



ORIGINAL RESEARCH PAPER

Dermatology

DERMOSCOPIC PATTERNS OF FACIAL MELANOSIS - A CROSS SECTIONAL STUDY

KEY WORDS: facial melanosis, dermoscopy, melasma, pseudoreticular pattern, skin biopsy

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ABSTRACT

Introduction: Facial melanosis is a group of heterogenous entities, having a common clinical feature of altered pigmentation over face. They cause cosmetic disfigurement which often leads to significant psychosocial consequences. Dermoscopy is a noninvasive diagnostic technique for in- vivo observation of pigmented skin lesions, allowing better visualization of surface and sub surface structures which are not visible to the naked eye. In this study we aim to determine the Dermoscopic patterns of facial melanosis. **Methods:** Patients presenting to Dermatology out-patient Department over a period of 18 months with facial hyperpigmentation meeting the defined inclusion and exclusion criteria were enrolled in this cross-sectional, descriptive study. A detailed clinical history was taken and clinical examination of the lesions was done and recorded in a pre-structured proforma. Dermoscopic examination was performed using a Dermatoscope with a magnification of 10x. Clinical and dermoscopic features of these facial melanosis were photographically recorded and correlated. **Results:** A total of 200 patients of facial melanosis were included in the study. Majority of the patients (70.5%) belonged to age group of 20-40 years. Females outnumbered males with a ratio of 4.7: 1.0. Melasma was the most common facial melanosis seen in 110 (55%), followed by periorbital hyperpigmentation and freckles. On Dermoscopic examination, melasma showed reticular pattern, freckles showed reticular pattern with moth eaten border, accentuated pigment network was found in lentiginos, lichen planus pigmentosus revealed hem-like pattern and bluish grey granules, Reihl's melanosis showed reticular and pattern perifollicular whitish halo, exogenous ochronosis had arciform structures and obliteration of follicles, acanthosis nigricans showed linear crista cutis and sulcus cutis. **Conclusion:** This study was useful in delineating various clinical and dermoscopic patterns of facial melanosis. Understanding the distinct dermoscopic patterns of different facial melanosis helps in increasing the diagnostic accuracy, obviating the need for invasive procedures like skin biopsy.

INTRODUCTION

Facial melanosis is a group of heterogenous entities, which has a common clinical feature of altered pigmentation of face.¹ They include a diverse group of disorders including melasma, freckles, lentiginos, lichen planus pigmentosus, periorbital hyperpigmentation, actinic lichen planus, nevus of Ota, Hori nevus, drug induced hyperpigmentation, exogenous ochronosis, frictional melanoses, post inflammatory hyperpigmentation, facial acanthosis nigricans, solar lentiginos, erythema dyschromicum perstans, poikiloderma of civatte, reihl's melanosis.² It is a common presentation in Indian patients, causing cosmetic disfigurement which often leads to significant psychosocial consequences and has a negative influence on the quality of life.³ The importance of accurate diagnosis is emphasized here as the underlying diseases have varying etiologies that need to be addressed in order to effectively treat the dyspigmentation.⁴

Dermoscopy is a noninvasive diagnostic technique for in-vivo observation of pigmented skin lesions, allowing better visualization of surface and sub surface structures which will not be visible to naked eye. The basic principle underlying dermoscopy is transillumination of a lesion and studying it

with a high magnification. It is functionally similar to a magnifying lens but with the added features of an inbuilt illuminating system, a higher magnification which can be adjusted, the ability to assess structures as deep as in the reticular dermis, and the ability to record images.⁵ It enables a clear visualization of pigment distribution, and the color variation of melanin will depend on its location within the skin.⁶ Dermoscopic findings must be interpreted within the overall clinical context of the patient, because only then combination between such data can really enhance the diagnostic accuracy.⁷

Dermoscope is also a valuable tool in the follow-up of patients undergoing treatment for facial pigmentary disorders. It is also useful in studying the progress of the disease process. It is observed that on seeing the dermoscopic pictures, the patients become more treatment compliant.⁸ The technique provides bridge between naked eyed appearance of lesion and the histo-pathological examination often obviating the need for an invasive procedure like biopsy for confirmation of clinical diagnosis.

Hence, we intend to do the present study to determine the patterns of facial melanosis by dermoscopy, as it provides a

better noninvasive tool for routine diagnosis, assessment of disease activity and monitoring of patients.

MATERIALS AND METHODS

This cross-sectional descriptive study was conducted in the Department of Dermatology, Venereology and Leprosy, Adichunchanagiri Hospital and Research centre, B.G, Nagara, Nagamangala taluk, Mandya district, on an out-patient basis for 18 months from July 2021 to December 2022. A written informed consent was obtained from all patients. Institutional Ethics committee approval was obtained. Inclusion criteria included patients above 18 years with facial hyperpigmentation who are willing to participate in study. Exclusion criteria included patients who are not willing to participate in the study, patients on treatment for the same condition in the last 1 month, patients who underwent invasive or non-invasive procedures over the face in the past 6 weeks and patients having active infections over the affected area. A pre-structured proforma was used to collect the baseline data. After collecting demographic data like age, sex and occupation, a detailed clinical history consisting of presenting complaints, onset, duration of disease, progression of the disease, presence of similar lesions elsewhere in the body, if any were recorded for all the patients. History of precipitating factors, history of skin lesions prior to onset of hyperpigmentation, usage of cosmetics, hair dye, history of sun exposure, photosensitivity, pregnancy, drug intake prior to the onset of lesions, previous treatment history, family history and associated cutaneous or systemic disorders was documented. In patients with periorbital melanosis, details of sleep habits, reading habits, refractive errors, history of atopy was taken. In females, menstrual history, history of consumption of oral contraceptive pills or any other hormonal preparation were elicited. A thorough clinical examination of the lesions was done with emphasis on morphology, color of the lesion, its pattern, distribution, and extent of involvement and this was entered in the structured proforma. Facial melanosis was photographically documented after taking a consent. A clinical diagnosis was made based on the history and clinical examination.

Dermoscopic examination of facial melanosis was performed with ILLUCO IDS-1100 Dermatoscope with a magnification of 10x. The selected skin lesion was cleaned with saline before observing. Non-polarized mode was used to visualise superficial layers of skin and polarized mode was used to visualise deeper aspects of the skin. Various features of the lesion such as color, symmetry of pigment, pattern and vascular structures were noted. Dermoscopic features were documented, namely, reticular pattern, accentuated pigment network, pseudo reticular network, granular pigment network and so on.

Dermoscopic photographs of a lesions were taken with the help of an adaptor attached to a smart phone, and it was documented. Clinical and dermoscopic features were recorded and correlated. Details of the Dermatoscope are as given in table 1.

ILLUCO IDS - 110 Dermatoscope

Table 1: Technical Specifications of Illuco IDS-1100 Dermatoscope

Polarization	Cross polarization & parallel polarization
Lens diameter (field of view)	25 mm (22 mm)
Lens coating	Special BBAR coating
Magnification	10x
Brightness control	3 levels
Adapter for smartphone	Applicable
Led	32ea
Battery	Rechargeable Lithium ion 1150mAh/ 3.7v

Charging time	3 hours
Continuous duty time	2 hours
Charging terminal	Micro USB 5 pin
New dimensions / weight	138 x 65 x 33 (mm) / 190g

Statistical Analysis

Data was uploaded using Microsoft Excel. Data analysis was performed with Statistical Package for Social Sciences (SPSS) Statistical analysis was done. The Statistical software namely SAS 9.2 (Statistical analysis system), SPSS (Statistical Package for Social Sciences) 15.0, Stata 10.1, MedCalc 9.0.1, Systat 12.0 and R environment ver.2.11.1 was used.

RESULTS

A total of 200 patients were enrolled in the study. Most patients were females (165, 82.5%). Males were (35, 17.5%) with a female : male ratio of 4.7: 1.0. The mean age of patients was 34.60 ± 10.011 years. As shown in table 2, the highest percentage of patients (141, 70.5%) patients were in the age group of 20-40 years. In our study, 9.5% had Fitzpatrick skin type III, 85.5% had skin type IV and 5% were of skin type V (table 3). The most common facial melanosis was melasma (110, 55%), followed by periorbital melanosis (20, 10%) as in table 4. The dermoscopic features of various facial melanosis are as given in table 5.

Table 2: Distribution Of The Patients Based On Age Groups

Age group	Frequency	Percentage
18-20 years	12	6
20-40 years	141	70.5
>40 years	47	23.5
Total	200	100

Table 3: Fitzpatrick Skin Type

Fitzpatrick skin type	Frequency	Percentage
III	19	9.5
IV	171	85.5
V	10	5
Total	200	100

Table 4: Facial Melanosis

Facial melanosis	Frequency	Percentage
Melasma	110	55
Melasma with steroid facies	8	4
Periorbital melanosis	20	10
Post inflammatory hyperpigmentation	16	8
Freckles	18	9
Lentigines	2	1
Lichen planus pigmentosus	6	3
Ashy dermatosis	3	1.5
Seborrheic melanosis	3	1.5
Reihl's melanosis	4	2
Exogenous ochronosis	4	2
Facial acanthosis nigricans	2	1
Phototanning	3	1.5
Pigmentary demarcation lines	1	0.5
Total	200	100

Table 5: Dermoscopic Features Of Facial Melanoses

Facial melanosis	Dermoscopic features
Epidermal Melasma	Reticular pattern Pseudoreticular pattern Reticuloglobular pattern
Dermal Melasma	Pseudo reticular pattern Reticulo globular pattern Accentuated pigment network Blotches Arcuate pattern Annular pattern

Mixed Melasma	Diffuse Reticular pigmentation Blotches Arcuate Annular
Melasma with steroid facies	Reticular pattern of vascular arrangement Dark brown reticular pattern Telangiectasia
Freckles	Reticular pattern Moth eaten border Dark brown dots Sharp demarcation Accentuated pigment network
Lentiginos	Accentuated pigment network Moth eaten border
Lichen palnus pigmentosus	Reticular pattern Granular pattern Hem like pattern Periacrosyringeal pigment deposition Bluish grey blotches arciform structures
Reihl's melanosis	Reticular pattern Pseudoreticular pattern Granular pattern Perifollicular whitish halo Follicular keratotic plugs
Exogenous ochronosis	Archiform structures around follicle Obliteration of follicles White dots Annular structures Curvilinear pattern Worm-like structures
Peri orbital melanosis	Brown reticular pattern Blotches Globules
Seborrheic melanosis	Follicular plugs Yellowish white scales
Facial Aacanthosis Nigricans	Reticuloglobular pattern 100% Accentuated pigment network Granular pattern Linear crista cutis Linear sulcus cutis
Post inflammatory hyperpigmentation	Dark brown Pseudoreticular pattern Blotches Dark brown homogenous pattern
Pigmentary Demarcation lines	Accentuated Pseudoreticular pattern
Ashy dermatosis	Diffuse blue-grey pattern
Pigmentary demarcation lines	Exaggerated Pseudoreticular pigment network Blotches Granular pattern

DISCUSSION

In the present study out of 200 patients with facial melanosis, 165 (82.5%) were females and 35 (17.5%) were males with female to male ratio being 4.7: 1. This finding is similar to a study done by Puri N et al (female to male ratio of 4:1).⁸ In the present study, the youngest patient was 18 years old because we included patients from 18 years onwards and the oldest patient was 73 years with a mean age of 34.6 years. In a similar study, Kaur S et al and Nanjundaswamy BL et al also found a similar mean age of presentation of 34.86 years and 36.64 years respectively.^{10,11}

Majority 141 (70.5%) patients in the present study were in the age group of 20-40 years, followed by 47 (23.5%) belonging to the age group of more than 40 years and 12 (6%) in 18-20 years age group. In a study by Revathi TN et al, majority of

patients belonged to 31-40 years age group (35.6%), followed by 21-30 years (21.2%).¹² In a study by Hassan I et al, among 208 patients of facial melanosis, majority of patients that is 118 (56.73%) belonged to 21-40 years age group, followed by 54 (25.96%) to <20 years and 36 (17.30%) to >40 years of age group. The mean age of presentation was 27.40 years.¹

In our study, majority of subjects had Fitzpatrick skin type IV i.e 171 (85.5%), followed by Fitzpatrick skin type III 19 (9.5%) and Fitzpatrick skin type V 10 (5%). In a study by Amatya B. et al, 65.7% patients had Fitzpatrick skin type IV, 24% had skin type III and 10.3% had skin type V.¹³

Patients with melasma were subjected to woods lamp examination to determine the level of pigmentation. Out of 110 melasma patients, 50 (44.45%) had epidermal melasma (Figure 1a), 41 (37.27%) had mixed melasma and 19 (17.27%) had dermal melasma. On dermoscopic examination, epidermal melasma was characterised by reticular pattern, pseudoreticular pattern, reticuloglobular pattern (Figure 1b). Dermal melasma (Figure 2a) showed pseudo reticular pattern reticulo globular pattern, accentuated pigment network, blotches, arcuate pattern and annular pattern (figure 2b). Mixed melasma was characterised by diffuse reticular pigmentation, blotches, arcuate and annular pattern. Yalamanchili et al also found light or dark brown, diffuse or patchy reticular pigmentation in 95% of patients with melasma.³ Amatya B found dark brown to bluish grey reticular pattern, light brown reticular pattern and arciform pattern.¹³ Nanjundaswamy et al also found brown reticular network in epidermal melasma and in dermal type of melasma they observed uniform skin involvement with dark brown to grey hyperpigmented irregular pigment network.¹¹

In melasma with steroid facies (Figure 3a), our study found reticular pattern of vascular arrangement, dark brown reticular pattern and telangiectasia on dermoscopy (Figure 3b). In a case report on topical steroid dependent/damaged face by Jakhar et al, they described dilated and tortuous branched blood vessels interconnecting with one another to form polygonal pattern on dermoscopy. Other findings were white structureless areas, yellowish areas and coarse terminal hairs. They inferred that the white structureless areas correspond to dermal atrophy.¹⁴ These were in concordance with our study. Amatya B et al also reported similar observations except for white structureless areas.¹³

In post inflammatory hyperpigmentation (Figure 4a), on dermoscopy we found dark brown pseudoreticular pattern, dark brown homogenous pattern and blotches (Figure 4b). Most of the cases of PIH in our study were due to acne. Amatya B described brown structureless areas and brown reticular pattern in acne induced PIH. In PIH due to other causes, he found dark brown reticular pattern, moth-eaten borders, dark brown homogenous pattern, and dark brown peripheral reticular pattern with central hypopigmentation.¹³

In our study, freckles (Figure 5a) was characterised by reticular pattern, moth eaten border, dark brown dots, sharp demarcation, accentuated pigment network (Figure 5b). Findings in our study was similar to that of Amatya B who also found brown reticular pattern with moth eaten border and dark brown dots in patients with freckles.¹³ In Lentiginos (Figure 6a) our study found accentuated pigment network, moth eaten border (Figure 6b). We could not find studies that describe the dermoscopic findings of lentiginos.

In LPP (figure 7a), we found reticular pattern, granular pattern, Hem like pattern, periacrosyringeal pigment deposition, bluish grey blotches and arciform structures (Figure 7b). Devanda R et al reported a case series with 6 cases of LPP. They found overlapping patterns in each patient. They observed dots, which were were small bluish black annular

granular structures. Dots were seen in various patterns such as linear/hem pattern, peppering, arciform rim of dots, reticular and incomplete reticular pattern. They also observed globules distributed mostly in an irregular pattern or regular globules with minimal variation in shape and size. Other patterns seen were a rim of arciform globules, Chinese letter pattern and polygonal globules distributed symmetrically (cobblestone). Apart from this they observed bluish gray annular granular structures in peri follicular and peri-eccrine areas. Targetoid pattern and large globules, also known as Blotches which were completely obscuring the underlying structures were also seen.¹⁵ Sharma VK et al also reported similar findings.¹⁶

In ashy dermatosis (figure.), on dermoscopy, our study revealed diffuse blue grey pattern (figure.). Amatya B in one patient with ashy dermatosis observed blue gray pigmentation forming a curvilinear pattern.¹³ Elmas OF et al found gray dots and globules having an irregular linear arrangement.¹⁷ However in our study, we did not observe curvilinear pattern or globules.

In periorbital melanosis (Figure 8a.), our study found brown reticular pattern, blotches and globules on dermoscopy (Figure 8b). Jage M et al found blotches, exaggerated pigment network, coarse speckled pattern, fine speckled pattern and globules.¹⁸ In a study by Amatya B, all cases showed dark brown reticular pattern, dark brown hem-like pattern. In epidermal cases of peri orbital melanosis, they observed a cobblestone pattern in addition to the other features.¹³

In exogenous ochronosis (EO) (Figure 9a), we found arciform structures around follicle, obliteration of follicles, white dots and annular structures, worm-like structures and curvilinear pattern (Figure 9b). Khunger N et al in their two patients with EO found in areas with ochronosis, greyish brown dark amorphous structures in the perifollicular region and some obliterating the follicular openings. Curvilinear and "worm like" pattern were seen in some areas.¹⁹ Gil I et al. found irregular, brown-gray, globular, annular, and arciform structures on dermoscopy of exogenous ochronosis.²⁰ Charlin R et al described dermoscopic features of 2 patients with exogenous ochronosis. They documented blue-gray amorphous areas which were obliterating some follicular openings which was similar to our findings.²¹

In Seborrheic melanosis (Figure 10a), we found follicular plugs, yellowish white scales (Figure 10b). Verma et al described three patterns of dermoscopy namely, pigment, vascular, and mixed patterns. Pigment pattern with prominent pseudonetwork. Vascular pattern with linear and arborizing vessels over light pink background. Mixed pattern with a combination of both. Yellowish scales were also described by them which corroborated with our findings.²²

In Reihl's melanosis (Figure 11a), we found reticular pattern, pseudoreticular pattern, granular pattern, perifollicular whitish halo, follicular keratotic plugs (Figure 11b). Sonthalia S et al observed that Reihl's melanosis on dermoscopy showed uneven distribution of brown-to-gray-colored dots and globules with pseudo network of reticular network on an erythematous background.⁹

In facial acanthosis nigricans (Figure 12a), on dermoscopy we found reticuloglobular pattern, accentuated pigment network, granular pattern, linear crista cutis with hyperpigmented brown dots and linear sulcus cutis (Figure 12b). Histopathologically, linear crista cutis represents the pigmented and uplifted epidermis by papillomatous projections of dermis. Sulcus cutis represents the equally pigmented surrounding epidermis. The white color of sulci cutis is because of the basket weave stratum corneum filled in the valley of downward progressed epidermis. Similar to our observation, Uchida S et al have also described linear crista

cutis and sulcus cutis with scattered dark brown dots and globules. The background color was alternating darker brown or grayish-brown in crista cutis and white in sulci cutis.²³

Our study had one patient with Pigmentary demarcation lines (Figure 13a) in whom we observed accentuated pseudoreticular pigment network, blotches and granular pattern (Figure 13b). In a study by Sonthalia S et al, they found similar exaggerated pseudoreticular pigment network. In addition they reported brown globules distributed unevenly on a background of brownish pigmented areas.⁸ Our study did not find globules.



Figure 1a: Epidermal Melasma

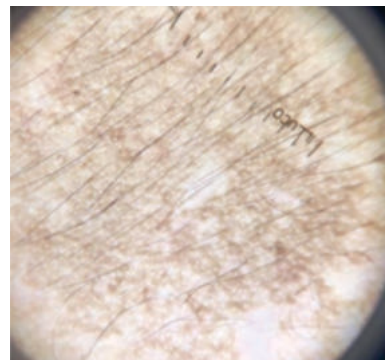


Figure 1b: Dermoscopy Showing Tan Brown Reticuloglobular Pattern With Sparring Of Follicular Openings (Yellow Circle), Arcuate Pattern (Red Circle)



Figure 2a: Dermal Melasma

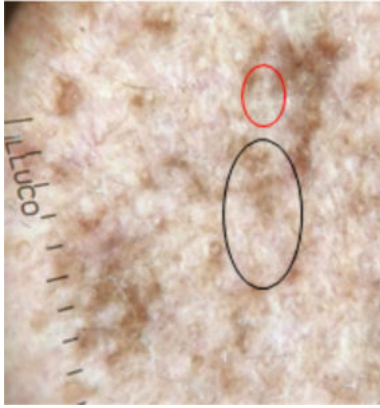


Figure 2b: Dermoscopy Of Dermal Melasma - Dark Brown To Grayish Psuedoreticular Pattern With No Areas Of Sparring (Black Circle), Annular Pattern (Red Circle)

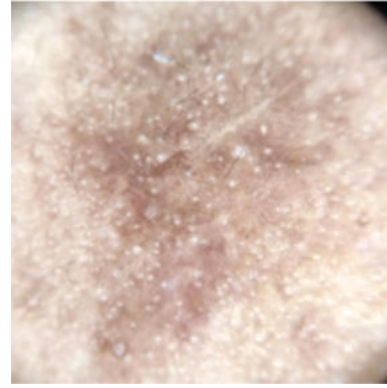


Figure 4b: Dermoscopy Of PIH Showing Accentuation Of Pigment Network (Black Circle)



Figure 3a: Melasma With Steroid Facies



Figure 5a: Freckles

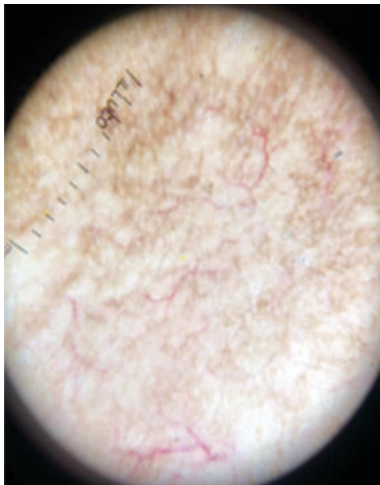


Figure 3b: Dermoscopy- Pseudoreticular Pattern, Linear And Arborising Telangiectasia (Blue Circle), White Structureless Areas (Red Circle)

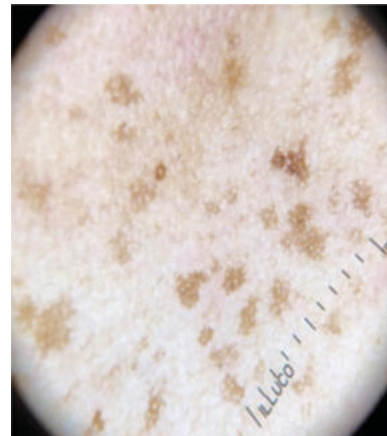


Figure 5b: Dermoscopy Of Freckles Showing Brown Reticular Network With Moth Eaten Border (Black Circle)



Figure 4a: PIH Following Acne Vulgaris



Figure 6a: Lentigines

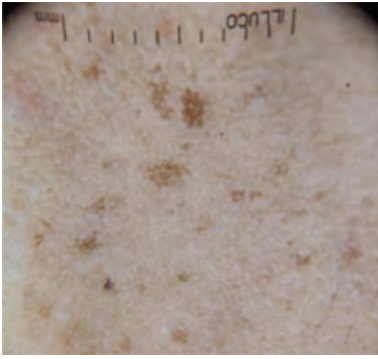


Figure 6b: Dermoscopy Of Lentiginos Hsowing Accentuated Brown Reticular Pigment Network With Moth Eaten Border (Red Circle)

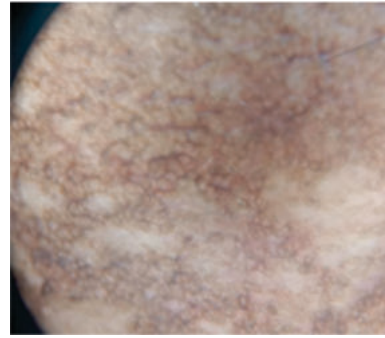


Figure 8b: Dermoscopy Showing Brown Macules With Central Hypopigmentation- Cobblestone Pattern (Black Circle), Reticular Pattern Of Vascular Arrangement (Red Circle)



Figure 7a: LPP



Figure 9a: Exogenous Ochronosis

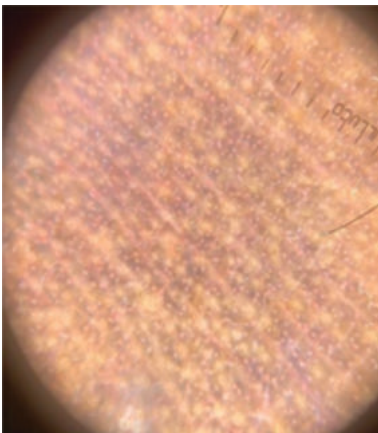


Figure 7b: Dermoscopy Of LPP- Hem Like Pattern (Black Circle), Peri Acrosyringial Pigment Deposition (Red Circle)

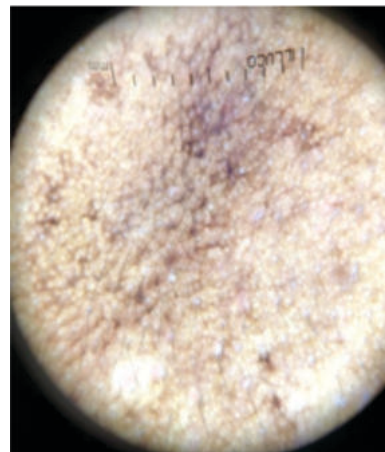


Figure 9b: Dermoscopy Of Eo Showing Dark Brown Amorphous Areas (Blue Circle), Curvilinear Worm Like Structures (Red Circle)



Figure 8a: Peri Orbital Melanosis



Figure 10a: Seborrheic Melanosis

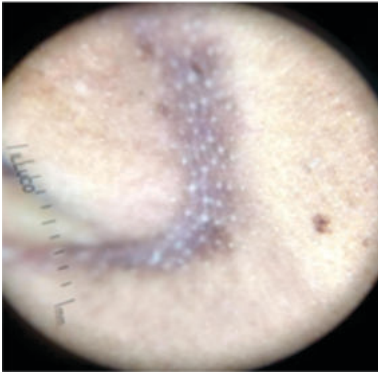


Figure 10b: Seborrheic Melanosis Brown Reticular Pattern With Follicular Keratotic Plugs (Red Circle)

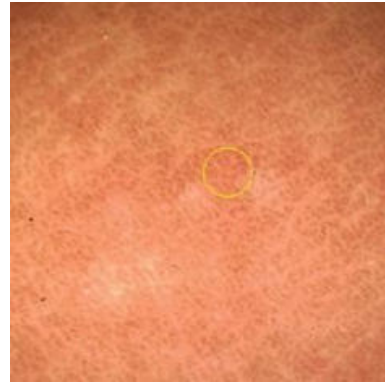


Figure 12b: Dermoscopy Of An Showing Linear Crista Cutis (Yellow Circle), Linear Sulcus Cutis (Red Circle)



Figure 11a:Reihl's Melanosis



Figure 13a: Pigmentary Demarcation Lines (PDL) With V Shaped Pigmented Patch Between Malar Prominence And Temple

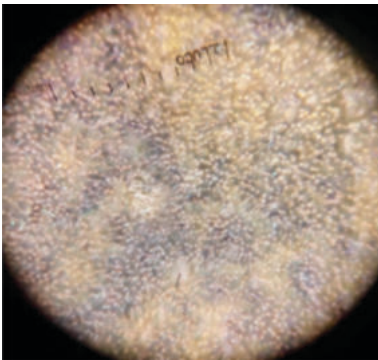


Figure 11b: Greyish Brown To Black Pseudo Reticular Pattern With Blotches (Blue Circle), Perifollicular White Halo (Red Circle)

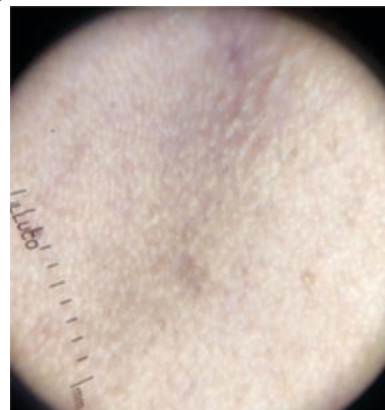


Figure 13b: Dermoscopy Of PDL -pseudoreticular Pigment Network With Blotches (Red Circle) And Granular Pattern (Blue Circle)



Figure 12a: Facial Acanthosis Nigricans

Limitations of our study were that we did not correlate with histopathology and our study had a small sample size.

CONCLUSION

To conclude, hypermelanotic lesions on face demonstrate characteristic dermoscopic patterns. A thorough knowledge of these patterns and ability to identify these patterns will help in distinguishing various facial melanosis, thereby avoiding invasive biopsies on the face. Further studies with larger number of patients are needed to substantiate these findings in facial melanosis.

Source of Funding: Nil

Conflict of Interest:None

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