

Deformities, Dystrophies And Discoloration Of The Nails

Dr. G. Sumathy, Professor and Head,

*Department of Anatomy,
Sree Balaji Dental College & Hospital,
Bharath Institute of Higher Education & Research,
Chennai.*

*Bhaskaran Sathyapriya¹, Chandrakala B², Heba A³, AnubharathyV³, Govindarajan Sumathy**

1. Professor, Department of Anatomy, Sree Balaji Dental College & Hospital, Bharath Institute of Higher Education & Research, Chennai.

2. Senior Lecturer, Department of Anatomy, Sree Balaji Dental College & Hospital, Bharath Institute of Higher Education & Research, Chennai.

3. Graduate student, Sree Balaji Dental College and Hospital, Bharath Institute of Higher Education and Research

** Professor and Head, Department of Anatomy, Sree Balaji Dental College & Hospital, Bharath Institute of Higher Education & Research, Chennai.*

Abstract

Deformities are often considered together with dystrophies, but the two are slightly different; deformities are generally considered to be gross changes in nail shape, whereas dystrophies are changes in nail texture or composition (eg, onychomycosis). About 50% of nail dystrophies result from fungal infection. The remainder result from various causes, including trauma, congenital abnormalities, psoriasis, lichen planus, benign tumors, and occasionally cancer.

Key words: *Onychomycosis, Psoriasis, Lichen, planus*

Introduction

Nail dystrophy (distortion and discoloration of normal nail-plate structure), may result from any traumatic or inflammatory process that involves the nail matrix, nail bed, or surrounding tissues. Although onychomycosis, the result of dermatophyte fungal infection, is the most common cause of nail dystrophy in adults, it is unusual in children before puberty. Nail discoloration, in which the nails appear white, yellow, or green, can result from different infections and conditions of the skin. In about 50% of cases, discolored nails are a result of infections with common fungi that can be found in the air, dust, and soil. Chronic medical conditions also can affect the appearance of the nails. Specific color changes in the nails can be suggestive of diabetes or of liver, kidney, heart, or lung conditions.

Nail Deformities and Dystrophies Associated with Systemic Problems

In Plummer-Vinson syndrome (caused by severe, untreated iron deficiency), 50% of patients have koilonychia

(concave, spoon-shaped nails) (Fig 1).

Yellow nail syndrome is a rare condition characterized by slow-growing, thickened, hypercurved, yellow nails. This condition typically occurs in patients with lymphedema and/or chronic respiratory disorders. Chronic bronchial infections are present in about half of reported cases.



Figure 1: Characteristics of Spoon-Shaped Nails

Half-and-half nails (Lindsay nails) occur usually with renal failure; the proximal half of the nail is white, and the distal half is pink or red-brown. Half-and-half nails occur in 20 to 50% of patients who have chronic kidney disease; however, this nail abnormality has been reported in various other chronic diseases including Crohn disease, cirrhosis, pellagra, and Kawasaki disease. This abnormality also occurs in healthy people^(1,2)

Terry nails are characterized by whiteness of about 80% of the nail bed with a 0.5- to 3.0-mm brown to pink distal band. Terry nails are often associated with cirrhosis, chronic heart failure, and adult-onset diabetes mellitus. Differentiation from half-and-half nails can be difficult⁽²⁾

White nails occur with cirrhosis, although the distal third may remain pinker. Intensely white nails, also called Terry nails, can be present in patients with chronic liver or kidney failure, heart failure, or diabetes. Terry nails are a type of leukonychia; the abnormality is not in the nail itself but rather the nail bed, causing the nail to appear white. In Terry nails, nearly the entire nail is opaque white and the lunula is not visible. There is a thin zone of normal pink nail bed at the distal edge of the nail. Terry nails may sometimes occur as part of normal aging⁽²⁾

Beau lines are horizontal grooves in the nail plate that occur when nail growth temporarily slows, which can occur after infection, trauma, systemic illness, or during cycles of chemotherapy. Onychomadesis similarly results from temporary growth arrest of the nail matrix and differs from Beau lines in that the full thickness of the nail is involved, causing a proximal separation of the nail plate from the nail bed. It most frequently occurs several months after hand-foot-and-mouth disease but can occur after other viral infections. Nails affected by Beau lines or onychomadesis regrow normally with time (Fig 2).



Figure 2: This image shows beau lines in a patient undergoing multiple cycles of chemotherapy

Nail Deformities Associated with Dermatologic Conditions

In **psoriasis**, nails may have a number of changes, including irregular pits, oil spots (localized areas of tan-brown

discoloration), separation of part of the nail from the nail bed (onycholysis), and thickening and crumbling of the nail plate. Nail psoriasis is independently associated with treatment-resistant psoriatic disease and is a risk factor for development of psoriatic arthritis.

Treatment of nail psoriasis is challenging, but immunomodulatory agents are the most effective⁽³⁾ Topical therapies can lead to modest improvement. Device-based therapies (eg, laser, light) need more study to judge their effectiveness.

Alopecia areata can be accompanied by regular pits that form a geometric pattern. Pits are small and fine. Alopecia areata may also be associated with severe onychorrhexis (brittleness with nail breakage). Treatment options include intralesional and topical corticosteroids and topical sensitizers such as squaric acid dibutylester

Pincer nail deformity is a transverse over-curvature of the nail plate. It is most often caused by onychomycosis, psoriasis, tumors of the nail apparatus, and poorly fitting shoes (Fig 3). It has also been reported in patients with systemic lupus erythematosus, Kawasaki disease, end-stage renal disease, and some genetic syndromes (eg, paronychia congenita). Patients often have pain at the borders of the nail where the nail plate curves into the tips of the fingers^(4,5)



Figure 3: Pincer nail deformity

Discoloration

Cancer chemotherapy drugs (especially the taxanes) can cause melanonychia (nail plate pigmentation), which can be diffuse or may occur in transverse bands. Some drugs can cause characteristic changes in nail coloration:

- **Quinacrine:** Nails appear greenish yellow or white under ultraviolet light.
- **Cyclophosphamide:** The onychodermal bands (seal formed at the junction of the nail plate and distal nail bed at the free edge of the nail plate) become slate-gray or bluish.
- **Arsenic:** Nails may turn diffusely brown.
- **Tetracyclines, ketoconazole, phenothiazines, sulfonamides, and phenindione:** Nails may have brownish or blue discoloration.
- **Gold therapy:** Nails may be light or dark brown.
- **Silver salts (argyria):** Nails may be diffusely blue-gray.

Tobacco smoking or nail polish can result in yellow or brownish discoloration of nails and fingertips.

Green-nail syndrome is caused by infection with *Pseudomonas*. It is generally a harmless infection, usually of 1 or 2 nails, and is noteworthy for its striking blue-green color. It often occurs in patients with onycholysis or chronic paronychia whose nails have been exposed to irritants or have had excessive exposure to water (Fig 4).



Figure 4: Green-nail syndrome

Median Nail Dystrophy (Median Canaliform Dystrophy)

Median nail dystrophy is characterized by small cracks in the nail that extend laterally and look like the branches of an evergreen tree. The cracks and ridges are similar to those seen in habit- tic nail deformity (which is dystrophy of the central nail caused by repetitive trauma to the nail matrix resulting from rubbing or picking with another finger).

Vitamin and Mineral Deficiency

Nutrition plays an important role in nail health. Deficiencies in dietary intake of vitamins, minerals, and other nutrients can contribute to nail diseases (Fig 5). Interestingly, too much and too little Vitamin A is associated with nail changes. It is known that too much vitamin A as well as medications that are vitamin A derivatives, such as isotretinoin, can cause brittle nails. Vitamin A toxicity has also been reported to lead to onycholysis (separation of the nail from the nail bed) and nail ridging. Low vitamin C shows as bleeding under the nails and a condition called hapalonychia, or “egg shell nails”. Deficiency of vitamin E can cause white spots and patches in nails. Iron is vital for many functions throughout the body including proper red blood cell formation, protein synthesis, and immune system functioning. Iron deficiency is classically associated with a nail condition called koilonychia, also known as “spoon-shaped nails,” in which the nails become thin and have a spoon-shaped convexity. In addition, iron deficiency can cause the nails to become dry, brittle, and fragile. Zinc deficiency can result from both genetic diseases and lack of adequate zinc intake from foods. In a rare genetic disease of zinc deficiency, called acrodermatitis enteropathica, patients suffer from multiple symptoms including nail findings of onychodystrophy and skin infections around the nails (called paronychia).



Figure 5: This image shows white spots due to Vitamin Deficiency

Onychogryphosis

Onychogryphosis is a nail dystrophy in which the nail, most often on the big toe, becomes thickened and curved. It may be caused by ill-fitting shoes. It is common among the elderly.

Onycholysis

Onycholysis is separation of the nail plate from the nail bed or complete nail plate loss. It can occur as a drug reaction in patients treated with tetracyclines (photo-onycholysis), doxorubicin, 5-fluorouracil, cardiovascular drugs (particularly practolol and captopril), cloxacillin and cephaloridine (rarely), trimethoprim/sulfamethoxazole, diflunisal, etretinate, indomethacin, isoniazid, griseofulvin, and isotretinoin. Simple onycholysis may also result from exposure to irritants, such as frequent exposure to water, citrus fruits, or chemicals. Irritant contact dermatitis of the hands and fingers may lead to onycholysis. Colonization of the nail bed with *Candida albicans* may occur, but treating the underlying irritant exposure leads to resolution of the onycholysis, with or without treating the *Candida*. Partial onycholysis may also occur in patients with psoriasis or thyrotoxicosis.

Onychotillomania

In this disorder, patients pick at and self-mutilate their nails, which can lead to parallel transverse grooves and ridges (washboard deformity or habit-tic nail deformity). It most commonly manifests in patients who habitually push back the cuticle on one finger, causing dystrophy of the nail plate as it grows. Subungual hemorrhages can also develop in onychotillomania.

Trachyonychia

Trachyonychia (rough, opaque nails) may occur with alopecia areata, lichen planus, atopic dermatitis, and psoriasis. It is most common among children. When present in all nails, trachyonychia is often called 20-nail dystrophy. When it occurs in children, it tends to resolve spontaneously. When it occurs in adults, treatment is aimed at the underlying disorder.

Nail Tumors

Benign and malignant tumors can affect the nail unit, causing deformity. Benign tumors include myxoid cysts, pyogenic granulomas, and glomus tumors. Malignant tumors include Bowen disease, squamous cell carcinoma, and malignant melanoma. When cancer is suspected, expeditious biopsy followed by referral to a surgeon is strongly advised.

Conclusion

Fingernails should be kept short, and the undersides should be cleaned frequently with soap and water. Because of their length, longer fingernails can harbor more dirt and bacteria than short nails, thus potentially contributing to the spread of infection.

Before clipping or grooming nails, all equipment (for example, nail clippers and files) should be properly cleaned. Sterilizing equipment before use is especially important when nail tools are shared among a number of people, as is common in commercial nail salons.

Infections of the fingernails or toenails are often characterized by swelling of the surrounding skin, pain in the surrounding area, or thickening of the nail. In some cases, these infections may be serious and need to be treated by a physician.

References

1. Gupta AK, Nakrieko KA: Onychomycosis infections
2. Pitukweerakul S, Pilla S: Terry's nails and Lindsay's nails: Two nail abnormalities in chronic systemic diseases.
3. van de Kerkhof P, Guenther L, Gottlieb AB, et al: treatment improves fingernail psoriasis in patients

with moderate-to-severe psoriasis:

4. Shin WJ, Chang BK, Shim JW, et al: Nail plate and bed reconstruction for pincer nail deformity.
5. Won JH, Chun JS, Park YH, et al: Treatment of pincer nail deformity using dental correction principles