

## Comparative Study of Clinical and Dermoscopic Features in Nail Psoriasis

### Abstract

**Background, Aims, and Objectives:** Nail changes have been reported in approximately 40% of psoriasis patients. Occasionally nail psoriasis may be the sole finding or the first presentation of the disease. Assessment of the nail changes associated with psoriasis can be done clinically, ultrasonographically, and most recently using a dermoscope. The aim of this study is to assess the dermoscopic features in nails of psoriasis as well as to compare the dermoscopic with the clinical findings. This study has also assessed the correlation between disease duration and the severity of skin and nail involvement. **Materials and Methods:** A total of 50 patients with psoriatic nail changes were recruited in the study. The psoriasis area severity index (PASI) was used to assess the severity of the disease. The nail psoriasis severity index (NAPSI) was used to determine the severity of nail involvement. The patient's nails were examined both clinically and dermoscopically. **Results:** Pitting was the commonest feature (84%) noted both clinically and dermoscopically. A statistically significant higher NAPSI score ( $P < 0.05$ ) was obtained by a dermoscope than by clinical examination. Salmon patch and splinter hemorrhage were better visualized using a dermoscope than by clinical evaluation ( $P < 0.05$ ). The duration of the disease had a strong positive correlation ( $R = 0.901$ ) with the duration of nail involvement whereas there was a weak correlation between the duration of the disease and the clinical NAPSI ( $R = 0.23$ ) and dermoscopic NAPSI ( $R = 0.28$ ). A weak positive correlation ( $R = 0.3$ ) was noted between the PASI and NAPSI scores. **Conclusion:** Dermoscopy of nails proved to be an efficient, supportive, easy, noninvasive method that provides a better insight into the subtle nail changes in psoriatic patients, which may have been missed clinically.

**Keywords:** Dermoscopy, nail psoriasis, nail psoriasis severity index, psoriasis area severity index

### Introduction

Psoriasis is a common, chronic debilitating and stigmatizing skin disorder associated with significant physical and psychological comorbidities. The worldwide prevalence is estimated to be 1% to 2% of the general population. Nails are reported to be involved in 50% to 88% of psoriasis patients, more so in patients with psoriatic arthritis.<sup>[1]</sup> Approximately 5% of psoriatic patients present with isolated nail changes and do not exhibit any skin involvement. This poses a diagnostic challenge to the clinicians.<sup>[2]</sup> Rich and Scher first described an objective scoring system called nail psoriasis severity index (NAPSI) as a simple, reproducible tool to observe the nail changes in psoriasis as well as to assess the efficacy of various therapeutic modalities.<sup>[3]</sup> The nail matrix changes observed are pitting, crumbling of nail plate, leukonychia, and red spots in the lunula, whereas onycholysis, salmon patch, splinter hemorrhages, and

subungual hyperkeratosis are changes observed on the nail bed.<sup>[3]</sup> Dermoscopy is a valuable noninvasive tool in dermatology, which was initially used to aid in the diagnosis of melanoma. The scope of dermoscopy has extended beyond cutaneous malignancies. Currently dermoscopy is used as an adjunctive tool in the diagnosis of pigmented and non-pigmented skin lesions, infectious diseases, inflammatory disease, connective tissue disorders, as well as in hair and nail disorders.<sup>[2,4]</sup> This study has been done taking into account the limited number of studies that have been performed on dermoscopic evaluation of nail changes in psoriasis.<sup>[1,5,6]</sup>

### Objective

The aim of this study was to evaluate the dermoscopic features in psoriasis of the nail as well as to compare the clinical and dermoscopic nail findings using the standard NAPSI scoring. This study also assessed the correlation between the disease

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severity [using psoriasis area severity index (PASI) score] and the NAPS I score.

## Materials and Methods

This was a prospective observational study conducted over a period of three months in the Department of Dermatology, Goa Medical College, after obtaining the IEC clearance. A total of 50 patients clinically diagnosed as psoriasis with nail involvement who consented for the study were recruited.

Onychomycosis was ruled out after performing KOH mount on nail clippings obtained from all the suspected cases. Patients with coexisting onychomycosis, patients not consenting to the study, and patients with systemic disorders that may influence the nail changes were excluded from this study.

Demographic data such as age, gender, and clinical data like duration of psoriasis, systemic comorbidities, treatments received, family history, and personal history were recorded.

PASI was used as a clinical assessment tool for each patient to determine disease severity.<sup>[7]</sup> Finger nails of all ten digits were examined thoroughly, first by clinical examination followed by dermoscopic examination. NAPS I scores were calculated by dividing each nail into four quadrants. Each quadrant was evaluated for the presence of any nail matrix and nail bed signs. A score of 1 is given for the presence of such signs in every quadrant, so that there is nail matrix score of 0–4 and nail bed score of 0–4 per nail with a minimum score of 0 and a maximum score of 8 per nail.<sup>[3]</sup> Additional nail changes not included in NAPS I scoring were recorded.

A dermlite DL 4 hand held dermoscope using polarized light with a magnification of 10× and derminda D Scop video dermoscope, polarized with 100× magnification was used for this study. Clinical photographs were taken using Nikon 5300 DSLR camera.

## Statistical analysis

Statistical analysis was done using SPSS software (version 22).

For quantitative data, mean  $\pm$  standard deviation (SD) was used to define the data whereas for qualitative data, number and percentage (%) were used. Student's *t*-test was used to assess the statistical significance between various scores. McNemar's test was used to analyze the statistical significance between the various individual parameters observed clinically and dermoscopically. A *P* value of  $< 0.05$  was taken as significant for all the statistical tests. The Pearson correlation coefficient test was used to determine the strength of association between the various quantitative data.

## Results

A total of 50 patients with psoriatic nail involvement were included in the study. The age of the patients ranged

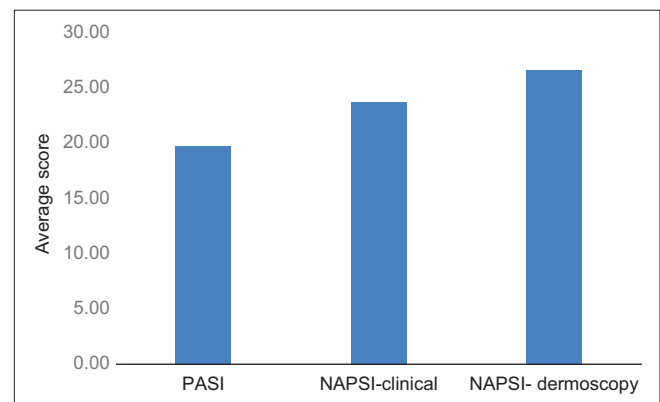
between 12 years to 66 years (mean  $\pm$  SD: 45.02  $\pm$  13.67). Males ( $n = 38$ ; 76%) outnumbered females ( $n = 12$ ; 24%) in this study. The duration of cutaneous psoriasis ranged between 5 months to 15 years (mean  $\pm$  SD: 4.94  $\pm$  3.626), whereas duration of nail psoriasis ranged from 5 months to 12 years (mean  $\pm$  SD: 4.3  $\pm$  3.1712). In this study, 56% of the patients ( $n = 28$ ) had a history of cutaneous psoriasis prior to the onset of nail changes, whereas 18% of the patients ( $n = 9$ ) had a history of nail changes prior to the onset of cutaneous psoriasis and 2% of the patients ( $n = 1$ ) had isolated nail psoriasis. The time interval between the onset of cutaneous psoriasis and development of nail changes ranged from 0.5 to 5 years (mean  $\pm$  SD: 1.531  $\pm$  1.039). The time interval between the onset of nail changes and the onset of skin involvement ranged from 0.5–6 years (mean  $\pm$  SD 1.11  $\pm$  0.546).

The different clinical variants of psoriasis encountered in our patients are summarized in Table 1. Chronic plaque psoriasis was the commonest clinical presentation. The PASI score of the patients ranged from 0 to 52 (mean  $\pm$  SD: 19.808  $\pm$  12.092). The mean clinical NAPS I score was 23.82  $\pm$  16.128, whereas the mean dermoscopic NAPS I score was 26.68  $\pm$  16.073. Figure 1 shows the mean PASI score, and mean clinical and dermoscopic NAPS I score.

Table 2 demonstrates the four nail bed and four nail matrix signs included in the NAPS I score observed in our patients. In this study, pitting was the commonest feature observed both clinically (84%) and dermoscopically (84%). Salmon patch and splinter hemorrhage were noted

**Table 1: Types of psoriasis**

Type of psoriasis	Number of patients	Percentage (%)
Chronic plaque	40	80
Erythrodermic	2	4
Guttate psoriasis	1	2
Nail psoriasis	1	2
Palmoplantar	4	8
Pustular psoriasis	1	2
Psoriatic arthropathy	1	2
Total	50	100



**Figure 1: Mean PASI score, and mean clinical and dermoscopic NAPS I score**

significantly better by the dermoscope than by clinical examination ( $P < 0.05$ , McNemar's test of statistical significance). There was no statistically significant difference in the other nail bed and nail matrix parameters observed clinically or dermoscopically.

Figure 2 shows the additional nail findings observed that were not included in the NAPS I scoring. Features that were visualized solely with the help of a dermoscope were hypertrophic cuticle (22%), pseudofiber sign (18%) and dilated hyponychial capillaries (10%).

The paired *t*-test for comparison between the clinical and dermoscopic NAPS I showed that dermoscopically evaluated NAPS I score was significantly higher ( $P < 0.05$ ) than the clinically evaluated NAPS I score.

A strong positive correlation was observed between the duration of the disease and the duration of nail involvement which was statistically significant ( $R = 0.9013$ ;  $P < 0.05$ ) [Figure 3].

A positive correlation was also noted between the PASI score and the dermoscopic NAPS I score, which was statistically significant ( $R = 0.3483$ ,  $P = 0.013$ ).

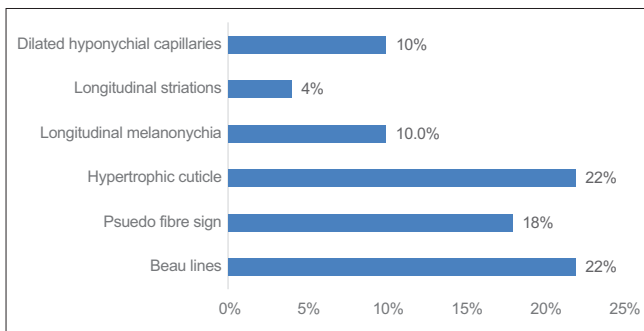


Figure 2: Additional nail findings

There was a statistically significant correlation noted between the duration of nail involvement and the dermoscopic NAPS I score ( $R = 0.42$ ,  $P = 0.023$ ).

A weak correlation was observed between the duration of psoriasis and the dermoscopic NAPS I score ( $R = 0.2835$ ;  $P = 0.046$ ).

**Discussion**

Dermoscopy is a novel, noninvasive innovation in the field of dermatology. Dermoscopy emerged as a tool to aid in the diagnosis of cutaneous malignant and pre-malignant conditions such as melanomas, actinic keratosis, and basal cell carcinomas. In the present scenario, the utility of a dermoscope has extended beyond the established boundaries. A dermoscope may also act as a supportive tool for the examination of nail changes associated with various dermatological conditions. It is particularly important when

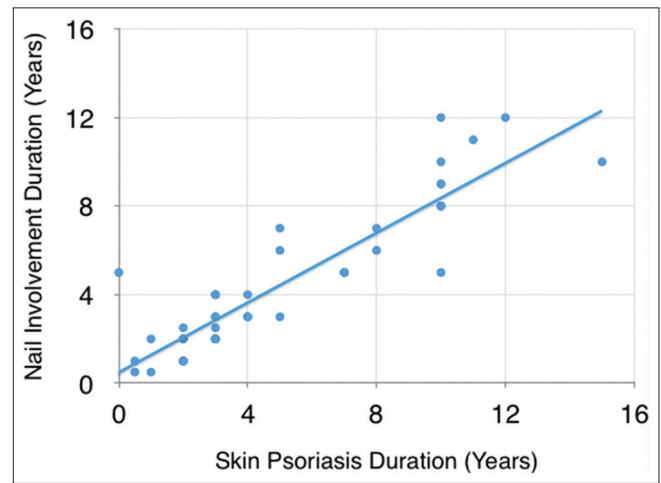


Figure 3: Correlation between duration of disease and duration of nail involvement

**Table 2: Nail parameters as seen clinically and dermoscopically**

Nail findings	Remarks	Clinical	Dermoscope	C%	D%	P
Pitting	No	8	8	16.00%	16.00%	0
	Yes	42	42	84.00%	84.00%	
Crumbling	No	43	42	86.00%	84.00%	0
	Yes	7	8	14.00%	16.00%	
Leukonychia	No	40	39	80.00%	78.00%	0
	Yes	10	11	20.00%	22.00%	
Red lunula	No	50	46	100.00%	92.00%	0
	Yes	0	4	0.00%	8.00%	
Salmon patch**	No	34	28	68.00%	56.00%	0.031
	Yes	16	22	32.00%	44.00%	
Onycholysis	No	23	23	46.00%	46.00%	0
	Yes	27	27	54.00%	54.00%	
Subungal hyperkeratosis	No	30	27	60.00%	54.00%	0.375
	Yes	20	23	40.00%	46.00%	
Splinter hemorrhage**	No	46	19	92.00%	38.00%	<0.001
	Yes	4	31	8.00%	62.00%	

\*\*Significantly different between the C and D groups by McNemar's Chi-square test

the nail features are too subtle to be appreciated clinically. Dermoscopy can aid in better visualization of these nail changes, as well as uncover new additional features that may be specific to psoriasis.<sup>[1]</sup>

Table 3 compares the results of this study with other similar studies on nail changes in psoriasis.

Pitting is the most common feature observed in 84% of our patients both clinically and dermoscopically [Figures 4 and 5]. Pitting is caused by the defective keratinization of the proximal nail matrix resulting in the accumulation of foci of parakeratotic cells. Shedding

off of these foci of cells results in the formation of punctate depressions clinically seen as pits on the nail plate.<sup>[8]</sup>

Leukonychia occurs due to the parakeratosis of the distal nail matrix, which prevents the normal desquamation of the underlying keratinocytes.<sup>[1]</sup> A slightly higher frequency of leukonychia was observed by dermoscopic examination compared to clinical observation [Figure 6].

Onycholysis refers to the separation of the nail plate from the nail bed. Yorulmaz and Artaz noted a linear erythematous border around the onycholysis, which was better observed by a dermoscope than by clinical examination. They considered this feature to be specific



Figure 4: Pitting (clinical)

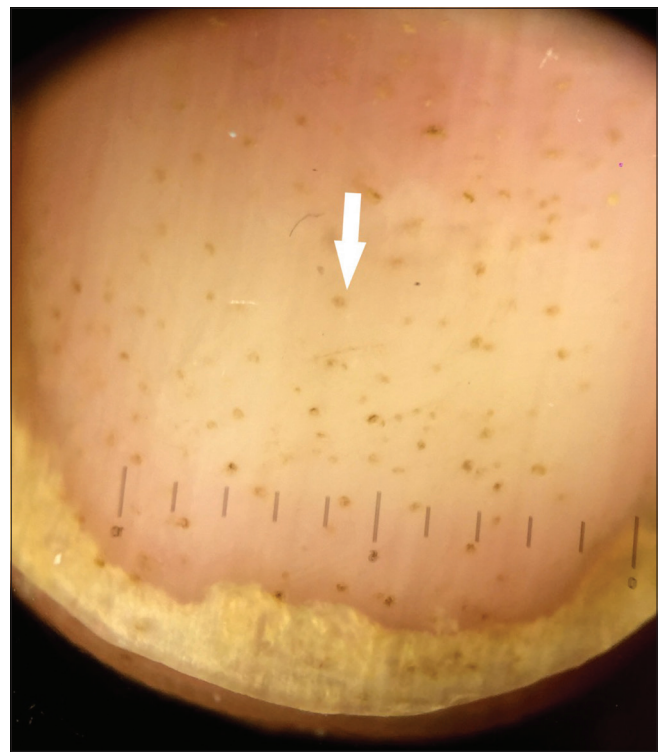


Figure 5: Pitting (dermoscope)

Table 3: Comparison of our results with other related studies

Nail features	This study		Polat <i>et al.</i> <sup>[11]</sup>		Yadav and Khopkar <sup>[5]</sup>	Kaur <i>et al.</i> <sup>[9]</sup>	Rajshekhar <i>et al.</i> <sup>[10]</sup>
	Clinical %	Dermoscopic %	Clinical %	Dermoscopic %	Dermoscope n=46	Clinical %	Clinical %
<b>Nail Matrix Features</b>							
Pitting	84	84	92.5	77.5	18	97.4	83.1
Leukonychia	20	22	82.5	92.5	-	63.2	6.2
Crumbling of nail plate	14	16	17.5	20	-	-	7.7
Red lunula	0	8	5	5	-	-	0
<b>Nail bed Features</b>							
Subungal hyperkeratosis	40	46	35	32.5	-	89.5	23.1
Onycholysis	54	54	67.5	77.5	10	94.7	73.8
Splinter hemorrhage	8	62	75	80	5	36.8	4.6
Salmon patch	32	44	42.5	47.5	2	55.3	3.1

for psoriatic nails.<sup>[6]</sup> Similar observation was made by Polat *et al.*<sup>[1]</sup> We also noted similar findings in a few of the patients in this study [Figure 7].

Splinter hemorrhages are described as reddish brown to purplish-black striae in a longitudinal distribution that are usually visualized at the distal ends of the nails. They are formed due to the extravasation of blood along the grooves beneath the nail plate when the dilated capillaries in the nail bed ruptures.<sup>[8]</sup>

In this study, we concluded that a dermoscope greatly enhances the visualization of splinter hemorrhages when compared to clinical observation [Figure 8].

Salmon patch or oil drop sign occur due to psoriatic plaques in the distal matrix and nail bed [Figure 9]. With the help of the dermoscope, salmon patch was identified in a higher percentage of the patients.

Figure 2 shows the additional nail features observed in this study not included in the NAPSII score. Pseudofiber

sign was first described by Yorulmaz and Artaz who had observed this feature by the dermoscope in 34.3% of their patients. Pseudofibers are filamentous structures which are red and black in color, located in proximity to the cuticle or under the hyponychium along the distal free edge of the nail plate. It was suggested that pseudofiber sign may be related to nail bed psoriasis and the filamentous structures are representative of bare capillaries.<sup>[6]</sup> In this current study, we found pseudofiber sign in 18% of the patients studied [Figure 10].



Figure 6: Leukonychia (dermoscope)

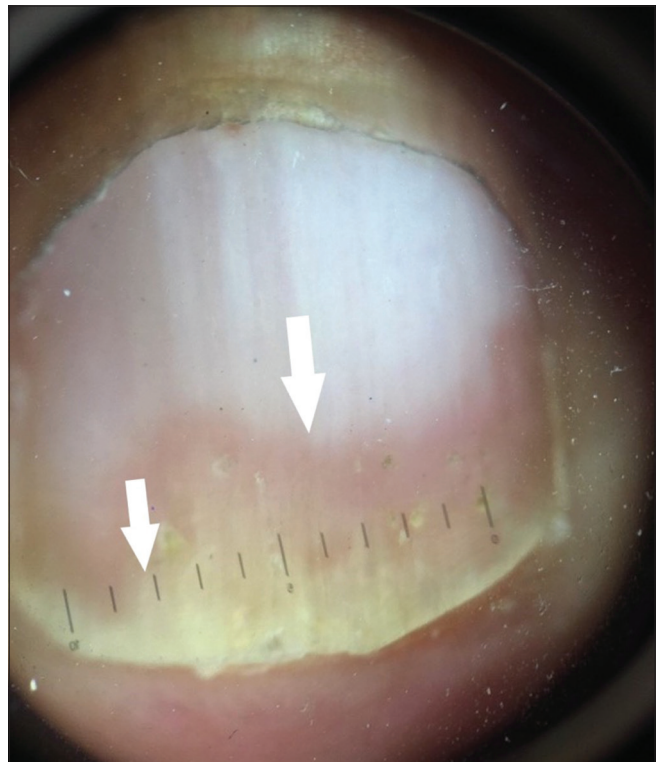


Figure 7: Onycholysis (dermoscope)

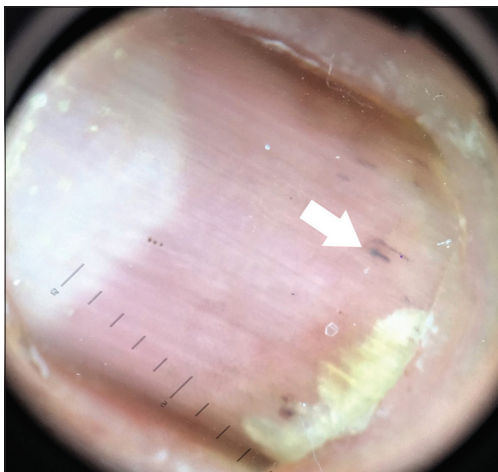
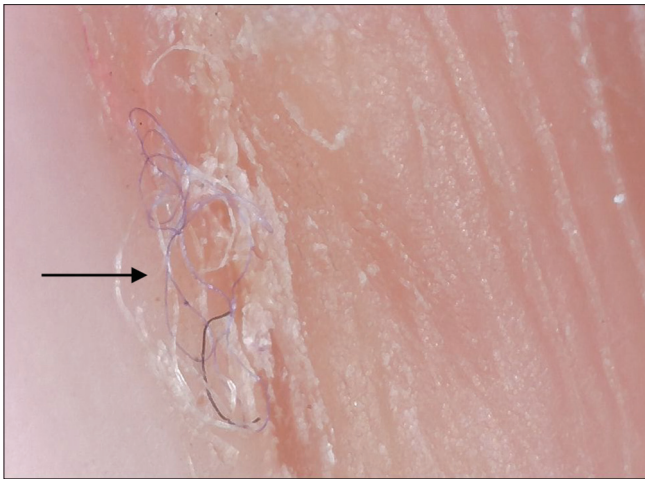


Figure 8: Splinter hemorrhage (dermoscope)



Figure 9: Salmon patch (clinical)



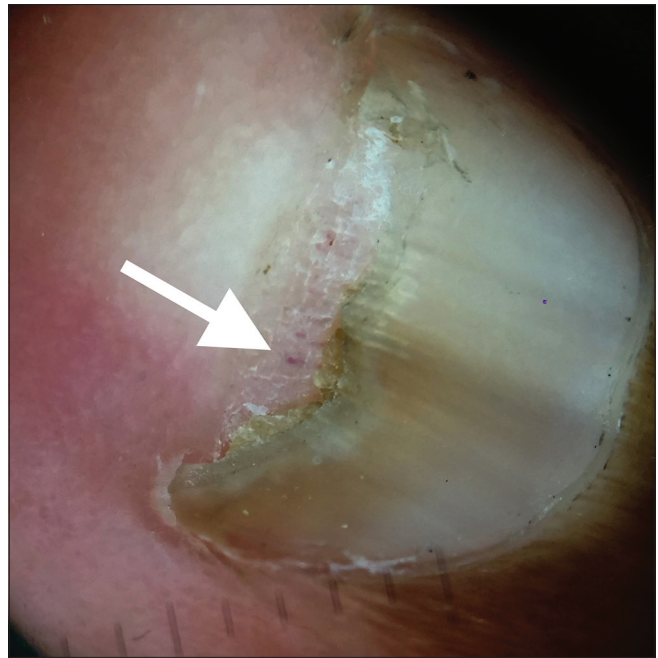
**Figure 10: Pseudofiber sign (dermoscope)**

Yorulmaz and Artaz also noted dilated hyponychial capillaries in 35.82% of their patients using a dermoscope. This sign could be due to the underlying changes in the dermal vasculature, which may be representative of the well-described Auspitz sign, demonstrated clinically on psoriatic plaques.<sup>[6]</sup> We observed this feature in 10% of our patients with the help of a dermoscope [Figure 11].

In this study, patients with a longer duration of cutaneous psoriasis also had a longer duration of nail involvement. We also observed that patients with longer duration of nail involvement also had a higher NAPS I score. A statistically significant positive correlation was noted between the PASI score and the NAPS I score. This shows that patients with higher disease severity (indicated by PASI score) had more severe nail involvement. However, this observation could be biased due to the fact that most of the patients recruited in this study were psoriasis patients presenting in exacerbation.

### Conclusion

From this study, we conclude that nail examination using a dermoscope aids in the diagnosis of the subtle changes in the nails of psoriasis patients. Splinter hemorrhage and salmon patch were better visualized using a dermoscope. The erythematous linear band present abutting the onycholytic area was observed with a dermoscope and proved to be a consistent finding, which is also reported in other studies.<sup>[1]</sup> Additional findings such as hypertrophied cuticle and pseudofiber sign were also observed with the help of a dermoscope. Whether these features can be considered specific to psoriasis or a coincidental finding needs to be further evaluated. Dermoscopic evaluation of nails is a preferred, noninvasive, easy bedside method, which can help to diagnose nail psoriasis even in patients with isolated nail involvement. This can also help obviate the need of painful procedures like nail biopsy in patients with clinical suspicion of psoriasis.



**Figure 11: Dilated hyponychial capillaries**

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Nil.

### Conflicts of interest

There are no conflicts of interest.

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