Portuguese Journal of Dermatology and Venereology

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ORIGINAL ARTICLE

Dermoscopy of facial flat pigmented lesions: a series of 406 cases

Dermatoscopia das lesões pigmentadas planas da face: série de 406 casos

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Abstract

Objective: The diagnosis of facial pigmented lesions remains challenging due to overlapping clinical and dermoscopic features, particularly in individuals with darker phototypes. This study aimed to evaluate and compare the dermoscopic characteristics of common facial pigmented lesions and assess their diagnostic relevance. **Methods:** A retrospective and prospective observational study involving 406 lesions from 274 patients was analyzed through a descriptive and analytical approach, with diagnoses based on clinical and dermoscopic criteria and confirmed by histopathology. **Results:** Solar lentigo (n = 170) was significantly associated with dermoscopic lightening, sharp borders, homogeneous brown pigmentation, moth-eaten borders, and symmetrical perifollicular pigmentation. Seborrheic keratosis (n = 83) showed strong associations with sharp borders, fingerprint patterns, fissures and ridges, pseudocomedones, and cerebriform structures. Lichenoid keratosis (n = 60) was predominantly characterized by a diffuse granular pattern. Pigmented actinic keratosis (n = 82) was mainly associated with a pigmented pseudonetwork, rhomboidal structures, gray halos, and annular granular patterns. Lentigo maligna (n = 11) demonstrated significant associations with asymmetrical pigmented follicular openings, target-like structures, and rhomboidal patterns. **Conclusion:** Overall, dermoscopic features showed considerable overlap among lesions and variability according to phototype, emphasizing the importance of a phototype-oriented dermoscopic approach to improve diagnostic accuracy.

Keywords: Actinic keratosis. Dermoscopy. Lentigo maligna. Lichenoid keratosis. Seborrheic keratosis. Solar lentigo.

Resumo

Objetivo: O diagnóstico das lesões pigmentadas faciais continua a ser um desafio devido à sobreposição de características clínicas e dermatoscópicas, particularmente em indivíduos com fotótipos mais escuros. Este estudo teve como objetivo avaliar e comparar as características dermatoscópicas das lesões pigmentadas faciais comuns e avaliar a sua relevância diagnóstica. **Métodos:** Um estudo observacional retrospetivo e prospetivo envolvendo 406 lesões de 274 doentes foi analisado através de uma abordagem descritiva e analítica, com diagnósticos baseados em critérios clínicos e dermatoscópicos e confirmados por exame histopatológico. **Resultados:** O lentigo solar (n = 170) esteve significativamente associado a um clareamento à dermatoscopia, bordos bem definidos, pigmentação castanha homogénea, bordos em "mordedura de traça" e pigmentação perifolicular simétrica. A queratose seborreica (n = 83) mostrou forte associação com bordos bem definidos, padrão em impressão digital, fissuras e cristas, pseudocomedões e estruturas cerebriformes. A queratose liquenoide (n = 60)

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Received: 17-03-2026
Accepted: 27-04-2026
DOI: 10.24875/PJDV.26000037

Available online: 04-06-2026
Port J Dermatol and Venereol. (ahead of print)
www.portuguesejournalofdermatology.com

foi predominantemente caracterizada por um padrão granular difuso. A queratose actínica pigmentada (n = 82) esteve principalmente associada a pseudo-rede pigmentada, estruturas romboidais, halos acinzentados e padrões granulares anulares. O lentigo maligno (n = 11) demonstrou associações significativas com aberturas foliculares pigmentadas assimétricas, estruturas em alvo e padrões romboidais. **Conclusão:** De forma geral, as características dermatoscópicas apresentaram uma sobreposição considerável entre as lesões e variabilidade de acordo com o fototipo, reforçando a importância de uma abordagem dermatoscópica orientada pelo fototipo para melhorar a precisão diagnóstica.

Palavras-chave: Queratose actínica. Dermatoscopia. Lentigo maligno. Queratose liquenoide. Queratose seborreica. Lentigo solar.

Introduction

Seborrheic keratosis (SK), solar lentigo (SL), pigmented actinic keratosis (pAK), and lichenoid keratosis (LK) are common benign skin lesions. These lesions often appear near each other or may develop from one another. Pigmented facial lesions frequently present to physicians and can be challenging to distinguish because the differential diagnosis includes a wide range of benign and malignant conditions with similar clinical appearances, particularly in dark skin phototypes. In many cases, diagnostic uncertainty is not resolved by clinical inspection or by dermatoscopy. This usually leads to confocal microscopy, biopsy, or excision to rule out melanoma *in situ*.[1]

On the other hand, flat pigmented lesions on the face are a common reason for consultation, with patients requesting rapid, non-surgical treatment by cryotherapy, laser, or other local treatment modalities, sometimes without a definitive histopathological diagnosis. This procedure carries the risk of inappropriate treatment of melanoma and a delayed diagnosis, which once again highlights the importance of dermoscopy.[2]

Dermoscopy is a non-invasive clinical method that is crucial for diagnosing and managing pigmented skin lesions in comparison with examination with the unaided eye.

Our study aimed to describe the epidemiological profile and identify the most frequent and specific dermoscopic signs of solar lentigines, flat SK, LK, pAK, and finally malignant lentigo, especially in dark skin phototypes.

Materials and methods

Study design and patients

We conducted a retrospective and prospective observational study involving 406 lesions from 274 patients diagnosed in our department.

- The inclusion criteria comprised all patients presenting with acquired flat pigmented lesions of the face
- The exclusion criteria included infiltrated lesions, ephelides, melanocytic nevi, basal cell carcinomas, and flat pigmented lesions located outside the facial area.

Patients were recruited from outpatient consultations, inpatient hospital activity, and referrals to the dermatology department.

A Dermlite DL4 and DL5 dermoscopes were used with ×10 magnification, both with and without immersion fluid, either hand-cleansing gel containing 70% ethanol or ultrasound gel with and without polarized light, and with the pigment boost option combined with an iPhone 11 smartphone. All patients underwent a clinical and dermoscopic examination, after which photographs were taken for each lesion and subsequently evaluated by two different dermatologists who were blinded to the histopathological diagnosis. Data collection was carried out using a structured data processing form and recorded in an Excel file. The following parameters were evaluated:

Clinical data: age, sex, Fitzpatrick skin type, and localization (cheeks, forehead, periorbital region, nose, ears, and mandibular area).

The diagnoses of SL, SK, pAK, and LK were established based on clinical and dermoscopic criteria described in the literature (Table 1).

Diagnosis

The diagnosis was based on clinical and dermoscopic evaluation. Histopathological confirmation was obtained whenever required for diagnostic clarification. Informed consent was obtained from all subjects involved in the study. The study was conducted in accordance with the principles outlined in the Declaration of Helsinki.

Statistical analysis

Statistical analysis was conducted using the Statistical Package for the Social Sciences 20.0 software. Descriptive and analytical comparisons of

Table 1. Definitions of the dermoscopic patterns examined in our study

Lesion	Dermoscopic pattern	Definition
SL	Structureless areas	Many lesions lack specific dermoscopic structures or a pigment network and present only light brown homogeneous (structureless) areas.[3]
	Moth-eaten border	Irregularly curved and sharply demarcated edge.[3]
	Fingerprint-like areas	Fine, parallel lines resembling dermatoglyphics are caused by elongated epidermal ridges.[3]
	Jelly sign	Superficial pigmentation extending in a liquid-like manner around follicular openings.[3]
	Pseudonetwork	Facial pigmentation is interrupted by follicular and adnexal openings.[3]
SK	Fissures	Brown linear or curvilinear structures that may coalesce into a cerebriform pattern; histologically correspond to deep epidermal invaginations filled with keratin.[4]
	Comedo-like openings	Round to oval keratin-filled clefts, usually dark brown, gray, or black; histologically correspond to concave epidermal invaginations filled with keratin.[4]
	Fat finger	Thick, gently curved lines, sometimes showing branching, with coloration ranging from hypopigmented to brown, black, or blue. The term "fat finger" is typically applied to flat or slightly elevated early seborrheic keratosis.[4]
pAK	Rhomboidal pattern	A grayish-brown pigmented pseudonetwork forming rhomboidal structures around follicular openings; histologically reflects hyperpigmentation of the Malpighian layer interrupted by follicles.[5]
	Scales and crusts	Superficial scales and crusts, which are not obligatorily centered within the follicular unit
	Rosettes	Four bright white dots arranged in a clover-like configuration, predominantly within follicular openings; correspond histologically to orthokeratosis and parakeratosis ("keratin pearls"), reflecting intraepidermal keratin whorls or horn pearls.
LK	Annular granular pattern	Grayish-brown dots and globules arranged annularly around hair follicles; histologically correspond to clusters of melanin and melanophages within the papillary dermis.[6]

SL: solar lentigo; SK: seborrheic keratosis; LK: lichenoid keratosis; pAK: pigmented actinic keratosis; LM: lentigo maligna.

dermoscopic findings were conducted. Dermoscopic features were compared across lesion types using Fisher's exact test to determine statistical significance ($p < 0.05$).

Results

Patient analysis

The study included 406 lesions from 274 patients. The mean age was 62.9 ± 10.7 years (range: 30-82 years) with a median of 65 years. The study population comprised 61.8% women and 38.2% men, with a sex ratio of 0.62. Phototype IV was predominant (60.2%), followed by phototype III (33.3%). Regarding anatomical location, the cheek was the most common site (59.9%), followed by the forehead (23.6%), the periorbital region and nose (7%), and the ears and mandibular area (1.3%).

Among the 406 analyzed cases, in SL (n = 170), the most frequent dermoscopic features were dermoscopic lightening (78.3%, p = 0.012), sharp borders (70.6%, p = 0.018), and homogeneous brown pigmentation (67.3%, p = 0.021). Moth-eaten borders were also significantly associated with this lesion type (57%, p = 0.034), as was symmetrical perifollicular pigmentation (37.8%, p = 0.029) (Fig. 1A).

In contrast, fingerprint-like structures (41.4%, p = 0.087), brown pseudonetwork (30.7%, p = 0.094), and asymmetrical perifollicular pigmentation (7.2%, p = 0.214) did not show a statistically significant association (Fig. 1B). SK (n = 83) was significantly associated with sharp borders (75.5%, p = 0.009), fingerprint pattern (57%, p = 0.015), fissures and ridges (45%, p = 0.022), pseudocomedones (26.5%, p = 0.031), and cerebriform pattern (24%, p = 0.040) (Fig. 2).

In LK (n = 60), a diffuse granular pattern was the predominant and significantly associated feature (80%, p = 0.006). The localized granular pattern (20%, p = 0.118) did not reach statistical significance (Fig. 3).

pAK (n = 82) was mainly characterized by a pigmented pseudonetwork (70%, p = 0.014). Other significantly associated features included the rhomboidal pattern (26%, p = 0.028), gray halos (15%, p = 0.033),

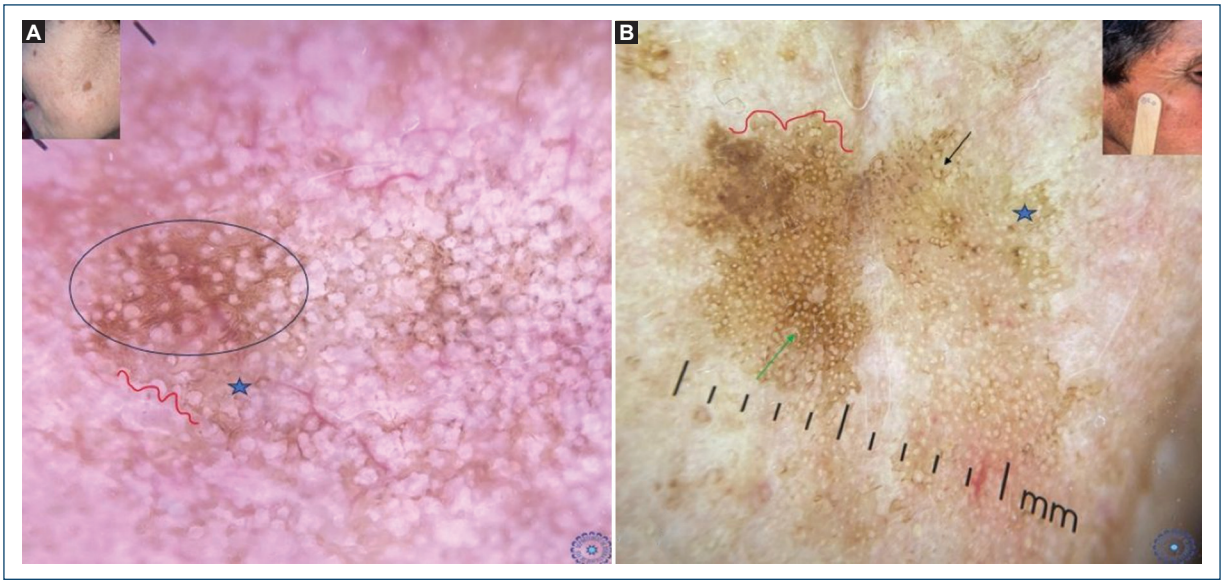

Figure 1. Clinical images. **A** and **B**: Dermoscopic features of solar lentigo showing fingerprint-like areas (blue circle), jelly sign (blue star), and moth-eaten border (red line), and symmetric pseudonetwork (green arrow).

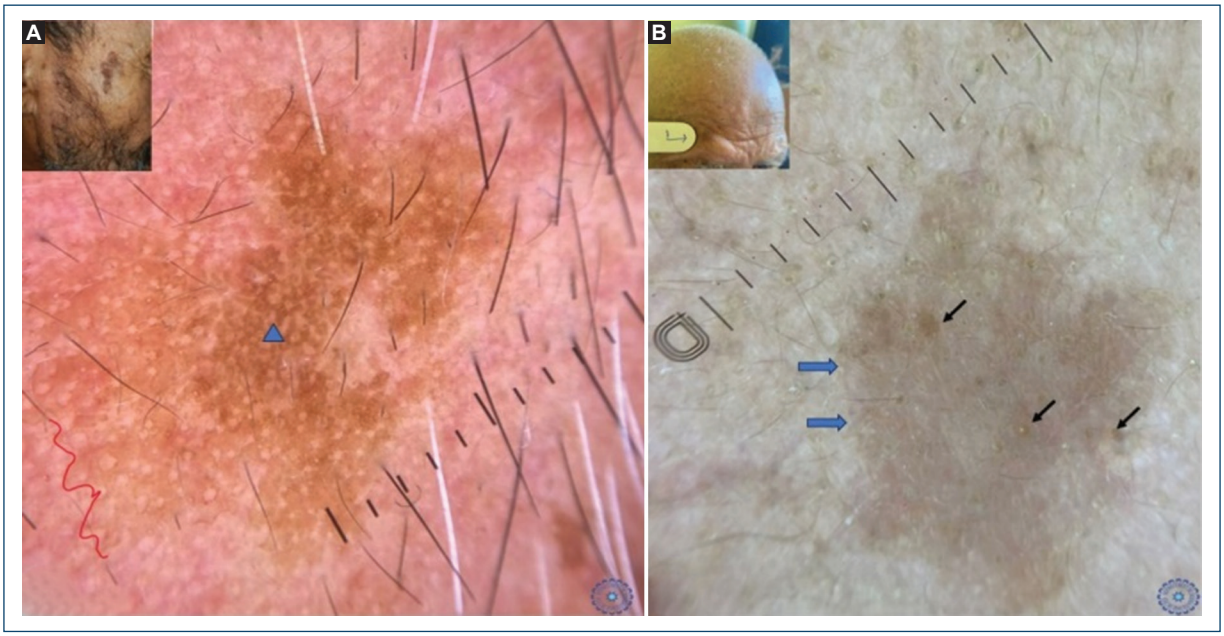

Figure 2. Clinical images. **A** and **B**: Dermoscopic features of seborrheic keratosis showing fissures and ridges forming a cerebriform pattern (blue triangle), sharp border (blue arrow), moth-eaten border (red line), and pseudocomedones (black arrow).

and annular granular pattern (17%, p = 0.025). Yellow follicles (18%, p = 0.176) were not significantly associated (Fig. 4).

Finally, in lentigo maligna (LM) (n = 11), asymmetrical pigmented follicular openings were the most strongly associated feature (75%, p = 0.011), followed by target-like appearance (62%, p = 0.019) and rhomboidal structures (43%, p = 0.037) (Fig. 5). Gray coloration (39%, p = 0.082) was observed but did not show statistical significance (Table 2).

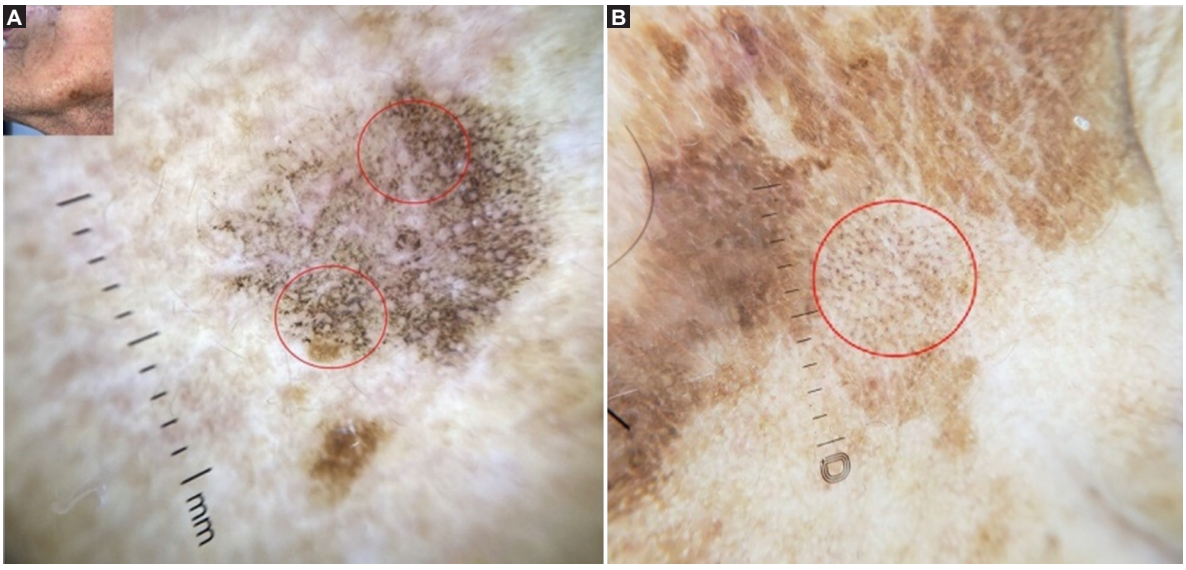

Figure 3. Diffuse granular pattern (**A** and **B**: red circles).

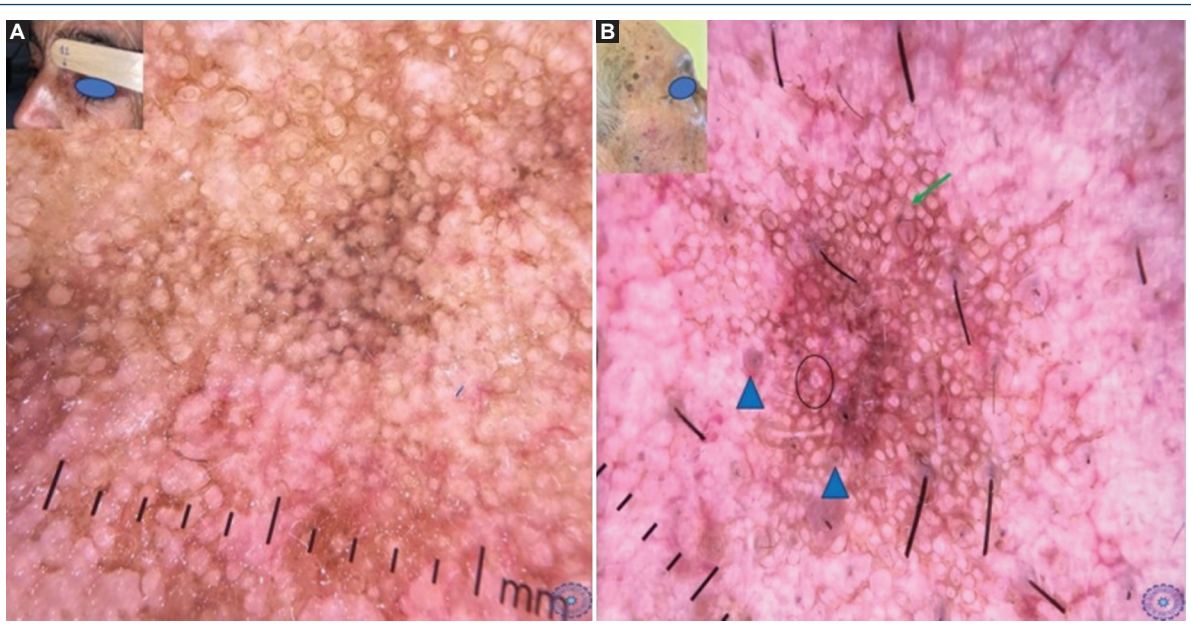

Figure 4. Dermoscopic features of pigmented actinic keratosis showing rhomboidal pattern (**A**), gray halo (blue triangle), rosettes (dark circle), and symmetric pseudonetwork (green arrow) (**B**).

Discussion

SK, SL, pAK, and LK, also termed lichen planus-like keratosis, are benign non-melanocytic lesions that frequently coexist in the same individual and may be difficult to differentiate, despite each having well-defined clinical and dermoscopic characteristics.[1] Histopathologically, these entities are distinct; however, because of their benign nature, biopsies are generally performed only in cases where melanoma is suspected.[7]

In clinical practice, dermoscopy is widely recognized as a valuable non-invasive tool that significantly

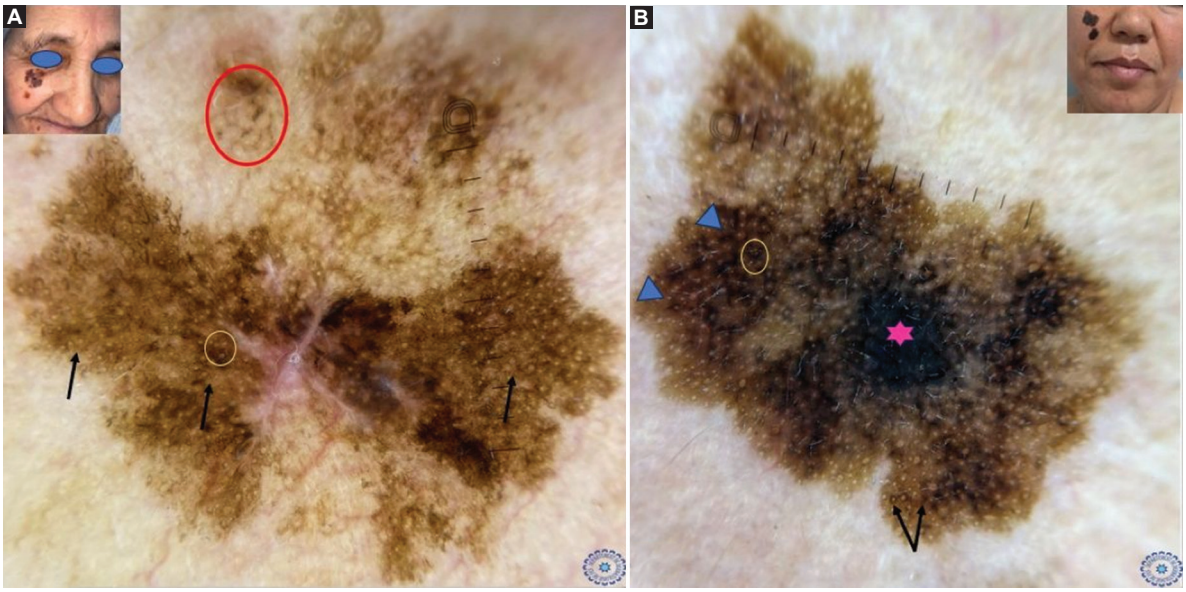

Figure 5. Clinical images. A and **B:** dermoscopic features of lentigo maligna showing rhomboid structures (blue triangle), asymmetric pigmented follicular openings and atypical pseudonetwork (black arrow), dark blotches (pink star), target-like appearance (yellow circles), and granular and annular pattern (red circle).

improves the diagnostic accuracy of pigmented skin lesions compared to visual inspection alone.[8]

Solar lentigines are among the most common benign pigmented skin lesions, typically presenting as well-defined, uniformly pigmented macules on sun-exposed areas. They may occasionally mimic LM, which often results in an excessive number of biopsies performed on benign lesions, a practice that dermoscopy can help reduce. Indeed, this phenomenon of "over-biopsy," driven by the fear of missing an early primary melanoma, represents a scenario in which dermoscopy is particularly valuable.

The main objective of this study was to evaluate and compare the dermoscopic characteristics of common facial pigmented lesions in individuals with dark phototypes, and to determine their diagnostic relevance for SL, SK, LK, pAK, and LM. Existing literature on this topic focuses primarily on fair skin phototypes, highlighting the need for dermoscopic data specific to dark skin phototypes.

In our series, the frequency of SL-specific dermoscopic criteria was comparable to that reported by Scott and Oakley, particularly homogeneous brown pigmentation, sharply demarcated borders, and the so-called "enlightenment" (lightening of pigmentation). However, cases of asymmetric follicular pigmentation were observed in our patients (7.2%), although this was not statistically significant ($p > 0.05$).[9]

Flat seborrheic keratoses typically present as oval macules ranging from light to dark brown with well-defined borders. As they progress, they evolve into plaques with a waxy, "stuck-on" appearance. Dermoscopy is particularly useful in atypical or irritated presentations and in early superficial lesions, as in our series. In addition to the moth-eaten borders and fingerprint-like structures described in SL, the maturation of these lesions revealed fissures and comedo-like openings.

In contrast to Scott and Oakley's series, SK in our patients showed darker brown dots and granules, a difference likely attributable to the darker phototypes of our population. Moreover, dermoscopic features typically associated with SL (lightening, jelly sign, moth-eaten borders, and brown pseudonetwork) were also observed in seborrheic keratoses, further reinforcing their overlap.[9]

LK may appear as macular or slightly infiltrated lesions, with brown, gray, or erythematous coloration. It results from an immunologic or inflammatory reaction to a pre-existing lesion, such as SK or SL. The hallmark dermoscopic feature is a granular pattern, consisting of brown, gray, or bluish granules with a localized or

Table 2. Analysis results of dermoscopic feature frequency according to lesion type and statistical significance

Lesion type	Dermoscopic feature	Frequency (%)	p-value
SL (n = 170)	Dermoscopic lightening	78.3	0.012
	Sharp border	70.6	0.018
	Homogeneous brown pigmentation	67.3	0.021
	Moth-eaten border	57	0.034
	Symmetrical perifollicular pigmentation	37.8	0.029
	Fingerprint-like structures	41.4	0.087
	Brown pseudonetwork	30.7	0.094
	Asymmetrical perifollicular pigmentation	7.2	0.214
SK (n = 83)	Sharp border	75.5	0.009
	Fingerprint pattern	57	0.015
	Dermoscopic lightening	59.2	0.001
	Fissures and ridges (fat fingers)	45	0.022
	Moth-eaten border	44.9	0.059
	Brown pseudonetwork	30.7	0.986
	Pseudocomedones	26.5	0.031
	Cerebriform pattern	24	0.040
LK (n = 60)	Diffuse granular pattern	80	0.006
	Dermoscopic lightening	36	0.005
	Localized granular pattern	20	0.118
	Brown pseudonetwork	17.2	0.005
pAK (n = 82)	Pigmented pseudonetwork	70	0.014
	Rhomboidal pattern	26	0.028
	Gray halos	15	0.033
	Annular granular pattern	17	0.025
	Yellow follicles	18	0.176
LM (n = 11)	Asymmetrical pigmented follicular openings	75	0.011
	Target-like appearance	62	0.019
	Rhomboidal structures	43	0.037
	Gray coloration	39	0.082

(Continues)

Table 2. Analysis results of dermoscopic feature frequency according to lesion type and statistical significance *(continued)*

SL: solar lentigo; SK: seborrheic keratosis; LK: lichenoid keratosis; pAK: pigmented actinic keratosis; LM: lentigo maligna.

diffuse distribution, corresponding histologically to pigment incontinence and melanophages in the papillary dermis.[9] Unlike our findings, Rebecca's series showed a predominance of the localized annular-granular pattern, probably due to a higher prevalence of erythematous LK.[9] Nevertheless, residual dermoscopic features of SK and SL observed in both studies support the concept of an evolutionary link among these lesions.

In our series, pAK was primarily characterized by the presence of a pigmented pseudonetwork, frequently accompanied by annular-granular structures, a gelatinous appearance, gray halos, and rhomboidal patterns.

These observations are partially consistent with published data. Kelati et al. described the same patterns associated with scaling and superficial pigmentation, suggesting a more significant follicular and keratinous component than that observed in our cohort.[5]

Similarly, Akay et al. identified slate-gray dots, brown-gray pseudonetworks, and rhomboidal structures as frequent dermoscopic signs of pigmented facial lesions, highlighting the relative specificity of the pseudonetwork for pAK.[10] Our results confirm this observation, with the pseudonetwork constituting a central dermoscopic feature in our series.

However, contrary to the data in the literature, Tschandl et al. and Lallas et al. reported that gray halos and circles were more strongly associated with LM than with pAK.[11,12] In our study, although gray halos were observed in pAK, they were not the predominant feature, which could explain their greater diagnostic relevance for LM than for pAK.

Early clinical diagnosis of LM remains challenging, as it can closely mimic SL or inflamed SK, particularly when

multiple lesions coexist. Dermoscopic differentiation is useful: pseudofollicular openings, milia-like cysts, opaque yellowish homogeneous areas, cerebriform structures, and fingerprint-like patterns are more commonly observed in benign pigmented facial lesions. In contrast, asymmetric pigmented follicular openings, rhomboidal structures, dark streaks, dark globules, and dots are more characteristic of malignant pigmented facial lesions[13].

In our series, LM was predominantly characterized by asymmetric pigmented follicular openings (75%, p = 0.011) and target-like structures (63%, p = 0.019). In contrast, studies conducted in turkish cohorts reported a higher diagnostic relevance of rhomboidal structures, and black blotches (75%)[13]. The prevalence of grey areas appeared comparable between the two populations (39%).

It is important to emphasize that asymmetric pigmented follicular openings are not exclusively specific to melanoma. Although considered a key diagnostic clue for LM, this feature may also be observed in benign pigmented lesions. In our cohort, asymmetric perifollicular pigmentation was identified in a subset of solar lentigines (7.2%, p = 0.214). This overlap underlines the need for cautious interpretation of follicular criteria, particularly in populations with darker phototypes where pigment distribution may be more heterogeneous.

Limitations

The limitations of our study include its single-center design, the relatively small number of LM cases, and the absence of systematic histopathological confirmation for all lesions.

Conclusion

The dermoscopic characteristics of pigmented lesions on sun-exposed skin largely overlap and can vary according to phototype, hence the importance of dermoscopic analysis according to phototype.

Funding

None.

Conflicts of interest

None.

Ethical considerations

Protection of human subjects and animals. The authors declare that no experiments on humans or animals were performed for this research.

Confidentiality, informed consent, and ethical approval. The authors have followed their institution's confidentiality protocols, obtained informed consent from all patients, and secured approval from the Ethics Committee. SAGER guidelines have been followed as applicable to the nature of the study.

Declaration on the use of artificial intelligence. The authors declare that no generative artificial intelligence was used in the writing or creation of the content of this manuscript.

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