

Dermoscopy: the ultimate tool for diagnosis of nail psoriasis? A review of the diagnostic utility of dermoscopy in nail psoriasis

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Abstract

Dermoscopy is a highly practical noninvasive diagnostic tool. Several dermoscopic algorithms have been proposed in the evaluation of skin diseases, which allow clinicians not only to identify and make differential diagnosis, but also to determine the treatment choices in challenging clinical circumstances. Over the years, we have witnessed a rapid increase in the utilization of dermoscopy in the assessment of nail disorders. However, to assess the diagnostic utility of dermoscopy in inflammatory nail diseases, current evidence is insufficient. Nail psoriasis is a significant challenge because of the difficulties in its diagnosis. Detection of nail involvement is of utmost importance in psoriasis because it is highly associated with arthritis, which is an indication for systemic treatment. Dermoscopy holds promise as a potential tool in the diagnosis of nail psoriasis, capable of providing characteristic clinical findings without any delay and discomfort. This review summarizes current evidence regarding the unique dermoscopic features of nail psoriasis. It addresses whether dermoscopy may serve as the gold-standard diagnostic tool, excluding the necessity of histopathological examination for the ultimate diagnosis of nail psoriasis.

Keywords: dermoscopy, diagnosis, gold-standard, nail psoriasis, psoriasis

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Introduction

After having revolutionized the approach to pigmented skin lesions, dermoscopy has more recently emerged as a valid diagnostic tool in various skin conditions, including inflammatory diseases and infections (1). Dermoscopy is an effective and practical tool in the diagnosis of nail disorders (2). However, to what extent can dermoscopy be used in the definitive diagnosis of nail disorders? Can dermoscopy replace the gold standard of histopathological examination? Nail biopsy is the only method of making a clear-cut conclusion in differentiating nail disorders. However, it is not only uncomfortable and worrisome for patients, but also challenging for physicians. The procedure requires expertise, in which the physician should know the exact anatomical location of the disease process (3). Unless the tissue specimen is taken from the specific area, nail biopsy in psoriasis is mostly associated with diagnostic errors (4). Herein, the utility of dermoscopy in the diagnosis of nail psoriasis is discussed. The author investigates whether this practical and noninvasive tool can replace the gold standard method of biopsy in nail psoriasis.

Nail psoriasis

Psoriasis is a common chronic inflammatory disease with a global prevalence of 1% to 2%. It is one of the most common skin diseases

that affect the nails. Nearly half of patients have nail involvement, which is reported to occur in 90% of all psoriasis patients during their lifetime (4). Nail involvement has an immense burden when it causes functional impairment, pain, and cosmetic concerns (5). Nail psoriasis is strongly associated with psoriatic arthritis. The rate of nail involvement in psoriatic arthritis is as high as 80%. Nail psoriasis is a predictive factor for the development of arthritis, and it may manifest even years earlier than the onset of arthritis symptoms (6). Detection of nail involvement in psoriasis is of utmost importance because it may completely change the choice of the treatment to prevent irreversible joint damage (7).

Diagnosis of nail psoriasis is not difficult when typical silvery scaly erythematous plaques are present on predilection sites of psoriasis. However, isolated nail psoriasis without cutaneous involvement occurs in up to 5% of the patients, in whom diagnosis is challenging (4). Psoriasis may affect any part of the nail unit, and clinical manifestations depend on the affected site of the involvement. On clinical examination, isolated or combination of lesions may be detected (Figs. 1 and 2). Psoriasis manifests with both specific and nonspecific nail lesions. Salmon patches and distal onycholysis with an erythematous border have been regarded as the specific nail lesions for psoriasis (4, 5, 8–10). Despite being one of the most common findings, pitting is not specific, but it is highly suggestive for psoriasis. However, 10 pits in one nail has been considered proof of psoriasis (4). Similarly, splinter hemorrhages



Figure 1 | Two patients with severe nail psoriasis, in both of whom the diagnosis of nail psoriasis is apparent with clinical examination.

are a very common but nonspecific feature of nail psoriasis (5). Psoriasis manifests with other well-known nonspecific nail lesions, including subungual hyperkeratosis, thickened white-yellow nail plates, leukonychia, red spots in the lunula, Beau's lines, and longitudinal ridging (4, 8, 11, 12).



Figure 2 | A typical example of nail psoriasis, which demonstrates both nail bed-related findings (salmon patches, distal onycholysis, fuzzy lunula, and longitudinal erythema of the nail bed) and matrix-related (pitting) findings.

Dermoscopic features of nail psoriasis

The diagnosis of isolated nail psoriasis is very difficult unless highly characteristic lesions are detected. Dermoscopy is extremely helpful in not only better visualization of the lesions, but also identification of the lesions, which are invisible to the naked eye

(Figs. 3 and 4) (4). Fuzzy lunula, mottled lunula, and dilated hyponychial capillaries are characteristic dermoscopic features of nail psoriasis (12–15). A recent study defined longitudinal erythema of the nail bed and dilated nail bed capillaries, in addition to peripheral white halos around red spots, dilated nail bed capillaries, and salmon patches, as unique dermoscopic features of nail psoriasis (12). Longitudinal erythema of the nail bed has been described as dilated vascular channels on the epidermal-dermal ridges, which end with dilated nail bed capillaries distally. This study also highlighted the association of longitudinal erythema of the nail bed with fuzzy lunula, and it suggested that the jagged border of the fuzzy lunula is caused by multiple longitudinal erythema of the nail bed that runs longitudinally through the lunula (12).

The pathogenesis of psoriasis is closely linked with angiogenesis. Tortuous and dilated capillaries within elongated dermal papillae are a well-known histological hallmark of psoriasis (16–18). Fuzzy lunula, mottled lunula, red spots in the lunula, longitudinal erythema of the nail bed, dilated nail bed capillaries, dilated hyponychial capillaries, white halos around dilated nail bed capillaries, red spots, and salmon patches all share the same pathogenesis; that is, increased angiogenesis, microvascular dilation, and plasma extravasation seen in psoriasis (12). Fuzzy lunula, longitudinal erythema of the nail bed, dilated nail bed capillaries, splinter hemorrhages, and distal onycholysis are shown in Figure 5. Longitudinal erythema of the nail bed, dilated nail bed capillaries, and fuzzy lunula are the signature features creating the unique characteristic of psoriasis in both nails (Fig. 5). Similarly, longitudinal erythema of the nail bed, fuzzy lunula, mottled lunula, red spots in the lunula, salmon patches, white halos around red spots in the lunula, and a salmon patch are shown in Figure 6.



Figure 3 | (a) Fuzzy lunula, mottled lunula, longitudinal erythema of the nail bed; (b) fuzzy lunula, mottled lunula, longitudinal erythema of the nail bed, ridging; (c) fuzzy lunula, mottled lunula, longitudinal erythema of the nail bed, splinter hemorrhages, longitudinal paleness; (d) fuzzy lunula, longitudinal erythema of the nail bed, dilated nail bed capillaries, pitting, multiple white dots, scaling; (e) dilated nail bed capillaries, distal onycholysis, subungual hyperkeratosis, splinter hemorrhages; (f) white halos around dilated nail bed capillaries, longitudinal erythema of the nail bed, splinter hemorrhages, distal onycholysis; (g) white halos around dilated nail bed capillaries, longitudinal erythema of the nail bed, splinter hemorrhages, distal onycholysis; (h) splinter hemorrhages, distal onycholysis, pitting; (i) longitudinal erythema of the nail bed, dilated nail bed capillaries, white halos around salmon patches; (j) fuzzy lunula, longitudinal erythema of the nail bed, white halos around red spots in the lunula and nail bed red spots; (k) longitudinal erythema of the nail bed, longitudinal paleness, pitting, distal onycholysis, splinter hemorrhages, salmon patches, white patchy areas; (l) distal onycholysis, pitting, white halos around dilated nail bed capillaries, longitudinal erythema of the nail bed, salmon patches; (m) dilated nail bed capillaries, salmon patches, distal onycholysis; (n) splinter hemorrhages, salmon patches, distal onycholysis, dilated nail bed capillaries, dilated hyponychial capillaries, pitting; (o) red spots in the lunula, fuzzy lunula, longitudinal erythema of the nail bed, salmon patches, distal onycholysis, nail bed red spots; (p) dilated nail bed capillaries, longitudinal erythema of the nail bed, fuzzy lunula, red spots in the lunula, pitting, splinter hemorrhages, nail plate crumbling; (q) salmon patches, pitting, distal onycholysis, longitudinal erythema of the nail bed; (r) red spots in the lunula, pitting, salmon patches; (s) red spots in the lunula, fuzzy lunula, longitudinal erythema of the nail bed, pitting, scaling; (t) red spots in the lunula, thickened white-yellow nail plates, ridging, nail plate crumbling.



Figure 4 | (a) Longitudinal erythema of the nail bed, longitudinal paleness, scaling, nail plate crumbling, periungual dotted vessels; (b) longitudinal erythema of the nail bed, nail plate crumbling, transverse groove; (c) dilated hyponychial capillaries; (d) multiple white dots, longitudinal erythema of the nail bed, distal onycholysis; (e) splinter hemorrhages, scaling; (f) red spots in the lunula, nail bed red spots, salmon patches, pitting, longitudinal erythema of the nail bed, nail plate crumbling; (g) longitudinal erythema of the nail bed, distal onycholysis, splinter hemorrhages, dilated nail bed capillaries; (h) splinter hemorrhages, distal onycholysis, longitudinal erythema of the nail bed, pitting, nail plate crumbling; (i) dilated nail bed capillaries, distal onycholysis, nail plate crumbling, longitudinal erythema of the nail bed; (j) splinter hemorrhages, ridging, longitudinal erythema of the nail bed, nail plate crumbling; (k) longitudinal erythema of the nail bed, ridging, scaling, distal onycholysis, nail plate crumbling, thickened white-yellow nail plates; (l) splinter hemorrhages, thickened white-yellow nail plates, scaling, ridging; (m) distal onycholysis, splinter hemorrhages, scaling; (n) thickened white-yellow nail plates, nail plate crumbling, hemorrhages, white halos around dilate nail bed capillaries; (o) pitting, scaling, distal onycholysis; (p) splinter hemorrhages, thickened white-yellow nail plates, nail plate crumbling, subungual hyperkeratosis, ridging; (q) splinter hemorrhages, thickened white-yellow nail plates, ridging, nail plate crumbling, transverse deep groove; (r) nail plate crumbling, thickened white-yellow nail plates, scaling; (s) subungual hyperkeratosis, thickened white-yellow nail plates, hemorrhages; (t) scaling, ridging, subungual hyperkeratosis.

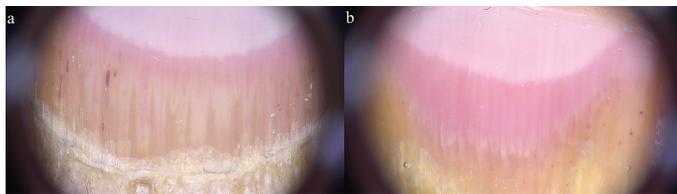


Figure 5 | (a) Longitudinal erythema of the nail bed, dilated nail bed capillaries, splinter hemorrhages, fuzzy lunula, distal onycholysis, subungual hyperkeratosis, multiple white dots; (b) longitudinal erythema of the nail bed, salmon patches, fuzzy lunula, splinter hemorrhages, distal onycholysis, white halos around dilated nail bed capillaries.

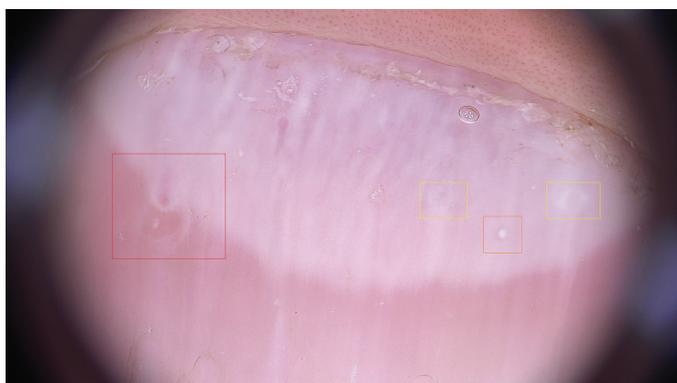


Figure 6 | Mottled lunula, fuzzy lunula, red spots in the lunula, longitudinal erythema of the nail bed, longitudinal paleness, periungual bushy capillaries. Peripheral white halos around red spots (yellow rectangles), a white spot in the lunula (orange square). Note the red spot, which is in juxtaposition with a salmon patch, both of which are surrounded by white halos (red square).

As defined previously, mottled lunula, fuzzy lunula, red spots in the lunula, and longitudinal erythema of the nail bed are related to each other and linked with vascular alterations in psoriasis. Mottled lunula, fuzzy lunula, and red spots in the lunula are not

completely different entities, but they represent different presentations of a spectrum of the same pathological process.

The marbled appearance seen in mottled lunula, which is shaped by different shades of white, pink, and red, reflects the engorgement in the vascular spaces. The multiple linear bands with different hues manifest as either red spots in the lunula or mottled lunula. Longitudinal erythema of the nail bed is the continuum of this appearance seen on the further parts of the nail (12). In contrast to Figure 3d, in which obvious dilated nail bed capillaries appear as longitudinal erythema of the nail bed running through the lunula, longitudinal erythema of the nail bed can also appear as dark intervals between dilated nail bed capillaries, as shown in Figure 5. Because vasoconstriction and vasodilation alternate between each other, longitudinal paleness can also be seen with longitudinal erythema of the nail bed in nail psoriasis (Figs. 3a–d, j, and k; Figs. 4a and 4b; and Fig. 5). Figure 3 shows white halos around the salmon patches (Figs. 3i and 3o), red spots in the lunula (Fig. 3j), and nail bed red spots (Figs. 3j and 3k), which show the same phenomenon separated only by the location or extent of the disease process. In the most extreme vasodilation, one can only see white discrete patchy areas instead of white halos around red spots (Fig. 3k). In Figure 6, a salmon patch is observed in juxtaposition with a red spot in the lunula, both of which are surrounded by white halos (red square). This proximity implies that red spots in the lunula and salmon patches evolve as continuing lesions, originating from the same pathophysiological process.

The erythematous border around distal onycholysis is a unique dermoscopic feature of nail psoriasis (8, 10, 19). Sometimes, instead of an erythematous border, distal onycholysis is accompanied by a surrounding salmon patch, which is also very specific for nail psoriasis (Figs. 3k, 3m–o, 4i, and 5b). Psoriatic distal

onycholysis differs from onychomycotic onycholysis, which is one of the most common causes of onycholysis, regarding pattern and color (12). Whereas psoriatic distal onycholysis is composed of parallel splits, spikes are the main constituent of onychomycotic onycholysis. A jagged proximal edge with yellowish white spikes is the characteristic presentation of onychomycotic onycholysis, which is caused by fungal invasion (20). However, in psoriatic distal onycholysis, the onycholysis has a typical round linear proximal edge and a silvery-whitish hue (12).

Diagnostic utility of dermoscopy in nail psoriasis—a gold standard?

Longitudinal erythema of the nail bed, fuzzy lunula, mottled lunula, dilated nail bed capillaries, dilated hyponychial capillaries, salmon patches, nail bed red spots, distal onycholysis with an erythematous linear proximal edge, white halos around dilated nail bed capillaries, salmon patches, and red spots are the unique dermoscopic features of nail psoriasis (12). Although these are findings related to the nail bed that mostly characterize nail psoriasis (12), most of the matrix-related findings of nail psoriasis are nonspecific. Thickened white-yellow nail plates, multiple white dots, leukonychia, Beau's lines, scales, and longitudinal ridging are nonspecific matrix-related lesions (11, 12). Other than pitting, nail plate crumbling is the only matrix-related finding, which has significance in defining psoriasis (12). Red spots in the lunula, which are also seen in other diseases, including alopecia areata, lichen planus, and rheumatoid arthritis (13), are a lesion related to both the matrix and nail bed (12).

There is no evidence-based recommendation for the diagnostic criteria for nail psoriasis. How many and which features are necessary to make a diagnosis of nail psoriasis is unclear. Should one mark and focus on only the specific findings, such as distal onycholysis with an erythematous border and salmon patches or outline all the present findings, classify them according to their origin, and make an evaluation based on a scoring system? Some findings, such as leukonychia or longitudinal ridging, are not only nonspecific, but also rarely seen in psoriasis (8, 12, 19). Their role in differentiating nail psoriasis from other nail disorders remains obscure. Because a significant component of the pathogenesis of psoriasis is driven through inflammatory angiogenesis, nail bed-related findings are the characterizing features of nail psoriasis (12). However, whether newly defined nail bed-related features are specific enough to be considered diagnostic requires further investigation.

A combination of nail bed-related and matrix-related findings could serve as the dermoscopic presentation of nail psoriasis (12). A typical example of nail psoriasis is demonstrated in Figure 7. The patient manifests with both nail bed-related findings (mottled lunula, fuzzy lunula, longitudinal erythema of the nail bed, dilated nail bed capillaries, splinter hemorrhages, and distal onycholysis with an erythematous border) and matrix-related (pitting) findings. Ten pits in one nail are deemed to confirm psoriasis (4), and distal onycholysis with an erythematous border is

a specific finding of nail psoriasis (8, 10). Thus, even if other nail bed-related findings were not detected, a diagnosis of psoriasis can be made without any doubt in this scenario. The detection of a combination of findings increases the diagnostic accuracy, although detection of only matrix-related or nail bed-related findings would be enough to make a diagnosis of nail psoriasis. Essentially, the pattern seen in Figure 7, which embodies both the matrix- and nail bed-related findings, is one of the most characteristic presentations of nail psoriasis. No other nail disorder has been described as manifesting with a combination of mottled lunula, fuzzy lunula, longitudinal erythema of the nail bed, dilated nail bed capillaries, splinter hemorrhages, and distal onycholysis with an erythematous border and pitting.



Figure 7 | Characteristic presentation of nail psoriasis, which embodies both matrix-related findings (pitting) and nail bed-related findings (mottled lunula, fuzzy lunula, longitudinal erythema of the nail bed, splinter hemorrhages, and distal onycholysis with an erythematous border).

Conclusions

Skin imaging technologies are currently evolving exponentially. Recent advances in dermoscopy suggest that clinico-imaging diagnosis has replaced clinicopathologic diagnosis (21). Dermoscopy provides definitive diagnosis with high sensitivity and specificity in various skin diseases. Moreover, dermoscopy aids in the treatment choice and management decisions in challenging clinical situations (1). In terms of diagnosis and management, isolated nail psoriasis is one of the most complex nail diseases dermatologists face (4). Dermoscopy provides predictive information about the severity of nail psoriasis and accompanying arthritis, which affects the treatment choice (12).

Clinical signs of nail psoriasis vary. Not only specific and non-specific findings, but also different combinations of these lesions, can be detected during an examination (4). A combination of matrix- and nail bed-related findings appears to be the characteristic presentation of nail psoriasis. Despite the lack of comparative studies, nail psoriasis has many specific dermoscopic features, which make the diagnosis straightforward (11, 12, 14, 15, 19, 22–26). Thus, dermoscopy may serve as the gold-standard diagnostic tool, excluding the necessity of histopathological examination when detecting a combination of specific findings.

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