

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 (\pm 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

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SLO = symmetric lupoid onychodystrophy

TABLE 1

CLAW BED TERMINOLOGY¹

Term	Definition	Conditions
Anonychia	Absence of claws	Congenital, trauma, iatrogenic
Brachyonychia	Shortened claws	Normal variant, congenital, trauma, iatrogenic from trimming
Leukonychia	Claw whitening	Normal variant, iatrogenic, trauma
Macronychia	Unusually large claws	Congenital, normal variant, leishmaniasis
Micronychia	Unusually small claws	Congenital, normal variant, iatrogenic
Onychalgia	Claw pain	Iatrogenic, trauma, bacterial infection, SLO, idiopathic, neuropathic, neoplasia
Onychatrophia	Atrophy of claws	Trauma, iatrogenic, bacterial, fungal, SLO, parasitic, neoplasia
Onychauxis	Hypertrophy of claws	Normal variant, neoplasia
Onychitis	Inflammation anywhere in claw	
Onychodystrophy	Abnormal claw formation	Normal variant, bacterial, fungal, demodicosis, <i>Ancylostoma</i> spp, neoplasia, previous trauma, SLO
Onychogryphosis	Abnormal curvature of claws	Normal variant, <i>Ancylostoma</i> spp
Onycholysis	Separation of claw structure at its proximal attachment and progressing distally	Trauma, bacterial, fungal, neoplasia, SLO
Onychomadesis	Sloughing of claws	Trauma, neoplasia, SLO, bacterial
Onychomalacia	Softening of claws	Normal variant, SLO, neoplasia
Onychomycosis	Fungal infection of claws	
Onychopathy	Disease of claws	
Onychorrhhexis	Fragmentation and horizontal separation in lamellae at free edge of the claw	Normal variant, SLO
Onychoschizia	Splitting of claw, usually beginning distally	Trauma, normal variant, immune-mediated, neoplasia
Pachyonychia	Thickening of claws	Normal variant, neoplasia, inflammation
Paronychia	Infection or inflammation of claws	Trauma, bacterial, fungal, demodicosis, SLO, neoplasia, pemphigus foliaceus
Platyonychia	Increased curvature of claw in long axis	Normal variant, congenital
Trachyonychia	Roughness of claws with brittleness and splitting	Immune-mediated, SLO

common in cats.¹ Although most trauma is physical (environmental and iatrogenic), chemical trauma is also possible. Distribution of trauma-related injuries varies (ie, asymmetrical, symmetrical, multifocal, focal) and treatment is based on injury severity. Supportive treatment with pain management, bandaging, and antibiotics may be required. Pain can be exhibited by lameness or apparent soreness to the touch. If there are signs of excess swelling, hemopurulent discharge and pain, then systemic oral antibiotics (eg, cefpodoxime, cephalexin, clindamycin) and pain medications (eg, NSAIDs, opioids) should be recommended.

Removal of fractured claw portions under general anesthesia is warranted on a case-by-case basis (eg, severity, concurrent disease, clinician experience). To help ensure normal claw regrowth, efforts should be made to preserve the quick—the vascular rich periosteum of the unguis that extends distally from the phalanx itself—when removing claws. Removing the quick can leave the patient susceptible to avascular necrosis of the third phalanx as well as osteomyelitis.¹

Parasitic or Protozoal Causes

Demodicosis

Demodicosis, especially *Demodex canis*, can cause paronychia that stimulates onychodystrophy. Other dermatologic signs may include erythema; scaling; comedones; and alopecia on the face, legs, paws, and/or trunk.

Hookworms (*Ancylostoma* spp, *Uncinaria* spp)

This condition presents with rapid claw growth (>1.9 mm/week¹), onychogryphosis, and onychodystrophy. Other systemic signs may include diarrhea, weight loss, failure to grow, and anemia.¹

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 onychogryphosis⁴ 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-

NSAIDs = nonsteroidal anti-inflammatory drugs

SLO = symmetric lupoid onychodystrophy

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onychia. 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.⁷

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,¹ generally for 4 to 6 weeks as nail based bacterial infections are considered deeper infections. Empirical antibiotics include a β -lactam antibiotic (eg, cephalexin, 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 onychomalacia and/or trachyonychia. Reported causes include *Trichophyton* spp in dogs, blastomycosis, cryptococcosis, *Geotrichum candidum* in dogs, and *Sporothrix schenckii* in dogs and cats.¹ 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.¹ 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.¹ (Detailed discussion of diagnosis and management of pemphi-

SLO = symmetric lupoid onychodystrophy

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.¹ The German shepherd dog, Gordon setter, English setter, and Finnish bearded collie appear to be genetically predisposed.⁷ 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.¹

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.^{1,8} 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.^{7,9} 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).⁸

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

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TABLE 2

COMMON CLAW BED TUMORS¹⁰

Cats (Most to Least Common)	Dogs (Most to Least Common)
Squamous cell carcinoma	Squamous cell carcinoma
Fibrosarcoma	Melanoma
Adenocarcinoma	Soft tissue sarcoma
Osteosarcoma	Mast cell tumor
Hemangiosarcoma	

PROGNOSIS OVERVIEW

- *Excellent:* Trauma, benign claw bed neoplasia, *Malassezia* spp, hookworms, bacterial infections
- *Good:* SLO, demodicosis
- *Fair:* Pemphigus foliaceus
- *Guarded:* Most systemic fungal infections
- *Poor:* Leishmaniasis and malignant claw bed neoplasia

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. ■

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