Derm Diagnostics: Using Simple Tests for Maximum Yield

The words tape, scrape and DTM are synonymous with veterinary dermatology. These procedures are routinely performed in everyday practice and provide value to the patient. Uncertainty about proper technique is commonly expressed when interacting with veterinarians of all experience levels. This presentation will utilize a series of photos to demonstrate techniques and tips for tape cytology, superficial and deep skin scrapes, DTM, sample collection for bacterial culture/sensitivity testing and biopsy.

Tape cytology is a useful tool to ruling out secondary infections. One of the first studies to tout the importance of cytology was published in 1979. To quote from two of the author’s favorite sources: "An enormous amount of vital diagnostic data can be obtained by microscopic examination of stained material, such as smears of tissues or fluids, during a clinical exam ... often supplies sufficient data to narrow a differential diagnosis and develop a diagnostic plan." From a more recent publication on feline dermatology: "Cytology can give rapid results and may help to suggest or even confirm a diagnosis." This invaluable tool helps the practitioner make informed decisions about proper therapy which in turn benefits the patient and improves client satisfaction. A series of photos will be presented to show optimal technique and examples of common cytological diagnoses will be shared.

Bacterial Culture and sensitivity is utilized frequently in the author’s practice. Pustules are easy lesions to sample. Ideally, at least two pustules will be present, one for cytology to confirm the presence of bacteria and one for collection of the C/S sample. A sterile needle can be used to open the pustule and cotton tipped applicator can be touched inside the open pustule. Epidermal collarettes can also be sampled. The tightly adhered crusts can be lifted with a sterile needle and a cotton tipped applicator can be used to swab underneath the lifted crust. A study published in 2005 demonstrated that dry sterile cotton swabs rolled across epidermal collarettes and submitted for aerobic C/S produced isolates of S. (pseud)intermedius from 18/22 dogs. In the same study, samples were collected from the healthy abdominal skin from 24 healthy dogs. Staphylococcal (pseud)intermedius was not isolated from any of the control dogs. Finally, with deep pyoderma or lesions of papular dermatitis, a biopsy for macerated tissue culture may be necessary. Prep the surface by lightly clipping if necessary and lightly brushing with antiseptic. Please do not perform a heavy surface prep. Chose the papules you want to biopsy and inject local lidocaine. I recommend ring block due to the presence of confounding studies in the medical literature as to whether lidocaine will hinder bacterial growth of S. aureus. Perform punch biopsy and submit sample in sterile red top tube. Additional information regarding when you should consider C/S testing can be found in a 2016 publication from the International Society of Companion Animal Infectious Diseases (ISCAID). The review article states “Bacterial culture of superficial bacterial folliculitis (SBF) is never contraindicated. It further describes 5 situations that may mandate C/S testing:

1. Less than 50% reduction in extent of lesions within 2 weeks of appropriate systemic antimicrobial therapy
2. Emergence of new lesions (papules, pustules, collarettes) 2 weeks or more after the initiation of appropriate antimicrobial therapy
3. Presence of residual SBF lesions after 6 weeks of appropriate antimicrobial therapy together with the presence of cocci on cytology (while typical course of therapy may be 21-28 days several studies indicate that therapy for up to 6 weeks may be necessary in some cases)
4. Intracellular rods-shaped bacteria are detected on cytology
5. Prior history of multi-drug resistant infection in the dog or in a pet from same household

**Skin scrapes:** Deep skin scrapes are useful for diagnosing the follicular mites such as *Demodex* species *canis, injai* and *cati*. You may need to clip the pelage in order to start working right at the surface of the skin. Squeeze the skin before scraping; envision pushing the mites upwards from deep inside the hair follicles. Place mineral oil on the blade and scrape in the direction of hair growth until capillary bleeding is noted. Place the material on a slide, turn the condenser down on your microscope and examine at 10x magnification. Superficial skin scrapes are useful for *Sarcoptes scabiei, Cheyletiella sp.*, *Notoedres cati, Demodex gatoi, Otodectes cynosus* and lice. You may need to consider clipping affected area(s) but try not to dislodge scale and crust as this may decrease your ability to find the parasite. Mineral oil can be placed directly on the blade or on the pelage/skin itself. The area is then gently scraped collecting material from the stratum corneum, no need to draw blood since these parasites live on or within the surface layers. Turn the condenser down on your microscope and examine at 10x magnification. Scabies can be difficult to find. Improve your chances by scraping several sites, typically ear margins, elbows, hocks and ventrum.

**DTM** (dermatophyte test medium) results can be optimized by following these steps. Sample collection can be enhanced by using a Wood’s lamp to collect hairs that fluoresce. Keep in mind this method is neither sensitive nor specific. A lack of fluorescence does not rule out dermatophyte since approximately 50% of *M. canis* strains will not glow. Additionally, positive fluorescence does not automatically confirm infection as fluorescing scale and debris can be distracting. Hairs can be collected by plucking with sterile hemostats or with the Mackenzie toothbrush technique. The best lesions to sample are new or expanding lesions and areas with scale, crust or broken hairs. The author’s clinic uses Dermaoplate-Duos. Package inserts recommend plates be kept cool prior to use (36-77°F), protect from light and warm to room temp before inoculation. Plates are monitored daily for growth of white or light colored cottony to powdery colonies at the same time as media color change. Dermatophyte colonies are never green, gray or black. The author tends to wait a few days to allow the colony to mature before opening the plate for identification. Remember some dermatophytes are zoonotic. Ideally, all plates should be handled under a laboratory hood and gloves should be worn. Use clear acetate tape and gently touch the surface of the colony. Apply the tape to a slide over a drop of blue stain (methylene blue, lactophenol cotton blue, blue Diff-Quik) and observe at 100x power.

**Dermatophytes**
- **Microsporum canis**
  - Contagious amongst pets
  - Macroconidia: Spindle shape, thick wall with 6 or more internal cells, terminal knob
- **Microsporum gypseum**
  - Originates from the soil
  - Macroconidia: Spindle shape, thin wall, 6 or fewer internal cells, no terminal knob
- **Trichophyton mentagrophytes**
  - Originates from rodent/rabbit nest
  - Macroconidia: Cigar shape, thin walls may also see spiral shaped hyphae and small grapelike clusters of microconidia
Biopsy is best performed on lesions that have been non-responsive to medical therapy over a period of time, ideally before chronic changes occur. The author prefers to treat secondary infections before biopsy. The author obtains samples from multiple sites that represent lesions in different stages of development. Skin biopsy does not need any surgical prep, to be sure cleaning and scrubbing is likely to remove valuable diagnostic material. Use a sharpie to circle or mark the four corners of the sites you would like to biopsy. The need for sedation is determined by patient personality but local lidocaine block is a must. Inject approximately 0.5 – 1 cc of lidocaine under each site. Keep in mind that each patient has a maximum lidocaine dose that can be injected. Wait at least 5 minutes before performing biopsy. A punch biopsy tool is placed vertically over the skin lesion. Rotate the punch in one direction with firm pressure until it moves into the subcutaneous tissue. Remove the punch, use forceps to grasp the sample deep near the panniculus tissue then cut with blade or scissors. Avoid grabbing the dermis/epidermis. Blot the sample with gauze to remove blood. Place in formalin. Close with simple interrupted or cruciate suture. Send the sample to a dermatophistopathologist and provide a thorough history and a list of your differential diagnoses.


