

# A Study of Nail Changes in Various Dermatoses

Karim ATMR<sup>1</sup>, Sadeque SP<sup>2</sup>, Khan MAL<sup>3</sup>, Hasan MS<sup>4</sup>, Al-Azad MAS<sup>5</sup>, Siraj MS<sup>6</sup>, Kabir MH<sup>7</sup>, Begum ST<sup>8</sup>

## Abstract

**Introduction:** Nails act as a window to diagnosis of skin diseases. Various dermatoses affect the nails and the severity of the skin disorder is reflected in the nails. Nail changes are seen in various dermatoses like psoriasis, lichen planus, onychomycosis, collagen vascular disorders, vesicobullous disorders and other papulosquamous disorders.

**Objectives:** The objective of this study is to see the abnormal nail changes in patients' reporting to the Department of Dermatology and Venereology in Combined Military Hospital, Comilla.

**Materials and Methods:** This is a prospective study, carried out in the department of Dermatology and Venereology, Combined Military Hospital, Comilla from January 2014 to December 2014. Total 250 patients based on nail changes coming for various dermatological conditions were enrolled in this study. A detailed clinical history regarding onset, duration and associated symptoms was asked. A thorough systemic and dermatological examination was conducted and all details were recorded on a special proforma. Routine investigations like haemoglobin concentration (Hb), total leucocyte count (TLC), differential leucocyte count (DLC), ESR, platelet count, urine routine examination, serum urea and creatinine were carried out to confirm the diagnosis. Special investigations like nail clipping for bacteriological and fungal infection and skin biopsy were carried out whenever required.

**Results:** This study showed, out of 250 patients, nail changes were seen in various dermatoses. Maximum number of patients (50%), were of onychomycosis (Fig-1) followed by 12% patients of

paronychia (Fig-2), eight percent patients of Psoriasis (Fig-3), eight percent patients of lichen planus (Fig-4) and four percent patient were of Twenty nail dystrophy (Fig-5). Out of 20 patients of psoriasis the most common changes were pitting, subungual hyperkeratosis, onycholysis and discoloration. Out of 20 cases of lichen planus, the most common changes were longitudinal ridging, pterygium and onycholysis. Twenty nail dystrophy was seen in 10 cases and the commonest cause of twenty nail dystrophy was idiopathic in 40% cases, psoriasis in 30% cases, lichen planus in 20% cases and alopecia areata was seen in 10% cases.

**Conclusion:** A variety of nail changes can occur in various dermatological, systemic and other conditions. The nail unit is capable of only a limited number of reaction patterns; therefore, many diseases share similar changes, but correlation of the nail changes helps dermatologist to reach conclusive diagnosis. Nails remain an under studied and yet quiet accessible structure that lends itself for examination and evaluation. Hence truly said that nails are the windows through which one can look into the health of the patient.

**Key-words:** Nail disease, psoriasis, onychomycosis lichen planus.

## Introduction

Nail disorder comprises approximately 10% of all dermatological condition<sup>1,2</sup>. Any portion of the nail unit may get affected by various dermatological condition, systemic disease, infections, ageing process, internal and external medication, vascular insufficiency, physical and environmental agents, trauma, neurological abnormalities, nutritional

1. Lt Col ATM Rezaul Karim, MBBS, DDV, MCPS, FCPS, Classified Specialist in Dermatology, CMH, Comilla; 2. Dr Shayesta Parvin Sadeque, MBBS, DGO, Assistant Professor, Department of Gynaecology & Obstetrics, Mynamoti Medical College, Comilla; 3. Brig Gen Md Abdul Latif Khan, MBBS, DDV, FCPS, Adviser Specialist in Dermatology, CMH, Dhaka; 4. Col Md Sayeed Hasan, MBBS, DDV, FCPS, Professor of Dermatology, AFMC, Dhaka; 5. Lt Col Md Abdus Samad Al-Azad, MBBS, MCPS, DFM, Assistant Professor of Forensic Medicine, AFMC, Dhaka; 6. Lt Col Md Shajahan Siraj, MBBS, MCPS, DDV, Trainee Officer, AFMI, Dhaka; 7. Lt Col Md Humayun Kabir, MBBS, MCPS, DDV, FCPS, Classified Specialist in Dermatology, CMH, Chittagong; 8. Maj Syeda Tania Begum, MBBS, FCPS, Classified Specialist in Dermatology & Venereology, CMH, Dhaka.

deficiency, and both benign and malignant tumours<sup>3</sup>. Various nail abnormalities result in pain or interference with functioning or both. Nail disorder may affect walking, picking up of fine objects and protective function. The increasing emphasis on the aesthetic consideration in dermatology means even the slightest nail change may assume significance for the patient<sup>4</sup>. Abnormal nails are of utmost clinical importance, especially when they are the only presenting feature without any other apparent signs and symptoms of a disease. Hence nail provides us insight of window looking through which one can establish the diagnosis. Various dermatological conditions that characteristically involve the skin and hair may also involve the nail<sup>5</sup>.

The following is the classification of nail disorders:

1. Genetic disorders: Epidermolysisbullosa, congenital onychodysplasia of index finger, Racket nail, Dolichonychia, ichthyosis, incontinentia-pigmenti, acrodermatitisenteropathica.

2. Nail changes in infections: Various fungal, bacteria, viral, spirochete, yeast, HIV infection, leprosy may affect the nail.

3. Nail changes in dermatological conditions: Lichen planus, psoriasis, eczema, alopecia areata, vitiligo and pemphigus vulgaris.

4. Nails in systemic conditions:

- Cardiovascular diseases.
- Impaired peripheral circulation.
- Renal diseases: nephrotic syndrome.
- Respiratory diseases: tubercular empyema.
- Endocrine disorder: hypothyroid, hyperthyroid, diabetes mellitus.
- Gastrointestinal and hepatic disorders.

5. Nail deformities due to trauma: Nail biting, nail picking, habit-tic deformity, Heller's dystrophy, hang nails and ill fitting shoes.

6. Occupational nail changes: Rickshaw pullers, housemaids.

7. Neoplasm of nails:

Benign: like glomustumour, myxoid cyst, periungual fibroma.

Malignant: Malignant melanoma and squamous cell carcinoma.

8. Drug induced nail changes.

9. Cosmetics induced nail changes.

## Aims

To study the abnormal nail changes in patients reporting to the Department of Dermatology and Venereology, Combined Military Hospital, Comilla.

## Material and Methods

For the present study, 250 patients with nail changes reporting for various dermatological conditions were selected. A detailed clinical history regarding onset, duration and associated symptoms was asked. A thorough systemic and dermatological examination was conducted and all details were recorded on a special proforma. Routine investigations like Hb, TLC, DLC, ESR, platelet count, urine routine examination, serum urea and creatinine were carried out to confirm the diagnosis. Special investigations like nail clipping for bacteriological and fungal infection and skin biopsy were carried out whenever required.

## Results

The data was collected, analyzed and the following results were obtained. Table-I shows that maximum number of patients with nail changes (40%) were in the age group of 21-40 years, followed by 30% in the age group of 41-60 years, 20% were less than 20 years and 10% were in the age group 61-80 years.

**Table-I:** Incidence of nail changes among different age groups (n= 250).

Age	Number of cases	Percentage
<20	50	20
21 - 40	100	40
41 - 60	75	30
61 - 80	25	10

**Table-II:** Sex distribution of patients with nail changes (n=250).

Sex	Number of cases	Percentage
Males	100	40
Females	150	60
Total	250	100

Table-III shows majority of cases i.e. 58% with nail changes were housewife, whereas 30% of cases were in service and 12% were students.

**Table-III:** Occupational status of patients with nail changes (n=250).

Occupational status	Number of cases	Percentage
Housewives	145	58
Services	75	30
Students	30	12

Table-IV shows that majority of cases i.e. 38% had 6-10 number of nail involvement, 34% patients had 1-5 number of nail involvement, 18% patients had 16-20 number of nail involvement and 10% patients had 11-15 number of nail involvement.

**Table-IV:** Number of nails involved (n=250).

No of nails	Number of cases	Percentage
1 - 5	85	34
6 - 10	95	38
11 - 15	25	10
16 - 20	45	18
Total	250	100

Table-V shows that majority of cases were of onychomycosis (50%), followed by paronychia (12%), psoriasis eight percent, lichen planus eight percent and eczema five percent.

**Table-V:** Nail changes in various dermatosis (n=250).

Dermatosis	Number of cases	Percentage
Onychomycosis	125	50
Psoriasis	20	8
Lichen planus	20	8
Paronychia	30	12
Eczema	12	5
Alopecia areata	5	2
Drug induce	5	2
Periungual warts	8	3
Atopic dermatitis	5	2
Twenty nail dystrophy	10	4
Nail changes due to trauma	10	4
<b>Total</b>	<b>250</b>	<b>100</b>

It is clear from Table-VI that pitting was the most common finding in psoriasis, accounting for 70% cases. Next most common nail changes were onycholysis in 50% and subungual hyperkeratosis in 40% cases. Discoloration was found in 25% cases followed by paronychia in ten 10% cases. Splinter haemorrhages were seen in 10% and Beau's lines were observed in 15% cases salmon patches in 10% cases, longitudinal ridging in 10% cases, longitudinal melanonychia in five percent cases, perilunular erythema/red lunules in five percent cases and twenty nail dystrophy in three percent cases.

**Table-VI:** Nail changes in psoriasis (n = 20).

Nail changes	Cases	%
Pitting	14	70
Subungual hyperkeratosis	8	40
Onycholysis	10	50
Discoloration	5	25
Paronychia	2	10
Splinter haemorrhage	2	10
Beau's line	3	15
Salmon patches	2	10
Longitudinal ridging	2	10
Dystrophy	1	5
Longitudinal melanonychia	1	5
Perilunular erythema/red lunules	1	5
Twenty nail dystrophy	1	5

Table-VII shows that longitudinal ridging was the most common finding accounting for 25% cases. Next most common nail changes were pterygium in 15% and onycholysis in 15% cases. Longitudinal melanonychia was found in 20% cases followed by dystrophy in five percent cases. Twenty nails dystrophy was seen in 10% and subungual hyperkeratosis was observed in 10% cases.

**Table-VII:** Nail changes in lichen planus (n = 20).

Nail changes	Cases	%
Pterygium	3	15
Longitudinal melanonychia	4	20
Longitudinal ridging	5	25
Onycholysis	3	15
Dystrophy	1	5
Subungual hyperkeratosis	2	10
Twenty nail dystrophy	2	10

Table-VIII shows that distal lateral subungual onychomycosis was the most common finding accounting for 74.4% cases. Next most common nail changes were total dystrophic onychomycosis in 20% cases. Superficial white onychomycosis was found in four percent cases followed by Proximal subungual onychomycosis in 1.6% cases.

**Table-VIII:** Types of onychomycosis (n=125).

Type	Cases	%
Distal lateral subungual onychomycosis	93	74.4
Superficial white onychomycosis	5	4
Proximal subungual onychomycosis	2	1.6
Total dystrophic onychomycosis	25	20

Table-IX shows that the commonest cause of Twenty Nail Dystrophy (TND) was idiopathic (40%). Other causes of TND were psoriasis in 30% cases, lichen planus in 20% cases and alopecia areata was seen in 10% cases.

**Table-IX:** Nail changes in twenty nail dystrophy (n=10).

Type	Cases	Percentage
Psoriasis	3	30
Lichen planus	2	20
Alopecia areata	1	10
Idiopathic	4	40
<b>Total</b>	<b>10</b>	<b>100</b>

Table-X shows that absent cuticles and nail fold inflammation were the commonest nail changes seen in all the cases, discoloration in 60% cases, transverse grooves in 50% and onycholysis in 40% cases.

**Table-X:** Nail changes in paronychia (n=30).

Nail changes	Cases	Percentage
Absent cuticles	30	100
Nail fold inflammation	30	100
Subungual hyperkeratosis	6	20
Onycholysis	12	40
Discoloration	18	60
Longitudinal striations	3	10
Transverse grooves	15	50
Nail dystrophy	3	10

## Discussion

Nail disorders are seen in various dermatosis like fungal infections, psoriasis, lichen planus, vesicobullous and collagen vascular disorders. Onychomycosis represents a broad term for any fungal infection of any part of the nail unit by dermatophytes, molds or yeast<sup>6</sup>. Onychomycosis caused by dermatophytosis also called astineaungium. Fungal infection of nail may be classified as<sup>7</sup>:

1. Distal subungual onychomycosis primarily involves the distal nail bed and hyponychium.
2. Superficial white Onychomycosis is an invasion of the surface of the nail plate.
3. Proximal subungual onychomycosis involves the nail plate from the proximal nail fold.
4. Candidal onychomycosis involves all the nail plates<sup>8,9,10</sup>. There is true invasion of nail plate by candida albicans resulting in dystrophic nail. It occurs in patients with chronic mucocutaneous candidiasis.

Nail involvement of one or all the nail component occur in 10% of patient with lichen planus<sup>11,12</sup>. Severe inflammatory focus in the nail matrix, leads to adhesion formation between epidermis of proximal nail fold and nail bed and result in pterygium formation, which is highly suggestive of lichen planus (LP). Other less common features include onycholysis, shedding of the nail, subungual hyperkeratosis, erythematous patches in the lunula, koilonychia, pitting and nail discoloration may also occur<sup>13,14,15</sup>. Psoriasis is a common disease affecting nails with subsequent dystrophy. Nail involvement has been reported up to 50% of case<sup>16,17</sup> but over a life time, the incidence cumulatively increases to 80-90%. In order of decreasing frequency, nail changes of psoriasis are pitting, onycholysis, subungual hyperkeratosis, nail plate discoloration, uneven nail surface, splinter haemorrhages and lastly acute and chronic paronychia<sup>18,19,20</sup>. Nail changes are common in alopecia areata<sup>21</sup>, ranging from 7% to 66%. Nail changes are not only seen in extensive alopecia areata but may also be present with minimal hair loss and does not imply a poor prognosis for regrowth. Uniform pitting is the most common abnormality seen in alopecia areata. Pits are often uniformly arranged in lines both transversely and longitudinally in a geometrical or scotch plaid pattern<sup>22</sup>. Other nail changes include ridging, onychorrhexis, beau's lines or transversely arranged pits, thinning or occasionally thickening of the plate, koilonychia, onychomadesis leading to nail shedding, leukonychia punctate due to nail bed dystrophy and lunules may be red or mottled. Round finger pad sign could be the early sign of scleroderma. Pterygium inversum unguis may be the helpful diagnostic sign in scleroderma<sup>23</sup>. It is characterized by obliteration of the distal groove due to adherence of the distal portion of the nail bed to the ventral surface of the nail plate.

Other nail sign like onycholysis, longitudinal ridging, onychorrhexis, onychogryphosis, haplonychia, longitudinal striation, absent lunulae, periungual vesiculation has been reported in scleroderma. Parrot beak deformity is another distinctive feature of the disease characterized by over curvature of the free margins of the nail over a shortened finger tip. It is due to atrophy of the soft tissue. Twenty nail dystrophy (TND) is a condition in which all twenty nails are uniformly and simultaneously affected<sup>24,25</sup>. Earlier it was called as excessive ridging of childhood

or Trachonychia<sup>26</sup>. TND can be idiopathic, congenital or acquired<sup>27</sup>. The acquired type may be related to variety of disorders like lichen planus, psoriasis, alopecia areata, ichthyosis vulgaris, eczema and perhaps Pemphigus. Neerja Puri et al conducted a study on 500 patients who were suffering from nail changes in various dermatosis in Department of Dermatology, GGS Medical College, Punjab, India. They showed maximum number of patients (45%), were of onychomycosis followed by 15% patients of paronychia, 10% patients of psoriasis, eight percent patients were of lichen planus, six percent patients of eczema and three percent patients were of twenty nail dystrophy. Out of 50 patients of psoriasis the most common changes were pitting, subungual hyperkeratosis, onycholysis and discoloration. Out of 25 cases of lichen planus, the most common changes were longitudinal ridging, pterygium and onycholysis. Twenty nail dystrophy was seen in 15 cases and the commonest cause of twenty nail dystrophy was idiopathic in 40% cases, psoriasis in 30% cases, lichen planus in 20% cases and alopecia areata was seen in 10% cases. Calvert HT et al conducted a study on 200 patients who were suffering from nail changes in Psoriasis. They showed the most common changes were pitting (60%), next most common nail changes were onycholysis (50%) and subungual hyperkeratosis were in 45% cases. Tosti A et al conducted a study on 150 patients who were suffering from nail changes in Lichen Planus. They showed absent of cuticles and nail fold inflammation were 100% cases. Next most common nail changes were discoloration (65%) and transverse groove were in 50% cases. In our study, nail changes in various dermatosis were seen in 250 patients. Out of 250 patients, maximum number of patients (50%), were of onychomycosis (Fig-1) followed by 12% patients of paronychia (Fig-2), 8% patients of psoriasis (Fig-3), 8% patients were of lichen planus (Fig-4), 5% patients of eczema and 4% patients were of twenty nail dystrophy (Fig-5). Out of 20 patients of psoriasis the most common changes were pitting (70%), next most common nail changes were onycholysis (50%) and subungual hyperkeratosis were in 40% cases. Out of 20 cases of lichen planus, the most common changes were longitudinal ridging (25%), next most common nail changes were Longitudinal melanonychia (20%) and pterygium (15%). Twenty nail dystrophy was seen in 10 cases and the commonest cause of twenty nail dystrophy

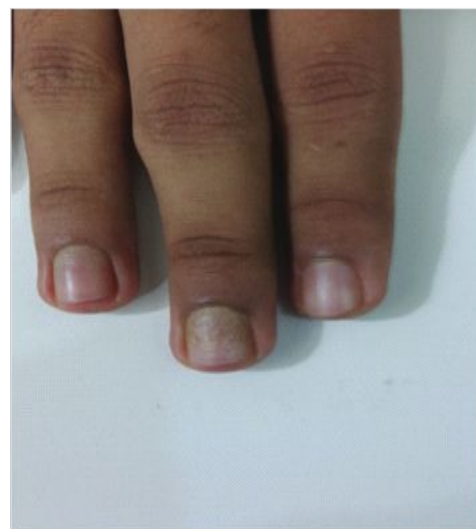
was idiopathic in 40% cases, psoriasis in 30% cases, lichen planus in 20% cases and alopecia areata was seen in 10% cases. Our study correlates with the study achieved by Neerja Puri et al, Calvert HT et al and Tosti A et al.



**Fig-1:** Distal lateral subungual onychomycosis.



**Fig-2:** Paronychia with nail fold inflammation.



**Fig-3:** Pitting in psoriasis.



**Fig-4:** Pterygium formation in lichen planus.



**Fig-5:** Twenty nail dystrophy.

## Conclusion

From the foregoing account, it can be concluded that a variety of nail changes can occur in various dermatological, systemic and other conditions. The nail unit is capable of only a limited number of reaction patterns; therefore, many diseases share similar changes, but correlation of the nail changes helps dermatologist to reach conclusive diagnosis. In order to evaluate the nail changes skillfully one must be familiar with the terminology and classification of the nail disorders. Thus knowing the normal and abnormal variants of the nail and their association with wide range of diseases is beneficial not only for the establishing diagnosis but also for the specific management of the disease. Hence, no physical examination is complete without the study of nails. However, nails remain an understudied and yet quiet accessible structure that lends itself for examination and evaluation. Hence truly said that nails are the windows through which one can look into the health of the patients.

## References

1. De Berker DAR, Baran R, Dawber RPR: Disorders of nails: Burn T, Breathnach S Cox N, Griffiths C (editors). Rook's Textbook of Dermatology. 7th edn. Blackwell 2004; 4: 62.1-62.62.
2. Samman PD: The nail in disease. Eds. 2. Heineman W. London 1972: 1-176.
3. Zaias N: The nail in health and disease. Spectrum Publications, New York 1980; p.173.
4. Siblinga MS: Observations on growth of fingernails in health and disease. Paediatrics 1959; 24: 225-33.
5. Neerja Puri, Tejinder Kaur: A study of nail changes in various dermatosis in Punjab, India. Our Dermatol on line. 2013; 3(3): 164-70.
6. Haeneke E: Epidemiology and Pathology of onychomycosis. In Onychomycosis Nolting S. Korting Eds. Berlin Springer Verlag 1989; 1-8.
7. Williams HC: The epidemiology of onychomycosis in Britain. Br J Dermatol. 1993; 26: 481-90.
8. Roberts DT: Prevalence of dermatophyte onychomycosis. Results of an omnibus survey. Br J Dermatol. 1992; 39: 23-7.
9. Zaias N: Onychomycosis. Arch Dermatol. 1972; 105: 263-74.
10. Jones HE, Reinhardt JH, Sinaldi MG: A clinical mycological and immunological survey of dermatophytes. Arch Dermatol. 1973; 108: 61-5.
11. Zaias N: The nail in Lichen planus. Arch Dermatol. 1970; 101: 264-71.
12. Tosti A, Guerra L, Morelli R, Bardazzi F, Fanti PA: Role of food in the pathogenesis of chronic paronychia. J Am Acad Dermatol. 1992; 27: 706-10.
13. Sayer A: Generalized lichen planus lesion of the palms and nails. Arch Derm Syph. 1940; 41: 813-4.
14. Cornelius CE, Shelly WB: Permanent anonychia due to lichen planus. Arch Dermatol. 1967; 96: 434-5.
15. Baran R: Lichen Planus of the nails mimicking the yellow nail syndrome. Br J Dermatol. 2000; 143: 1117-8.
16. Zaias N: Psoriasis of the nail: clinicopathological study. Arch Dermatol. 1969; 99: 537-79.
17. Calvert HT, Smith MA, Wells RS: Psoriasis and the nails. Br J Dermatol. 1963; 73: 415-8.

18. De Jong EM, Seegers BA, Gulinck MK, Boezeman JB, Van de Kerkhof PC: Psoriasis of the nails associated with disability in a large number of patients. Results of a recent interview with 1728 patients. *Dermatology* 1996; 193: 300-3.

19. Baker H, Golding DN, Thompson M: The nails in psoriatic arthritis. *Br J Dermatol.*1964; 76: 549-54.

20. Burden AD, Kemmett D: The spectrum of nail involvement in palmoplantar pustulosis. *Br Dermatol.* 1996; 134: 1079-82.

21. Sharma VK, Dawn G, Muralidhar S, Kumar B: Nail changes in 1000 Indian patients with alopecia areata. *J Eur Acad Dermatol Venerol.* 1998; 10: 189-90.

22. Tosti A, Peluso AM, Fanti PA, Piraccini BM: Nail lichen planus: Clinical and Pathological Study of 24 patients. *J Am Acad Dermatol.* 1993; 28: 724-30.

23. Patterson JW: Pterygium inversum unguis - like changes in scleroderma. *Arch Dermatol.*1977; 113: 1429-30.

24. Hazelriggs DE, Duncan WC, Jarrat M: Twenty nail dystrophy of childhood. *Arch Derm.*1977; 113: 73-5.

25. Tosti A, Bardazzi F, Piraccini BM, Fanti PA: Idiopathic trachonychia (Twenty nail dystrophy) a pathological study of 23 patient. *Br J Dermatol.*1994; 131: 866-72.

26. Tosti A, Fanti PA, Morelli R, Bardazzi F: Trachonychia associated with alopecia areata: A clinical and pathological study. *J Am Acad Dermatol.* 1991; 25: 266-70.

27. Sakata S, Howard A, Tosti A, Sinclair R: Follow up of 12 patients with trachonychia. *Australas J Dermatol.* 2006; 47: 166.