

Pododermatitis: My Feet Are Itchy!

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Pododermatitis, also known as pedal folliculitis and furunculosis, is a multifactorial inflammatory disease process affecting the feet.^{1,2} Most commonly pododermatitis is noted in canines as opposed to felines. It is not a diagnosis but more a clinical presentation indicative of many different underlying diseases.² Clinical signs related to the paws will appear the same with many of the underlying conditions. Tissue affected may include interdigital webbing, nail folds, nails and footpads. Lesions can wax and wane and spontaneously resolve in certain cases. Due to the complexity of the disease and the changing nature of lesions, pododermatitis can be frustrating to diagnose and treat. Many factors should be evaluated including age, breed, coat length, conformation, presence of other clinical signs and the number of paws affected. This information will help guide the diagnostic approach to the case as well as treatment plan.¹⁻³

Clinical Signs

All four paws can be involved but the front are more often affected when compared to the back. This is thought to be due to weight bearing in canines.¹ In certain disease processes, only one foot may be affected. Patients may present with pruritus of the paws, erythema, edema, paronychia, alopecia, erosion, ulceration, draining tracts and paw pad involvement may present as hyperkeratosis and erosion. Due to the magnitude of inflammation the feet often appear swollen. Dogs may exhibit pain through lameness or licking and chewing at feet.

Lesions can be further exacerbated by licking, trauma to the feet from normal daily activity, trauma to the feet due to an orthopedic abnormality. Friction along the bottom of the paws combined with inflammation, can lead to plugged follicles and comedone formation. Follicles dilate and then rupture so hair and bacteria are released into the dermis. This incites a further inflammatory reaction and furunculosis can then develop.

Conformation

One report suggested that the flatness of the feet and “scoop-shaped” interdigital web of breeds such as Pekingese and some terriers may predispose to folliculitis and pedal dermatitis.⁴ Another study suggested that Labradors had wide-based paws with greater distance between pads, compared with other breeds, predisposing them to paw disease.⁵ This suggests that weight bearing might be distributed more to haired interdigital skin leading to plantar paw trauma and irritation. I feel that dogs with short coats are overrepresented in populations of patients with pedal furunculosis.

Differential Diagnoses

Below are the differential diagnoses to consider when examining a patient with pododermatitis (list may change depending on what parts of the paws are affected).

Traumatic	Sterile interdigital pyogranulomatous pododermatitis
	Foreign body
Age related	Osteoarthritis
Genetic	Lethal acrodermatitis of bull terriers
	Familial paw pad hyperkeratosis
Nutritional	Zinc-responsive dermatitis
Metabolic	Superficial necrolytic dermatitis
Immune mediated	Symmetric lupoid onychodystrophy
	Pemphigus foliaceus
	Systemic lupus erythematosus
	Vasculitis
	Adverse drug reaction
	Lymphocytic plasmacytic pododermatitis
Neoplastic	Nail bed tumour (melanoma, squamous cell carcinoma)
	Cutaneous T cell epitheliotropic lymphoma
Endocrine	Hypothyroidism
	Hyperadrenocorticism
Allergic	Atopic Dermatitis
	Cutaneous adverse food reaction
	Contact dermatitis
	Flea allergy dermatitis
Infection	Deep pyoderma and furunculosis (<i>Nocardia</i> , <i>Actinomyces</i>)
	Superficial bacterial pyoderma
	Superficial fungal infection (<i>Malassezia</i> , dermatophytosis)
	Deep fungal (<i>blastomycosis</i> , <i>sporotrichosis</i> , <i>phaeohyphomycosis</i>)
	Parasitic (demodicosis, hookworm dermatitis, <i>Pelodera</i> , ticks)
	Viral (distemper)

Amongst these differentials, allergic skin disease is one of the most common reasons for pododermatitis ranging from interdigital erythema to pedal furunculosis due to secondary infection. Both the underlying allergic skin disease and infection must be managed/treated to allow full resolution of the disease. Parasitic pododermatitis is also of concern. This presentation is perhaps less common with the use of isoxazolines for flea/tick prevention. In chronically inflamed lesions, skin biopsy may be required for diagnosis. Demodectic pododermatitis can present on the feet solely without any other lesions on the body.¹ Based on previous studies, demodicosis of the feet is one of the most commonly misdiagnosed skin diseases in dogs older than four years of age.⁵

Diagnostic approach

Pododermatitis can often be self-perpetuating, multi-factorial, and resistant to empirical therapy. Such factors can make this a frustrating condition to deal with, for both the pet owner and the clinician. Lesions heal with scarring, which makes the paw more susceptible to future infections. Because the condition has potential for chronic changes within the paw, substantial effort should be made to diagnose the underlying primary disease or predisposing factor.⁵ Patients should be treated aggressively early while pursuing diagnostics. A systematic

approach towards ruling out differential diagnoses coupled with follow-up examinations and client education will often lead to a diagnosis being made.¹

As with any dermatologic case, it is important to always collect a thorough history from your clients. In cases of pododermatitis, historical clues may allow identification of the underlying primary cause for inflammation.⁶ If the patient concurrently has other systemic signs alongside the pododermatitis, this may provide evidence or a focus of diagnostic testing. Physical examination may identify any other problem areas on the body that, again, could help narrow the differential list. A minimum database should then be pursued including cytology and skin scrapings or hair plucks.⁷ Cytology verifies the presence or absence of neutrophils, other inflammatory cells, and bacteria, yeast or fungal hyphae.⁶ Skin scrapings and hair plucks are important tests used to diagnose parasitic pododermatitis.⁷ If a bacterial infection is noted on cytology then a bacterial culture and susceptibility should be obtained and submitted to guide antimicrobial therapy. These cultures can be obtained by either swabbing areas of furunculosis, especially where purulent exudate is draining. In certain circumstance a skin biopsy submitted for macerated tissue culture maybe required to diagnose a deeper infection. Secondary infections in cases of pododermatitis are often due to a deep pyoderma (if furunculosis is present). Systemic antimicrobial therapy is warranted in these cases. Empirical therapy should not be started without a culture due to resistant bacterial species that are present in companion animal practice. If antimicrobial therapy is pursued, rechecks and repeat cytology will allow the clinician to monitor response to therapy. Systemic antimicrobials may be required for an extended period (4-8 weeks) so rechecks form part of the treatment plan. A fungal culture or skin biopsy may be performed next based on the differential list for each individual patient.

If one or two paws are affected in an older individual, radiographs of the paws and legs should be assessed to check for any boney changes, signs of osteoarthritis or osteomyelitis. Routine bloodwork as well as testing for endocrine disease via a thyroid profile may also be required in older patients with systemic signs of disease compatible with this differential.

In patients with persistent pododermatitis of one or multiple paws, histopathology may be required to demonstrate foreign bodies, deep bacterial infection, parasites, fungi, and neoplasia. Special stains are often used during histopathologic evaluation. In general, the histologic response shows perifolliculitis, folliculitis, or furunculosis; nodular to diffuse pyogranulomatous inflammation being the most common.^{1,8}

Treatment

Treatment of the primary cause of inflammation should always be instituted as early in the development of lesions as possible (for reasons noted previously). If a foreign body is identified, then surgical exploration/removal is warranted. If osteoarthritis is observed, a treatment plan to decrease inflammation and decrease pain is important. Ectoparasitocidal medications, thyroid medication, allergy work-up, digit amputation etc would also be potential treatment options based on diagnostic testing results.

If a patient is licking, chewing or biting at their feet and the clinician feels this is due to pruritus, then anti-pruritic/anti-inflammatory therapy should be instituted. I feel that oral glucocorticoids provide the quickest and fastest relief in cases of pododermatitis and often use dexamethasone at a dose of 0.05 mg/kg given every 24 hours and then tapered.

In the literature there are reports of surgical ablation with a carbon dioxide laser being used for the treatment of pedal furunculosis.^{1,9} Success rate is 70% dependent on the skill level of the user. Skin is left to heal by second intention and patients are treated for infection as well as given NSAIDs and frequent bandage changes.

To decrease swelling and clinical signs associated with the pododermatitis itself, treatment will be multi-modal. Any infections present should be treated both systemically and topically. Prolonged antibiotic treatment based on bacterial culture and susceptibility, usually for 8 to 12 weeks, is needed in cases of deep bacterial pododermatitis.^{1,2} A dramatic improvement in the first 2 to 4 weeks may be noted but it is essential that antibiotic therapy not be discontinued too abruptly. For chronic or draining lesions, topical washes and foot soaks are also beneficial. Some sources recommend Epsom soak foot soaks, others antimicrobial shampoos and solutions. Fluorescent biomodulation or fluorescent light energy therapy (Phovia™, Vetoquinol) is a new treatment option for pedal furunculosis as an adjunct to systemic antibiotics. Previous studies have shown that when this treatment is combined with systemic antibiotics, time to clinical resolution is accelerated.¹⁰

When large interdigital lesions are noted, the patient's activity may need to be restricted or they may need to wear protective booties when on rough surfaces. Ideally, they would be limited to smooth surface during treatment to prevent friction and further inflammatory reactions of the skin.

Unfortunately, with any treatment, recurrence is common if the underlying cause of the pododermatitis is not addressed.

Cat Feet

So as not to leave our feline friends out, pododermatitis, such as described in dogs is not seen in cats. Cats can, however develop secondary infections in the interdigital region or around the nail bases. If cats are noted to be licking or chewing at their feet then cytological samples should be obtained to diagnose any infection that needs to be addressed.

A disease of feline paw pads is plasma cell pododermatitis (pillow foot). Cats will present with swollen pads that can then fissure and ulcerate and induce pain. In most cases, more than one footpad is affected. The metacarpal and metatarsal footpads are those primarily affected. Digital footpads may also be affected, but the lesions generally tend to be less severe. This disease is believed to have an immune mediated basis. Plasma cell pododermatitis is characterized by infiltration of plasma cells into the paw pad tissue. This infiltration causes the pads to swell. Some patients can present with seasonal relapses suggesting a seasonal allergy may be a trigger factor. Some authors also suggest an infectious etiology, specifically feline immunodeficiency virus (FIV). In fact, published case reports suggest FIV positivity rates of 44 to 63%.^{11,12} Diagnosis is via histopathology as well as FIV/FelV testing. Cats with this disease generally respond well to steroids, cyclosporine or doxycycline.¹¹

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