An Atlas of Nail Disorders, Part 15

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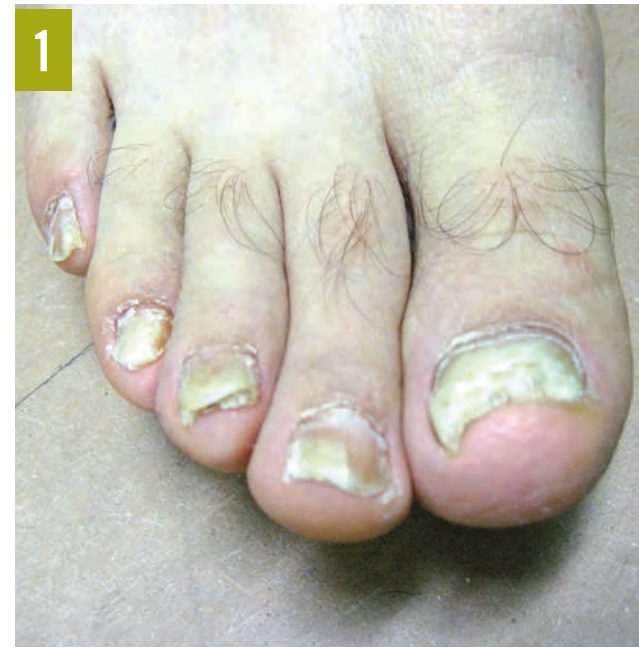
EDITOR'S NOTE: This article is part 15 of a 15-part series of Photo Essays describing and differentiating conditions affecting the nails. To access previously published articles in the series, visit the Consultant archive at www.Consultant360.com and click the "Journals" tab.

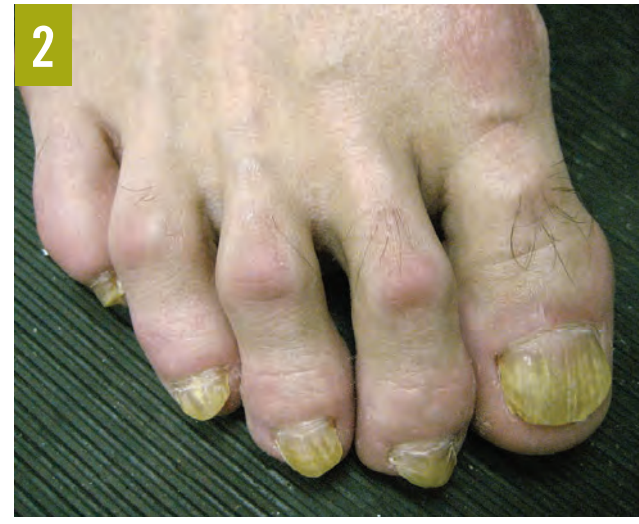
Onychomycosis

Onychomycosis is the most common fungal infection of the nail unit caused by dermatophytes (tinea unguium), nondermatophyte molds, and yeasts.[1,2] Approximately 90% of toenail onychomycosis cases and 75% of fingernail onychomycosis cases are caused by dermatophytes, notably *Trichophyton mentagrophytes* and *Trichophyton rubrum*.[3,4]

Typically, onychomycosis presents as a yellow-white discoloration of the nail (**Figure 1**).[4] Other clinical manifestations include detachment of the nail from the nail bed (onycholysis), thickening of the nail plate (onychauxis), and subungual hyperkeratosis.[5,6] Dermatophytoma—which presents as linear, longitudinal, single or multiple, yellow, white, orange or brown bands or "spikes" on the nail plate—is specific for onychomycosis (**Figure 2**).[5]

In general, toenails are affected 7 to 10 times more frequently than fingernails, presumably because of repeated





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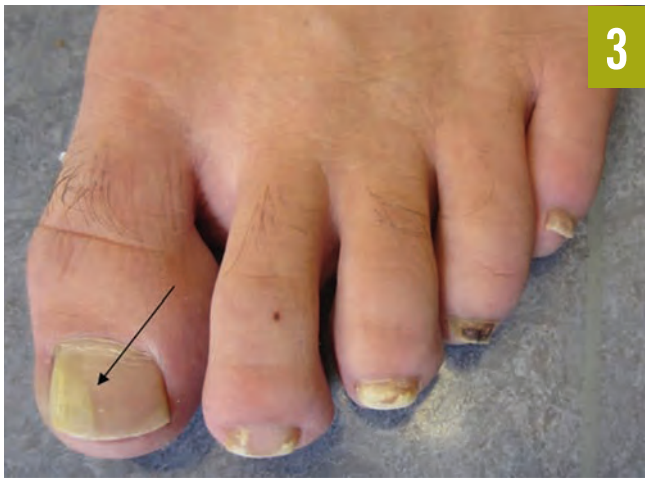

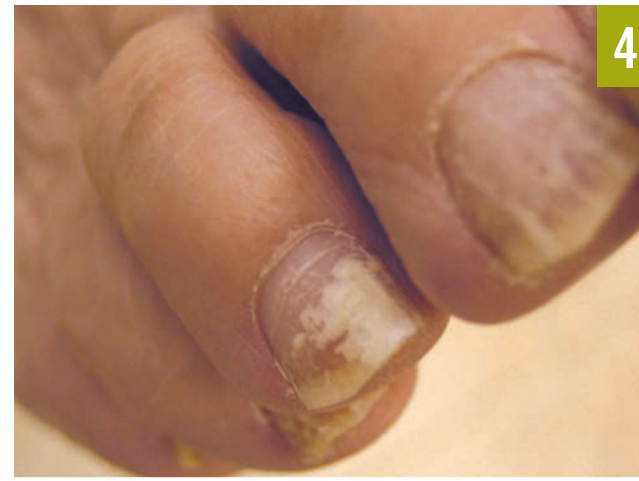

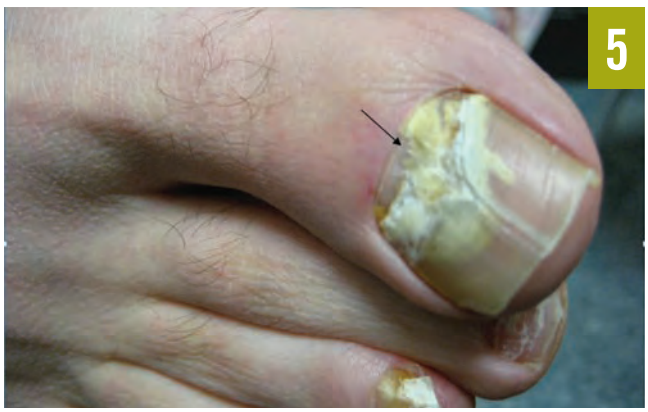

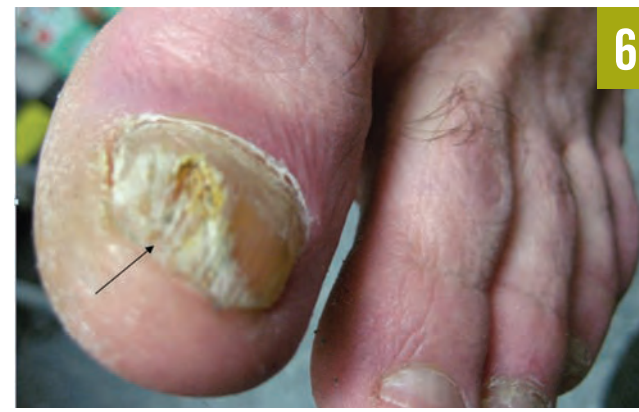

blunt pressure from footwear and wearing of occlusive and tight shoes.[2,7,8] The big toenails are most often affected.[4] Generally, several toenails are affected. Tinea pedis is also often present.[9,10] Furthermore, it is unusual to have more than one fingernail involved without concomitant toenail involvement unless there is a history of trauma or the patient is immunocompromised.[5]

Based on the pattern of invasion and location of the nail bed involvement, onychomycosis can be divided into the following 5 clinical subtypes: distal lateral subungual onychomycosis, white superficial onychomycosis, proximal subungual onychomycosis, endonyx onychomycosis, and total dystrophic onychomycosis. Patients may have a combination of these subtypes.

Distal lateral subungual onychomycosis, the most common clinical subtype, is usually caused by *T rubrum* and less commonly by *T mentagrophytes*.[6,11,12] In distal lateral subungual onychomycosis, the fungal invasion begins at the hyponychium and the distal nail bed and then progresses to involve the distal nail bed and subsequently the nail plate.[6,11,12] The fungus then migrates proximally through the nail plate, causing linear channels or "spikes."[12] Clinically, distal lateral subungual onychomycosis presents as yellowish, whitish, or brownish discoloration of a distal corner of a nail (**Figure 3**).[6,11] Distal subungual hyperkeratosis, onycholysis, and/or onychauxis of the lateral and distal aspects of the nail plate are common.[8,10,11]

In white superficial onychomycosis, the upper surface of the nail plate is invaded by the fungus, notably *T mentagrophytes*.[6,11,12] Typically, white superficial onychomycosis presents as crumbly, soft, chalky white discoloration of the dorsal surface of the nail plate (**Figure 4**) that can be easily scraped off.[3,5,6,11,12]

Proximal subungual onychomycosis is usually caused by *T rubrum* and *Fusarium* spp.[6] In proximal subungual onychomycosis, the fungus invades the undersurface of the proximal nail fold in the vicinity of the cuticle and then extends distally.[5,11] Clinically, proximal subungual onychomycosis presents as an area of leukonychia in the proximal nail plate and moves distally with nail growth (**Figure 5**).[12] Proximal subungual onychomycosis usually occurs in immunocompromised patients, especially those with AIDS.[3,5,7]

Endonyx onychomycosis is usually caused by *Trichophyton soudanense* and *Trichophyton violaceum*.[5,10] In endonyx onychomycosis, the fungus infects the nail plate but not the nail bed.[6,9,10]

Clinically, endonyx onychomycosis is characterized by milky patches of the nail plate, indentations, and lamellar splitting.[5,10] The nail plate is firmly attached to the nail bed, and subungual hyperkeratosis is absent.[10,11]

Total dystrophic onychomycosis is characterized by total destruction of the entire nail apparatus and is often the end stage of onychomycosis that may follow any of other subtypes.[6,9,12] Clinically, total dystrophic onychomycosis presents as a severely dystrophic and crumbed nail plate that is yellowish, diffusely thickened, and friable (**Figure 6**).[10,12]

Accurate diagnosis is important prior to treatment. When onychomycosis is suspected, samples of the nail clippings and subungual debris should be collected.[11] If available, in-office microscopy can be performed using 10% to 30% potassium hydroxide.[5,12] Otherwise, the samples should be sent for laboratory microscopy. A culture and/or histologic evaluations with periodic acid–Schiff staining can be obtained if the microscopy results are positive for fungal elements such as hyphae, pseudohyphae, or yeast cells.[5,11] Although polymerase chain reaction testing is more accurate than cultures, and results are often available within days, the test is not yet widely available or easily accessible.[5,11]

Oral antifungal therapy is considered the gold standard for onychomycosis because of shorter courses of treatment and higher cure rates compared with topical antifungal therapy.[8,9] Oral antifungals, when used in combination with topical antifungals, increase the cure rate.[3,6,10] Nd:YAG nonspecific laser heating of onychomycosis may offer some benefit, although more research is needed.[2] Surgical or chemical (eg, high-concentration urea) avulsion of especially thick nails with onychomycosis is also an option where medical therapy has failed.[6] ■

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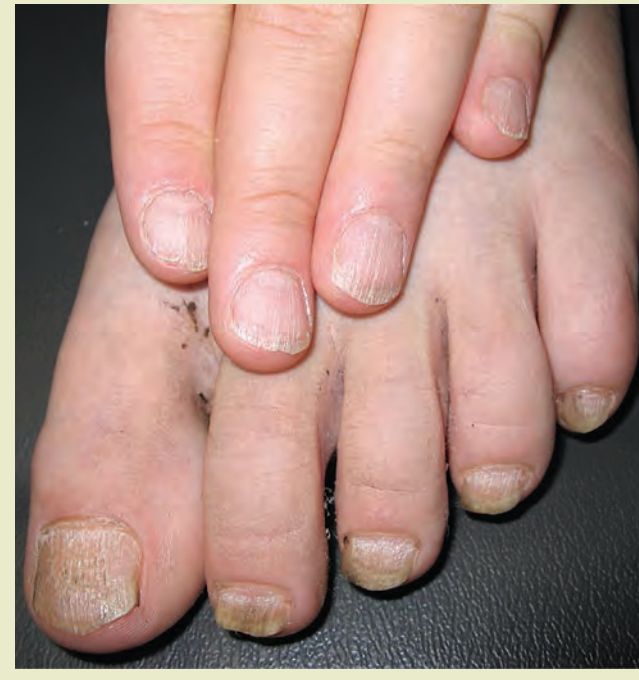
Trachyonychia

Trachyonychia, also known as twenty-nail dystrophy, sandpapered nails, or rough nails, is a disorder of the nail unit characterized by rough, sandpapered-appearing nails with longitudinal ridging (**Figure**). The word *trachyonychia* is derived in part from the Greek word *trakos*, meaning "rough." *Twenty-nail dystrophy* is a misnomer, because patients with trachyonychia do not always have involvement of all 20 nails, and many other conditions can result in dystrophy of all nails.[1]

Typically, trachyonychia presents with roughness of the nail plate associated with longitudinal ridging that may give the nail an opaque, sandpaper-like appearance (opaque trachyonychia).[2] Less commonly, trachyonychia presents with diffuse, closely aggregated, small superficial pits that reflect light, which may give the nail a shiny appearance (shiny trachyonychia).[1,2] Opaque trachyonychia and shiny trachyonychia represent the spectrum of disease severity, with opaque trachyonychia being the more severe type.[3] The two varieties may coexist.[4]



Trachyonychia may involve the nail of one, several, or all digits. The degree of severity may, however, vary from nail to nail. Typically, the involvement is bilateral and symmetric. Multiple nails are usually affected at the time of presentation.[3] The adjacent cuticles are usually ragged, hyperkeratotic, and thickened.[1] Affected nails are often thin and brittle.[5] Koilonychia is commonly seen.

The incidence of trachyonychia is not known. Although trachyonychia can occur at any age, the peak age of onset is between 3 and 12 years.[1,2] In the pediatric age group, the condition is more commonly seen in boys, whereas adult-onset trachyonychia has a female predominance.[1]

Most cases occur sporadically and are idiopathic.[1,6] However, trachyonychia has been reported in association with a number of dermatologic diseases (eg, alopecia areata, atopic dermatitis, vitiligo, psoriasis, lichen planus, lichen nitidus, ichthyosis vulgaris, pemphigus vulgaris, systemic sclerosis, incontinentia pigmenti, congenital cutaneous candidiasis, pachyonychia congenita), nondermatologic diseases (eg, immunoglobulin A deficiency, autoimmune hemolytic anemia, immune thrombocytopenia, juvenile dermatomyositis, graft-versus-host disease, sarcoidosis, amyloidosis, primary biliary cirrhosis, reflex sympathetic dystrophy), and syndromes (eg, nail-patella syndrome, Down syndrome, Clouston syndrome, Bart syndrome, Sézary syndrome, Hay-Wells syndrome, Brauer-Buschke-Fischer syndrome, and Zinsser-Engman-Cole syndrome).[1,2,6,7] Familial cases have also been reported. An autosomal dominant mode of inheritance has been described.[5]

It is generally believed that trachyonychia results from multiple foci of defective keratinization of onychocytes in the proximal nail matrix, resulting in the formation of loose and disorganized arrangement of keratinized cells that are thinner and that desquamate easily.[4] The most common histopathologic finding in idiopathic trachyonychia is focal spongiosis and exocytosis of inflammatory cells into the epithelium of the nail.[6]

The diagnosis is typically established clinically and is based on physical examination findings. Nail biopsy is not necessary or recommended.[6]

Trachyonychia should be differentiated from onychomycosis. Typically, onychomycosis presents as a yellow-brown or white discoloration of the nail. Other clinical manifestations include subungual hyperkeratosis, onycholysis, onychauxis, and dermatophytoma. The latter is specific for onychomycosis.

Most children with isolated trachyonychia have significant improvement or spontaneous resolution of the lesions with time regardless of treatment.[8,9] Trachyonychia is unsightly and may have an adverse effect on quality of life. Treatment is usually not necessary except for cosmesis, especially in severe disease. Treatment modalities include topical, intralesional, or systemic corticosteroids; topical or systemic retinoids; glycolic acid peeling; topical 5-fluorouracil; topical psoralen plus UV-A; systemic biotin; and systemic cyclosporine.[6] Topical modalities are generally preferred. There is, however, no single evidenced-based treatment that has been shown to be reliably effective. Associated disease should be treated if possible. ■

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