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Original Research Article

A clinico-epidemiological and onychoscopic study of nail changes in papulosquamous disorders at a tertiary care centre in Puducherry

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Abstract

Background: Nails are an integral part of the integumentary system which aid in protection, tactile perception, motor functions in addition to their cosmetic value. Onychoscopy, a dermoscopy of the nail unit enables visualization of the subtle changes of the nail unit which are invisible to the naked eye.
Aim: To study the onychoscopic findings and clinical patterns of nails in papulosquamous disorders.
Materials and Methods: This is a cross-sectional study with purposive sampling. Following inclusion and exclusion criteria, 62 patients with papulosquamous disorders were recruited. Each fingernail and toenail were numbered from 1 to 10, and detailed clinical assessment was conducted. Utilizing the Heine Delta 20 dermatoscope, detailed onychoscopic examinations were carried out.
Results: Out of the 62 subjects, 47 were male, with Psoriasis being the most prevalent disorder (75.8%). A significant proportion (89%) of patients exhibited nail abnormalities, with onycholysis being the predominant clinical and dermoscopic change in psoriasis. Onychoscopy proved superior in visualizing nail alterations such as onycholysis, splinter hemorrhages, salmon patches, and dilated onychodermal band capillaries.
Conclusion: Onychoscopic evaluation in papulosquamous disorders facilitates the detection of subtle alterations in the nails that are imperceptible to the unaided eye. Despite biopsy serving as the benchmark diagnostic procedure for papulosquamous disorders, its invasiveness, discomfort, and diagnostic delays are noteworthy drawbacks. Onychoscopy, a non-invasive, cost-effective modality, can either complement or serve as an alternative to nail biopsy in papulosquamous disorders.

Keywords: Papulosquamous disorders, Nail changes, Onychoscopy.

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1. Introduction

Nails are an integral part of the integumentary system and are made up of hardened keratin. In addition to their cosmetic value, nails also aid in protection, tactile perception, and motor functions. The nail plate, nail bed, nail matrix, cuticle, and nail folds constitute the nail unit. In this day and age, where physical appearance is given so much importance, nail diseases have long been a reason for concern.[1] Nail changes have been implicated in many dermatological as well as systemic disorders. The main cause of nail changes, other than trauma and infectious diseases, is papulosquamous disorders.[1] Of all dermatological conditions, nail abnormalities account for about 10%, with papulosquamous disorders being the main cause.[1,2] Abnormalities of nails may be a presenting feature even before the appearance of other clinical indications of the disease. Papulosquamous disorders are heterogenous group of disorders which are characterized by scaly papules and plaques. They consist of a wide spectrum of disorders. Papulosquamous disorders frequently encountered are psoriasis, lichen planus, parapsoriasis, lichen striatus, lichen nitidus, pityriasis rubra pilaris, pityriasis lichenoides and pityriasis rosea. In papulosquamous disorders, pitting, subungual hyperkeratosis and onycholysis are frequently observed features.[3] A nail biopsy is necessary to validate the diagnosis of papulosquamous disorders affecting the nail, a procedure which is painful and associated with increased blood loss. A cost-effective, non-invasive

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method for diagnosing nail disorders is onychoscopy, a dermoscopy of the nail unit. It enables visualization of the subtle changes of the nail unit which are invisible to the naked eye. It helps to identify nail changes at an earlier stage before irreversible changes set in. This study was done to identify the onychoscopic changes and clinical patterns of the nail in papulosquamous disorders.

2. Materials and methods

This was an observational cross-sectional study conducted over 18 months. Patients with papulosquamous disorders attending Dermatology outpatient department in a tertiary hospital were included in the study by purposive sampling technique. The sample size was 62.

2.1. Exclusion criteria

1. Patients with history of using artificial nails such as acrylic nails were excluded as it can induce severe nail changes.
2. Patients with onychomycosis.

2.2. Data collection

Patients attending dermatology outpatient department with papulosquamous disorders were included in the study. After getting informed and written consent, a detailed history followed by clinical examination were done. Right hand fingernails were numbered from F1 to F5 from left to right with right thumb being assigned as F1 and right little finger as F5 (**Figure 1**). Similar numbering was done on left hand from right to left with left thumb being assigned as F6 and left little finger being assigned as F10. Similarly, the toenails were numbered. Onychoscopic examination was done using a handheld 10x non polarised contact dermoscope (Heine's delta 20) and instrument were sterilized using alcohol after each use. All the details were entered in a pre-structured proforma (**Figure 2**). Clinical and onychoscopic photographs of the nails were taken using a 48-megapixel camera.

2.3. Data analysis

The Data were were analyzed using SPSS software (version23.0). Descriptive statistics were obtained for quantitative variables like Age, Duration of Disease. Categorical variable like gender, history, onychoscopic features were expressed in percentage.

3. Results

The majority of patients were in the age group 41-60 (37.1%) (**Table 1**). The least number of patients were seen in the age group of 11-20 (9.7%). The mean age of patients in our study was 46 years. Out of 62 patients, 47 (75.8%) were males and 15 (24.2%) were females**.** Out of the 62 patients enrolled in the study, 47 patients (75.8%) had psoriasis. Most patients with psoriasis were in the age group of 41-60 years (42.5%). The least number of patients were seen in the age group of 11-20 years (6.3%). A total of 9 patients (14.5%) with lichen planus were seen in our study. The majority of patients were in the age group of 21-40 years (44.4%). The least number of patients were seen in the age group of 11-20 years and above 60 years.

Among papulosquamous disorders, nail changes were seen in 54 patients (87 %) (**Table 2**). Out of the 47 patients with psoriasis, nail changes were seen in 42 patients. Out of the 9 patients with LP, 7 patients had nail changes. Out of the 3 patients with PR, 2 had nail changes. All the patients with PRP, LN and PLEVA had nail changes.

Fingernail involvement was seen in 87% in patients of psoriasis and 78% in lichen planus (**Table 3**). In pityriasis rosea, fingernail involvement was seen in 67% and all the patients with PRP and LN had fingernail involvement. PLEVA did not have any fingernail involvement. Toenail involvement was seen in 51% of psoriasis patients. PLEVA patient had involvement of toenails. Toenails were not involved in lichen planus, PRP, LN and PR.

Table 1: Papulosquamous disorders in our study in association with age and gender.

Papulosquamous disorders	**Age and Gender distribution**							
	11 – 20y		**21 – 40y**		**41 – 60y**		**61 – 80y**	
	M	**F**	**M**	**F**	**M**	**F**	**M**	**F**
Psoriasis (n=47; 75.8%)	0	3	11	2	16	4	11	0
LP (n=9; 14.5%)	0	1	1	3	3	0	1	0
PRP (n=1; 1.6%)	0	0	1	0	0	0	0	0
LN (n=1; 1.6%)	0	0	0	1	0	0	0	0
PR (n=3; 4.9%)	2	0	0	1	0	0	0	0
PLEVA (n=1; 1.6%)	0	0	1	0	0	0	0	0
Total (n = 62) Male=47 (75.8%) Female=15 (24.2%)	2(3.2%)	4(6.5%)	14(22.5%)	7(11.3%)	19(30.6%)	4(6.5%)	12(19.4%)	0

Table 2: Papulosquamous disorders in association with presence of nail changes.

Diagnosis	Nail involvement Present N (%)	Nail involvement Absent N (%)
Psoriasis (n=47)	42 (89)	5(11)
Lichen Planus (n=9)	7(78)	2(22)
Pityriasis rubra pilaris (n=1)	1(100)	(0)
Lichen nitidus (n=1)	1(100)	(0)
Pityriasis rosea (n=3)	2(67)	1(33)
Pityriasis lichenoides et varioliformis acuta (n=1)	1(100)	(0)

Table 3: Distribution of papulosquamous disorders and involvement of fingernails and toenails.

Diagnosis	Fingernail involvement present N (%)	Toenails involvement Present N (%)
Psoriasis (n=47)	41(87)	24(51)
Lichen Planus (n=9)	7 (78)	0
Pityriasis rubra pilaris (n=1)	1(100)	0
Lichen nitidus (n=1)	1(100)	0
Pityriasis rosea (n=3)	2(67)	0
Pityriasis lichenoides et varioliformis acuta (n=1)	(0)	1(100)

Nail changes were more common in fingernails than toenails. Onycholysis in psoriasis was more commonly seen in fingernails F3 and F6 (**Table 4**). Leukonychia was frequently observed in fingernails F8, F9 in lichen planus and F1, F3 in pityriasis rosea Longitudinal melanonychia was observed more commonly in F2 in Pityriasis rubra pilaris. Longitudinal ridges and Beau's lines were commonly seen in fingernail F1 in lichen nitidus and PLEVA respectively.

Table 4: Common nail changes and the commonly involved nails in papulosquamous disorders.

Diagnosis	Common nail change	Commonly involved nail
Psoriasis	Onycholysis	F3, F6
Lichen planus	Leukonychia	F8, F9
Pityriasis rosea	Leukonychia	F1, F3
Pityriasis rubra pilaris	Longitudinal melanonychia	F2
Lichen nitidus	Longitudinal ridges	F1
PLEVA	Beau's lines	F1

Chronic plaque psoriasis was the most common type of psoriasis seen in our study. Among psoriasis patients (n=47), nail changes were seen in 42 patients (89%). The most common nail change observed in psoriasis was onycholysis (78.5%) (**Figure 3**a) followed by pitting (54.7%) (**Figure 3b**), longitudinal ridges (52.3%) and longitudinal melanonychia (52.3%). Other nail changes observed in psoriasis were SUH (50%), oil drop sign (7.1%) (**Figure 4a**), leukonychia (38.1%), onychomadesis (4.7%), nail dystrophy (14.2%), splinter hemorrhage (7.1%) (**Figure 4b**), dilated onychodermal band capillaries (11.1%) (**Figure 5a**), discolouration (16.6%), Beau's lines (11.9%) and onychoschizia (2.3%). In our study, fingernails were more frequently involved than toenails. Pitting and onycholysis were commonly seen over fingernails F3 and 6.

Among patients with lichen planus (n=9), nail changes were seen in 7 patients (77.7%). The most common nail change seen in lichen planus was leukonychia (71.4%) (**Figure 5b**) followed by longitudinal ridges (57.1%) and onycholysis (42.8%). 28.5% patients had thinning of nail plate, longitudinal melanonychia and SUH. 14.2% of patients had pitting, tenting and onychoschizia. One patient had splitting of nails (**Figure 6**). In our study, only fingernail involvement was seen in lichen planus. There was no involvement of toenails.

In our study, out of 62 patients, pityriasis rosea was reported in 3 patients (4.9%). Nail changes were seen in two patients (66.6%). Leukonychia was the only finding seen in pityriasis rosea. The commonly involved nails were F1 (right thumb nail) and F3 (right middle fingernail).

Out of the 62 patients in our study, only one case (1.6%) of PRP was seen. SUH and longitudinal melanonychia were the only findings seen. The involved nails were F2.

In a single case (1.6%) of lichen nitidus, longitudinal melanonychia and longitudinal ridges were the only findings seen. The involved nails were F1 and F6.

PLEVA constituted 1.6% of all papulosquamous disorders in our study. Beau's lines were the only finding in a single case of PLEVA. The nail involved was F1.

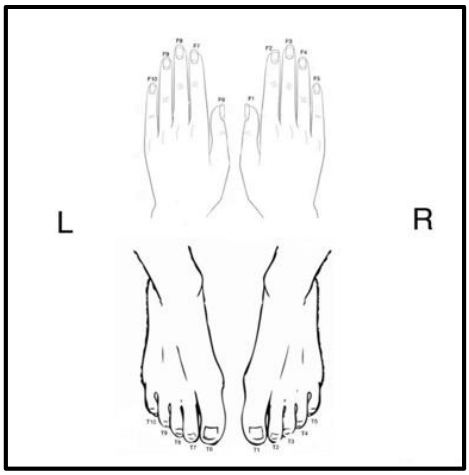

Figure 1: Shows numbering of digits.

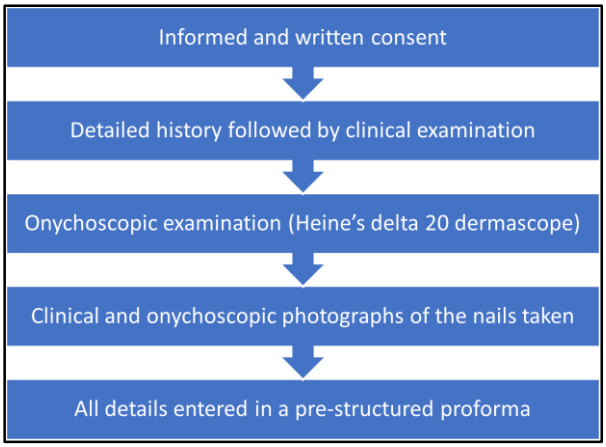

Figure 2: Data collection method.

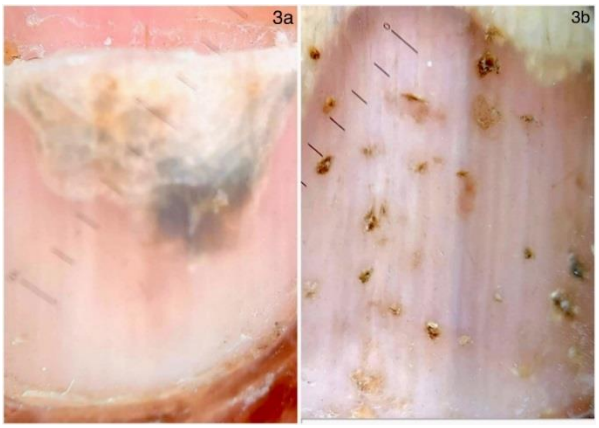

Figure 3: a: Shows onychoscopic (Heine's delta 20, non-polarised, 10x magnification) picture of onycholysis; **b:** Shows onychoscopic (Heine's delta 20, non-polarised, 10x magnification) picture of pitting.

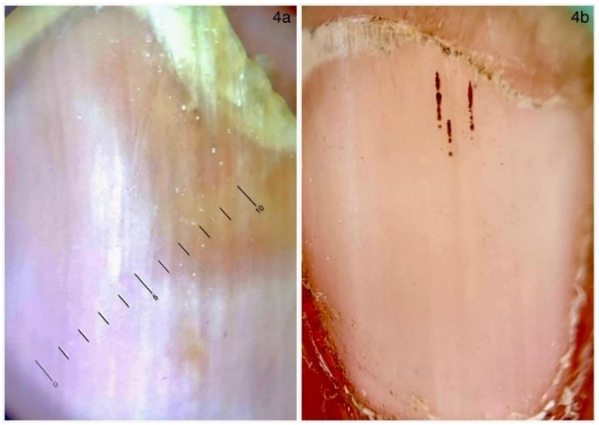

Figure 4: a: Shows onychoscopic (Heine's delta 20, non-polarised, 10x magnification) picture of oil drop sign; **b:** Shows onychoscopic (Heine's delta 20, non-polarised, 10x magnification) picture of splinter hemorrhage.

Onycholysis (66.6%) was the most common nail finding seen in our study both clinically as well as with the onychoscope (**Figure 7**). The next common finding seen was longitudinal ridges (50%) followed by longitudinal melanonychia (48.1%). Other nail changes observed in our study were pitting (44.4%), SUH (44.4%), oil drop sign (5.5%), leukonychia (42.5%), onychomadesis (3.7%), nail dystrophy (11.1%), splinter hemorrhage (5.5%), dilated capillaries in the onychodermal band (11.1%), nail discolouration (12.9%), Beau's lines (11.1%), onychoschizia (3.7%), nail thinning (3.7%) and tenting (1.8%). Nail changes like onycholysis, splinter hemorrhage, and oil drop sign were better appreciated with the onychoscope than by clinical examination.

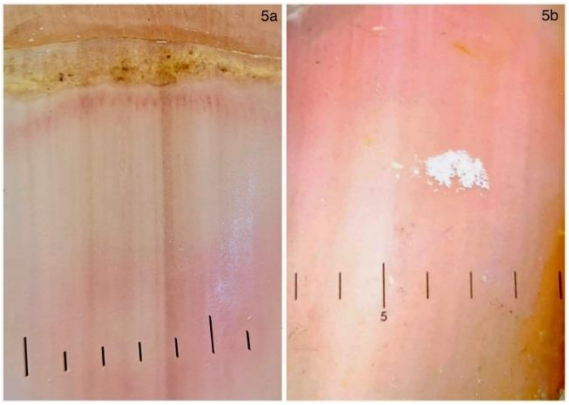

Figure 5: a: Shows onychoscopic (Heine's delta 20, non-polarised, 10x magnification) picture of dilated onychodermal band capillaries; **b**: Shows onychoscopic (Heine's delta 20, non-polarised, 10x magnification) picture of leukonychia.

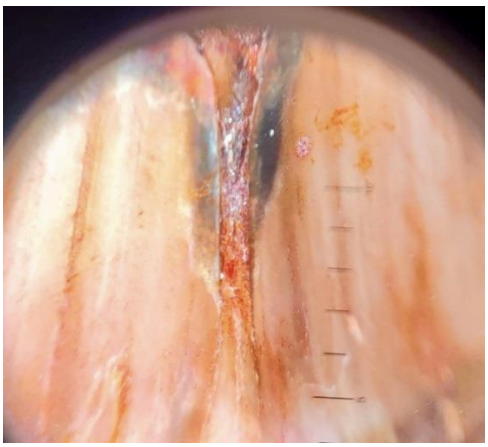

Figure 6: Shows onychoscopic (Heine's delta 20, non-polarised, 10x magnification) picture of nail splitting.

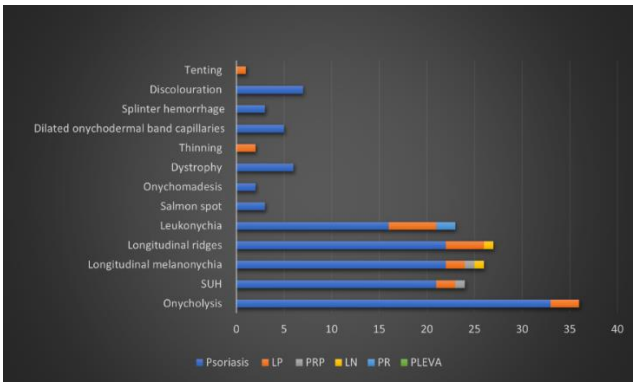

Figure 7: Shows the nail changes in papulosquamous disorders seen in our study.

4. Discussion

A total of 62 patients were enrolled in our study after applying inclusion and exclusion criteria. A mean age of 46 years was observed in our study which was comparable to the studies by David et al.[3] (40.9 years) and Wanniang et al.[4] (45.02 years). Out of these 62 patients, 47 were males and 15 were females. The male to female ratio was 3:1. Our study had a male preponderance which was similar to the study by Wali and Prasad.[5]

The onychoscopic features of papulosquamous depends upon the part of the nail affected. Nail matrix involvement results in leukonychia, pitting, nail plate crumbling and red lunula.[6] Involvement of the nail bed results in changes like oil drop sign, onycholysis, SUH and splinter hemorrhages.[7]

Out of the 62 patients, 47 patients had psoriasis. The male to female ratio was 4.2:1. Yadav TA and Khopkar US[8] had a male to female ratio of 2.83:1 and Wanniang et al.[4] had a male to female ratio of 3.1:1. The majority of patients in our study were in the age group of 41-60 years whereas in the study by Patokar et al.[7] the majority of patients were in the age group of 21-35 years. Chronic plaque psoriasis was the most frequently encountered type of psoriasis in our study which was similar to the studies by Wanniang et al.[4] and Varma et al.[9] Of the 47 patients with psoriasis, 42 patients (89%) had nail changes in our study.

In our study, onycholysis was the most common clinical as well as onychoscopic feature which was similar to the studies by Schons et al.[10] van der valden et al.[11] and Grover et al.[12] whereas Subudhi et al.[13] reported pitting as the most common finding clinically and onychoscopically. Gisondi et al.[14] examined the presence of nail manifestations in individuals with psoriasis through the utilization of ultrasonography and identified onycholysis as the most frequent nail involved. Polat and Kapıcıoğlu stated that pitting and leukonychia were the common clinical and onychoscopic features of psoriasis.[15] Yorulmaz and Artuz in their study observed splinter hemorrhage as the most common dermoscopic finding.[16]

Dilated onychodermal band capillaries were seen in 11.1% of patients in our study (**Table 5**) which was more than what was reported in a study by Varma et al.[9] and was comparable to the study by Yadav TA and Khopkar US.[8] Dilated onychodermal band capillaries were not commonly reported in other studies.

Haneke[17] stated that fingernails are more commonly involved than toenails in psoriasis which was consistent in our study. Brazzeli et al. observed that the fourth fingernail of both hands were the most commonly involved fingernails in their study.[18] The most commonly involved fingernail in our study was the thumb of both right and left hand whereas Subudhi et al.[13] stated that the thumb and the index finger of the right hand were most commonly involved in their study.

In our study, a total of 9 patients with lichen planus were observed. The male to female ratio was 1.25:1. There was slight male predominance in contrast to studies by Subudhi et al.[13] and Sharma et al.[20] Most of the patients were in the age group of 21-40 which was comparable to Kanwar et al.[21]

Out of the 9 patients with LP, 7 patients (77.7%) had nail changes whereas in a study by Antony et al.[1] and Subudhi et al.[13] only 39.5% and 26% patients had nail changes respectively. The most common nail change in our study was leukonychia (55.5%) whereas in the study by Subudhi et al.[13] and Sharma et al.[20] it was thinning of the nail. Wechsuruk et al. in their study reported melanonychia as the common nail finding.[22] Only the fingernails were involved in our study whereas both fingernails and toenails were involved in a study by Antony et al.[1]

In pityriasis rosea, the most common nail changes observed was leukonychia whereas Subudhi et al.[13] observed beau's lines as the most common nail finding.

Out of 62 patients in our study, only one case of PRP was seen. SUH and longitudinal melanonychia were seen in our study whereas Antony et al.[1] reported thickening, SUH and pitting as the most common finding in their study.

Table 5: Comparison of our study results with other studies on onychoscopic nail changes in psoriasis.

Nail findings	Our study (%)	Patokar et al[7] (%)	Yadav TA and Khopkar US[8] (%)	Wanniang et al[4] (%)	Schons et al[10] (%)	Chauhan et al[19] (%)	Varma et al[9] (%)
Pitting	44.4	85.93	39.13	84	33.3	76.36	79.2
Onycholysis	66.6	10.93	21.73	54	80	67.27	68.8
SUH	44.4	25	-	46	66.7	-	66.7
Leukonychia	42.5	18.75	-	22	26.7	29.09	14.5
Oil drop sign	5.5	12.5	4.34	44	43.3	16.36	10.4
Splinter hemorrhages	5.5	12.5	10.86	62	26.7	43.63	72.9
Pseudo-fiber sign	-	6.25	-	-	-	-	-
Dilated onychodermal band capillaries	11.1	-	19.56	-	-	-	6.3

Only one case of lichen nitidus was seen in our study. The nail change seen in lichen nitidus was longitudinal melanonychia and longitudinal ridges. Albayrak et al. in their study stated longitudinal ridges and grooving as the most characteristic nail change in LN.[13]

Out of the 62 patients with papulosquamous disorders, only one case of PLEVA was seen in our study. Beau's lines were the only nail change observed in our study in comparable to Antony et al.[1] where they observed Beau's lines in five patients of pityriasis lichenoides chronica. Onychomadesis was reported in a study of PLEVA treated with methotrexate.[24]

5. Conclusion

From this study, it is deduced that performing onychoscopic evaluation in papulosquamous disorders facilitates the detection of subtle alterations in the nails that are imperceptible to the unaided eye. Moreover, it enhances the comprehension of nail changes that were previously observable without assistance. Despite biopsy serving as the benchmark diagnostic procedure for papulosquamous disorders, its invasiveness, discomfort, and diagnostic delays are noteworthy drawbacks. Through early identification of the nail characteristics, onychoscope contributes to the prevention of disease progression and timely intervention. Onychoscopy, a non-invasive, cost-effective modality, can either complement or serve as an alternative to nail biopsy in papulosquamous disorders.

6. Limitations of the Study

1. Histopathological correlations were not done in all patients.
2. Smaller sample size and further studies with larger sample size are required.

7. Source of Funding

None.

8. Conflict of Interest

None.

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