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Exploring the Dermoscopic Spectrum and Examination of Non-Melanocytic Benign Skin Tumors in Humans

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Abstract

Dermoscopy unveils distinctive features aiding non-melanocytic benign skin tumor identification. This study aimed to delineate and characterize these unique dermoscopic patterns, essential for precise diagnosis and tailored treatment. The study was conducted between December 2022 and June 2023, this descriptive study in a tertiary hospital assessed 96 patients with various benign skin tumors. Dermoscopic evaluations were blinded, ensuring rigorous data collection. Dermatofibroma displays a central white globule encircled by a peripheral pigmented network, while neurofibroma exhibits finger-print-like pigmentary lines. Mucosal neurofibroma stands out with its vascular reticulate network against a homogenous white background, contrasting with trichoepithelioma's structureless shiny white structures. Angiofibroma presents as unevenly distributed brown pigmentation, distinct from pyogenic granuloma's white collarette. Steatocystoma displays peripheral reticulate brown pigmentation, while keratoacanthoma showcases a central keratin mass. Cylindroma is characterized by a salmon pink-yellow color background with arborizing blood vessels at the periphery, whereas syringoma manifests multiple pigmented clusters. This study emphasizes dermoscopy's significance as a non-invasive tool enhancing diagnostic accuracy and guiding effective treatment modalities in dermatological practice.

***Keywords*:** Dermoscopy, non-melanocytic benign skin tumor, Dermoscopic pattern, Diagnostic accuracy.

Introduction

One of the most common skin discoveries is a benign melanocytic or non-melanocytic skin tumour [1]. A wide range of dermatological diseases, such as dermatofibroma, angiomas, and seborrheic keratosis, are classified as non-melanocytic benign skin tumours [2]. Dermoscopy is a non-invasive imaging technology that has completely changed the diagnostic field by making skin patterns and structures more visible [3, 4]. This has allowed for more accurate characterisation of these lesions.

Understanding the complex morphological characteristics specific to benign skin tumours that are not melanocytic has been made easier with the use of dermoscopic examination. For example, common dermoscopic features in seborrheic keratosis (SK) lesions include the appearance of comedo-like holes, milia-like cysts, and fissures within a distinctive yellowish-orange backdrop [5]. A similar characteristic that aids in the identification of dermatofibromas is the "central white patch,"

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which is encircled by a pigment-free zone or a peripheral pigment network [6]. Additionally, the dermoscopic characterisation of angiomas is greatly influenced by the vascular patterns that are seen in them, such as red homogenous patches or a red lacunae network [7].

A thorough investigation of the dermoscopic patterns unique to different non-melanocytic benign skin tumours is essential to improve the precision of diagnosis and direct the most suitable course of treatment. The goal is to identify and study the distinct dermoscopic characteristics that are commonly seen in benign skin-colored neoplasms. Dermoscopy, a non-invasive imaging procedure, is used to distinguish between benign growths and malignant or suspicious lesions. This incorporates a thorough inspection of certain patterns, colors, and structures that are indicative of benign neoplasms, resulting in more accurate diagnosis.

Methodology

The cross-sectional hospital-based investigation was carried out between December 2022 and June 2023. During this time, the study included all patients who visited the Department of Dermatology at Saveetha Medical College and Hospital and were clinically diagnosed with non-melanocytic epidermal tumors. This study included patients of various ages and genders with non-melanocytic skin tumors. Patients with suspected melanocytic tumors and pigmented/melanocytic tumors were excluded. Before providing written informed consent, all individuals who agreed to participate in the study were informed about the technique and purpose of the photography. A pre-defined proforma was used to collect demographic and comprehensive clinical data.

Sampling Method

Purposive sampling was done and all the patients fulfilling the inclusion and exclusion criteria during the study period were taken into the study. All dermoscopic data were analyzed with a handheld pocket dermoscope (Dermlite DL1) with high magnification and both polarizing and non-polarizing lenses. This device features a 25 mm four-element lens, 28 high-powered LEDs, and the Pigment Boost illumination technology. In circumstances when a patient had several lesions, just one active lesion was chosen for dermoscopy. A smartphone was used in conjunction with the dermoscope to take images and document the findings.

Dermoscopic evaluation variables were split into vascular and non-vascular aspects, and further classified into vascular morphology and arrangement, background color, scale type and pattern, follicular abnormalities, and any unique clues. The characteristics were identified as either present or absent.

Data Collection

The demographic data for each patient included their age, gender, and clinical factors such as tumor location and duration. Tumors were carefully selected for microscopic examination in order to offer a thorough pathological evaluation. The Dermlite DL4 dermoscope was used to assess the lesions [8]. This improved gadget enabled high-resolution vision, allowing for the precise identification of vascular and non-vascular characteristics, hence assisting in the proper diagnosis and documentation of skin cancers.

Results

There were 96 patients in the trial overall, including 41 men and 55 women, indicating a varied mix of participants. A wide range of skin disorders, each with unique clinical manifestations, were covered by the research. With 21 cases detected, pyogenic granuloma was the most prevalent type of case. There were also many cases of neurofibroma and syringoma, with 14 patients each. 12 cases of dermatofibroma and 10 cases of angiofibroma

were observed. In addition, there were 8 cases of steatocystoma, 7 cases of trichoepithelioma, 6 cases with keratoacanthoma, and 4 cases with cylindroma (Table 1 to 4). This wide range of skin cancers gave researchers a thorough picture of all the non-melanocytic epidermal tumors in their studies (Figure 1 to 22).

Table 1. Shapes of Different Tumours

S No	Tumor	Shapes
1	Dermatofibroma	Firm, non-tender nodules with smooth surface
2	Neurofibroma	Painless papules, nodules, or subcutaneous masses
3	Mucosal Neurofibroma	Non-tender submucosal tumors
4	Trichoepithelioma	Dome-shaped, firm, shiny papules coalescing to plaques
5	Angiofibroma	Dome-shaped papules
6	Pyogenic Granuloma	Sessile papules with collarette of scales
7	Steatocystoma	Translucent dome-shaped papules
8	Keratoacanthoma	Dome-shaped nodules
9	Cylindroma	Multiple cutaneous nodules on the scalp
10	Syringoma	Dome shaped or flat papules

Table 2: Characteristic Findings Of Different Tumour

S No	Tumor	Characteristic findings
1	Dermatofibroma	"Dimple sign", pseudofollicular openings, peripheral pigment network, central white globule
2	Neurofibroma	"Buttonhole sign", fingerprint-like pigmentary lines, peripheral halo of hyperpigmentation, central homogeneous scar
3	Mucosal Neurofibroma	Vascular reticulate network, homogeneous white background
4	Trichoepithelioma	Milia-like cysts, white-brown background, shiny white structures
5	Angiofibroma	Yellow-white dots, unevenly distributed brown pigmentation, presence of crypts
6	Pyogenic Granuloma	Reddish homogeneous area, intersecting white lines, white collarette
7	Steatocystoma	Yellow homogeneous area, peripheral reticulate brown pigmentation
8	Keratoacanthoma	Crateriform appearance, thick yellow-white scales, central keratin mass
9	Cylindroma	Salmon pink-yellow color background, arborizing blood vessels at the periphery
10	Syringoma	Comma-shaped ("tadpole") tail of dilated, cystic eccrine ducts

Table 3: Colour of Different Tumours

S No	Tumor	Colour
1	Dermatofibroma	Skin-coloured
2	Neurofibroma	Skin-coloured or violaceous
3	Mucosal Neurofibroma	
4	Trichoepithelioma	Skin-coloured
5	Angiofibroma	Skin-coloured/ white to red
6	Pyogenic Granuloma	Red or Skin-coloured
7	Steatocystoma	Flesh coloured to yellow
8	Keratoacanthoma	
9	Cylindroma	Salmon pink-yellow
10	Syringoma	Skin-coloured

Table 4: Additional Characteristics

S No	Tumur	Additional features
1	Dermatofibroma	Smooth surface, firm texture
2	Neurofibroma	Smooth or slightly raised surface
3	Mucosal Neurofibroma	Discrete, non-tender, submucosal tumors
4	Trichoepithelioma	Shiny, dome-shaped, sometimes shiny white structures
5	Angiofibroma	Dome-shaped papules, sometimes associated with syndromes
6	Pyogenic Granuloma	Presence of an epidermal collarette of scales
7	Steatocystoma	Translucent appearance, dome-shaped nodules
8	Keratoacanthoma	Yellow-white scales, crater-like appearance
9	Cylindroma	Multiple nodules, arborizing blood vessels at the periphery
10	Syringoma	Comma-shaped tails, dome-shaped or flat papules, multiple pigmented clusters

Clinical Photographs

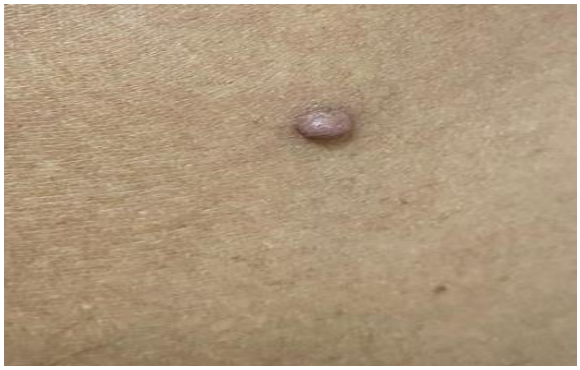

Figure 1. Clinical picture of DERMATOFIBROMA

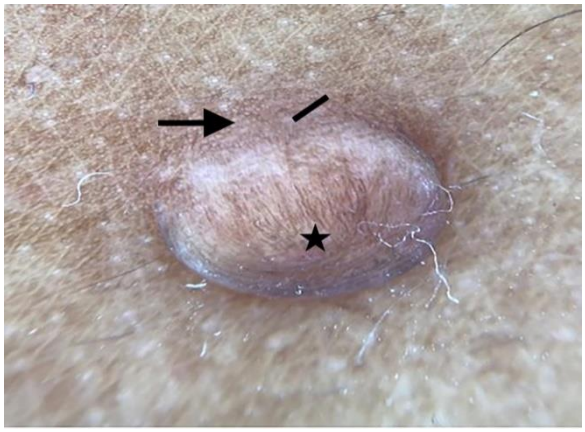

Figure 2. Dermoscopy(10x) showing Pseudofollicular Openings (black line), Peripheral Pigment Network (black arrow), Central White Globule (star)

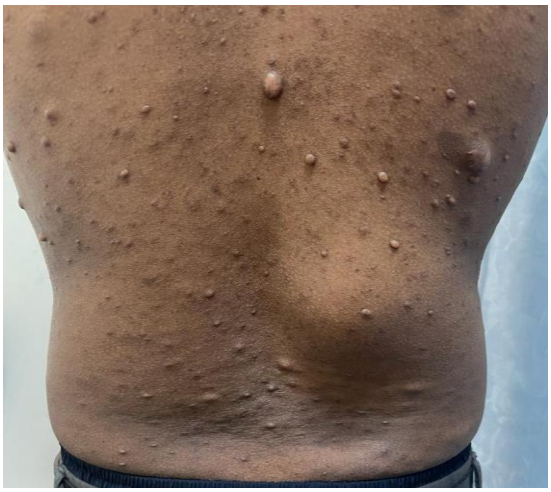

Figure 3. Clinical Picture of NEUROFIBROMA

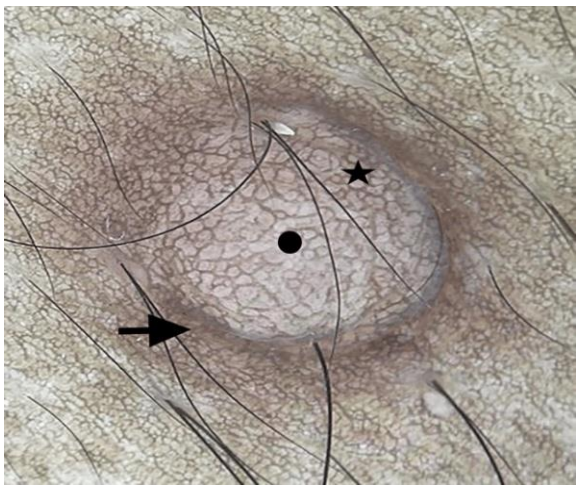

Figure 4. Dermoscopy (x10) showing Finger Print Like Pigmentary Lines (star), Peripheral halo of Hyperpigmentation (black arrow), Central Homogenous White Scar (circle)

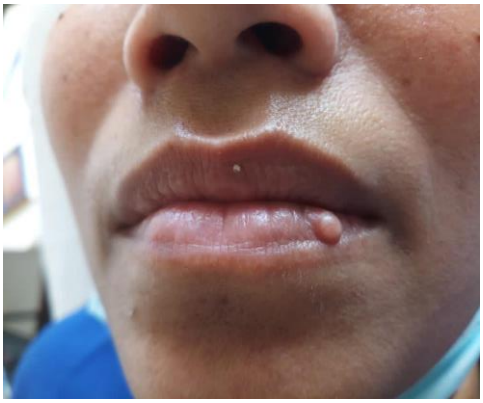

Figure 5. Clinical picture of MUCOSAL NEUROFIBROMA

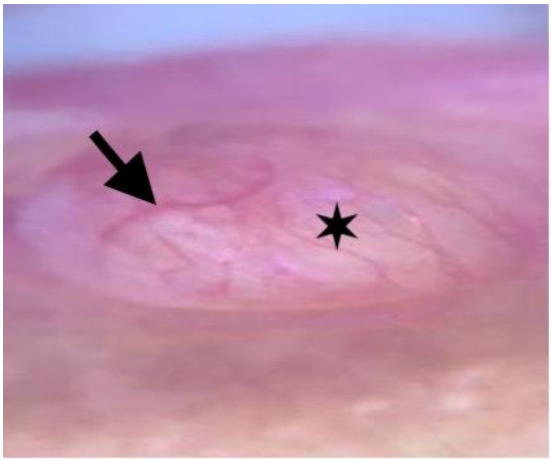

Figure 6. Dermoscopy(x10) showing Vascular Reticulate Network(black arrow), Homogenous white Background (star)

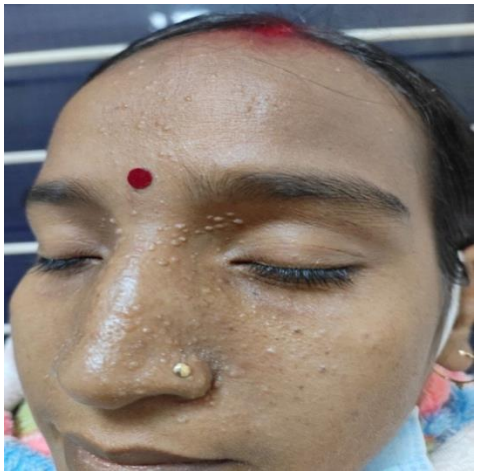

Figure 7. Clinical Picture of TRICHOEPITHELIOMA

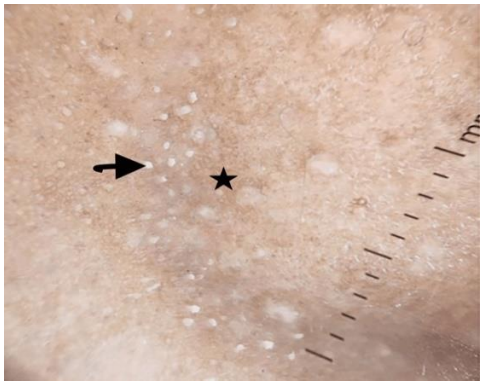

Figure 8. Dermoscopy (x10) Showing milia like Cysts (black arrow), White Brown Background (star)

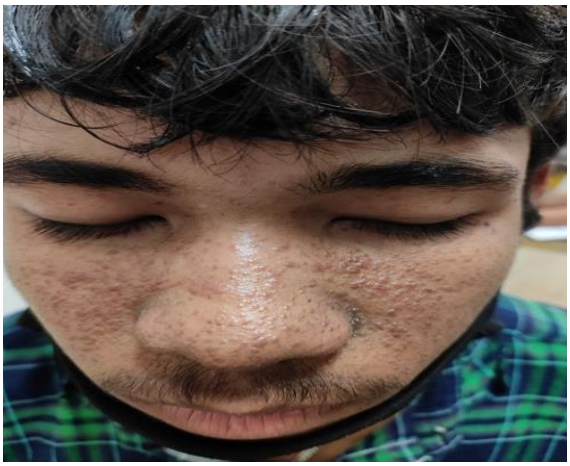

Figure 9. Clinical picture of ANGIOFIBROMA

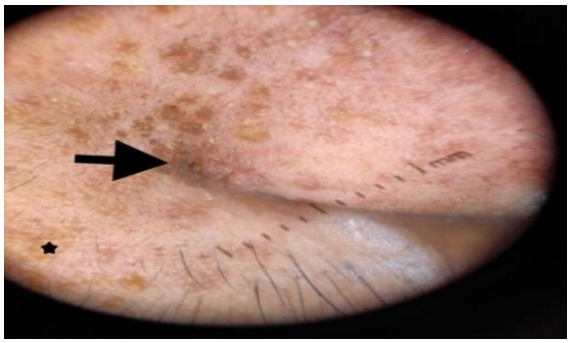

Figure 10. Dermoscopy (x10) showing yellow white dots (star), presence of crypts (black arrow)

Figure 11. Clinical picture of PYOGENIC GRANULOMA

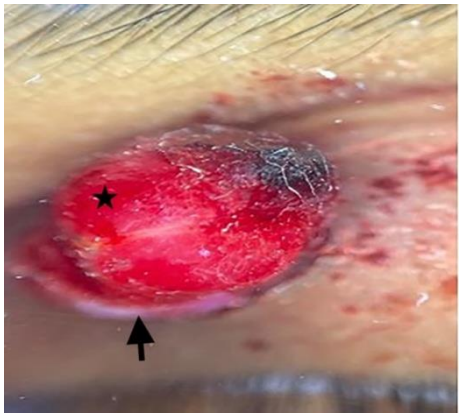

Figure 12. Dermoscopy (x10) showing Reddish Homogenous area (star) with white lines that intersect the lesion, white collarette (black arrow)

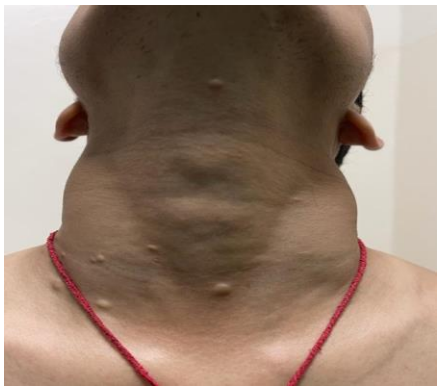

Figure 13. Clinical picture of STEATOCYSTOMA

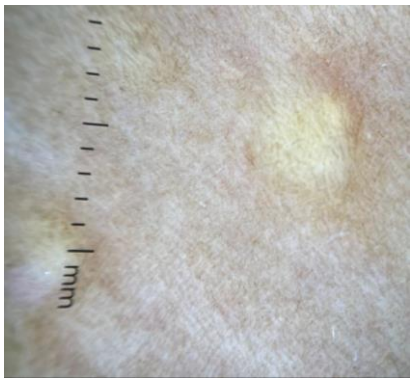

Figure 14. Dermoscopy (x10)showing yellow Homogeneous Areacovering the lesion(star), Peripheral Reticulate brown Pigmentation(black arrow)

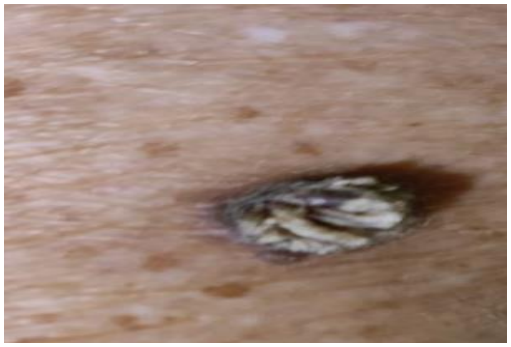

Figure 15. Clinical picture of KERATOACANTHOMA

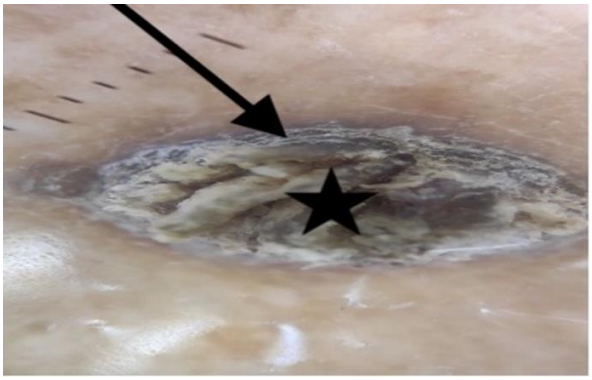

Figure 16. Dermoscopy (x10)showing thick yellow white scales(black arrow), central keratin mass(star)

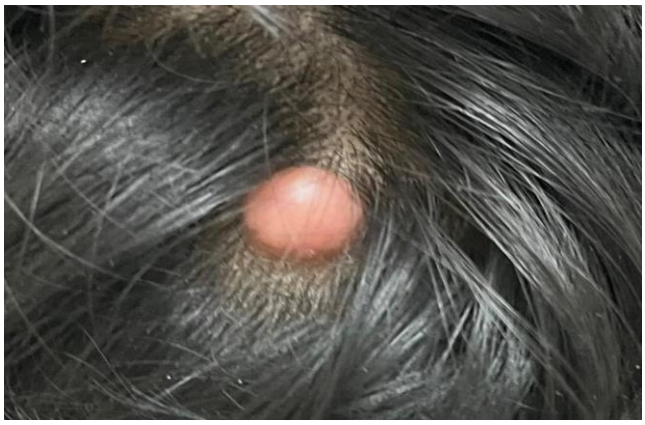

Figure 17. Clinical Picture of CYLINDROMA

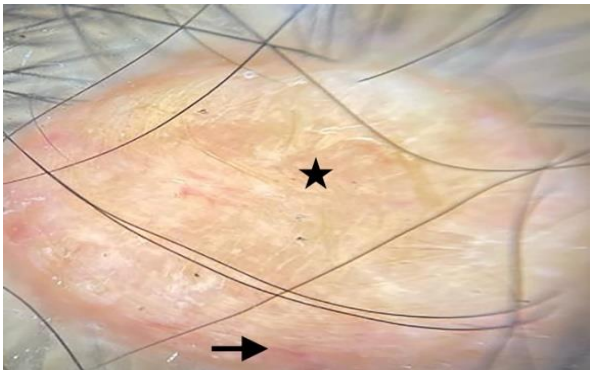

Figure 18. DermoscopyshowingSalmon pink-yellow colourbackground(star), arborizing blood vesselsat the periphery(black arrow)

Figure 19. Clinical picture of SYRINGOMA

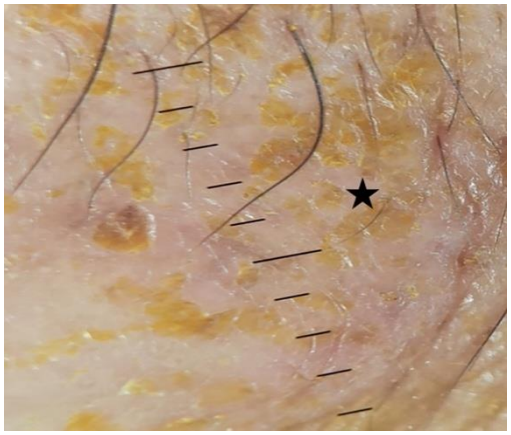

Figure 20. Dermoscopyshowing Multiple Light Brown Pigmented Clusterswith White Dots

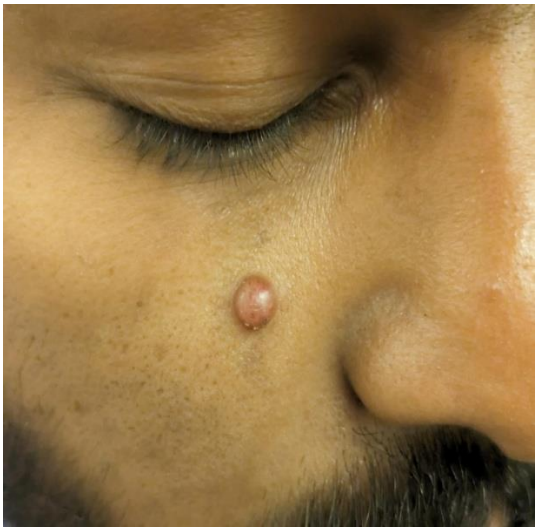

Figure 21. Clinical picture of XANTHOGRANULOMA

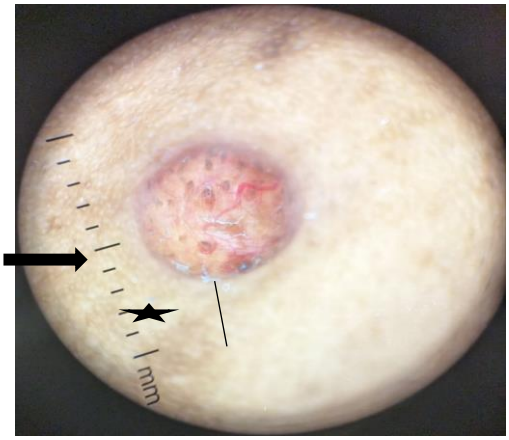

Figure 22. Dermoscopy (x10) showing red yellow centre (star), erythematous halo (black arrow), telangectasia (black line)

Discussion

The study focuses on a spectrum of diverse dermatological conditions, each with its unique clinical and dermoscopic features. Dermatoscopy, sometimes referred to as dermoscopy, epiluminescence microscopy, skin-surface microscopy and incident light microscopy is a low-cost, non-invasive in vivo method that makes it possible to observe

morphologic characteristics that are invisible to the naked eye [9].

Dermatofibromas, neurofibromas, trichoepitheliomas, angiofibromas, pyogenic granulomas, steatocystomas, keratoacanthoma, cylindromas, and syringomas are among the many dermatological disorders for which dermoscopy is essential in the diagnosis process. Practitioners can efficiently separate these disorders from one another and from malignant lesions by studying dermoscopic patterns as well as clinical symptoms. By combining dermoscopic and clinical examination, skin tumors that are benign or potentially malignant can be appropriately managed. This improves diagnosis accuracy.

Dermatofibroma

Increased fibrocytes in the dermis are a characteristic of dermatofibroma (DF), a fibrous tumour. Malignant melanoma and other pigmented tumours can be mistaken for dermatofibroma. Therefore, it's essential to distinguish DF from other tumours [10]. Numerous patterns that are revealed by dermoscopy aid in diagnosing [11]. In the present study, Dermatofibroma, characterized by its slow-growing, asymptomatic nature, presents as a firm, non-tender cutaneous nodule with a distinct smooth surface. It is notable for the "dimple sign" and exhibits dermoscopic features such as pseudofollicular openings, a peripheral pigment network, and a central white globule.

Neurofibroma

Neurofibroma is a benign peripheral nerve sheath tumor. When several lesions are present, clinical diagnosis is not difficult; solitary and pigmented lesions, on the other hand, are challenging to diagnose [12]. In the present study, itpresents as painless papules, nodules, or subcutaneous masses, often displaying the "buttonhole sign" and showcasing in the present study they appeared asfinger-print-like pigmentary lines, peripheral halo of hyperpigmentation, and a central homogeneous white scar on dermoscopy. Mucosal Neurofibroma,is highlighted by its discrete, non-tender, submucosal presence and exhibits unique dermoscopic features of a vascular reticulate network and a homogenous white background.

Trichoepithelioma

Follicular differentiation produces benign neoplasms called trichoepitheliomas (TE). Basal Cell Carcinoma (BCC) and solitary lesions are frequently mistaken. The authors discovered arborizing vessels in trichoepithelioma by comparing the reflectance confocal microscopy pattern and dermoscopic examination [13]. In the present study, Trichoepithelioma, presents as skin-colored dome-shaped papules that are firm, shiny, and can coalesce into plaques. Its dermoscopic features include milia-like cysts, a white-brown background, and structureless shiny white structures.

Angiofibroma

On the face and genitalia, angiofibromas (AF) are smooth, glossy, little tumours with a reddish brown colour. There have been reports of AF dermoscopy affecting the penis and nose. The motifs are white globules on a backdrop that is either pinkish or whitish-red [14]. In the present study, Angiofibroma, benign fibrous neoplasms associated with certain syndromes is was seen as dome-shaped papules and showcases yellow-white dots, unevenly distributed brown pigmentation, and the presence of crypts on dermoscopy.

Pyogenic Granuloma

A frequent vascular tumour of the skin and mucous membranes, pyrogenic granuloma (PG) appears as a pink lump that bleeds when touched. Pyogenic granuloma is a benign vascular tumor of skin and mucus membrane which bleeds on touch. It is a clinical simulator of vascular tumours such as poroma and amelanotic melanoma. It is crucial to use

microscopy to confirm the diagnosis. Few dermoscopic patterns described in literature includesvascular structures, white collarette, white rail line, and reddish homogenous patches [15]. In the present study, Pyogenic Granuloma, a vascular tumor, presents as small, red, or skin-colored papules with an epidermal collarette of scales, often associated with the Band-aid sign. Its dermoscopic features encompass a reddish homogeneous area intersected by white lines and a white collarette.

Steatocystoma

Steatocystoma, a hamartomous malformation, appears as multiple translucent flesh-colored to yellow dome-shaped papules or nodules and exhibits dermoscopic features of a yellow homogeneous area covering the lesion with peripheral reticulate brown pigmentation.

Keratoacanthoma

Keratoacanthoma (KA) is a fast-growing benign skin tumour consisting of squamous cells that keratinize and originate from pilosebaceous follicles. Presents clinically as a dome-shaped nodule with a crater and an inflammatory border. It bears similarities to desmoplastic melanoma, nBCC, and nodular squamous cell carcinoma [16]. In the present study, Keratoacanthoma, known for its low-grade, rapid growth, is characterized by dome-shaped nodules with thick yellow-white scales and a central keratin mass on dermoscopy.

Cylindroma

Cylindroma, a rare benign neoplasm, manifests as multiple cutaneous nodules on the scalp and showcases a salmon pink-yellow color background with arborizing blood vessels at the periphery.

Syingoma

Sweat duct tumours known as syringomas (SR) manifest as skin-colored papules on the face, particularly beneath the eyes. They are interchangeable with trichoepithelioma, milia, hydrocystoma, and xanthoma. There aren't many reports on syringema dermoscopy in the literature. A study described a lower limb linear syringoma as having uniform light brown pigmentation with multifocal white regions and a delicate pigment network at the perimeter [17]. Syringoma, appears as multiple dome-shaped or flat skin-colored papules, featuring a characteristic histopathological pattern and dermoscopic features of multiple light brown pigmented clusters with white dots in the present study.

This diverse range of dermatological conditions underscores the importance of recognizing their distinctive clinical and dermoscopic features for accurate diagnosis and appropriate management.

This study highlights the significance of various dermatological conditions through clinical and dermoscopic examination. Even though they are both benign fibrous tumors, dermatofibromas (DF) and neurofibromas differ in that DF has the "dimple sign" and particular dermoscopic patterns like pseudofollicular openings and peripheral pigment networks, while neurofibromas have the "buttonhole sign" and distinct pigmentation patterns [18]. Trichoepitheliomas (TE) are distinguished by unique dermoscopic features such as cysts resembling milia, which can be mistaken for basal cell carcinoma, and skin-colored, dome-shaped papules [19]. Angiofibromas can be distinguished from other lesions by their yellow-white spots and crypts, which give them the appearance of dome-shaped papules [20]. Pyogenic granulomas are little red papules that have a characteristic white collarette. A dermoscopic examination is necessary to evaluate other vascular tumors before treating pyogenic granulomas [21]. While keratoacanthomas might resemble more serious illnesses like squamous cell carcinoma due to their central keratin mass and quickly expanding nodules, steatocystomas can be distinguished by their

translucent papules and distinct dermoscopic appearance [22]. While syringomas and cylindromas are less common, they also have unique dermoscopic characteristics, such as several light brown clusters in syringomas and arborizing vessels in cylindromas [23]. Understanding these distinct clinical and dermoscopic features is essential for precise diagnosis and efficient treatment of these various dermatological disorders.

Conclusion

Non-melanocytic benign skin cancers can be distinguished from potentially more serious disorders primarily by their unique dermoscopic features. The research highlights the tremendous value of dermoscopy as a non-invasive imaging technique that greatly improves diagnostic accuracy and directs suitable treatment plans. This method makes it easier to diagnose benign skin tumors and develop individualized therapies by recognizing the distinctive dermoscopic characteristics of each type of tumor. Dermoscopy has many useful benefits in contemporary dermatological treatment, one of which is its capacity to minimize the need for biopsies, especially in parts of the body that are sensitive to cosmetics or for patients who are uncomfortable with intrusive procedures. Furthermore, the ability to track lesion progression through digital documentation improves patient care by providing a non-invasive way for those who decide against having lesions removed to observe changes over time. Dermoscopy is becoming a vital addition to dermatology, providing substantial benefits to patient care and benign skin tumor management. The continued application of dermoscopy in standard practice will be essential to maximizing therapeutic results and diagnostic precision as the discipline develops.

Acknowledgement

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Conflict of Interest

The authors hereby declare that there is no conflict of interest in this study.

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