, scaling, pruritic, well-demarcated circular patch, showing numerous broken-off hairs, that keeps spreading centrifugally. Small patches coalesce to form larger patches. Many patches may be present for weeks to months. (See **Figure 2.**)

Diagnosis is by direct visualization of hyphae under the microscope or by Wood's lamp. Hairs infected with *Microsporum spp* fluoresce.

Occasionally, the lesion becomes boggy, waxy,

8.3 Nursing Mothers: Studies in rats have demonstrated that zanamivir is excreted in milk. However, nursing mothers should be instructed that it is not known whether zanamivir is excreted in human milk. Because many drugs are excreted in human milk, caution should be exercised when RELENZA is administered to a nursing mother.

8.4 Pediatric Use: Treatment of influenza: Safety and effectiveness of RELENZA for treatment of influenza have not been assessed in pediatric patients less than 7 years of age, but were studied in a Phase III treatment study in pediatric patients, where 471 children 5 to 12 years of age received zanamivir or placebo [see Clinical Studies (14.1) of full prescribing information]. Adolescents were included in the 3 principal Phase III adult treatment studies. In these studies, 67 patients were 12 to 16 years of age. No definite differences in safety and efficacy were observed between these adolescent patients and young adults.

In a Phase I study of 16 children ages 6 to 12 years with signs and symptoms of respiratory disease, 4 did not produce a measurable peak inspiratory flow rate (PIFR) through the DISKHALER (3 with no adequate inhalation on request, 1 with missing data), 9 had measurable PIFR on each of 2 inhalations, and 3 achieved measurable PIFR on only 1 of 2 inhalations. Neither of two 6-year-olds and one of two 7-year-olds produced measurable PIFR. Overall, 8 of the 16 children (including all those under 8 years old) either did not produce measurable inspiratory flow through the DISKHALER or produced peak inspiratory flow rates below the 60 L/min considered optimal for the device under standardized in vitro testing; lack of measurable flow rate was related to low or undetectable serum concentrations [see Clinical Pharmacology (12.3), Clinical Studies (14.1) of full prescribing information]. Prescribers should carefully evaluate the ability of young children to use the delivery system if prescription of RELENZA is considered.

Prophylaxis of Influenza: The safety and effectiveness of RELENZA for prophylaxis of influenza have been studied in 4 Phase III studies where 273 children 5 to 11 years of age and 239 adolescents 12 to 16 years of age received RELENZA. No differences in safety and effectiveness were observed between pediatric and adult subjects [see Clinical Studies (14.2) of full prescribing information].

8.5 Geriatric Use: Of the total number of patients in 6 clinical studies of RELENZA for treatment of influenza, 59 patients were 65 years of age and older, while 24 patients were 75 years of age and older. Of the total number of patients in 4 clinical studies of RELENZA for prophylaxis of influenza in households and community settings, 954 patients were 65 years of age and older, while 347 patients were 75 years of age and older. No overall differences in safety or effectiveness were observed between these patients and younger patients, and other reported clinical experience has not identified differences in responses between the elderly and younger patients, but greater sensitivity of some older individuals cannot be ruled out. Elderly patients may need assistance with use of the device.

In 2 additional studies of RELENZA for prophylaxis of influenza in the nursing home setting, efficacy was not demonstrated [see Indications and Usage (1.3) of full prescribing information].

10 OVERDOSAGE

There have been no reports of overdose from administration of RELENZA.

17 PATIENT COUNSELING INFORMATION

See FDA-Approved Patient Labeling (17.6).

17.1 Bronchospasm: Patients should be advised of the risk of bronchospasm, especially in the setting of underlying airways disease, and should stop RELENZA and contact their physician if they experience increased respiratory symptoms during treatment such as worsening wheezing, shortness of breath, or other signs or symptoms of bronchospasm [see Warnings and Precautions (5.1)]. If a decision is made to prescribe RELENZA for a patient with asthma or chronic obstructive pulmonary disease, the patient should be made aware of the risks and should have a fast-acting bronchodilator available.

17.2 Concomitant Bronchodilator Use: Patients scheduled to take inhaled bronchodilators at the same time as RELENZA should be advised to use their bronchodilators before taking RELENZA.

17.3 Neuropsychiatric Events: Patients with influenza (the flu), particularly children and adolescents, may be at an increased risk of seizures, confusion, or abnormal behavior early in their illness. These events may occur after beginning RELENZA or may occur when flu is not treated. These events are uncommon but may result in accidental injury to the patient. Therefore, patients should be observed for signs of unusual behavior and a healthcare professional should be contacted immediately if the patient shows any signs of unusual behavior [see Warnings and Precautions (5.3)].

17.4 Instructions for Use: Patients should be instructed in use of the delivery system. Instructions should include a demonstration whenever possible. For the proper use of RELENZA, the patient should read and follow carefully the accompanying Patient Instructions for Use.

If RELENZA is prescribed for children, it should be used only under adult supervision and instruction, and the supervising adult should first be instructed by a healthcare professional [see Dosage and Administration (2.1)].

17.5 Risk of Influenza Transmission to Others: Patients should be advised that the use of RELENZA for treatment of influenza has not been shown to reduce the risk of transmission of influenza to others.

17.6 FDA-Approved Patient Labeling and Instructions for Use: See separate leaflet.

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Figure 3. Gray patch tinea capitis with associated kerion.



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purulent, and extremely tender and is associated with lymphadenopathy (kerion; see **Figure 3**).

Treatment

BDTC and GPTC both respond to the same medications (**Table 2**). Topical agents are ineffective.

Treatment of kerion is a subject of minor controversy. While some practitioners advocate treating with antibiotics active against Group A *Strep* and *S aureus* in addition to griseofulvin 250 mg BID for four to six weeks plus hot compresses, others maintain that kerion can be treated successfully without antibiotics.

Prevention

Examine school and home contacts to identify asymptomatic carriers. Carriers should be treated with selenium sulfide shampoo or with an oral antifungal agent. Children under treatment can return to school.

Tinea Corporis

Tinea corporis (TC; also referred to as ring worm) refers to dermatophyte infections of the trunk, legs, arms, and neck (excluding feet, hands, or groin), most commonly due to *T rubrum*. It affects all ages and can be transmitted by autoinoculation from other parts of the body, but also from close contact with animals or contaminated soil.

TC is more common in tropical and subtropical regions. It appears clinically as multiple, bright, mildly pruritic or asymptomatic sharply marginated, scaly plaques, with or without vesicles at the margin (**Figure 4**). These plaques enlarge peripherally with central clearing and production of concentric rings.

Allergic contact dermatitis, psoriasis, seborrheic dermatitis, and granuloma annulare all can mimic TC.

Tinea corporis gladiatorum affects athletes who have skin-to-skin contact, and is caused primarily by *T tonsurans*. In such cases, the athlete should abstain from contact sports for 10 to 15 days.

Table 2. Pharmacotherapy for BDTC and GPTC

	Dose*	Side effects	Noteworthy
Griseofulvin	<p><i>Adults</i> For GPTC: 250 mg BID, 1-2 months; microsize 15 mg/kg/day up to 500 mg/day</p> <p>For BDTC: 250 mg TID, 6-12 weeks; ultramicrosize 10/mg/day</p> <p><i>Children</i> 30-50-pound child: 125 mg-250 mg/day >50-pound child: 250 mg-500 mg/day</p>	Headache, nausea/vomiting, photosensitivity	CBC, LFTs if treatment lasts >3 months
Terbinafine	<p><i>Adults</i> 10-20 kg: 62.5 mg/day, 4 weeks 20-40 kg: 125 mg/day, 4 weeks >40 kg: 250 mg/day, 4 weeks</p> <p><i>Children</i> Not recommended</p>	Rarely, nausea, abdominal pain, aplastic anemia	
Itraconazole	<p><i>Adults</i> 200 mg/day, 4-8 weeks</p> <p><i>Children</i> 3-5 mg/kg/day, 4-6 weeks</p> <p>or 5 mg/kg/day, 1 week each month for 2-3 months</p>	Needs acid gastric pH, raises levels of digoxin and cyclosporine	
Fluconazole	<p><i>Adults and children</i> 6 mg/kg/day, 2 weeks Repeat at four weeks if needed</p>		Only oral agent approved for children <2 years

CBC, complete blood count; LFT, liver function test *Variations on dosing regimens exist in the literature.

for immunocompromised individuals, patients who failed topical treatment, and for TC gladiatorum.

Tinea Cruris

Tinea cruris (jock itch) refers to dermatophytosis of the groin, pubic area, and inner thighs. Primarily, it affects obese males who wear tight occlusive clothing in a humid, warm environment. Usually, it is associated with tinea pedis, often with a history of tinea cruris.

Clinically, tinea cruris presents as an erythematous patch on the inner aspect of one or both thighs. It spreads outward with central clearing and sharp, slightly elevated border which may or may not contain tiny vesicles. Scrotum and penis are rarely involved.

Differential diagnosis involves intertrigo, erythrasma, pityriasis versicolor, and psoriasis.

Diagnosis is achieved by direct visualization of hyphae under the microscope or by cultures (on Sabouraud’s medium).

Treatment

Tinea cruris responds well to topical antifungals, including azole and allylamine products, as well as ciclopirox and haloprogin. Failure to treat concomitant tinea pedis results in recurrence.

Prevention

Prevention is achieved by wearing shower shoes when using public baths, using antifungal powders to keep the groin dry, and avoiding hot baths and opting for boxer shorts instead of briefs. Wearing loose clothing may also be helpful. Also, avoid sharing fomites, like hats, clothing, and towels.

Treatment

Tinea corporis usually responds well to topical antifungals, particularly the azoles. Systemic treatment is reserved

Tinea Pedis

Tinea pedis (athlete’s foot; see **Figure 5**) is the most

common dermatophytic infection seen in practice. It involves the feet and is characterized by erythema, scaling, maceration and/or bulla formation. The infection can, in time, spread to the groin, trunk, hands, and nails. Bacteria can invade through the cracks and cause cellulitis or lymphangitis.

Tinea pedis tends to be chronic, with exacerbations.

Males are more prone to tinea pedis than females. Hot, humid weather, occlusive shoes, and excessive sweating are other predisposing factors. Typically, tinea pedis is transmitted by walking barefoot on contaminated floors.

Itching and pain with secondary infections are characteristics of the disease.

Skin lesions can be:

- *interdigital type* (dry scaling or macerated, peeling, fissuring of toe webs)
- *moccasin type*, which is the most difficult to treat (well-demarcated erythema with tiny papules and scales and being confined to heels, soles and lateral

Figure 4. Tinea corporis.



Source: George Skandamis, MD.

- borders of feet)
- *inflammatory/bullous type* (vesicles or bullae filled with clear fluid on soles, instep, web spaces)
- *ulcerative type* (extension of interdigital tinea infec-

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Figure 5A and Figure 5B. Tinea pedis.

Source: George Skandamis, MD.

Figure 6. Tinea manuum.

Source: George Skandamis, MD.

tion onto dorsal and plantar foot, usually complicated by bacterial infections).

Differential diagnosis includes erythrasma, impetigo, *Candida* intertrigo, bullous impetigo, and dyshidrosis.

Diagnosis is established by direct microscopy or fungal cultures.

Treatment

Most topical agents (azoles, pyridones, allylamines, or benzylamines) applied BID for four weeks are effective against tinea pedis. Some prescription agents have a broader spectrum and can be applied once daily. A meta-analysis of 11 randomized trials concluded that treatment with terbinafine or naftifine HCl produces a higher cure rate than treatment with itraconazole.

It should be noted that topical agents may be unable to penetrate keratinized plantar skin. In such cases, the oral form of these agents may be preferable.

Apply Burow's wet dressings to macerated, interdigital lesions. Apply cool compresses and, if severe, add systemic steroids to acutely inflamed feet.

Prevention

Instruct patients to wear shower shoes in public baths and locker rooms. Wash feet with benzoyl peroxide after shower.

Tinea Manuum

Tinea manuum refers to a chronic dermatophytosis of the hands that does not resolve spontaneously. Even after treatment, recurrences are common. Usually, the dominant hand is involved. Tinea manuum can last for years.

On examination, hands look red with white scales confined to palmar creases (**Figure 6**). Borders are well demarcated with central clearing and pruritus is present.

Tinea manuum is usually associated with tinea pedis and/or tinea cruris and/or tinea unguium of fingernails.

Treatment

Because of the thickness of the palmar skin, topical agents are not effective. Use:

- terbinafine 250 mg QD for two weeks, or
- itraconazole 200 mg QD for one week, or
- fluconazole 200 mg QD for two to four weeks.

Cutaneous Candidiasis

Cutaneous candidiasis is a superficial skin infection affecting moist, macerated, chafed skin. Intertrigo refers to *Candida* infection of intertriginous areas (two closely opposed skin surfaces; see **Figure 7**). Factors that *increase* skin friction, moisture, warmth, or maceration and *decrease* immune response typically increase risk.

Clinically, the initial picture is one of an erythematous, pruritic plaque of the groin, perianal area, axilla, abdominal pannus, web space of toes and fingers, or under the breasts, with fine peripheral scaling and satellite pustules. Later, the plaques coalesce to form large eroded areas.

Diagnosis is clinical but can be confirmed by potassium hydroxide (KOH) preparation or culture of scrapings.

Treatment

The treatment is tailored toward the actual fungal infection, the underlying predisposing factors, and keeping the intertriginous areas as dry as possible.

Initial treatment for the majority of patients is a topical antifungal cream, typically miconazole or clotrimazole, applied for seven to 14 days. Oral antifungal agents (ketoconazole 200 mg/day or fluconazole 100 mg/day for four to six weeks) are reserved for resistant cases.

Various drying agents (e.g., corn starch, Domeboro's solution, talcum powder, antifungal powders) can minimize skin fold moisture. Drying agents are used after adequate antifungal treatment has been completed. High-risk patients should use drying agents indefinitely, as well as an antifungal cream once or twice a week.

Tinea Versicolor

Tinea versicolor is a chronic asymptomatic scaling dermatosis due to overgrowth of a yeast (*Pityrosporum ovale*) that resides normally in the keratin of skin and hair follicles. The term "tinea" should be reserved for dermatophytosis, and the present condition should be termed "pityriasis versicolor" (PV). Predisposing factors include humidity, high rate of sebum production, application of grease to skin, or high levels of cortisol.

PV presents as multiple, sharply demarcated hypopigmented macules with fine scales on the upper back, trunk, neck, arms, and abdomen (see **Figure 8**). The small macules are asymptomatic or may produce mild itching and can enlarge to form extensive patches.

Differential diagnosis includes vitiligo, pityriasis alba, psoriasis, and tinea corporis.

Diagnosis is achieved by identifying round yeast and elongated hyphae, so-called "spaghetti and meatballs," on direct microscopic examination of scales prepared with KOH or by the blue-green fluorescence of the scales under the Wood's lamp.

Patients should be informed that PV is not considered contagious, does not leave permanent scars, and that skin color alteration resolves within months.

Treatment

Selenium sulfide lotion applied to affected areas daily for two weeks is the mainstay of treatment.

Topical azole antifungal agents can be used once daily for two weeks.

Figure 7. Intertrigo infection (cutaneous candidiasis).



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Figure 8. Pityriasis versicolor.



Source: George Skandamis, MD.

Recurrence can usually be prevented by using any topical agent once weekly for the following few months.

Oral therapy is also effective (and sometimes preferred for its convenience), using:

- ketoconazole 200 mg/day for 10 days, or
- fluconazole 150 mg to 300 mg single dose/week for two to four weeks, or
- itraconazole 200 mg/day for seven days.

Oral therapy does not prevent recurrences.

Conclusion

Acute discomfort is often viewed as an urgent matter for which some may be disinclined to wait for a primary care appointment. Urgent care's growth has been fueled by its ability to fill such gaps. Being prepared to provide relief with an accurate diagnosis and informed treatment choice for common, superficial fungal infections will help further establish the practitioner as an invaluable member of the healthcare "team." ■