

Selected skin diseases located on the feet

Jacyk WK, MD

Department of Dermatology, University of Pretoria

INTRODUCTION

The spectrum of diseases presented in this article covers benign common conditions with variable aetiology as well as some diseases caused by fungi, viruses, bacteria and ectoparasites. (SA Fam Pract 2004;46(1): 37-41)

A. FUNGAL INFECTIONS

Tinea pedis (ringworm of the feet, athlete's foot) is the most common dermatophyte infection in the developed world. Three main factors constitute the basis of any tinea pedis infection; warmth, moisture and friction. Tinea pedis does not affect barefoot people. Shoes, in particular plastic and occluded, create a milieu for dermatophytes to prosper. Tinea pedis is most often caused by anthropophilic subspecies of *Trichophyton*; *T. rubrum* and *T. mentagrophytes* (interdigital). These agents can be transmitted directly from person to person as well as by the scales harbouring the fungus shed on a carpeted floor or in shared shoes.

Tinea pedis may present in several clinical forms:

1. Interdigital, intertriginous form (toe web infection, classic athlete's foot) (Figure 1)

This is the most common and usually the initial presentation of tinea pedis. The third and fourth interdigital spaces are most frequently involved. Often discrete scaling or slight maceration are the only signs. In other cases there is more pronounced inflammation with redness, vesiculation, desquamation and maceration. If the condition is left untreated it may extend to other interdigital clefts, soles and even to the dorsum of the feet (Figure 2). Tinea pedis may be complicated by superinfection with bacteria, lipophilic diphtheroides,

staphylococcus aureus and haemolytic streptococci.



Figure 1. Interdigital tinea pedis



Figure 2. Tinea pedis affecting the dorsal aspects of the feet

2. Squamous, hyperkeratotic form ("moccasin" type) (Figure 3)



Figure 3. Hyperkeratotic form of tinea pedis

This type is characterised by erythematous and scaly lesions affect-

ing the soles, heels and sides of the feet. In extensive involvement, prominent hyperkeratosis with fissures leads to a "moccasin" presentation. *Trichophyton rubrum* is usually grown in this dry-type of infection.

3. Vesiculobullous form

It is more inflamed with vesicles and blisters and it extends from the web spaces to the dorsum of the foot and to the soles. The inducing agent is usually *T. mentagrophytes*. The most common complication of ordinary tinea pedis is Gram-negative toe web infection, which can occasionally be extremely inflammatory to the point of causing disability. A vesicular eruption (idre reaction) can develop at a distant site from the feet, most often on the palms and inner aspects of the fingers. It is an allergic reaction and occurs in acute, exudative forms of tinea pedis.

The differential diagnosis of tinea pedis is vast and includes candidal, mould and bacterial infections, foot eczema and acral psoriasis.

Management of tinea pedis requires in addition to topical and/or systemic antifungal therapy the maintenance of a dry local environment and avoidance of occlusive footwear. Socks, preferably made of cotton should be changed frequently and shoes should be alternated.

The morphology of the skin lesions dictates the type of the vehicle to be used; sprays, lotions, creams, or ointments. Both feet have to be



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treated even if the changes in one are clinically not apparent.

The list of available effective topical preparations is long, and includes either imidazoles or terbinafine.

The interdigital and vesiculobulbous types of tinea pedis usually respond well to topical therapy. The medication is usually applied twice daily. The minimum period of topical treatment has never been clearly determined.

Patients with the hyperkeratotic type of tinea pedis constitute a more difficult group to treat and an orally active antimycotic is often needed.

Intraconazole 100 mg daily is recommended for four weeks. Other treatment schedules have also been suggested 400 mg daily for one week or a pulse of 200 mg daily for a week, each month for 3-4 months.

Terbinafine appears particularly useful in infections caused by *T. rubrum* – 250 mg once daily for two weeks.

B. CANDIDIASIS OF THE FEET

Candida albicans often affects the

intertoe clefts. As in tinea pedis the cleft between the third and fourth toe is most often affected. Lesions are usually characteristically white with erosions and fissures (Figure 4). The process is usually more acute than that due to dermatophytes, there is itch and often pain. The inflammation initially confined to the clefts can later spread beyond this area.



Figure 4. Interdigital changes caused by *Candida*

Treatment of candidal infection of the feet is the same as for acute or subacute forms of tinea pedis. Imidazoles and nystatine are the most useful agents, terbinafine is much less effective.

C. NON-DERMATOPHYTIC INFECTIONS OF THE FEET

Scytalidium hyalinum and *Scytalidium dimidiatum* (Hendersonula toruloides), non-dermatophytic moulds, can produce pictures very similar to dermatophyte-induced tinea pedis (and tinea unguis). These agents may imitate in particular infections attributed to *T. rubrum*. The frequency of infections with these agents appears to grow worldwide, as well as in Africa.

Kambila *et al.*¹ found *Scytalidium dimidiatum* responsible for 34% of cases of tinea pedis in Gabon and Gugnani and Oyeka for 10% in Nigeria.² There are no data from South Africa.

It is quite likely that an apparent lack of success in the treatment of tinea pedis (and unguis) in some cases in South Africa can be explained by the fact that the infection is due to these non-dermatophytic moulds. These agents are generally considered resistant to itraconazole and terbinafine. Culture is therefore indispensable and should be performed on media with and also without cycloheximide (actidione), since this agent inhibits the growth of *Scytalidium* species. It is important to remember this and to advise the mycologist when sending the material.

D.SKIN CHANGES ON THE FEET CAUSED BY ECTOPARASITES

Larva migrans

Cutaneous larva migrans is a self-limiting skin eruption caused most often by larvae of dog and cat hookworms (*Ancylostoma caninum* and *Ancylostoma braziliense*, respectively). These hookworms reside in the intestines of these domestic animals and their ova are shed with faeces.

Under favourable conditions of humidity and temperature the ova hatch into infectious larvae, which may penetrate human skin. Cutaneous larva migrans is most frequent in warmer climates in shady areas and beaches. In humans, larvae are not able to complete their natural cycle and remain confined to the skin. When they migrate through

the skin, release of larval secretions produces a local inflammatory reaction. The route of larvae migration is manifested by a wandering thread-like line (creeping eruption), which is severely pruritic (Figure 5).



Figure 5. Larva migrans

The feet are often affected. The process ends with the death of the larvae, which takes place between 1 and 3 months in the majority of cases.

The treatment of choice is oral administration of albendazole.³ The dose of 400 mg once or twice daily for 3 days is effective. Cryotherapy with liquid nitrogen seldom kills the larvae. The larval tract reflects an allergic reaction to the larva and does not indicate its actual location.

Tungiasis

Tungiasis is caused by the sand flea (*Tunga penetrans*). It occurs in tropical regions, including South Africa.

Only the impregnated female of that flea is a menace to humans. She burrows into the skin of a man or other mammal and deposits the eggs. Lesions are found most often on the feet, under the toenails, between the toes and on the heels (Figure 6).



Figure 6. Tungiasis

The uncomplicated lesion is a small nodule with a dark central point, which often still contains the distend-

ed egg-filled abdomen of the flea. Often there is an erythematous halo and swelling. The itch is often severe. The numbers of lesions vary.

This clear picture is, however, seldom seen. Secondary infection usually ensues with development of pustules and suppurative ulcers. When the lesions are multiple, crusting gives the area a honeycomb appearance. Lymphangitis, cellulitis, regional lymphadenitis are common.

In uncomplicated cases treatment consists of removing the flea.

In cases with secondary infection the parasite can be killed by application of chloroform. Pyoderma is treated in the standard way.

E. VIRAL WARTS (Figures 7, 8, 9)



Figure 7. Mosaic plantar warts



Figure 8. Plantar warts, deep, myrmecia type



Figure 9. Multiple common warts on the dorsal aspects of the feet

Viral warts, or infection with human papilloma viruses, are often located on the feet. Those on the dorsal

aspect are usually common warts and much less often juvenile plane warts. Their biology and management do not differ from that of warts in other locations. Warts situated on the volar (plantar) aspect of the feet constitute a separate subgroup, caused by specific strains of human papilloma virus and require often a different therapeutic approach. The details are contained in my recent review on warts.⁴

F. PITTED KERATOLYSIS

Pitted keratolysis or keratosis plantare sulcatum is infection of the horny layer of the sole and volar aspect of the toes.

It is caused by a species of *Corynebacterium*. The lesions consist of shallow, punched-out circular pits ranging from 1-6 mm in diameter, often coalescing to form larger depressed areas of a few cm (Figure 10).



Figure 10. Pitted keratolysis

Pitted keratolysis is often asymptomatic but may cause pain and have an offensive odour. Hyperhidrosis is usually present. Pitted keratolysis occurs most often in a tropical environment with high humidity in people wearing occluded shoes. Management consists of removing the patient from a chronically wet environment and application of a variety of topical preparations – topical antibiotics (2% Fucidin ointment or cream, 2% Erythromycin topical solution). Control of associated hyperhidrosis with 5% formalin solution or 40% formalin ointment also helps.

G. FOOT ECZEMA

Various types of eczema occur on the feet. Contact forms, irritant or allergic, occur more often than atopic.

1. Contact foot eczema

In contact eczema the dorsal aspects of the feet are mainly affected but plantar surface, heels and toes can also be involved. The involvement of the dorsum of the foot points to allergens in shoe uppers or lining – shoe dermatitis (Figure 11).



Figure 11. Contact dermatitis

The process usually starts at the dorsal surface of the big toes and spreads to the dorsa of the feet and the other toes. The most common allergens provoking allergic contact eczema of the feet are tanning agents, such as chromates, glutaraldehyde, rubber chemicals and adhesives. Nickel trimming on shoes can also be the cause of eczematous reaction.

Identification and subsequent avoidance of allergens is essential for the management of contact allergic form.

Symptomatic treatment consists of usage of topical corticosteroids and emollients. In severe cases a short course of systemic corticosteroids is effective. For details of the management see the article on contact eczema in the August 2002 issue of *Geneeskunde*.⁵

2. Atopic eczema (Figure 12)

Eczematous changes on the feet are not uncommon in widespread atopic dermatitis. They present usually as chronic lesions with thickening of the skin and lichenification (increased skin marking). Hyperlinearity of the soles is considered one of the stigmata of atopic diathesis. Irritant contact eczema is common in atopic patients due to their defective barrier skin function. Isolated

involvement of feet in atopic eczema without lesions elsewhere is rare.

3. Juvenile plantar dermatosis (forefoot eczema)

It is a dry fissured dermatitis of the plantar surface of the peridigital areas of the feet. The plantar surface of the toes and the forefoot is dry, red with a glazed and fissured appearance (Figure 13).



Figure 12. Lesions on the feet and lower legs in atopic dermatitis



Figure 13. Juvenile plantar dermatosis

The process affects both feet symmetrically. This condition is seen mainly in children from 7 to 16 years old. External factors – hyperhidrosis and friction, exacerbated by occlusive socks made of synthetic fibres and tight rubber shoes – seem to play the main role. Most cases improve spontaneously at the age when the patients change to leather shoes.

4. Infective eczema

It represents an eczema in which bacteria, especially *staphylococcus aureus* and haemolytic streptococci, provoke an eczematous reaction. This form of eczema occurs mainly in patients with poor hygiene, pedal hyperhidrosis and tight heavy footwear. Infective eczema often imitates clinically an acute vesiculobullous form of tinea pedis.

5. Hypostatic eczema (Stasis dermatitis)

This form occurs most often in middle-aged or elderly women with a previous deep thrombophlebitis or insufficient deep or communicating veins. The clinical picture is characteristic (Figure 14). Oedema, erythema, hyperpigmentation, due to haemosiderosis and scaling are seen on the distal part of the lower leg, around the medial ankle and often the dorsum of the foot. In long-standing cases hard thickening of the skin occurs – lipodermatosclerosis. Ulcers, particularly in the proximity of the medial ankle are common. Secondary allergic or irritant contact eczema develops frequently as these patients are treated with various potentially sensitizing preparations.



Figure 14. Stasis dermatitis

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So-called acral psoriasis is usually pustular psoriasis characterised by fiercely erythematous plaques with scattered sterile pustules. The toe nails are very often affected and association with psoriatic arthropathy result in deformities (Figure 17).



Figure 17. Acral pustular psoriasis in a patient with psoriatic arthropathy

Most patients with acral psoriasis require systemic therapy (methotrexate, retinoids, PUVA). ✎

See CPD Questionnaire, Page 47

6. Nummular eczema

Circumscribed, coin-shaped, often severally pruritic lesions are located on the lower legs and dorsal aspects of the feet. The degree of inflammation may vary. In acute lesions erythema and vesiculopustules predominate while chronic lesions are dry and scaly.

7. Hyperkeratotic plantar eczema

The term eczema implying vesiculation may be misleading for this affliction. There are no vesicles. Scaly, fissured hyperkeratotic patches appear symmetrically on the soles (Figure 15).



Figure 15. Hyperkeratotic dermatitis

Itching is mild if any. The aetiology is unknown, mechanical trauma seems to aggravate the process. It is most frequent in the elderly and affects both sexes. Topical therapy is often not effective and an oral retinoid (Neotigason) should be considered.

H. Psoriasis of the feet

Psoriasis vulgaris, a very common inflammatory skin disease, is characterised by well-defined, red, scaly plaques. The lesions can be confined to certain areas or be widely disseminated. Stable plaque psoriasis located only on the feet is rare (Figure 16).



Figure 16. Lesions of psoriasis vulgaris on the feet

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