Claw & Claw Bed Diseases

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YOU HAVE ASKED...

What do I need to know to approach and treat claw and claw bed diseases in dogs and cats?

THE EXPERTS SAY...

Claw and claw bed diseases (see Table 1, next page) occur in dogs and cats of any age, sex, and breed, affecting (as the only abnormality) 1.3% dogs and 2.2% of cats.1-3 Although claw and claw bed diseases are usually local in nature, they can also be a sign of more generalized disease, so complete physical examination and consideration of systemic disease is essential.

Diagnostics

A thorough history and complete physical examination—including attention to all paws, claws, and skin—is necessary.

When a single claw is affected, trauma or neoplasia (± bacterial infection) may be suspected. When neoplasia is suspected, further diagnostics (eg, radiographs of the affected paw, thoracic radiographs, peripheral lymph node aspirates of affected limb, abdominal ultrasonography) may be indicated. When 2 or more claws are affected, other causes, (eg, parasitic infections, fungal disease, vasculitis, nutritional imbalances, or symmetric lupoid onychodystrophy [SLO]) should be considered.

The basic diagnostic package includes CBC; serum chemistry panel; claw bed cytology; skin or claw bed scraping; and, potentially, bacterial or fungal culture. Radiographs and possibly biopsy of affected digit(s) may also be indicated.

Trauma-Induced Disease

Trauma is the most common cause of claw disease in the dog and the second most...
## TABLE 1

**CLAW BED TERMINOLOGY**

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anonychia</td>
<td>Absence of claws</td>
<td>Congenital, trauma, iatrogenic</td>
</tr>
<tr>
<td>Brachyonychia</td>
<td>Shortened claws</td>
<td>Normal variant, congenital, trauma, iatrogenic from trimming</td>
</tr>
<tr>
<td>Leukonychia</td>
<td>Claw whitening</td>
<td>Normal variant, iatrogenic, trauma</td>
</tr>
<tr>
<td>Macronychia</td>
<td>Unusually large claws</td>
<td>Congenital, normal variant, leishmaniasis</td>
</tr>
<tr>
<td>Micronychia</td>
<td>Unusually small claws</td>
<td>Congenital, normal variant, iatrogenic</td>
</tr>
<tr>
<td>Onychalgia</td>
<td>Claw pain</td>
<td>Iatrogenic, trauma, bacterial infection, SLO, idiopathic, neuropathic, neoplasia</td>
</tr>
<tr>
<td>Onychatrophia</td>
<td>Atrophy of claws</td>
<td>Trauma, iatrogenic, bacterial, fungal, SLO, parasitic, neoplasia</td>
</tr>
<tr>
<td>Onychauxis</td>
<td>Hypertrophy of claws</td>
<td>Normal variant, neoplasia</td>
</tr>
<tr>
<td>Onychitis</td>
<td>Inflammation anywhere in claw</td>
<td></td>
</tr>
<tr>
<td>Onychodystrophy</td>
<td>Abnormal claw formation</td>
<td>Normal variant, bacterial, fungal, demodicosis, <em>Ancylostoma</em> spp, neoplasia, previous trauma, SLO</td>
</tr>
<tr>
<td>Onychogryphosis</td>
<td>Abnormal curvature of claws</td>
<td>Normal variant, <em>Ancylostoma</em> spp</td>
</tr>
<tr>
<td>Onycholysis</td>
<td>Separation of claw structure at its proximal attachment and progressing distally</td>
<td>Trauma, bacterial, fungal, neoplasia, SLO</td>
</tr>
<tr>
<td>Onychomadesis</td>
<td>Sloughing of claws</td>
<td>Trauma, neoplasia, SLO, bacterial</td>
</tr>
<tr>
<td>Onychomalacia</td>
<td>Softening of claws</td>
<td>Normal variant, SLO, neoplasia</td>
</tr>
<tr>
<td>Onychomycosis</td>
<td>Fungal infection of claws</td>
<td></td>
</tr>
<tr>
<td>Onychopathy</td>
<td>Disease of claws</td>
<td></td>
</tr>
<tr>
<td>Onychorrhexit</td>
<td>Fragmentation and horizontal separation in lamellae at free edge of the claw</td>
<td>Normal variant, SLO</td>
</tr>
<tr>
<td>Onychorschizia</td>
<td>Splitting of claw, usually beginning distally</td>
<td>Trauma, normal variant, immune-mediated, neoplasia</td>
</tr>
<tr>
<td>Pachyonychia</td>
<td>Thickening of claws</td>
<td>Normal variant, neoplasia, inflammation</td>
</tr>
<tr>
<td>Paronychia</td>
<td>Infection or inflammation of claws</td>
<td>Trauma, bacterial, fungal, demodicosis, SLO, neoplasia, pemphigus foliaceus</td>
</tr>
<tr>
<td>Platyonychia</td>
<td>Increased curvature of claw in long axis</td>
<td>Normal variant, congenital</td>
</tr>
<tr>
<td>Trachyonychia</td>
<td>Roughness of claws with brittleness and splitting</td>
<td>Immune-mediated, SLO</td>
</tr>
</tbody>
</table>
Parasitic disorders can be diagnosed by history, presence of other signs, skin scrapings for *Demodex* spp, and fecal analysis for hookworms. Treatment is based on the affecting parasite and is beyond the scope of this article.

**Leishmaniasis (*Leishmania* spp)**
This condition is known to cause onychogryphosis¹ and abnormally long, brittle claws⁵ with no other signs; it can also cause exfoliative dermatitis on the head, pinnae, and extremities; periocular alopecia; and ulcerative dermatitis. Systemic signs may include weight loss, small or large bowel diarrhea, pronounced masticatory muscle atrophy, bilaterally symmetrical lameness, epistaxis, conjunctivitis, blepharitis, generalized weakness, and lethargy.⁶

Leishmaniasis (rare in the United States) is diagnosed through cytologic or histopathologic evaluation of visible lesions, lymph nodes, and bone marrow; serology; evaluation of cutaneous delayed-type hypersensitivity; in vitro lymphocyte proliferation test to *Leishmania* spp antigen; Western blotting; and/or polymerase chain reaction assays.⁶ Leishmaniasis is usually incurable; treatment is focused on alleviating signs and decreasing parasite load.

**Bacterial Causes**
Bacterial infections of the claw and claw bed are common and can present as par-
onychomycosis. These infections should be considered secondary, with trauma as the most common inciting cause. Regional lymphadenopathy, fever, and depression can occur when multiple claws are affected. Osteomyelitis is often present in chronic claw bed bacterial infections.

Treatment methods include removal of the fractured claw portions (if indicated), systemic antibiotics, topical antibacterial agents, and paw soaks. Systemic antibiotics should be continued at least 2 weeks past clinical resolution, generally for 4 to 6 weeks as nail based bacterial infections are considered deeper infections. Empirical antibiotics include a β-lactam antibiotic (eg, cephalaxin, clindamycin). Whenever possible, antibiotic choice should be based on culture and susceptibility results. Topical paw soaks with 2% to 4% chlorhexidine-containing products (solutions or shampoos), with or without Epsom salts, are often a helpful adjunctive therapy.

**Fungal Causes**

Fungal infections of the claws (ie, onychomycosis) can present as onychomalia and/or trachyonychia. Reported causes include *Trichophyton* spp in dogs, blastomycosis, cryptococcosis, *Geotrichum candidum* in dogs, and *Sporothrix schenckii* in dogs and cats. Dermatophytosis (including *Trichophyton* spp infections) also typically present with multifocal patches of alopecia, crusts, and erythema elsewhere on the body, especially the paws and face. Systemic fungal infections, such as blastomycosis, also present with draining tracts elsewhere on body and systemic signs, including fever, lethargy, and cough. *Malassezia* spp infection of the claws can demonstrate mild paronychia with a brown, dry-to-moist keratosebaceous debris, claw exudate, and/or rust-colored discoloration of the claw and paw.

Diagnosis of fungal infections is aided by compatible signs and history. For diagnosis of *Malassezia* spp infections, debris around claws and claw beds can be examined for cytologic presence of organisms (typically footprint-shaped yeast). Dermatophytosis is diagnosed through fungal culture (dermatophyte test medium) of proximal claw bed shavings or hair pluckings from hair around the claw bed. Blastomycosis can also be diagnosed via cytologic findings of yeast organisms—typically double-walled, dark-staining, broad-based budding yeast organisms.

Treatment for onychomycosis depends on type of infection. Use of systemic antifungals (eg, itraconazole, fluconazole, ketoconazole, terbinafine) are generally indicated. Treatment duration varies based on diagnosis. For *Malassezia* spp infections, topical antifungal therapies with miconazole, ketoconazole, or selenium sulfide are helpful adjunctive treatments or may be effective for mild infections.

**Immune-Mediated Causes**

**Pemphigus foliaceus**

Pemphigus foliaceus is the most common form of pemphigus and is the most common immune-mediated dermatosis in dogs and cats. Clinical signs can vary widely but are usually characterized by superficial pustules on the face, nasal planum, ears, trunk, and/or footpads.

Paronychia and footpad involvement can be seen in dogs and cats. Approximately 30% of feline patients diagnosed with pemphigus foliaceus have paronychia. (Detailed discussion of diagnosis and management of pemphi-
gus foliaceus is beyond scope of this review.)

Symmetric Lupoid Onychodystrophy (SLO), or Onychitis
SLO is the primary rule-out for dogs with a claw disorder that involves most claws on most paws.

SLO is believed to occur primarily in dogs between ages 2 and 6 years but can be seen at any age. The German shepherd dog, Gordon setter, English setter, and Finnish bearded collie appear to be genetically predisposed. It is a suspected immune-mediated disease; theories on the possible trigger include vaccination reaction, food allergies, and genetic predisposition, but there have been no definitive studies proving these theories.

SLO initially presents as onychomadesis (sloughing of a claw) followed by onychodystrophy (abnormal claw formation) on a single claw and eventually affects multiple claws on all paws. Presenting clinical signs are variable. Most SLO patients present with chronic lameness, swollen digits, partial loss of claws, bleeding from the claws, history of licking paws/claws, and secondary skin or claw infections. Owners report seeing claws caught in carpet or finding sloughed claws around the home. Baseline blood work is usually unremarkable in patients with primary SLO.

Current published data regarding diagnostics indicated for work-up of SLO suggest beginning with claw bed cytology and onychectomy with histopathology. Histopathology usually demonstrates interface dermatitis, typically lymphocytic exocytosis, and hydropic and lichenoid degeneration of the basal cell layer. Histopathology is not a definitive diagnosis, as leishmaniasis can also show similar interface dermatitis of the claw bed. However, most clinicians make a diagnosis of SLO based on history, clinical signs, and exclusion of other diagnoses. Onychectomy is rarely required for definitive diagnosis and rarely performed.

Treatment
Tetracycline and niacinamide have been reported to be effective for SLO treatment. Given recent lack of availability of tetracycline, doxycycline can be substituted and may be more convenient (ie, administered twice a day). This therapy typically takes 1 to 3 months before positive results (eg, decreased inflammation, regrowth of a healthy claw) are seen. Minocycline is also now substituted for tetracycline or doxycycline as availability and cost of the former drugs can make their use prohibitive.

Essential fatty acids have been shown to be effective as the sole or adjunctive treatment of SLO after more aggressive initial therapy. Treatment can take up to 8 to 12 weeks before positive results can be seen.

Pentoxifylline has been shown effective in treating other immune-mediated dermatologic conditions (eg, cutaneous vasculitis, dermatomyositis).

With regard to adverse effects, doxycycline can cause nausea, vomiting, anorexia, and diarrhea. Increased alanine aminotransferase and alkaline phosphatase have been reported in dogs, but the significance of this is unknown. Anecdotal reports by veterinary dermatologists have shown cases of increased seizure frequency in dogs taking niacinamide. Anecdotal reports suggest that dogs with epilepsy may
have increased seizure frequency when taking niacinamide; caution should be used in prescribing niacinamide to dogs with previous seizure history. Pentoxifylline and high doses of essential fatty acids can cause GI upset.10

Neoplastic Causes
Approximately 12% of all canine claw and claw bed lesions are tumors (see Table 2).11 About 47% to 52% of malignant digital tumors occur in older dogs (mean age, 9 years) and 75% of cases involve large-breed dogs.1 The Labrador retriever, standard poodle, rottweiler, dachshund, and flat-coated retriever are overrepresented.1 Subungual squamous cell carcinoma that arises from the subungual epithelium almost always results in lysis of the third phalanx.11 One- and 2-year survival rates were 95% and 75%, respectively, for squamous cell carcinoma originating from the subungual epithelium and 60% and 40%, respectively, for tumors originating from other parts of the digit.11,12

Melanoma is more malignant in digits compared with other areas of the skin (metastatic rate of 38%–58%).11 The Scottish terrier, standard and miniature schnauzer, Irish setter, golden retriever, and rottweiler are predisposed to melanoma.11,12 Prognosis is guarded (1-year survival rate of 42%–70%).12

Regardless of species, claw neoplasia occurs more frequently in the forelimb than the hindlimb,12,13 and neoplasms of the claw bed are best diagnosed via excisional biopsy and histopathology.12,13

Treatment of claw and claw bed neoplasia is variable depending on tumor type, grade, stage, and patient characteristics, and discussion is beyond scope of this review.

References
7. Zienier M., Nodtvedt A. A Treatment study of canine symmetrical onychomadesis (symmetrical lupoid onychodystrophy) comparing fish oil and cyclosporine supplementation in addition to a diet rich in omega-3 fatty acids. Acta Vet Scand. 2014:56(1);66.