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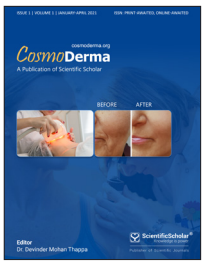

Resident Forum

Revisiting standardized skin surface biopsy to demonstrate Demodex mite

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Demodex is a spindle-shaped and transparent mite that populates the pilosebaceous follicles. It was first discovered by Henle in 1841. Simon later described it in detail in 1842.[1] We will discuss the structure of Demodex mite and the procedure to perform a standardized skin surface biopsy (SSSB) in this article.

DEMODEX

Demodex is a saprophytic mite. The adult *Demodex folliculorum* mites are 0.3–0.4 mm in length which commonly populates the follicular infundibulum of the face in groups of up to 10–15 mites.[2] *Demodex brevis* mites are 0.15–0.2 mm in length and are found solitarily in the deeper sebaceous glands and ducts of the neck and chest.[3] The mite is made of two fused segments. The first body segment provides attachment to eight, short, and segmented legs. It is covered with scales for attachment to the hair. While the posterior segment (opisthosoma) of *D. folliculorum* is long and tubular, *D. Brevis* has a short and pointed opisthosoma. The mite has pin-like mouthparts for ingestion of skin cells, sebum, and hormones present in the hair follicle. The eggs of *D. folliculorum* are over 100 μm long and arrowhead-shaped. *D. Brevis* eggs are < 65 μm long and oval. The mite has a lifespan of several weeks with dead mites decomposing inside hair follicles and sebaceous glands. The mite moves at a rate of 8–16 mm/h [Video 1]. The mite moves predominantly at night as light causes it to recede into the follicle.

DIAGNOSIS

The diagnosis of demodicosis can be done using SSSB, cellophane-tape preparations, and KOH preparation of skin scrapings/follicular material [Figure 1]. The mite can also be visualized using a slit skin smear. SSSB, initially described by Marks and Dawber,[4] is an easy method for making a diagnosis of demodicosis detecting density of Demodex mite.

PROCEDURE

Before starting the procedure, we must arrange for a glass slide, waterproof pen, cyanoacrylic adhesive, and microscope. The waterproof pen is used to mark an area of 1 cm^2 on the glass slide [Figure 2a]. The patient's face and the surface of the glass slide are cleaned with alcohol. A drop of cyanoacrylic adhesive [Figure 2b] is dropped over the slide. The slide is applied on a site with characteristic findings suggestive of disease activity; usually, the cheek is chosen [Figure 2c].

The adhesive is allowed to dry for 1–2 min. A mild burning sensation may be felt at this time. It is removed gently [Figure 2d]. It is covered with a coverslip after 2–3 drops of oil are dropped on the surface. They can be visualized under lower-power magnification (×20–40) in a microscope.

MICROSCOPY

SSSB can be used to observe ovum, larva, protonymph, nymph, and adult stages of the mite and dead mites. The eggs appear as oval, broad-based, oval-angled triangles, and notches or arrows with a sharp-pointed stem.[5] These acorn-like eggs develop leg protrusions as they grow in length. The Demodex mites stick to the slide with their tails as they stand upside down on the hair follicle. The Demodex density is calculated by counting the number of mites on a 1 cm^2 area. A Demodex density higher than 5/cm^2 is suggestive of demodicosis with a specificity of 98%.[1]

Video 1: Movement of limbs of demodex mite seen in microscope under high power (×40).

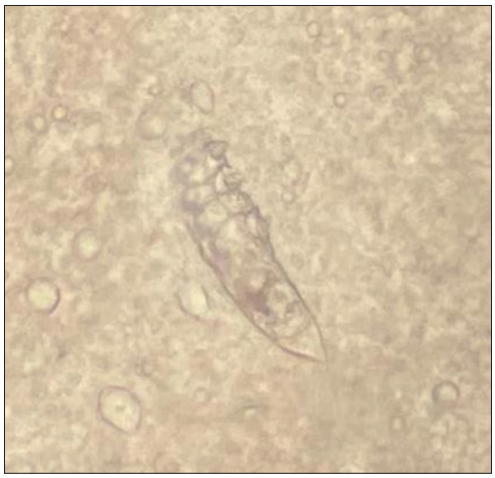

Figure 1: Demodex mite visualized in a microscope under high power (×40).

TIPS AND TRICKS

It is better to remove the hair before performing the procedure as the adhesive sticking to the hair causes pain.

Often, there may be fewer mites seen on the first attempt. This is because sebum and epithelial debris decrease the visibility of the Demodex mite. If we perform two/three SSSB on the same area, false negatives can be avoided.

While false negatives can also be avoided by cleaning the skin and slide with ether (removes more sebum and improves adherence),[6] it is practical to use alcohol as ether tends to evaporate quickly.

Some dermatologists may find applying the slide to the skin after putting a drop of cyanoacrylate adhesive on the slide difficult. In that case, a drop of cyanoacrylate adhesive may be put on the cheek [Figure 3] and the slide may be applied to it after that. The Demodex mites within the 1 cm^2 area should be counted for Demodex density.

While viewing through the microscope, the Demodex mites and eggs are better visualized if the aperture diaphragm is turned down as the field becomes darker.[5]

The mites do not survive for a long time under oil immersion. Therefore, the sample must be seen under a microscope as early as possible. Olive oil can be used to increase the vitality of the mites to 3–5 h.[5,7]

Figure 2: (a) Glass slide with 1 cm^2 area marked over it (b) cyanoacrylate adhesive for standardized skin surface biopsy, (c) applying the glass slide with cyanoacrylate adhesive over the involved area, (d) glass slide post procedure with superficial layers of skin attached to it.

Figure 3: Modification of the procedure where the cyanoacrylate adhesive to applied over the skin.

Dermoscopic examination of the SSSB can be attempted in case a microscope is not available.

CLINICAL SIGNIFICANCE OF DEMODEX MITE

The actual prevalence of the Demodex mite in humans is 100%. They are transferred between hosts by contact of hair, eyebrows, and sebaceous glands on the nose.[8] They have a pathogenic role only when the density is high. The infestation may be clinically inapparent or may manifest in the form of different pathological entities. The cutaneous conditions caused by demodex mites are called demodicosis or demodicidosis.

Increased demodex density is commonly implicated in rosacea. It manifests as a dry type of rosacea called rosacea-like demodicidosis.[9] Demodicidosis may also manifest as non-specific facial dermatitis including facial pruritus with/without erythema, seborrheic dermatitis-like eruption, perioral dermatitis-like lesions, and acneiform lesions without telangiectasia, flushing, or comedones.[10] The demodex mite has also been implicated in steroid-induced rosacea, androgenetic alopecia, and madarosis secondary to *D. folliculorum* infestation. Studies documenting the presence of demodex mite with spores of *Microsporum canis* inside them have opened the possibility of them acting as a vector for transmission.[11]

PREVENTION AND TREATMENT

Cleaning the face twice daily with a non-soap cleanser and avoiding greasy makeup and cleansers can prevent the proliferation of demodex mite. Treatment options include crotamiton cream, permethrin cream, and topical metronidazole. Severe cases might require oral ivermectin.

Dermatologists should be aware of the structure of demodex mite and be comfortable performing SSSB. Early diagnosis and proper treatment of demodicidosis will go a long way in improving the quality of patient's life and saving their time.

Declaration of patient consent

Patient consent is not required as the patient's identity is not disclosed or compromised.

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Conflicts of interest

There are no conflicts of interest.

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