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Role of onychoscopy in diagnosis of psoriatic nail disorders in adults

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Abstract
Nail psoriasis (NP) is a prevalent and impairing form of plaque-type psoriasis that has a significant impact on the patient's physical and mental well-being. The prevalence of NP without any involvement in skin or arthritis ranges from 0% to 6%. Dermoscopy of the nail bed is quite beneficial for individuals with NP as it enables the observation of the erythematous border that surrounds the outermost part of the detachment. Onychoscopy refers to the use of dermatoscopy to examine the nail unit and its parts. Onychoscopy facilitates enhanced and more detailed examination of nail characteristics that are not obvious to the naked eye. Nevertheless, nails possess a more intricate composition compared to skin, therefore onychoscopy diverges from skin dermatoscopy in notable manners.

Keywords: Polythene utilization, adults

Introduction
The nail is an in folding of skin that forms at the tip of every digit or toe. It consists of four distinct parts: the hyponychium, nail bed, matrix and proximal nail fold [1]. The process of determining the specific cause of nail diseases is frequently characterised by a lack of clarity [2]. Nail psoriasis (NP) is a prevalent and impairing form of cutaneous plaque-type psoriasis that has a significant impact on the patient's physical and mental well-being. The prevalence of NP without any involvement in the skin or arthritis ranges from 0% to 6% [3]. For differential diagnosis, it might be essential to use dermoscopy and mycology. Nail biopsy is beneficial in circumstances where there is uncertainty [4].
Onychoscopy refers to the dermatoscopic study of the nail unit and its many components. Onychoscopy facilitates enhanced and more detailed examination of nail characteristics that are not discernible to the naked eye. Nevertheless, nails possess a more intricate composition compared to skin, resulting in notable distinctions between onychoscopy and skin dermatoscopy [5].

Physiology of the nail unit
The hardness of nails mostly results from the ultrastructural arrangement of keratin fibrils. The majority of keratin fibres in the nail are aligned perpendicular to the growth direction and parallel to its surface. The stability of the keratin fibres is ensured by the disulfide bridges formed by the cystine molecules, as well as by the twofold convexity of the plate in both longitudinal and transverse directions. The presence of twofold curvature in this structure effectively avoids any lateral buckling from occurring [6]. The nail plate surface' pH averaged around 5 with toes exhibiting a notably higher pH compared to fingernails [7].
Elevated levels of D-amino acids have been detected in the nails of individuals with diabetes [8-10].
Arsenic, when consumed by drinking water or due to poisoning, can be detected in the nails. Nevertheless, the presence of magnesium or calcium in the nail doesn't accurately indicate the level of the bone mineralization [11].
The nail plate functions as a protective barrier that significantly restricts the passage of UVB radiation (280–315 nm). Between 3 and 20 percent of radiation with wavelengths between 313 and 500 nm is capable of passing through a healthy nail, whereas the ability to penetrate of this radiation through a nail affected by psoriasis is less than 4 percent [12].

Onychoscopy

Onychoscopy improves the visibility of nail characteristics, but it also aids in the identification of other distinctive and intriguing aspects that are not apparent to the naked eye [13].

Structure

The components of a dermoscope consist of an illuminating system, magnifying capabilities, and a power supplier. The dermoscope's faceplate contains achromatic lenses that give magnifying. The majority of handheld dermoscopes are connected to smartphones in order to gather images [14].

Instruments

1. Handheld dermoscope: compact and portable device, similar to an ophthalmoscope. Portable dermoscopes are convenient to use and are capable of being transported to various locations for the evaluation of a skin lesion [5, 15]. The device lacks storage capabilities and can just be accomplished by externally attaching smartphones or digital cameras [16]. The handheld dermoscope' lighting system comprises light-emitting diode (LED) bulbs. It is typically offering a maximum magnification of 14 times [14]. (Figure 1)

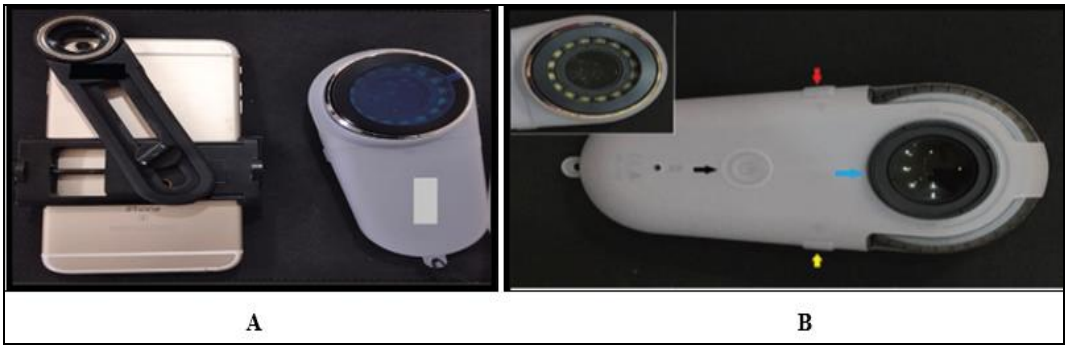

Fig 1: A) Handheld dermoscope features a power button (shown by the black arrow), a brightness increasing knob (indicated by the red arrow), a polarised and non-polarised knob (indicated by the yellow arrow), and a faceplate (indicated by the blue arrow). The system of illumination features a circular arrangement of light-emitting diode lights [5, 15]. Additionally, B) the dermoscope may be easily attached and detached from a smartphone via a universal adaptor [14]

2. Video dermoscope: Equipped with a USB connector that must be connected to a computer system in order to display the patterns of the dermoscopy. It enables simultaneous display of patterns of the dermoscopy on a computer screen, with the capability of saving the images, also small videos can be taken with this instrument. Video dermoscopes provide higher magnification up to ×160 to ×220 [14, 17]. (Figure 2)

Fig 2: Video dermoscope provides visualization of images on computer [17]

Technique of dermoscopy

There are two distinct dermoscopic techniques that allow specialists to observe the various structures to assist in the detailed analysis of dermoscopic patterns [14].

Polarized dermoscopy

After natural light hits the skin, it passes through refraction, diffraction, and mostly reflection, with just a small portion being absorbed by the object. Therefore, our eyes are unable to perceive the underlying structures within a specific breakout of skin [18]. In order to better visualise underlying structures, it is necessary to reduce the amount of "specular reflectance". This can be accomplished by utilising a glass plate with an ideal refractive index and an interface material in between, or by employing a method known as "polarised dermoscopy" [19].

Polarised dermoscopy involves the use of two specialised filters that are positioned at a 90° angle to each other. The light that passes through the initial filter, known as the source polarizer, retains its original phase and polarisation. When light hits the stratum corneum, a majority of it is reflected back and prevented from passing through by the second filter, known as the detector polarizer. This is because the light is in phase or has the same polarisation [20]. The polarised light that is absorbed and scattered by the underlying layers of the skin loses its polarisation and readily traverse the second filter to reach the light detector. This enables the visualisation of deeper structures of the skin, reaching a depth of up to 100 microns. The process by which light that has lost its polarisation has the ability for passing through a second filter while also blocking the reflected light that keeps its polarisation is referred to as "cross-polarization" [18].

Polarised dermoscopy enhances the visibility of deeper features, including the pigment network and vasculatures. Therefore, both modes complement one other to enhance the lesions' visual perspective [21].

Non-polarized dermoscopy

Non polarized dermoscopy necessitates direct contact with the skin surfaces and the use of an interface material. It is utilised to enhance the visualisation of superficial features such as milia-like cysts, comedones, crypts, scales, and fissures [18].

Wet dermoscopy illustrate the vascularity. Interface fluids commonly employed are 90% isopropanol, 70% ethanol, ultrasonic gel, water, and liquid paraffin. The ultrasonic gel is most commonly favoured due to its high viscosity, semi-transparency, and inert properties. This tool is specifically intended for examining the nails' convex surface and for

inspecting lesions closest to the eyes without any liquid dripping down.

Contact version-polarized dermoscopy is being utilised by numerous prominent dermoscopists worldwide. This refers to the act of making contact with the surface using lights that are in a polarised state. This is intended to enhance the brightness, clarity, and detail of structures [22].

Nail psoriasis

Nail psoriasis (NP) is an autoimmune disorder characterised by the presence of nail discolouration, pitting, and alterations in nail structure. The prevalence of NP without any involvement in skin or arthritis ranges from 0% to 6% [3]. Psoriasis-related nail illness mostly impacts the thumbnail of the dominant hand, followed by the remaining nails that are most involved in hand function [23]. The clinical manifestations in individuals with nail psoriasis arise as a result of inflammatory processes in either the nail bed or the nail matrix. The incidence of nail involvement is higher in fingernails compared to toenails. The nail matrix exhibits several characteristics such as onychomadesis, pitting, leukonychia, Beau's lines, red patches in the lunula, and crumbling. The characteristics of the nail bed include onycholysis, splinter haemorrhages, oil-drop salmon patches, and subungual hyperkeratosis [24].

The incidence of the particular nail characteristics varies throughout various investigations. Onycholysis and pitting are prevalent manifestations in psoriatic fingernails. Toenails frequently experience onycholysis and subungual hyperkeratosis [25, 26].

- Nail pits are indentations on the surface of the nail that progress towards the tip of the nail as it grows [27].
- Onycholysis is the result of the nail plate detaching and air accumulating underneath it, leading to the distinctive white discoloration [28]. Excessive keratinization at the hyponychium leads to the buildup of keratin, which reduces the attachment of the nail plate into the nail bed [29]. Onycholysis first appears at the far end or side of the nail and gradually progresses towards the base where the nail grows [30].
- Subungual hyperkeratosis occurs when keratin accumulates underneath the nail plate, primarily on the distal nail bed, because of the buildup of cells which haven't shed. The condition affects the hyponychium and distal nail bed [31].

Dermoscopy of nail psoriasis

Dermoscopy is a useful tool for diagnosing psoriasis in cases where the clinical characteristics aren't typical. In individuals with fingernail onycholysis, dermoscopy of the nail bed is a valuable tool. It enables the visualisation of the erythematous border that surrounds the distal edge of the detachment [32]. The hyponychium can also be examined via dermoscopy, which reveals the presence of unevenly dilated, distributed, tortuous, and elongated capillaries [33]. The deterioration of the nail plate is an indication of severe psoriasis. Dermoscopy of the proximal section of the nail plate, where it emerges from the proximal nail fold, reveals that the irregularities in the nail plate are primary in nature. This means that they are caused by the nail matrix itself, rather than being a result of external environmental or microbial damage to the nail plate [34]. Dermoscopy of the nail bed during the subacute phase of pustular psoriasis (Hallopeau's acrodermatitis) reveals the presence of dilated vessels, scaling, haemorrhages, and potentially small pustules that are not visible to the naked eye [33]. (Fig 3)

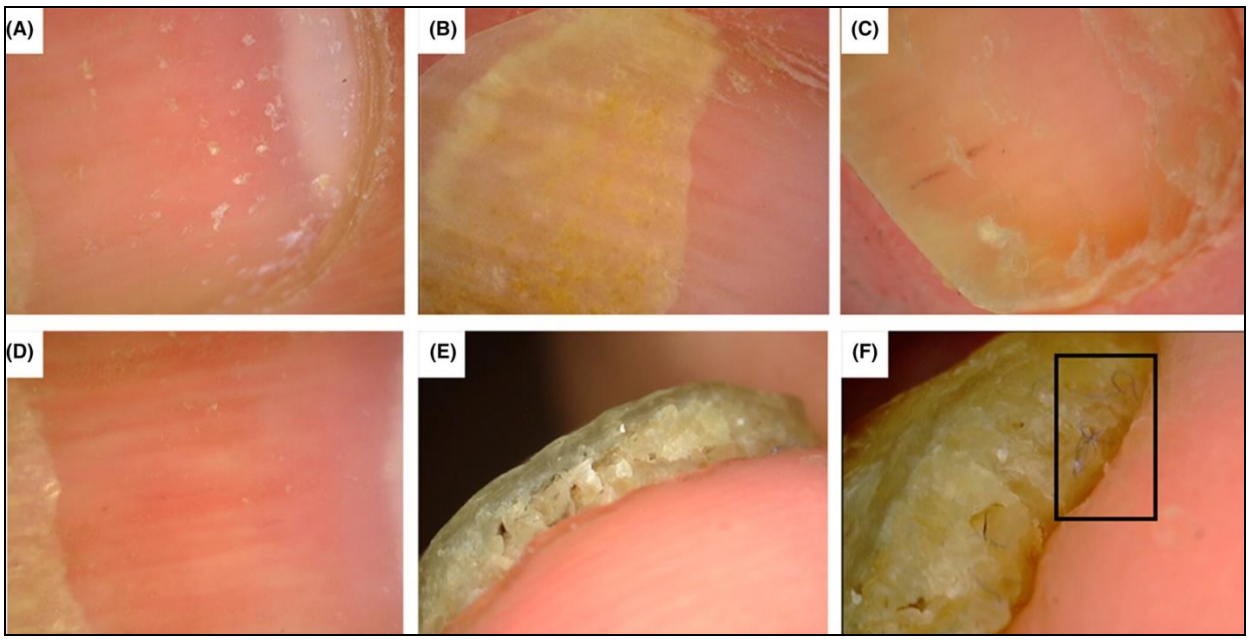

Fig 3: Dermoscopic manifestations of nail psoriasis (×50). (A) Pitting; (B) Onycholysis; (C) Splinter hemorrhage; (D) Dilated hyponychial capillaries; (E) Subungual hyperkeratosis; (F) pseudofibrous structures (black box).

Management of nail psoriasis

Topical treatment of nail psoriasis: An optimal formulation ought to consist of solution, ointment, or foam. For the management of a condition affecting only a few nails (involving three or fewer nails) and specifically targeting the nail matrix, the recommended initial therapy options include topical steroids combined with vitamin D analogues, in addition to intralesional steroid injections. Various treatment plans can be found in the literature [35].

Laser and light treatment of nail psoriasis

The management of nail psoriasis involves the use of either

a pulsed dye laser (PDL) utilising a wavelength of 595 nm or intense pulsed light (IPL) utilising a 550-nm filter. Administering PDL once a month for a 3-months period led to a notable decrease in the Nail Psoriasis Severity Index (NAPSI), particularly in the alleviation of onycholysis and subungual hyperkeratosis [36].

Conventional systemic treatment

Cyclosporine, acitretin, methotrexate, and fumaric acid, which are frequently prescribed systemic medicines for cutaneous psoriasis, have also been successfully employed in treating nail psoriasis [36].

Conflict of Interest

Not available

Financial Support

Not available

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