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Derm Diagnostics

Linda Frank
lfrank@utk.edu

Derm Diagnostics 101

Linda A. Frank, MS, DVM, DACVD

There are many routine tests that we use to diagnose and monitor dermatologic conditions. I am going to briefly describe some of these techniques, their uses and limitations.

Skin scrapings

- Skin scrapes are one of the most common dermatologic diagnostic tests. This relatively simple and quick test can identify many types of parasitic infections. Although not always diagnostic, the relative ease and low cost makes it an essential test in a dermatological minimum data base.
- With our increasing awareness of transmittable diseases (Bartonella, Rickettsii, FeLV, FIV, herpes, and papilloma virus), the reusing of scalpel blades for skin scrapes is not recommended.
- Superficial skin scrapes (for *Sarcoptes*, *Notoedres*, *Demodex gatoi*, *Cheyletiella*)
  A dulled scalpel blade is held perpendicular to the skin and used with moderate pressure to scrape in the direction of hair growth. If the area is haired it may be necessary to clip a small window to access the skin. Large areas are scraped (2-5 inches) to maximize the chance of finding a mite. Applying mineral oil directly to the skin to be scraped helps dislodge debris and makes it easier to collect the scraped material. Since these mites do not live deep in the skin, it is not necessary to visualize capillary oozing or blood. The most productive sites for sarcoptic mites include the ear margin and lateral elbows. *Demodex gatoi* in cats may be more easily found over the shoulders.
- Deep skin scrapes (for *Demodex spp*. except *D. gatoi*)
  A dulled scalpel blade is held perpendicular to the skin and used with moderate pressure to scrape in the direction of hair growth. After several scrapes, the skin should become pink with the capillaries becoming visible and oozing blood. This assures that the material collected is from deep enough within the skin to collect the follicular *Demodex* mites. The skin should be squeezed to express the mites from deep in the follicles into a more superficial area so that they are more easily collected. In some situations (Shar peis or deep inflammation with scarring), it may be impossible to scrape deep enough to harvest the *Demodex* mites. These cases are few in number but require biopsy to identify the mites in the hair follicles. Hair-plucks from an area of lesional skin may be used to help find mites but the accuracy of this technique compared to skin scrapes is unknown. Make sure you sample at least 3 representative lesions.

- The entire slide should be searched for mites using low power (usually a 10X objective). It may be helpful to *lower the microscope condenser* which increases the contrast for better visualization of the mites and eggs.

Mites	**Diagnostic test**	**Accuracy**	**Other tests**
Demodex canis *Demodex injai* *Demodex cati*	Deep scrape	HIGH	Biopsies may be needed in extremely thickened lesions
Demodex gatoi	Superficial scrape (between shoulder blades)	LOW May be hard to find mites	PCR, fecal flotation, lime sulfur dip trial
Sarcoptes scabieii	Superficial scrape	LOW	Response to treatment
Cheyletiella	Flea comb, tape prep, superficial scrape, vacuum	LOW to MODERATE	Vacuum collection, fecal flotation
Notoedres cati	Superficial scrape	HIGH	

Cutaneous cytology

- Cutaneous cytology is the second most frequently employed dermatological diagnostic technique. Its purpose is to identify bacterial or fungal organisms (yeast), the infiltrating cell types, neoplastic cells, or acantholytic cells.
- Direct Impression Smear - Moist exudate is collected from pustules, erosions, ulcers, or draining lesions. Alternatively, crusts can be lifted revealing a moist undersurface. Papular lesions can be traumatized using the corner of a glass slide or a needle and then squeezed to express fluid. The slide is air dried, then stained using a commercially available cytology stain and gently rinsed. A low power objective is used to scan the slide and select ideal areas for closer examination. High power (100X oil objective) is used to identify individual cell types as well as bacteria or fungal organisms.
- Acetate tape preparations - Tape preps are used to evaluate **SURFACE** colonization of bacteria or yeast in a variety of different conditions. The basic technique involves using crystal clear tape (single or double sided) to collect a sample of hair or superficial skin debris. The tape is repeatedly applied to the area in question. It is then adhered to the end of a glass slide and stained with a cytology stain (omitting the first alcohol stain solution). The tape is then placed, sticky side down, onto the slide and all water is milked from the sample. The tape

serves as a cover slip and can be examined using high power (100X oil objective) to identify *Malassezia* or bacterial organisms.

Otic Cytology

- Otic cytology is used to identify secondary yeast and bacterial otitis externa and to monitor response to treatment. It will also aid in determining when a culture is indicated. Collect debris with a cotton swab. The goal is to obtain material from the junction of the horizontal and vertical canal. The sample is placed on a slide and stained with cytology stain. The slide is examined at low power to find a cellular area and then using the oil immersion objective to identify the organisms. Remember to make note of the presence of any inflammatory cells.

Trichogram (for the evaluation of the hair tips, shafts, and roots)

- A trichogram is used to visualize the hair for evidence of pruritus, fungal infection, pigmentation defects, and growth phase.
- A small amount of hair to be examined is epilated. Mineral oil and a cover slip are used to secure the hair sample in position on a glass slide. The sample is examined using low power (4X or 10X objective).
- The hair tips are usually evaluated to determine if a patient is pruritic (especially cats) or if there is a non-traumatic cause of the hair loss (endocrine disease or follicular dysplasia). Pruritic animals will break the tips off the hairs leaving a broken end that can easily be detected. This determination is especially useful in feline patients when the owners are not convinced that the patient is pruritic. This technique is not useful for animals that get clipped regularly.
- The hair roots may be examined to identify anagen and telogen hairs in an attempt to determine if the hair follicles are cycling normally. In most breeds, the majority of hairs will be in the telogen stage but some anagen hairs should be identifiable. In breeds with prolonged growth periods (poodles), most of the hairs may be in anagen with relatively few hairs in the telogen stage. In telogen defluxion, all of the hairs epilated are in telogen.
- Dermatophyte ectothrix spores can sometimes be visualized in patients with dermatophytosis. Identifying the ectothrix spores can be difficult and may require a clearing agent like KOH to help dissolve the excessive keratin. The cortex of the hair will appear swollen and damaged. The spores (small spherical structures) may be clumped around the damaged region of the hair shaft.
- Hair plucks can be used to diagnose demodicosis in difficult to scrape sites.
- Hair shafts can be examined for abnormal pigment clumping which would be suggestive of color dilution alopecia and follicular dysplasia. Other hair shaft abnormalities have been reported but are extremely rare.