

Original Article

Dermoscopic features of hyperpigmentary dermatoses: A cross-sectional study

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ABSTRACT

Objectives: The objective of the study is to evaluate the dermoscopic features of various hyperpigmentary dermatoses and determine their utility in differentiating between clinically similar conditions.

Materials and Methods: A hospital-based, observational, cross-sectional study was conducted in the Department of Dermatology, Venereology, and Leprosy, Government Medical College and Sir T Hospital, Bhavnagar, from April 1, 2023, to March 31, 2024, after obtaining approval from the Institutional Ethics Committee (EC No. 1241/2023). Patients presenting with hyperpigmented lesions were enrolled after obtaining written informed consent. Detailed demographic and clinical information were recorded, and cases were categorized as epidermal, dermal, or mixed-type hyperpigmentation. Dermoscopic examination was performed on lesional skin using the DermLite DL5 dermoscope (3Gen Inc., San Juan Capistrano, California, USA) under both polarized and non-polarized modes at ×10 magnification. Dermoscopic parameters, including pigment network, dots and globules, vascular structures, follicular and eccrine changes, and scaling patterns, were systematically documented. The data were entered into Microsoft Excel (Microsoft Corporation, Redmond, Washington, USA) and analyzed descriptively, with results expressed as frequencies and percentages to identify characteristic dermoscopic features of individual hyperpigmentary dermatoses.

Results: Distinct dermoscopic features were identified across various hyperpigmentary dermatoses. Epidermal dermatoses showed characteristic patterns, with acanthosis nigricans demonstrating a sulci-gyral pattern (100%) with brown dots (67%) and eccrine accentuation (33%), Becker's nevus showing a reticuloglobular pattern (100%) with perifollicular sparing (86%), and café-au-lait macules revealing a reticular pattern (100%) with patchy brown pigmentation (67%). Mixed-type dermatoses included epidermal melasma with patchy brown pigmentation (100%), arcuate structures (50%), and a reticuloglobular pattern (42%); lichen planus pigmentosus with fine gray dots (86%), peri-eccrine pigmentation (50%), and a Chinese-letter pattern (23%); and Riehl's melanosis with peri-eccrine pigmentation (67%), perifollicular white scales (33%), and pseudo-network (33%). Dermal dermatoses showed distinctive features, with dermal melasma revealing a diffuse blue-gray background and brown globules (100%), nevus of Ota showing a uniform blue-gray background (100%) with blotches (75%) and clods (25%), and Mongolian spots exhibiting a homogeneous blue-gray background with eccrine accentuation (100%). Other findings included lichen amyloidosis displaying a hub-and-spoke pattern (100%), macular amyloidosis showing a reticuloglobular pattern (33%), pigmented purpuric dermatoses demonstrating red globules (100%) and yellow-orange areas (75%), seborrheic keratosis exhibiting comedo-like openings and cerebriform appearance (100%), and exogenous ochronosis showing a worm-like pattern (87.5%) with brown globules (62.5%).

Conclusion: Distinct dermoscopic patterns were observed across different hyperpigmentary dermatoses, highlighting the value of dermoscopy in their evaluation and differentiation. Dermoscopy provides a reliable, non-invasive approach that enhances diagnostic accuracy and supports appropriate clinical management of hyperpigmentation.

Keywords: Dermoscopy, Hyperpigmentary dermatoses, Lichen planus pigmentosus, Melasma, Riehl's melanosis

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INTRODUCTION

Hyperpigmentation refers to the darkening of the skin or mucosa resulting from excessive melanin deposition and may arise from a variety of etiologies, including ultraviolet (UV) radiation, inflammation, hormonal influences, drugs, and systemic disorders.^[1] Pigmentary dermatoses constitute one of the most common reasons for dermatology consultations and often lead to significant cosmetic concern and psychosocial distress, particularly in individuals with darker skin phototypes, where pigmentation tends to be more persistent and clinically prominent.^[2]

Dermoscopy, also known as dermatoscopy or epiluminescence microscopy, is a non-invasive diagnostic technique that permits visualization of epidermal and superficial dermal structures that are not visible to the naked eye.^[3] Although dermoscopy is widely established as an essential tool for the evaluation of melanocytic lesions and early detection of melanoma, its role in general dermatology – particularly in pigmentary disorders – has only recently gained attention. In disorders such as melasma, lichen planus pigmentosus (LPP), Riehl's melanosis, frictional melanosis, and post-inflammatory hyperpigmentation (PIH), clinical examination alone often fails to reliably determine the nature, depth, and pattern of pigmentation, leading to diagnostic uncertainty and inappropriate management.^[4]

The existing literature on dermoscopy of hyperpigmentary dermatoses is limited, fragmented, and largely focused on individual conditions rather than providing a comprehensive, site-specific, and comparative evaluation across the full spectrum of pigmentary disorders. Moreover, there is a lack of standardized dermoscopic criteria and insufficient data on the relative frequencies of specific dermoscopic patterns, particularly in darker skin types. This knowledge gap limits the routine use of dermoscopy as a reliable diagnostic tool in pigmentary disorders and often necessitates invasive procedures such as skin biopsy for confirmation.

The primary problem addressed by this study is the absence of a systematic, pattern-based dermoscopic framework for evaluating hyperpigmentary dermatoses, especially in conditions that are clinically similar and frequently misdiagnosed. Without well-defined dermoscopic benchmarks, clinicians may struggle to distinguish epidermal from dermal pigmentation, identify etiologic factors such as friction, inflammation, or drug exposure, and select appropriate therapeutic strategies.

Therefore, the objective of this study was to systematically analyze and characterize the dermoscopic features of a wide range of facial and extrafacial hyperpigmentary dermatoses, and to evaluate the diagnostic utility of dermoscopy in differentiating clinically overlapping conditions. By identifying reproducible dermoscopic patterns and their

relative frequencies, this study aims to bridge the existing gap in knowledge and establish dermoscopy as a practical, non-invasive, and reliable tool for the routine assessment and management of pigmentary disorders.

MATERIALS AND METHODS

This observational, cross-sectional study was conducted in the Dermatology Outpatient Department of Government Medical College and Sir T Hospital, Bhavnagar, over 12 months from April 1, 2023, to March 31, 2024. A total of 180 consecutive patients clinically diagnosed with hyperpigmentary dermatoses and attending the dermatology outpatient clinic were enrolled using a convenience sampling method after obtaining written informed consent.

The study protocol was approved by the Institutional Ethics Committee of Government Medical College, Bhavnagar (Approval No. EC-1241/2023), and the study was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki (revised 2000). Written informed consent was obtained from all adult participants, and patient confidentiality was strictly maintained. In cases where clinical photographs were used, care was taken to ensure anonymity, and consent for publication of images was obtained where applicable.

Detailed demographic and clinical data were recorded for all participants, followed by a comprehensive cutaneous examination. Dermoscopic evaluation was performed on lesional skin using a DL5 DermLite dermoscope (3Gen Inc., San Juan Capistrano, California, USA). Patients fulfilling the inclusion criteria were included, while those unwilling to provide written informed consent were excluded.

Quantitative variables were summarized using descriptive statistics, and qualitative variables – including clinical and dermoscopic patterns – were expressed as frequency and percentage. Data were entered and analyzed using Microsoft Excel (Microsoft Corporation, Redmond, Washington, USA).

RESULTS

A total of 180 patients with hyperpigmentary dermatoses were evaluated, of whom 118 (65.6%) were female, and 62 (34.4%) were male, with most of the patients belonging to the 21–40-year age group (84.3%). Lesions were classified as melanocytic ($n = 8$; 4.4%) and melanotic ($n = 172$; 95.6%). The spectrum of dermatoses observed included melasma ($n = 46$), LPP ($n = 22$), acanthosis nigricans ($n = 6$), Becker's nevus ($n = 9$), café-au-lait macules (CALM) ($n = 5$), exogenous ochronosis ($n = 8$), macular amyloidosis ($n = 13$), lichen amyloidosis, periorbital hyperpigmentation ($n = 18$), Riehl's melanosis ($n = 3$), pigmented purpuric dermatoses ($n = 4$), seborrheic melanosis, seborrheic keratosis ($n = 4$),

freckles, Dowling–Degos disease (DDD), terra firma–forme dermatosis (TFFD), and melanocytic lesions including nevus of Ota ($n = 4$), Mongolian spot ($n = 2$), and lentigines ($n = 2$). The overall spectrum and frequency of hyperpigmentary dermatoses observed in the study are summarized in Table 1. The overall spectrum and frequency of hyperpigmentary dermatoses observed in the study are summarized in Table 1 and Figure 1.

The face was the most commonly affected site (54.4%), followed by extra-facial areas (37.2%) and combined involvement (8.3%). A history of chronic sun exposure was present in 97 (53.9%) patients, while 70 (38.9%) reported

topical product use and 60 (33.3%) reported mechanical rubbing. Itching was the most frequent symptom (32.8%), and 65.6% of patients were asymptomatic.

Melanocytic lesions (nevus of Ota $n = 4$, Mongolian spot $n = 2$, lentigines $n = 2$) were more common in males and showed characteristic dermoscopic findings such as blue–gray background, blotches, brown dots, reticular or reticulo-globular patterns, and eccrine accentuation.

Among melanotic dermatoses ($n = 172$), melasma ($n = 46$) demonstrated patchy brown pigmentation (96%), pseudo-network (55%), arcuate structures (60%), brown dots (60%), erythema (55%), perifollicular sparing (65%), and blue–gray background in deeper forms. A comparative summary of key dermoscopic features of epidermal and dermal melasma is provided in Table 2. LPP ($n = 22$) showed gray dots (86%), brown dots (73%), and peri-eccrine pigmentation (50%), while acanthosis nigricans ($n = 6$) displayed a sulci-gyral pattern (100%) with brown dots and globules. Becker’s nevus ($n = 9$) exhibited a reticulo-globular network (77.8%) and perifollicular sparing (66.7%), and CALM ($n = 5$) showed a reticular pattern (60%). Exogenous ochronosis ($n = 8$) demonstrated a worm-like pattern (87.5%), patchy brown pigmentation, brown dots/globules, eccrine accentuation, and leukotrichia. Macular amyloidosis ($n = 13$) showed brown dots (100%) and a hub-and-spoke appearance, while lichen amyloidosis showed a hub-and-spoke pattern with scales. Periorbital hyperpigmentation ($n = 18$) revealed patchy brown pigmentation, blue–gray background, and erythema. Riehl’s melanosis ($n = 3$) showed peri-eccrine pigmentation and hem-like patterns, pigmented purpuric dermatoses ($n = 4$) showed red globules and coppery-brown hue, and seborrheic melanosis exhibited peri-eccrine pigmentation and follicular plugging. Seborrheic keratosis ($n = 4$) showed cerebriform appearance, comedone-like

Table 1: Clinical and demographical data of hyperpigmentary dermatoses.

Hyperpigmentary dermatosis	Female n (%)	Male n (%)	Total n (%)
Melasma	25 (13.95)	1 (0.58)	26 (14.53)
Lichen planus pigmentosus	12 (6.98)	10 (5.81)	22 (12.79)
Periorbital hyperpigmentation	11 (6.40)	1 (0.58)	12 (6.98)
Becker’s nevus	2 (1.16)	7 (4.07)	9 (5.23)
Macular amyloidosis	8 (4.65)	1 (0.58)	9 (5.23)
Exogenous ochronosis	4 (2.33)	4 (2.33)	8 (4.65)
Extrafacial melasma	7 (4.07)	0 (0.00)	7 (4.07)
Acanthosis nigricans	1 (0.58)	5 (2.91)	6 (3.49)
Perioral hyperpigmentation	5 (2.91)	1 (0.58)	6 (3.49)
Café-au-lait macules	2 (1.16)	3 (1.74)	5 (2.91)
Fixed drug eruption	1 (0.58)	4 (2.33)	5 (2.91)
Frictional melanosis	1 (0.58)	4 (2.33)	5 (2.91)
Nevus of ota	1 (0.58)	3 (1.74)	4 (2.33)
Lichen amyloidosis	2 (1.16)	2 (1.16)	4 (2.33)
Pigmented purpuric dermatosis	1 (0.58)	3 (1.74)	4 (2.33)
Seborrheic keratosis	1 (0.58)	3 (1.74)	4 (2.33)
Hyperpigmented p. Versicolor	0 (0.00)	3 (1.74)	3 (1.74)
Kitamura disease	3 (1.74)	0 (0.00)	3 (1.74)
Reihls melanosis	3 (1.74)	0 (0.00)	3 (1.74)
Seborrheic melanosis	2 (1.16)	1 (0.58)	3 (1.74)
Lentigines	2 (1.16)	0 (0.00)	2 (1.16)
Mongolian spot	0 (0.00)	2 (1.16)	2 (1.16)
Dowling–Degos disease	2 (1.16)	0 (0.00)	2 (1.16)
Freckles	2 (1.16)	0 (0.00)	2 (1.16)
Dirty dermatosis	0 (0.00)	2 (1.16)	2 (1.16)
Pigmentary demarcation line	1 (0.58)	0 (0.00)	1 (0.58)
Terra Firma-Forme dermatosis	1 (0.58)	0 (0.00)	1 (0.58)

Table 2: Comparison of dermoscopic features of epidermal and dermal melasma.

Dermoscopic feature	Epidermal melasma	Dermal melasma
Background pigmentation	Brown	Blue-gray
Pigment distribution	Patchy pigmentation	Diffuse pigmentation
Pigment pattern	Reticulo-globular pattern	Pseudonetwork
Dots/globules	Brown dots	Not prominent
Arcuate structures	Present	Absent
Eccrine accentuation	Present (mild)	Not evident
Perifollicular sparing	Present	Absent
Vascularity	Mild to moderate	Minimal/absent

Table 3: Comparative dermoscopic features of facial hyperpigmentary dermatoses.

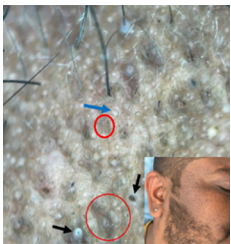
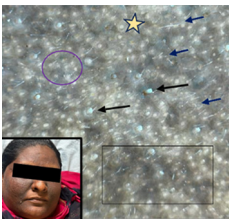
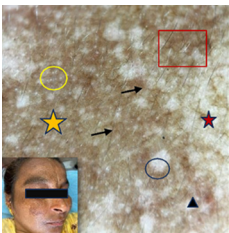
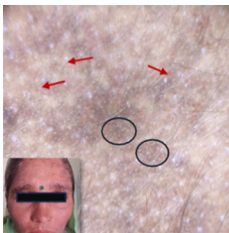
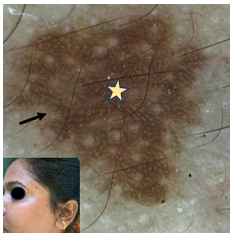
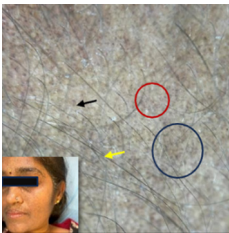
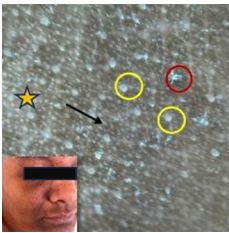
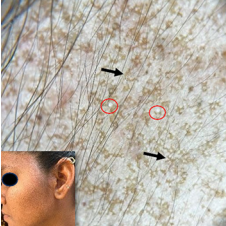

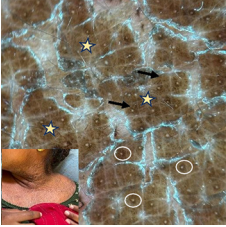
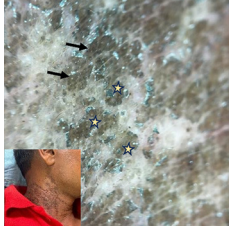
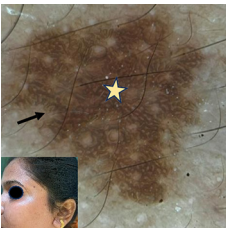
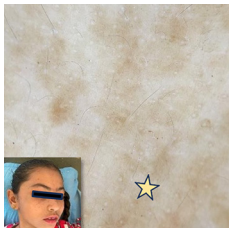
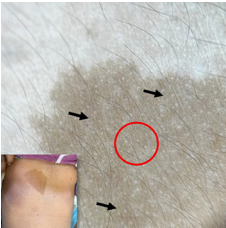

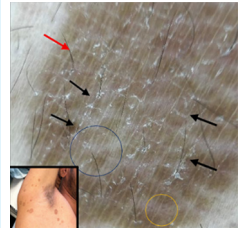
Acanthosis Nigricans	Exogenous ochronosis	Melasma	Riehl's melanosis
 <p>Sulci-gyral pattern (red circle), Peri eccrine brown dots and globules (blue arrow), Follicular plugging and scaling (black arrow)</p>	 <p>Blue-grey peri eccrine pigmentation (purple circle), Pseudonetwork pattern (star), Worm-like blotchy pigment pattern (black box), Leukotrichia (blue arrow), Follicular plugging (black arrow)</p>	 <p>Pseudonetwork pattern (yellow circle), Patchy brown granular pigmentation consists of brown dots and globules (yellow star), Focal hypopigmentation (red star), Erythema (triangle), Arcuate structure (black arrow), Honeycombing (red square), Perifollicular hypopigmentation (blue circle)</p>	 <p>Granular peri-eccrine accentuation of grey dot (blue circle), Diffuse white scales (red arrow)</p>
Frictional melanosis	Lichen planus pigmentosus	Seborrheic melanosis	
 <p>Peri eccrine ring-shaped pigmentation (yellow circle), Diffuse white scales (purple arrow), Grey granules and dots (red arrow)</p>	 <p>Brown granules (Black arrow), Peri eccrine pigmentation (red circle), globules, Chinese letter pattern (blue circle), Blue grey dots and globules (yellow arrow)</p>	 <p>Exaggerated pseudonetwork pattern (star), Follicular plugging (yellow circle), Parallel arrangement of brown-grey globules along the skin creases (black arrow), Folliculocentric white scales (red circle)</p>	

Table 4: Dermoscopic clues to differentiate common facial hyperpigmentary dermatoses.

Parameter	AN	EO	FM	LPP	Melasma	RM	SM
Background colour	Brown-grey	Blue-grey	Brown-Grey	Blue-grey	Light brown	Blue-grey	Yellow-brown
Pigmentary pattern	Sulci-gyral	Worm-like	Pseudo-network	Hem like	Reticulo-globular	Pseudo-network	Mixed
Pigment structures	Black dots	Grey-blue globules	Brown dots	Grey-blue dots	Brown dots	Brown globules	Grey-brown globules
Pigmentation site	Peri-eccrine	Peri-eccrine+ Perifollicular	Perifollicular	Peri-eccrine	-	Peri-eccrine	Peri-eccrine+ Perifollicular
Scales	-	White	White	-	-	White	Yellow scales
Vascularity	-	Telangiectasia	-	-	Erythema	-	Erythema
Other clues	Eccrine accentuation	Blotches	Ring/c shaped pigmentation	Reticular, Chinese letter patterns	Arcuate structures	Perifollicular sparing	Follicular plugging

AN: Acanthosis Nigricans (facial), EO: Exogenous ochronosis, FM: Frictional melanosis, LPP: Lichen planus pigmentosus, RM: Riehl's melanosis, SM: Seborrheic melanosis

Table 5: Dermoscopic differential of similar looking clinically condition.

Dowling-Degos disease	Reticulate Acropigmentation of Kitamura	
		
<p>Antler-like arcuate pattern (black arrow), Follicular plugging (red circle)</p>	<p>Reticuloglobular pattern (red circle), Regular brown globules (black arrow), Leukotrichia (blue arrow), Focal hypopigmentation (yellow star)</p>	
Terra Firma-Forme dermatosis	Dermatosis Neglecta	
		
<p>Brown globules (black arrow) representing plate like scales arranged together giving a Mosaic arrangement/ stone pavement (star), Peri eccrine hyperpigmentation (yellow circle)</p>	<p>Irregularly dispersed brown globules (black arrow), Cornflake-like scales (star)</p>	
Lentigenes	Freckles	
		
<p>Dark brown Reticular pigmentation pattern (star), Moth-eaten edges (black arrow)</p>	<p>Homogenous light brown, Pigmentation with pseudo-network pattern (star), Reticuloglobular pattern</p>	
Café-au-lait macules	Mongolian spot	Hyperpigmented p.versicolour
		
<p>Homogenous light brown background with reticular pattern (red circle), Prominent skin markings, Eccrine accentuation (black arrow)</p>	<p>Blue-grey background and eccrine accentuation (star)</p>	<p>Collarette scales (black arrow), Brown dots and globules (blue circle), Red dots with faint background erythema (yellow circle), Prominent skin markings (red arrow)</p>

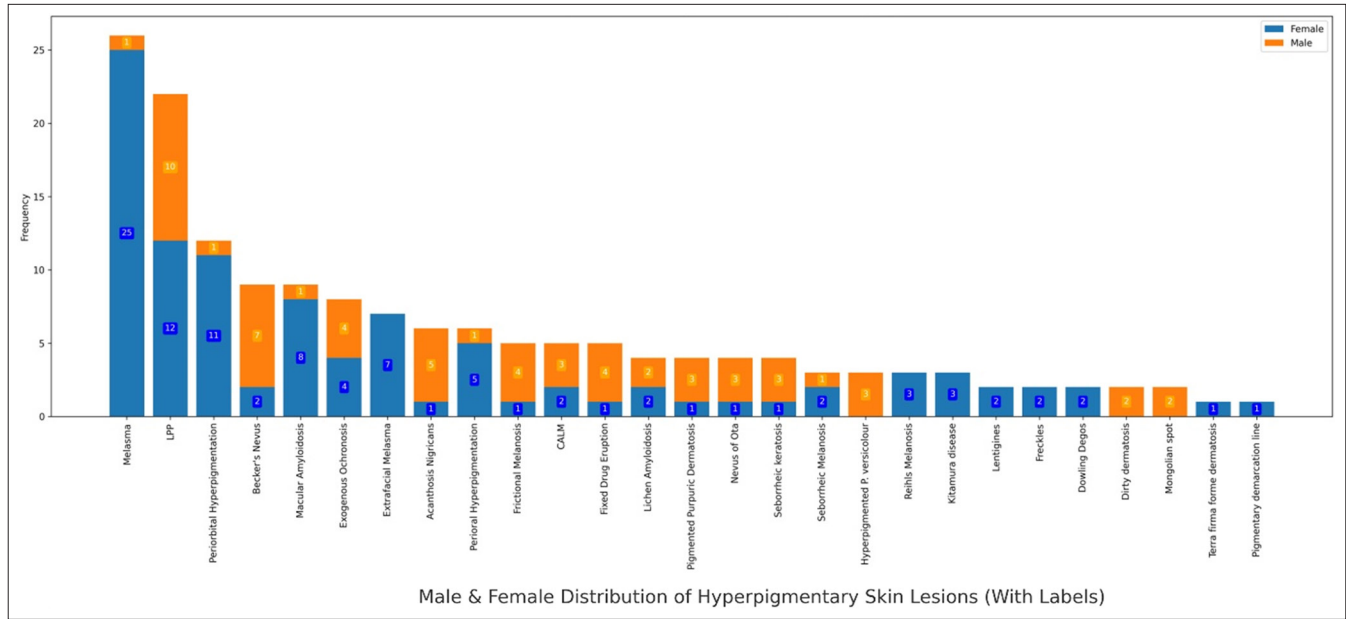


Figure 1: Clinical and demographical data of hyperpigmentary dermatoses.

openings, and milia-like cysts. Rare pigmentary disorders such as freckles, DDD, and TFFD showed brown reticular or mosaic patterns.

DISCUSSION

Facial and extrafacial hyperpigmentary dermatoses constitute a heterogeneous group of conditions with overlapping clinical presentations, making precise diagnosis challenging, particularly in darker skin phototypes where pigmentary disorders are prevalent and cosmetically distressing. Dermoscopy has emerged as an indispensable, non-invasive adjunct that enhances diagnostic accuracy by allowing detailed visualization of pigment distribution, adnexal changes, vascular patterns, and scale morphology that are not readily appreciable on clinical examination alone. The present study systematically evaluated dermoscopic findings across a wide spectrum of hyperpigmentary conditions involving the face, trunk, extremities, and site-specific variants, demonstrating clear, statistically and clinically relevant patterns that improve differential diagnosis and reduce reliance on invasive procedures.

Among facial hyperpigmentary disorders, acanthosis nigricans demonstrated a consistent sulci-gyral pattern in all cases (100%), reflecting papillomatosis, hyperkeratosis, and acanthosis, corroborating observations by Shah *et al.*^[5] Brown dots (66.67%) and brown globules (50%) indicated localized melanocytic activation,^[6] while perifollicular scales (16.67%) and follicular plugging (33.33%) in patients with habitual friction emphasized the role of mechanical trauma in disease exacerbation. Melasma showed subtype-specific dermoscopic

signatures: epidermal melasma revealed dominant patchy brown pigmentation (96%), reticulo-globular patterns (40%), arcuate structures (48%), and eccrine accentuation (32%) – findings consistent with superficial melanin clustering.^[7] Mixed melasma exhibited both epidermal and dermal features, including pseudonetwork (55%), arcuate structures (60%), and increased globules (60%), alongside perifollicular sparing (65%) and enhanced vascularity, reflecting the microvascular influence supported by VEGF-driven pathways.^[8] Dermal melasma, though limited to a single case, demonstrated classical blue-gray pigmentation with loss of follicular sparing, consistent with deep dermal melanophage deposition. Importantly, patients with chronic sun exposure or prolonged topical steroid use exhibited focal hypopigmentation (72.22%) and erythema (77.77%), underscoring melanocyte suppression from corticosteroid misuse and UV-aggravated mottling – findings with major therapeutic implications. Patchy pigmentation and perifollicular sparing were statistically significant ($P < 0.05$), reinforcing their diagnostic utility.

Exogenous ochronosis demonstrated its hallmark worm-like pattern in 87.5% of cases, in agreement with classical dermal ochronotic fiber deposition described by multiple reports.^[9,10] Eccrine accentuation (50%) further supported peri-ductal involvement. Frictional melanosis revealed perifollicular ring-shaped pigmentation (60%), perifollicular scales (40%), brown dots (80%), reticuloglobular pattern (40%), and pseudonetwork (60%), reflecting repeated mechanical trauma leading to pigment clustering around adnexal structures.^[11] LPP showed gray dots in 86%, the most sensitive marker of dermal melanophages, with Chinese-



Figure 2: Becker's nevus: Clinical image showing Well-defined brown hyperpigmented patch over the left elbow, with irregular margins. Dermoscopy showing Reticulo-globular pattern (red circle), perifollicular sparing (black arrow); Other findings: Sulci-gyral pattern, perifollicular scales, diffuse scales.

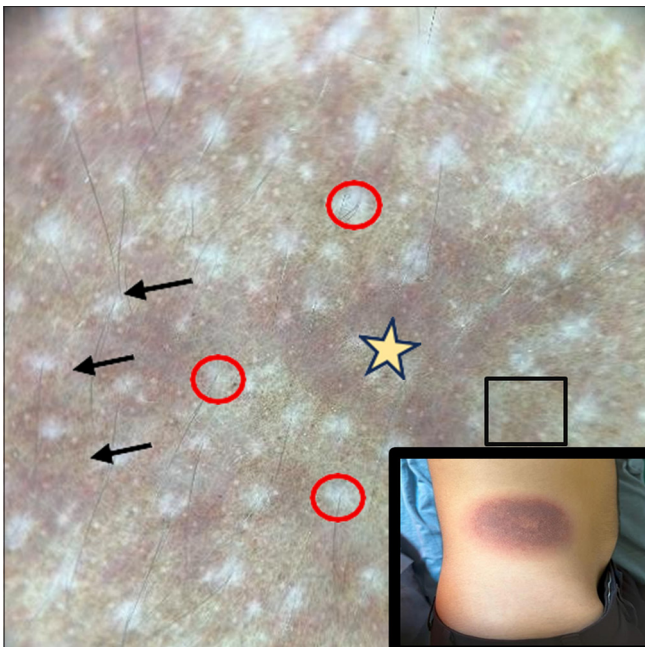


Figure 3: Fixed drug eruption: Clinical image shows Well-defined round hyperpigmented patch over the right side of the abdomen. Dermoscopy shows Central violaceous hue (star), granular brown pigmentation with eccrine accentuation (black box), perifollicular sparing (red circle), peripheral faint erythema (black arrow); Other findings worm-like pattern (brown dot), diffuse scales.

letter (23%) and hem-like patterns (14%) corroborating lichenoid interface damage, consistent with findings by Vinay *et al.*^[12] and Chamli *et al.*^[13] Riehl's melanosis exhibited adnexal-centered brown globules/dots in 67%, with concurrent hem-like patterns and perifollicular white scales (33%), supporting its post-inflammatory, irritant-related pathogenesis. Seborrheic melanosis consistently demonstrated peri-eccrine pigmentation and follicular plugging (100%), along with perifollicular white scales (67%) and yellow scales (33%), reflecting sebaceous dysfunction in accordance with Arshdeep *et al.*^[14]

Comparative analysis of common facial hyperpigmentary dermatoses are depicted in Tables 3 and 4.

Many hyperpigmented conditions present with mimicking clinical morphologies, making dermoscopy essential for differentiation. Lentigines consistently showed moth-eaten borders (100%) and reticular/reticulo-globular patterns (50%), matching descriptions by Tiodorovic-Zivkovic *et al.*,^[15] whereas freckles demonstrated pseudonetwork accentuation around adnexal openings. TFFD and dermatosis neglecta, although clinically identical, could be differentiated by dermoscopic assessment of adherent versus loosely adherent scales. Rare disorders such as DDD and reticulate acropigmentation of Kitamura demonstrated distinctive reticulate hyperpigmentation and follicular alterations, contributing valuable data to the limited dermoscopic literature. Hyperpigmented pityriasis versicolor exhibited brown globules (100%), brown dots (66.67%), and collarette scales (66.67%), aligning with Mathur *et al.*,^[16] while red dots (66.67%) represented a potentially novel inflammatory marker. Mongolian spots showed blue-gray pigmentation with eccrine accentuation in all cases (100%), consistent with dermal melanocytosis and the Tyndall effect, whereas CALM revealed uniform light-brown pigmentation with a reticulate network, supporting Plázár *et al.*^[17] Dermoscopic differential of similar looking clinical condition summarized in Table 5.

Site-specific dermoscopic evaluation further strengthened diagnostic precision. On the trunk, Becker's nevus showed reticulo-globular pigmentation (77.78%), perifollicular sparing (66.67%), and perifollicular white scales (44.44%), with a novel sulci-gyral pattern (44.44%), as shown in Figure 2 reflecting epidermal thickening.^[18] Fixed drug eruption exhibited a blue-gray background (40%), blue-gray dots/globules (40%), erythema (40%), and diffuse white scales (40%), as depicted in Figure 3, corroborating drug-induced epidermal damage and dermal pigment incontinence.^[19-21] Extrafacial melasma revealed globular pigment (57%), focal hypopigmentation (57%), and prominent skin markings (71%), with reduced perifollicular sparing (43%) as illustrated in Figure 4, reflecting anatomic differences from facial melasma.^[7] On the extremities, cutaneous amyloidosis showed variant-dependent patterns: macular amyloidosis

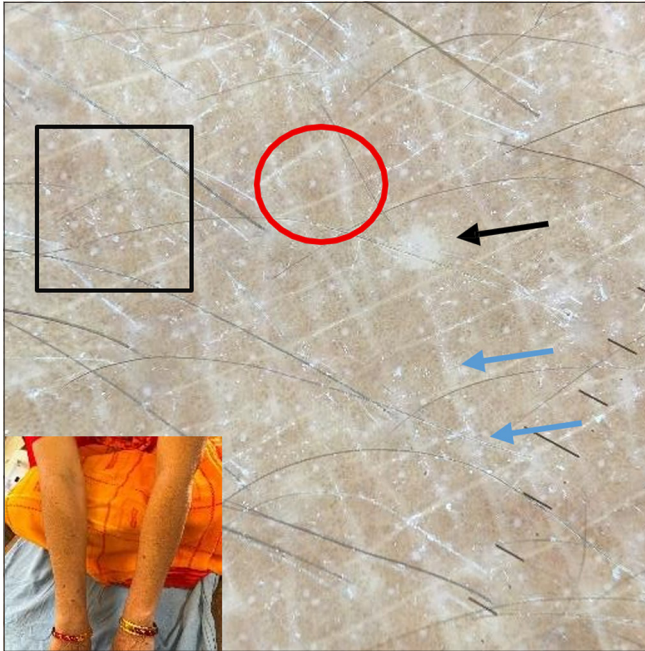


Figure 4: Extra facial melasma: Clinical image showing Symmetrical brown hyperpigmented macules and patches over the dorsal surface of both forearms with ill-defined margins. Dermoscopy showing Regular brown granules/dots (red circle), eccrine accentuation (black box), focal hypopigmentation (black arrow), prominent skin markings (blue arrow). Other findings: Perifollicular sparing, reticulo-globular pattern, pseudo-network pattern.

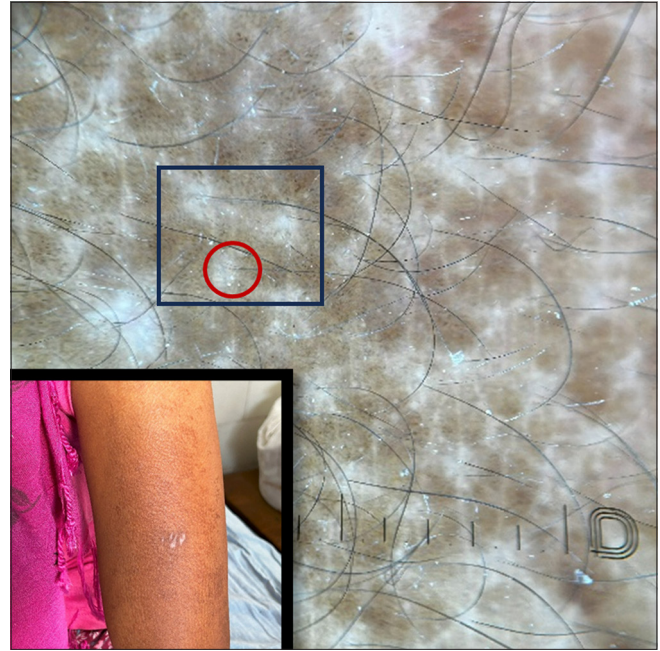


Figure 6: Macular amyloidosis: Clinical image showing Hyperpigmented macules over the left forearm forming a characteristic rippled pattern. Dermoscopy showing regular brown dots (blue square) with perifollicular sparing (red circle) gives rippling appearance; Other findings: Focal hypopigmentation, prominent skin markings, reticulo-globular pattern, brown globules.

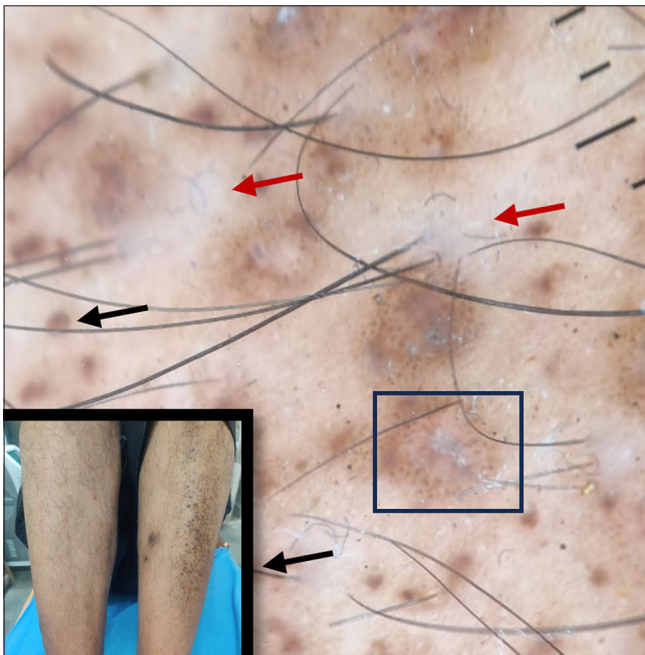


Figure 5: Lichen amyloidosis: Clinical image shows Multiple hyperpigmented, hyperkeratotic papules over the bilateral lower legs, some coalescing to form rippled plaques. Dermoscopy shows Brown dots arranged in a hub-and-spoke pattern (blue square), focal hypopigmentation (red arrow), irregular brown globules (black arrow); other findings: Prominent skin marking.

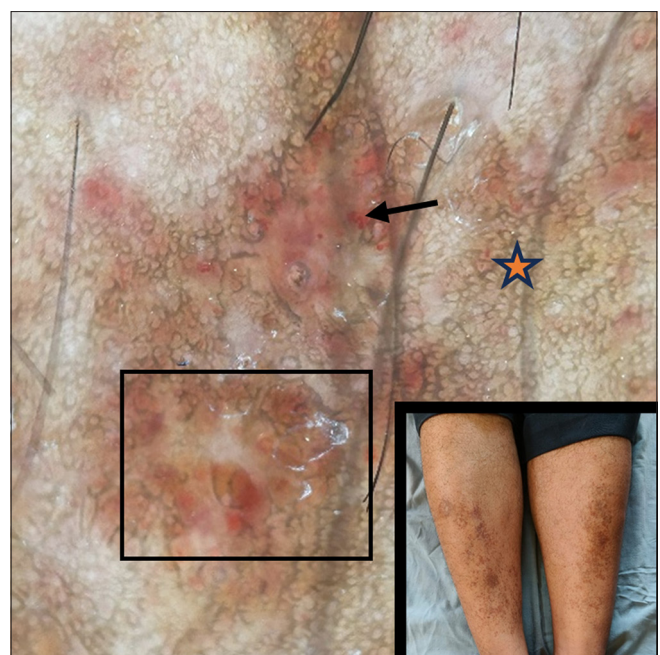


Figure 7: Pigmented purpuric dermatosis: Clinical image shows Multiple reddish-brown petechial macules over the bilateral legs, giving a 'cayenne pepper' appearance. Dermoscopy shows Dispersed red and brown globules giving cayenne pepper appearance (black box), Star: reticulo-globular pattern, comma-shaped vessel (black arrow); Other findings: Peri-eccrine pigmentation (50%), erythema.

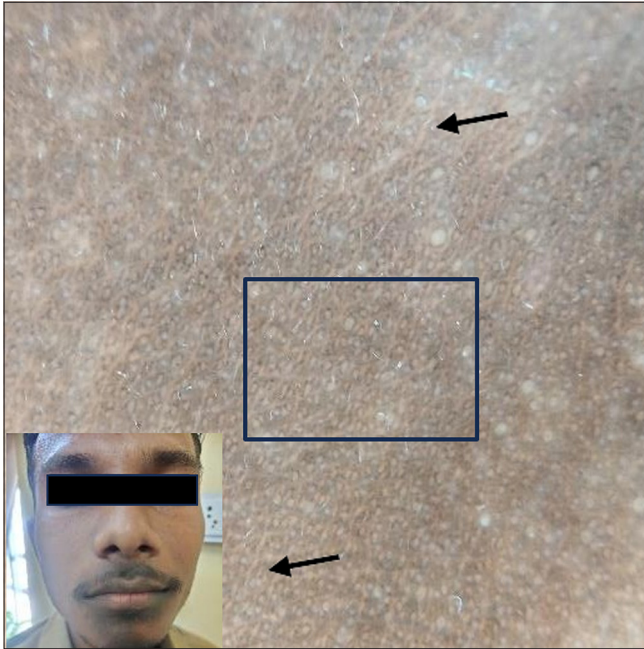


Figure 8: Perioral melanos: Clinical image shows Brown to dark-brown hyperpigmentation around the perioral region, symmetrically involving the skin surrounding the lips with ill-defined margins. Dermoscopy shows Signet ring-shaped perieccrine gray dots giving starry sky appearance (blue square), prominent skin markings (black arrow).



Figure 10: Pigmentary demarcation lines: Clinical image showing Sharply demarcated linear transition between hyperpigmented and lighter skin over the face. Dermoscopy shows Patchy brown pigmentation consists of brown globules (star).



Figure 9: Periorbital melanos: Clinical image shows Bilateral, symmetrical brown-to-black hyperpigmentation around the periorbital region, predominantly involving the infraorbital area with ill-defined margins. Dermoscopy showing Patchy brown pigmentation consists of brown globules (black arrow) and faint erythema (circle).

with reticulo-globular brown dots, and lichenoid amyloidosis with a hub-and-spoke appearance (100%) and dense globules (75%) shown in Figures 5 and 6—findings consistent with prior studies.^[22,23] Extrafacial melasma revealed globular pigment (57%), focal hypopigmentation (57%), and prominent skin markings (71%), with reduced perifollicular sparing (43%) as illustrated in Figure 4, reflecting anatomic differences from facial melasma.^[7] Pigmented purpuric dermatosis demonstrated coppery-brown pigmentation (75%), red globules (100%), and erythema (75%) as demonstrated in Figure 7, indicative of hemosiderin deposition and superficial capillaritis.^[24,25]

Miscellaneous regional pigmentary disorders also showed characteristic patterns. Perioral hyperpigmentation displayed patterns correlating with etiologic factors,^[26] including blue-grey pigmentation (dermal PIH), perifollicular pigmentation (frictional melanos), white scales (eczematous component), and brown reticular patterns (constitutional/vascular causes as seen in Figure 8).^[27] Periorbital hyperpigmentation demonstrated patchy brown pigmentation (75%) with brown globules, consistent with Jage *et al.*,^[28] while the yellow-orange cobblestone pattern (17%) as illustrated in Figure 9, nearly double the 8–10% described by Mahesh *et al.*,^[29] suggested greater vascular involvement.^[27] Pigmentary demarcation lines showed patchy brown pigmentation (100%) and brown globules (100%) as depicted in Figure 10, with sharply defined borders, consistent with recent literature^[30] and

clearly distinguishable from melasma, which typically shows pseudoreticular networks and arcuate structures.

Overall, the dermoscopic patterns documented across these facial, truncal, extremity, and site-specific pigmentary disorders demonstrate robust clinicopathologic correlation and reinforce dermoscopy as an invaluable tool in refining differential diagnosis across a wide spectrum of hyperpigmentation disorders. By enabling non-invasive visualization of pigment depth, adnexal structures, vascular patterns, and inflammatory changes, dermoscopy greatly enhances diagnostic precision, guides appropriate management, and reduces the need for biopsy in clinically overlapping conditions.

Limitations

The absence of histopathological examination constitutes a major limitation of this study. However, diagnoses were established based on a comprehensive clinical evaluation supported by characteristic dermoscopic patterns, which are increasingly recognized as reliable, non-invasive diagnostic markers in hyperpigmentary dermatoses. Biopsy was avoided due to cosmetic concerns, particularly in facial lesions, and because dermoscopy allowed adequate differentiation in the majority of cases. Nevertheless, the lack of histopathological correlation may limit definitive confirmation in diagnostically ambiguous cases, and future studies incorporating clinicodermoscopic-histopathological correlation would further strengthen the findings.

CONCLUSION

Dermoscopy provides a highly valuable, non-invasive method for accurately characterizing hyperpigmentary dermatoses and differentiating clinically overlapping conditions. By delineating pigment patterns, adnexal involvement, vascular changes, and site-specific morphological features, dermoscopy enhances diagnostic precision across a wide spectrum of facial, truncal, and extremity pigmentation disorders. The distinct dermoscopic signatures identified in this study – including those of melasma subtypes, LPP, Riehl's melanosis, acanthosis nigricans, frictional melanosis, exogenous ochronosis, and multiple mimickers – underscore its critical role in clinical practice. Incorporating dermoscopy into routine evaluation can reduce diagnostic uncertainty, minimize unnecessary interventions, and guide more targeted management of hyperpigmentary conditions.

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Declaration of patient consent: The authors certify that they have obtained all appropriate patient consent forms. In the form, the patients have given their consent for their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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