Tips to Treat the 5 Most Common Nail Disorders

Brittle Nails, Onycholysis, Paronychia, Psoriasis, Onychomycosis

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KEYWORDS

• Treatment • Brittle nails • Onycholysis • Paronychia • Psoriasis • Onychomycosis

KEY POINTS

- Nail disorders are difficult to treat and often frustrating for both patients and clinicians.
- Knowledge of the disease to be treated and the patient's status are important for the choice of the best treatment option.
- The nail plate is a dead structure and clinicians cannot act on it. Treatment should be focused on the new growing nail.
- When facing a nail disorder, consider the presence of more than 1 disease at the same time (eg, psoriasis and onychomycosis/paronychia and onychomycosis/psoriasis and fragility).

INTRODUCTION

Nail disorders are difficult to treat and often frustrating for both patients and clinicians. Because of the slow growth rate of the nail plate (3 mm/mo for fingernails and 1.5 mm/mo for toenails) and the difficulty of getting the drug actives to penetrate the nail tissues, it is usually necessary to wait several months before seeing the results of treatments. This delay often leads to discontinuation of therapy by the patients.[1–3]

This article therefore helps clinicians (dermatologists and general practitioners) to find the right treatment of each of the 5 most common nail disorders and provides practical tips that might improve patients' compliance.

BRITTLE NAILS

Nail fragility is a condition that almost exclusively affects fingernails. It may be idiopathic or the consequence of factors that alter nail plate production and/or damage the already keratinized nail plate (trauma, dermatologic/systemic disorders, nutritional deficiencies, drug intake).[4]

Scanning electron microscopy studies indicate that idiopathic nail brittleness is associated with an intrinsic defect in the intercellular cement that holds together nail plate keratinocytes, with a disorganized protein and lipid structure and with a disorganized orientation of keratin filaments (in normal conditions, keratin filaments, rich in cysteine, a high-sulfur amino acid, are oriented parallel or perpendicular to the growth axis). This condition leads to nails that split, flake, and crumble, becoming soft and losing elasticity. In women, the intercellular keratinocyte bridges are constitutionally weaker than in men. Old age further weakens these bridges.[5,6] Environmental factors that produce progressive dehydration of the nail plate (eg, wet working conditions, minor trauma, and overaggressive manicuring) also

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play important roles in the development of nail brittleness.[7] However, some investigators disagree that nail plate cohesion is related to water content.[8]

When the amount of water in nails is reduced to less than 16%, they become brittle. Several factors are able to influence this water content, including lipids.[9] Normal nails contain 5% lipids, which are organized in a bilayer structure, parallel to the nail surface. Lipids fill certain ampullar dilatations of the dorsal plate and intercellular spaces in the ventral plate. Low lipid content decreases the nail's ability to retain water. A study showing a decrease in cholesterol sulfate in the nail plate with age, especially in women, suggests an important role of lipids in the development of nail brittleness in postmenopausal women.[6]

Nail fragility manifests with several nail plate abnormalities (onychoschizia, onychorrhexis, keratin granulation, erosions, distal wedge-shaped incision) that may be associated with the same nail or be present in different nails of the same patient.

Nail plate thinning caused by proximal nail matrix damage always involves the whole nail length and is often associated with abnormalities in the superficial nail plate. In contrast, damage to the distal matrix may produce alterations in the shape of the nail plate free edge.

Treatment

Nail fragility significantly impairs daily activities and occupational abilities. Its treatment requires time and patience (**Box 1**). Because the nail plate is a completely keratinized, dead structure, injuries cannot be repaired and each accident is added to the previous damage, rendering the nail plate more and more weak. The damaged portion is cured only when it grows out and is cut away.

Box 1
Treatment of brittle nails: key points

1. Reduce trauma and contact with water and detergents.
2. Wear cotton gloves under rubber gloves during manual work.
3. After any soaking, rehydrate nails with topical moisturizers.
4. Keep nails short and squared.
5. File nails in only one direction with a cardboard file.
6. Avoid nail cosmetics; they might be potentially harmful.
7. Remember that the keratin filaments are harder at a slightly acid pH.

If nail brittleness is caused by a dermatologic or a systemic condition, the first thing to do is to treat the disease to obtain an improvement of the symptom.

Oral supplementation with vitamins (especially biotin), oligoelements, and amino acids (especially cysteine) can be useful in improving nail strength.[10,11]

Biotin can be useful because it may improve the synthesis of the lipid molecules that produce binding between nail plate keratinocytes. The recommended oral dose is 5 to 10 mg/d, with 2 months being the average time before clinical improvements are observed. The recommended time of treatment is 3 to 6 months, but it is not clear how long the improvement in nail strength lasts after cessation of treatment.

Iron supplementation may be effective when serum ferritin levels are less than 10 ng/mL, but there are no studies showing that iron deficiency is strictly correlated with nail fragility. Zinc deficiency is known to cause soft and fragile nails, nail plate abnormalities, and chronic paronychia. Prolonged treatment with zinc 20 mg/d seems to improve brittle nails. Silica also seems to be important in improving the resistance of the nail plate through the cross-linking of keratins.[12,13]

Nail moisturizers are important in patients with brittle nails because of their occlusives, such as petrolatum or lanoline, and humectants, such as glycerin and propylene glycol. Alpha-hydroxy acids and urea may also be added to increase the water-binding capacity of the nail plate.[14]

Also available are lacquers specifically developed to restructure nails affected by dystrophy and fragility.[15,16]

A first lacquer owes its effectiveness to the presence of hydroxypropyl chitosan (HPCH), *Equisetum arvense*, and methylsulfonylmethane. When applied to the nails, HPCH forms a highly elastic, smooth, and almost invisible film that adheres to the nail structures, protecting them against physical injuries. HPCH is a chitosan derivative that has the advantage of being soluble in cold water without any pH correction, because the chitosan polymer backbone bears hydrophilic residues. These residues are thought to be the basis of the high affinity of HPCH with keratin. The presence of HPCH in the formulation is specifically effective in decreasing lamellar splitting.

A second lacquer made of 16% polyureaurethane, when applied to the nails, adheres tightly to the surface forming a strong but flexible waterproof barrier to environmental hazards. The active penetrates intercellular spaces and nail ridges, providing mechanical support.