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## Diagnosis of ectoparasitic skin disease in small animal practice

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The diagnosis of skin disease is often difficult due to the similarity of clinical signs of many inflammatory dermatoses. Thus, taking a thorough history is extremely important in veterinary dermatology.

- The first important piece of information is the breed of the patient. Some breeds are predisposed to certain skin diseases and it may be worthwhile to keep a list of these breed predispositions in close reach. Shar Peis, West Highland White Terriers, Scottish Terriers, Bulldogs, Bullterriers and Weimaraner are some of the breeds predisposed for canine demodicosis.
- Next, the age of the patient may give some clues. Puppies are more commonly presented with ectoparasites such as *Sarcoptes scabiei*, *Otodectes cynotis* or *Demodex canis*.
- Affected sites can also fit a pattern seen more in some diseases than others. Table 1 outlines typical affected sites of certain diseases providing clues for the underlying disease

**Table 1:** Localization of lesions and/or pruritus of various skin diseases

Localization of lesions and/or pruritus	Common underlying diseases
Otitis externa	Atopy, adverse food reaction <b>Ear mites</b> Secondary infections?!
Pinnae	Atopy, adverse food reaction <b>Scabies</b> Vasculitis
Head/face	<b>Demodicosis</b> Atopy, adverse food reaction <i>Microsporum gypseum</i> Insect allergies
Paws	<b>Demodicosis</b> Atopy, adverse food reaction Malassezia dermatitis Pemphigus

- We would also like to know how long the disease is present, how did it progress and is it itchy? Acute onset of severe pruritus is more likely associated with scabies. Adverse food reaction may also sometimes have an explosive onset.
- *Are other animals in the household? Do they show cutaneous symptoms?* If other animals in the household are affected, contagious diseases such as scabies are more likely. However, other animals may serve as a reservoir for ectoparasites without showing clinical signs.
- *Does any person in the household have skin disease?* Two zoonoses of concern in veterinary dermatology are scabies and dermatophytosis (ringworm). However, if owners are not affected, the diseases can't be ruled out. Canine scabies affecting humans occurs as an itchy papular rash in contact areas such as arms and legs days to weeks after the pet started itching.

In addition to the history, a thorough physical examination is useful. As described above, the affected body sites can give clues to the underlying etiology. The primary lesion of canine demodicosis is a follicular papule or pustule (for which there are only two main differentials, bacterial folliculitis and dermatophytosis). Scabies presents typically with nonfollicular papules, cheyletiellosis with scaly dermatitis. Ear mites can often be seen with

otoscopic examination, the copious coffee-ground debris is classic and can be scooped up and evaluated in mineral oil under the microscope.

### **Diagnostic tests for ectoparasites**

#### **Superficial skin scrapings**

Superficial skin scrapings are taken from large areas, usually to detect *Sarcoptes* or *Cheyletiella*. Elbows, ear margins and belly are commonly scraped for *Sarcoptes* mites, the back for *Cheyletiella* mites. Mineral oil or pyrethrin ear drops should be put on the scalpel blade AND the skin to make debris stick easier and to prevent that the mites crawl away after being scraped off. Scrapings are done in the direction of hair growth. 50% of scabies cases may be negative on several scrapings. One mite or egg is diagnostic. It is important to scrape over a large area and in hairy dogs this may be easier if the hair is clipped away first. Should such clipping be necessary it is important not to remove the surface scale or crust which may be present, *Sarcoptes* mites are extremely superficially located within the epidermis and may be dislodged with such cleansing. We use scissors to remove the hair and select non-excoriated sites preferably with scale and papules as the lesions. Mineral oil is then applied to the affected skin, gently scraped off the surface, put on a slide, a cover slip is applied and the sample is evaluated microscopically.

#### **Deep skin scrapings**

Deep skin scrapings are performed to detect *Demodex* mites which live in the hair follicle (often very deep). Because they are deep it is useful to squeeze the skin prior to the scraping in an attempt to push the mites out from the depths of the follicles. A survey conducted by summer dermatology students realized a 50% higher mite count when squeezed prior to scraping. A blade covered with mineral oil should be used in the direction of hair growth until capillary bleeding is observed. Feet and faces are hard to scrape, Old English Sheepdogs, Scottish Terriers and especially Shar Peis may be negative on scrapings and may have to be biopsied for diagnosis. Although not documented it is thought that these breeds have more tortuous and deep hair follicles. More than 1 mite is diagnostic. When evaluating *Demodex* scrapings it is important to assess **and to note** the site of scraping, the relative numbers of adults (both live and dead), larvae / nymphs and eggs per LPF. In subsequent visits assessment of response to therapy relies on the comparison of such numbers, we routinely repeat scrape the same sites monthly when monitoring our demodicosis cases.

#### **Trichograms**

Positive hair plucks may render skin scrapings unnecessary in areas that are difficult to scrape such as the eye lids, periocular area, muzzle or feet. A forceps is used to forcefully pluck hairs in a partially or completely alopecic area. The hairs are then placed onto a slide and evaluated under low power. I usually use mineral oil and a cover slip to prevent hair blowing all over the table rather than remaining under the microscope. If you find *Demodex* mites hanging on the hairs, you do not need to perform a skin scraping. This is particularly useful when sites close to the eyes are affected or the lesions are very painful. However, only a positive result is diagnostic, a negative result necessitates skin scrapings.

#### **Tape preparations**

A direct impression technique uses clear sticky tape to collect debris from the surface of the skin. The tape is pressed several times sticky side down onto the skin. Next, it is pressed (also sticky side down) onto a slide. The tape serves as a cover slip: the sample can be evaluated even under oil immersion (with a small droplet of oil administered directly on top of the tape). This technique is especially useful for *Cheyletiella* mites, short-bodied *Demodex* mites and occasionally *Sarcoptes* mites, as a larger surface area can be sampled very quickly.

Remember, that all microscopic evaluations for ectoparasites should be undertaken with the condenser of the microscope down and the light source dimmed. A magnification of 40x or 100x is usually sufficient.

#### **Scabies treatment trial**

Any pruritic dog or cat could possibly be infested with *Sarcoptes scabiei* or *Notoedres cati* respectively, particularly if the pruritus was of sudden onset or if pinnae, ventrum and elbows are pruritic. With spot-ons used for flea control, I have seen patients with pruritus and lesions limited to ventrum and lower legs. Negative superficial skin scrapings do not rule out scabies, thus trial treatment is indicated in any patient with suspected scabies irrespective of negative skin scrapings. Several treatments for scabies are available. However, many of them are not registered for this use.

- Selamectin is a spot on registered for the treatment of scabies and ear mites in many countries. It also has been shown to be effective against cheyletiellosis. I use it every 2 weeks for 3 treatments.

- Moxidectin is available as a spot-on registered for the treatment of canine scabies as well.
- Topical treatments include lime sulfur dips, amitraz, ivermectin and other antiparasitic rinses. They are used weekly for 4 weeks.
- Systemic therapy may be undertaken with ivermectin or milbemycin. The routine protocol for a dog that did not receive ivermectin before, is a slow increase from 50 mcg/kg to 100 mcg/kg to 150 mcg/kg to 300 mcg/kg on subsequent doses every day. The owners get told to monitor the animal carefully during that time for the above mentioned side effects. If any signs of ataxia or tremors occur, administration of the drug must be discontinued immediately. Once the maintenance dose is reached, we continue that dose once weekly for 3 more weeks in suspected or proven cases with scabies, cheyletiellosis or infestations with *Otodectes cynotis*. Giving milbemycin oxime at 2 mg/kg twice weekly for 3-4 weeks has also proven a very safe, easy and successful treatment protocol for canine scabies.
- All animals in contact with the patient need to be treated as well!
- Initial deterioration during the first days of treatment may occur and may be treated with glucocorticoids daily for 3-4 days at 1 mg/kg body weight.
- Remission should be achieved within 4 weeks in most patients, although extended treatment for 8 weeks has been needed in some patients.

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