



TRANSCRIPT

S1.E1: THE SKIN EATERS

Dr. Tom Kovi: Hello and welcome to *Spot Diagnosis*, a podcast about all things dermatological, brought to you by the Skin & Cancer Foundation, also known as the Skin Health Institute in Melbourne, Australia.

Each month we'll be talking about dermatology clinical pearls for medical students, junior doctors and GPs. I am Dr. Tom Kovi.

Associate Professor Alvin Chong: I'm Associate Professor Alvin Chong. We are your hosts. Why don't you tell us a bit about yourself, Tom?

Tom: Sure. I'm a doctor currently working as a Research and Education Fellow in dermatology at the Skin Health Institute, and Professor Chong, how about you?

Alvin: I'm a specialist dermatologist and Director of Dermatology Education here at the Institute and at St. Vincent's Hospital, Melbourne. Tom, why are we doing this podcast?

Tom: Well, most people can go through medical school without learning much about dermatology. I think that's something we can improve on because junior doctors see heaps of rashes in the ward and in clinic but aren't too sure about what to do with them.

Alvin: So, we came up with an idea to make a series of podcasts about skin problems that are frequently encountered in everyday life.

Tom: I do love the idea of a podcast, but isn't it ironic that we're teaching something as visual as dermatology by voice only?

Alvin: That's true and it's going to be our challenge, but hopefully, we can make it interesting, informative and fun. We will try to paint the picture as best we can.

Tom: So, what are we going to cover in our first episode?

Alvin: For our first episode, we'll be talking about fungal infections of the skin, hair and nails known as tinea.

Tom: All right, let's talk about fungus. What is a fungus and how is it different from other germs like bacteria or viruses?

Alvin: Well, fungi are quite different from bacteria and viruses in a few ways. Firstly, fungi are usually bigger, so you can think of them a bit like tiny plants, but unlike plants, they can't make their own energy from sunlight, so they have to get their food from wherever they're growing on.

Tom: I see. Can you tell us some of the examples of the fungi?

Alvin: Well, when we say fungi, we often think of mold growing in our backyard, but most fungi are poisonous to humans, but some are actually edible like mushrooms and yeast that is used to make bread rise and ferment beer.

Tom: Mushrooms, bread and beer, all good stuff. Why do you think junior doctors need to know about fungus?

Alvin: Well, because they drink beer, but apart from that, fungi can grow on trees and soil, but they can also grow on human skin. You know how many microbes live on the skin?

Tom: How many?

Alvin: Millions. We can think of our skin as an ecosystem called the microbiome with lots of living things, including bacteria, fungi, viruses, and even mites.

Tom: Is that bad?

Alvin: Well, not really. Most of these bacteria and microbes just hang out without causing any trouble. Some of them can even be helpful protecting us from harmful organisms.

Tom: Okay, so you're saying lots of living things live on the skin, and sometimes they can cause trouble. How common is the problem of fungal infection?

Alvin: Superficial fungal infection or tinea is really common. In fact, it is one of the most common forms of infection affecting up to 25% of humans.

Tom: Wow, that's huge. There are a few different kinds of fungal infections like tinea and thrush. How are they different?

Alvin: The difference is, the causative organism. Tinea is caused by the dermatophytes, such as *Trichophyton Rubrum*. Thrush and pityriasis versicolor are caused by yeast. We're going to concentrate on dermatophyte infections or tinea today.

Tom: All right, so what is a dermatophyte?

Alvin: Dermatophyte is a type of fungus that feeds on keratin. You know where you find keratin?

Tom: Where at?

Alvin: You find them on skin in the epidermis, the outer layer of skin. You find it in hair, and you find it in nails, and you can call dermatophytes Skin Eaters.

Tom: Yes, I've read that they have a role in breaking down skin, feather and hair in the environment. What happens when you get dermatophyte infection of the skin?

Alvin: You get something known as tinea. These fungal organisms, when they infect the superficial layers of skin, they set up an inflammatory reaction. The affected part of the body gets itchy and inflamed so the edge of these lesions is often red, raised and scaly. It's called an Active Edge. What's interesting though is that as they expand, the central part clears so you get this ring-like lesion which can grow. Sometimes it can multiply and descriptions of something like ringworm, spelled R-Y-N-G-E-W-Y-R-M have dated from as early as the 15th century.

Tom: Do you reckon people back in the day think that ringworm was actually caused by a worm?

Alvin: I think they knew that it was something infective and they thought it was due to a parasitic worm, but it wasn't actually until the 19th century when a Hungarian physician discovered that ringworm is caused by a fungus. Of course, it's a great name and we are still stuck with the term ringworm because it is very catchy.

Tom: Here's our tip number one. When you see a ring-shaped lesion, think ringworm and remember, it's not a worm, it's a fungus.

Tom: Now how do you explain all the different names for tinea, like tinea pedis and tinea corporis?

Alvin: Tom, in medicine, you never use English when you can use another language to describe something, right?

Tom: True.

Alvin: So, we use Latin, the type of tinea corresponds to the part of the body affected and the terminology comes from Latin so pedis is a Latin word, meaning of the foot. Tinea pedis refers to tinea affecting the foot and it is the commonest dermatophyte infection. Do you know what corporal means?

Tom: What does it?

Alvin: Of the body, so tinea corporis is tinea of the skin on the body and **capitis**?

Tom: Of the head.

Alvin: Of the head, so tinea capitis which affects mainly prepubertal children is tinea of the scalp. Then there's something called tinea cruris, also known as jock itch, which affects the skin around the groin. Do you know what the weirdest one is?

Tom: What is it?

Alvin: It's actually not in Latin. It's called two feet-one hand syndrome.

Tom: What a strange name. Why is that?

Alvin: Well, if you actually have someone with tinea pedis on both their feet and they've been scratching and picking it with the nails with the dominant hand and they get tinea of one hand, you get two feet-one hand syndrome.

Tom: What happens to tinea if we don't treat it?

Alvin: You're lucky here. Tinea dermatophytes live on keratin and they don't cause deep infections in immunocompetent people, but it can certainly spread on skin, it can spread to nails. It can cause chronic itch and irritation and it can spread to other people. A person with tinea pedis walking around will be shedding epidermis infected with the dermatophytes.

Tom: That sounds pretty contagious. I suppose that's why people say not to share their towels and walk around barefoot in public shower.

Alvin: Absolutely. It is important to tell this to our patients to prevent the spread of tinea. We should also make sure that patients with tinea are promptly treated.

Tom: Okay, so how do we diagnose tinea?

Alvin: Clinically tinea of the feet or tinea of the skin produces a ring-shaped rash that may be single or multiple and that's classic ringworm. On the feet, it can cause scaling and itch called moccasin tinea. The whole sole may be affected. Most of the time you can diagnose tinea clinically.

Tom: Lots of rashes are scaly and itchy.

Alvin: Yes, many things can look like tinea, especially psoriasis and eczema. Often all things are treated like tinea. Do you know what we can do to confirm diagnosis?

Tom: Scraping?

Alvin: Scrapings, you can use a blade to scrape the active edge.

Tom: Isn't that uncomfortable?

Alvin: It's slightly uncomfortable, but I've actually scraped kids and they're much more scared of the scalpel, but not at the scraping itself. It's fine as long as you don't draw blood. You know what the tip is then?

Tom: Hide the scalpel.

Alvin: Hide the scalpel.

Tom: All right. I'll make sure I'll hide the scalpel. Then, what do you do with this scraping?

Alvin: The scrapings can be examined by light microscopy and then they can be cultured on agar. Microscopy of tinea shows hyphae and the results can come back quite quickly, but fungal culture can take a few weeks but either should enable a definitive diagnosis.

Tom: What about tinea of the nail?

Alvin: Tinea of the nail is known as tinea onychomycosis, it's very common. It gets common as people get older. Up to about half of people aged 70 years or older actually have onychomycosis although it's largely asymptomatic. Classically the toenails are more commonly affected than the fingernails and they show discoloration. They get thick and there's a chalky yellowish appearance, it's usually not particularly painful or itchy.

Tom: Okay. How do you confirm the diagnosis then?

Alvin: You need to actually clip off as much abnormal nail and scrape off subungual debris as possible, and then you send that off for fungal microscopy and culture.

Tom: That is our tip number two. We should always send off nail sample when suspecting onychomycosis before starting treatment.

Tony: Okay, now we have done the foot fungal infection, so let's work our way up. Let's talk about jock itch. What is it?

Alvin: Jock itch, known as tinea cruris, as the name suggests, it's itching particularly of the genital area, and it's a type of ringworm. When you actually look at it, you get the scaly, raised, sometimes sharply defined border spreading up from the groin to the inner thighs, but it can also spread to affect the genitals.

Tom: Can it affect women too?

Alvin: Yes, but men tend to get it more commonly than women because as you know, in men, the area tends to be a little bit more crowded, so they sweat more and fungi love warmth and sweat.

Tom: Okay, is there a way to prevent it?

Alvin: Yes, good skin hygiene is pretty important. You want to keep the groin area clean and dry. Avoid tight synthetic clothing. Wear cotton rather than nylon and change into dry clothes after sweaty exercise.

Tom: Okay, let's keep working our way up. How does tinea cause problem in hair and scalp?

Alvin: Tinea capitis affects young children before puberty, but it's pretty rare in adults.

Tom: Why is it rare in adults?

Alvin: I think it's due to the fungistatic activity of fatty acid and sebum that occurs after puberty.

Tom: How interesting. What does it look like?

Alvin: Usually, tinea capitis can present as a solitary patch or multiple patches of hair loss with itch, scale and broken-off hairs but some cases of tinea capitis are very subtle. I've seen patients with only a few scaly bits on the scalp without any alopecia. Then there are other cases of tinea capitis where there's a severe inflammatory response, where you have crusting, weepy hairs in the scalp and that's called a kerion. This type of problem is very severe, it can cause scarring and permanent hair loss.

Tom: That sounds nasty. I suppose to diagnose tinea capitis, you would need to send off the sample for microscopy and culture. How do you actually get the sample?

Alvin: What you actually need to send off is samples of hair and scale in the scalp. You can either use forceps or sterile moistened cotton swab to take out the hair samples. Infected hairs usually come off very easily. Then you can do skin scrapings on the scaly areas of the scalp. You actually need to confirm the diagnosis because the treatment for tinea capitis is usually quite prolonged. It's highly recommended that microbiological confirmation is obtained.

Tom: How do you structure your approach to tinea treatment?

Alvin: The treatment depends on the type of tinea. If you only have a small area of skin affected, you can actually treat it topically quite easily. You know you can use a topical therapy such as terbinafine or imidazole cream applied once or twice a day. After a few weeks, the infection should clear, but when you have tinea affecting the nails or very extensive cutaneous tinea or tinea capitis, then you're going to need prolonged systemic therapy.

Tom: What if it doesn't get better, what do you do then?

Alvin: Well, if you actually have tinea that improves and then it comes back again, then you need to ask a few questions. First, is the diagnosis, right? As you know, eczema and psoriasis and all kinds of things can look like tinea, so you should really get microbiological confirmation with the skin scraping.

The second thing that you need to ask is, is there a reservoir? We often get patients with tinea pedis. They include topical treatment and then it recurs again. Do you know why?

Tom: Why is that?

Alvin: Well, it's because these patients often have untreated tinea affecting the nails and then the dermatophytes in nails come out onto the skin and you have repeated episodes of tinea pedis.

Tom: What about pets?

Alvin: Good question. A less common reservoir is pets. They may harbor organisms such as *Microsporum canis*. This is a zoophilic dermatophyte which can infect humans.

Tom: Okay, what kind of pets?

Alvin: Usually dogs and cats. Sometimes hamsters, but anything that's actually furry. I had a patient I saw a few weeks ago who took possession of a puppy dog and within weeks of arrival the whole family had classic tinea corporis and growing *Microsporum canis*. The puppy actually had a tinea infection.

Tom: How did you treat the puppy?

Alvin: To treat the puppy, well, I asked my sister this because she's a vet. We actually use systemic antifungal treatments.

Tom: All right, so that's our tip number three. If tinea doesn't improve or recover quickly, think about if there is a reservoir such as untreated nail fungus or pets.

Tom: What about tinea infecting the nails? How do we treat them?

Alvin: Tinea onychomycosis is a more complex problem. Firstly, topical therapies generally won't work on nail infections.

Tom: Why not?

Alvin: Well, if you think about the nail, it's actually like a barrier and most fungal nail infections are not superficial. Unless it's actually just on the surface, topical treatment is not going to be able to penetrate the nail to cure the dermatophyte. For most cases, effective treatment needs to be systemic therapy and for a prolonged period at least three months. It is very important to get microbiological confirmation of tinea before you commence systemic treatment.

Tom: What would you pick as your first-line treatment for nail tinea?

Alvin: Well, unless there is a contraindication, first-line option would be oral terbinafine 250 milligrams orally daily in adults and the duration will depend on the site of the infection. Toenails require the longest duration, at least 12 weeks. Fingernails take six weeks. The PBS will subsidise this treatment on an authority script in Australia if you can prove microbiologically that the patient has a fungal nail infection, that it has failed topical therapy and there is an extensive infection with at least 80% of the nail infected.

Tom: What would you tell the patient about the cure rate for the oral treatment?

Alvin: The cure rate for systemic terbinafine is pretty high - about 70% to 80%. It's definitely superior to any topical therapy or Griseofulvin.

Tom: But is it safe?

Alvin: It's very safe. There's been a recent JAMA Dermatology publication stating that in healthy adults and children, you don't need to monitor blood tests unless there's an underlying liver or renal problem.

Tom: Is there anything else a patient can do?

Alvin: Yes, I think concurrent physical therapy such as removing as much of the diseased nail as possible, usually by a podiatrist, can be very good as an adjunctive treatment.

Tom: I've seen people who completed their treatment course and the nails still look pretty abnormal.

Alvin: Yes. Well, you have to tell your patients that even after the fungus is dead, the nail will look abnormal for a number of months before the fresh nail grows out and for everything to look normal again.

Tom: For cases when a patient can't take systemic therapy, what would you do?

Alvin: Sure, there are nail lacquers that contain antifungal treatments. These need to be painted on the nail daily. Two of them are available over the counter, amorolfine and ciclopirox.

Tom: How do you use them?

Alvin: You paint it on the nail once daily, but the cure rate is terrible. It's quite low. It's only about 30% in trials and in real life, the cure rate is probably even lower than that, because it's actually hard to do it properly. You need to debride the nail; you need to paint it on every day for about 9 to 12 months.

Tom: That is such a long time for something that is not very effective, I guess with patients who are very committed it can be tried. I have come across a combined nail treatment kit that includes urea-based cream. Can you tell us a little bit about it?

Alvin: Yes, sure. This treatment has two stages. Firstly, you use a urea-based cream applied daily to the diseased nail for the first two to three weeks and that will dissolve dead nail. Then a topical bifonazole cream is applied to the remaining nail for another month, but this also requires a lot of commitment for patients. My experience is this: if you have tinea affecting just one or two nails, then it is actually quite easy to do and the cure rate is actually not too bad.

Tom: Okay. We have discussed many pearls here and just to summarise the treatment of fungal nails, firstly, oral antifungal is the preferred option, and first line is terbinafine once a day for 12 weeks for toenails. Secondly, if patients cannot take an oral tablet, then nail lacquers can be tried but the cure rates are much lower. Now, how do we treat tinea capitis?

Alvin: The treatment of tinea capitis needs to be systemic and is either oral griseofulvin or terbinafine according to the bodyweight of the patient. You are going to need treatment to be continued until you get microbiological clearance, so about six months in general. Now if a patient has inflammatory kerion, they will need concurrent anti-inflammatory therapy with oral corticosteroids to reduce the risk of scarring. These patients are going to need a referral for specialist care.

Tom: Okay, are there any other situations when a GP should consider a referral to a dermatologist?

Alvin: Well, I think that if the rash you think is tinea is not responding to treatment as expected, then really consider a specialist referral.

Tom: We made it to the end of our first episode of *Spot Diagnosis* on the Skin Eaters. To recap our top three tips from today. Firstly, if you see a ring-shaped rash, think ringworm. Secondly, before starting any patients on oral antifungal, meaning, fungal nail or extensive

tinea corporis, always send off a sample for fungal microscopy and culture and if it doesn't get better, then we know it is because the diagnosis was wrong or if it's a resistant fungus. And thirdly, if tinea does not improve or recover quickly, we need to think about a reservoir like untreated fungal nails or pets.

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Tom: Thank you for listening to our first episode of *Spot Diagnosis*. We hope it's been educational for you. If there is a topic you want us to cover, we would love to hear from you.

More information, and other dermatology education resources, can be found on our website at

www.skinhealthinstitute.org.au/podcasts



