ADVANCED NONINVASIVE DIAGNOSTIC METHODS OF PARASITIC SKIN DISEASES

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PARASITIC SKIN DISEASES

- **Cutaneous parasitic skin diseases** are frequent in human pathology.
- The most common group of neglected parasitic diseases are caused by ectoparasites such as **scabies**, **pediculosis** (head lice, body lice and pubic lice), **demodicosis**.
Dermoscopy: Dermoscopy is a non-invasive diagnostic technique that allows for the visualization of skin structures at a higher magnification than the naked eye. It is particularly useful in the diagnosis and monitoring of demodicidosis.

**Dermoscopic picture:** Demodex “tails” (arrow), Demodex “follicular openings” (star), filaments protruding out of follicular openings (circle), erythema and non-specific scales.

Diagnostics: Dermoscopy

- **Dermoscopy** can be used to aid diagnosis of Pediculosis.
- Nymphs and adults are difficult to see, but the eggs that attach to the hair are easily identified.

**Figure (A) Pediculus capitis** on the scalp (Photo courtesy of Dr. Daniel França). Figure (B) Nits, attached to the hair.

Cardoso, Alberto Eduardo Cox, Cardoso, Alberto Eduardo Oiticica, Talhari, Carolina, & Santos, Monica. Update on parasitic dermatoses, Anais Brasileiros de Dermatologia, 2020; 95(1), 1-14. URL: https://doi.org/10.1016/j.abd.2019.12.001
• Videodermoscopy presenting one louse during blood meal. It is possible to observe blood in its intestinal tube.

**Video:** Videodermoscopic look of *pediculosis corporis*

Thanks to videodermoscopy (Figure 2):
- it is possible to distinguish, with sufficient clarity, the **eggs of the Sarcopes** located behind the mite. The **oval eggs are grouped at a short distance from each other with a major axis**
- There are also the parasite’s feces appear as small white-gray spheres

**Figure 1:** Objective examination of scabies in adults (L) and children (R). **Figure 2.**

Confocal laser scanning in vivo microscopy of Demodex mites

Figure. Images obtained using confocal laser scanning microscope VivaScope 1500® Lucid Inc., Rochester, NY). Hair follicles and sebaceous glands with the presence (left) and absence (right) of Demodex mites

Demodex was defined as rounded or long cone-shaped formations in hair follicle orifices and sebaceous glands

Confocal laser scanning in vivo microscopy of Sarcoptes scabiei

**Figure 1.** Sarcoptes scabiei observed at the end of a burrow by handheld confocal microscopy.


**Figure 2.** RCM image at 5.97 μm below the outer skin level.

The ovoid body of the S. scabiei mite is visible inside the hyporeflective burrow. Two anterior legs (white arrows) including the coxa (blue arrow) as well as the head (red arrow) are discernible. Levi A, Mumcuoglu KY, Ingber A, Enk CD. Assessment of Sarcoptes scabiei viability in vivo by reflectance confocal microscopy. Lasers Med Sci. 2011;26(3):291-292. doi:10.1007/s10103-011-0894-1
Advantages of Confocal laser scanning in vivo microscopy:
◊ Possibility to visualize mites located in deeper layers of the skin that are not accessible for scarification.
◊ It makes it possible to scan various layers of the skin, which allows determining the depth of the mites (≈ 46.63 μm); counting the number and setting the size of the mites.
◊ The absence of traumatization of the epithelium and the painfulness of the procedure.

Scabies mites was visualized in vivo with OCT. According to latest data, *scabies mites were identified in the vertical images as an ovoid structure (mango-/almond-shaped) measuring approximately 0.20 × 0.30 mm or less in the epidermis just beneath the stratum corneum.*

**Figure.** a, b Vertical OCT image of the skin of an interdigital finger web. The mango-shaped mite (encircled) is surrounded by the hyperreflective burrow wall. The mite is just below the stratum granulosum (white dot). The epidermis is indicated by a white bar.