# Tinea Corporis in Children

Developed by Jessica Hesthammer (nee Brown) and Dr. Melanie Lewis for PedsCases.com.
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## Introduction

Hi everyone, my name is Jessica Hesthammer and I am a third year medical student at the University of Alberta. Today, we are going to discuss different tinea infections in children, with a specific focus on tinea corporis. Let's begin with a clinical case.

"You are a third year medical student on your pediatrics rotation, in a community pediatricians office seeing Henry, a five-year-old boy for the first time. Henry appears well and is running around the office. However, as comes closer to you, you notice that he has an erythematous, annular, scaling rash on his right shoulder. Henry stops playing several times and scratches his shoulder."

Students, how critical is this situation? Have you begun to form a differential diagnosis and management plan? Most diagnoses that present in this way are benign, but there are a few that we need to be wary of. The objectives of this PedsCases podcast are to:

1. **Identify and describe a typical tinea corporis rash;**
2. **Develop an approach to making a differential diagnosis of a tinea corporis rash;**
3. **Compare and contrast the presentation of common superficial fungal infections;**
4. **Identify key questions to ask on history about a pediatric skin condition; and**
5. **Counsel caregivers on treatment of fungal infections.**

Let's begin with the basics.

## How do we approach someone with a rash?

We need to ensure our history is both basic and comprehensive. The most important thing when you are first seeing the child is risk stratification. Your first thought should be: Is this child well or unwell? An unwell child would have unstable vital signs, decreased level of consciousness, increased work of breathing, or generally look sick [1]. This is not something you should manage by yourself, and if a child is presenting with anything along these lines you should get help immediately.

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After you have determined that your patient is well enough to focus on the history, you need to figure out the onset and clinical course of the rash. When did the family first notice it? Have they noticed it anywhere else? Has it spread at all? Is it itchy? Is it painful? Few rashes are painful, and those that are can be concerning. Does anything make it better? Does anything make it worse? Have they tried anything for the rash? If they have tried a topical corticosteroid and the rash got significantly worse, that should make you suspicious for a fungal infection. Another important question to ask is: Have they been sick recently? Some rashes can be preceded by a viral illness, or be a result of a bacterial infection, but tinea corporis is not one of them [2]. And finally: Does anyone else in the family have a similar rash?

### How would a student form a differential diagnosis in a child with an erythematous, annular, papulosquamous rash with well-defined margins?

The best way to form a differential diagnosis is go back to your history. Besides the rash characteristics, the clinical picture of your patient is going to be the best way to help you to differentiate between the items on your differential diagnoses [3]. The timeline is going to be extremely important in our case. A parent noticing a rash for the first time within a week of starting a new medication is highly suspicious of a drug eruption [4]. This is especially true if there are accompanying symptoms, like fever or malaise. As is the case with most dermatological conditions, location matters. A rash on exclusively sun-exposed areas would lead you towards a diagnosis of subacute cutaneous lupus, whereas a rash on flexor surfaces of the body like the inside of your elbows would heighten your suspicion of eczema [5]. A superficial fungal rash, also known as dermatophytosis, should be at the top of your differential when you are looking at a round, erythematous, scaly rash [6].

### Now that we suspect it might be fungal, let's get back to basics. What is dermatophytosis?

Dermatophytosis or tinea is a superficial infection involving only the epidermis that is caused by pathogenic fungal species [9]. There are hundreds of species of dermatophytes that cause superficial fungal infections, and these infections are named for the area of body that they affect. Tinea corporis is a dermatophyte infection that occurs somewhere on the body, as compared to tinea capitis on the head, tinea pedis on the feet, and tinea cruris on the groin.[9] The most common dermatophyte that causes tinea corporis in children is a species known as *Trichophyton*. You might know dermatophytosis or tinea as Ringworm, which is a misnomer because the rash is not due to a worm. Rather, Ringworm is named because of the annular shape of the rash [7].

### How might other diagnoses similar to tinea corporis present?

A general differential diagnosis for tinea corporis would include cutaneous lupus erythematosus, drug eruption, eczema, erythema multiforme, granuloma annulare, nummular eczematous dermatitis, pityriasis rosea, psoriasis, and secondary syphilis. Subacute cutaneous lupus erythematosus presents as an annular plaque that began as small, erythematous, scaly papules

in photodistributed areas like the neck. The lesions would be exacerbated by sun exposure, unlike tinea corporis. A drug eruption rash could present with pruritic, circumscribed, erythematous eruption with central pallor lesions, but it would only present within hours to days of starting the offending medication. Erythema multiforme is characterized by distinctive target skin lesions that tend to affect the palms and soles. Secondary syphillis is also characterized by target-like lesions on the palms of your hands and would include a history of a syphillis infection. Eczema or nummular eczema tends to have a more chronic course, with nummular eczema presenting with pruritic, round, coin-shaped patches on the extremities. Pityriasis rosea is an acute, self-limiting disease characterized by oval, papulosquamous lesions on the trunk. It is usually preceded by a viral infection and can sometimes be associated with a prodrome. Granuloma annulare is a common condition characterized by a non-scaly, erythematous, annular plaque on the distal extremities. Finally, psoriasis should also be on the differential because it includes chronic plaque psoriasis, which involves well-demarcated, scaly, erythematous plaques. These are usually found on extensor surfaces like the elbow [9].

I know this is an extremely long and comprehensive list, but it is important to keep a large differential before you start narrowing it down based on your history and physical exam.

## What findings on history and physical exam would lead you to tinea corporis?

Patients with tinea corporis present with an annular patch or plaque with an advancing, raised, scaling border and central clearing [8]. It usually begins as pruritic and scaling, spreads centrifugally, and then clears centrally while the raised border remains. The patches can expand up to 5 cm within a few weeks. Keep in mind that the pattern can vary from person-to-person. Patients will have a history of an expanding rash that may have started as individual plaques and have since coalesced, and they may have a history of pustules on the rash [10].

On physical exam, patients should not have any systemic features besides the rash. They should be otherwise well, and vital signs should be stable. It is important to check the child's scalp and feet, as the rash on the shoulder could be a result of secondary spread [8].

## How do most children get tinea corporis?

Most tinea corporis is acquired from direct skin contact with fomites, or inanimate objects that carry infection from previous contact with an infected being, especially from playing in the dirt. However, they might have also gotten this infection from direct skin contact with an infected individual or animal [10].

It is important to remember that tinea corporis can result from a secondary spread from other sites of dermatophytosis, such as the scalp. Therefore, it is important to do a comprehensive head-to-toe physical exam.

## What investigations are necessary in order to confirm your diagnosis?

It is important that we form a correct diagnosis, as inappropriate treatment with topical steroids can cause the swelling and inflammation to subside but the tinea infection to persist. This is known as tinea incognito and can lead to more severe forms of tinea infection requiring oral anti-fungals or deep-seated folliculitis (Majocchi's granuloma) [10].

A diagnosis of tinea corporis can be made based on the clinical suspicion alone. However, potassium hydroxide (KOH) microscopy of a skin scraping can determine if hyphae are present. It is important that, when you are scraping the skin, you take it from the active border of the plaque. Fungal cultures are not necessary and will slow down the diagnosis [12].

### How would you counsel caregivers on the treatment of their child's fungal infection?

Topical treatment is usually sufficient to cure a superficial fungal infection. You would begin by prescribing topical Terbinafine, as it has the best evidence against dermatophytosis. You would tell the caregivers to apply the agent to the lesion as well as a 2 cm area surrounding the lesion once or twice daily. This treatment should be continued for a week after the rash has appeared to cleared. This is an extremely important aspect of caregiver education, as superficial fungi can persist once the rash has appeared to have healed. If the child's rash persisted beyond three weeks, we would then try oral Terbinafine for one to two weeks. Dosing is based on the child's weight [14].

Remember, extensive tinea corporis should heighten your suspicions for HIV or diabetes or some other systemic illness that is affecting the immune system. If Henry's rash persists despite proper treatment, or if he has multiple instances of tinea corporis within one year, you should consider additional investigations to assess immune function and other co-morbid diagnoses. If the rash is not responding to appropriate therapy, you should also consider a skin biopsy [13].

Caregivers will often be concerned about their child and will want to know how concerning their skin condition is. You should counsel them that it was right for them to bring them in, but this is a relatively benign rash that should be cured with topical treatment [11].

Okay, that was a lot of information. Here are the key takeaways that will be helpful in your future as a diagnostician:

1. **Tinea corporis will present as an erythematous, scaling, annular rash**
2. **This rash will be itchy, but should not be painful**
3. **Most children contract tinea corporis from playing in dirt or sand**
4. **Ensure you have a high degree of suspicion for similar rashes caused by more insidious diagnoses, such as secondary syphilis**
5. **KOH staining is sufficient to make the diagnosis and start treatment**
6. **Topical treatment is first line, but if the rash persists then an oral anti-fungal agent can be utilized**

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7. **If neither topical nor oral anti-fungals can control the tinea, or if a patient presents with three or more instances of tinea corporis within a year, immunodeficiency should be suspected**

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