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FELINE PODODERMATITIS

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Feline pododermatitis is not as common as *canine* pododermatitis, yet many skin diseases and systemic conditions seen in cats, may involve the paws. In cases of feline pododermatitis, the foot pads and nail beds are most commonly affected, less often the nails and seldomly the interdigital skin. The causes, clinical presentation, diagnostic approach and treatment of some of the more common conditions associated with feline pododermatitis will be discussed.

Causes of Feline Pododermatitis:

The most important causes of Feline pododermatitis are given in Table 1.

Table 1. The most important causes of Feline pododermatitis

Bacterial and viral causes	Bacterial paronychia, bite wounds, Herpes virus, Calici virus
Fungal causes	Dermatophytosis, Malassezia, Candidiasis, Cryptococcus
Parasitic causes	Demodicosis, Notoedres
Allergic causes	Atopic dermatitis, cutaneous adverse food reactions (CAFR), mosquito bite hypersensitivity, contact allergy
Eosinophilic granuloma complex	Eosinophilic plaques, eosinophilic granuloma
Autoimmune causes	Pemphigus foliaceus, DLE, SLE
Immune mediated causes	Plasma cell pododermatitis, cutaneous drug reactions
Environmental causes	Burns, frostbite, irritant contact dermatitis
Neoplastic causes	Feline lung digit syndrome, squamous cell carcinoma (SCC), mast cell tumour, fibrosarcoma complex, cutaneous T cell lymphoma, feline paraneoplastic alopecia associated with visceral neoplasia
Systemic illness	Hepatocutaneous syndrome, vasculitis
Behavioural causes	Nail chewing

Clinical presentation:

The conditions mentioned in Table 1 often present with similar, non-specific clinical signs. In order to narrow down the differential diagnoses, the clinical presentations can be divided into conditions that mainly affect the foot pads, the nail beds and the nails.

Conditions that affect the foot pads:

Common conditions/causes: trauma, bacterial infections, autoimmune and immune mediated conditions, tumours, dermatophytosis and viral diseases.

Clinical presentation: scaling, crusting, ulceration, swelling and horns.

Table 2. Clinical presentation of conditions/causes affecting the foot pads of cats

Clinical presentation	Cause(s)
Scaling and crusting	Pemphigus foliaceus, dermatophytosis. Uncommon causes: hepatocutaneous syndrome, feline paraneoplastic alopecia associated with visceral neoplasia.
Ulcerations	Self-trauma, injuries, irritant reactions, plasma cell pododermatitis, bacterial, fungal and viral infections, eosinophilic granulomas, tumours and drug reactions.
Swelling	Plasma cell pododermatitis
Horns	Spontaneous, papillomavirus infection, FeLV, SCC.

Conditions that affect the nail bed(s) (Paronychia):

Common conditions/causes: bacterial infections, Notoedres infestation, dermatophytosis, Malassezia infections and pemphigus foliaceus.

Clinical presentation: crusting, exudation, and pedal pruritus with waxy exudate.

Table 3 Clinical presentation of conditions/causes affecting the nail bed(s) of cats

Clinical presentation	Cause(s)
Crusting, exudation	Bacterial infections, Notoedres infestation, dermatophytosis, pemphigus foliaceus, feline lung digit syndrome.
Pruritus, brown, waxy exudate	Malassezia yeast infections

Conditions that affect the nails:

Nail biting and Idiopathic onychodystrophy

Diagnostic approach:

A thorough diagnostic approach is required as successful treatment depends on obtaining a definitive diagnosis. This may include a complete general and dermatological history (progression of disease, response to previous treatment, other animals/people affected, environment where

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cat lives), clinical examination (general and dermatological), skin scrapings, Wood's lamp examination, cytology, bacterial and/or fungal culture and sensitivity, and skin biopsies. Bacterial and fungal culture results should be interpreted with caution and always together with the history, cytology and histopathology results as contamination is common.

Cats where one or two adjacent nail beds are infected, can be treated with antibiotics for 2 to 3 weeks prior to performing other diagnostic tests. Suitable antibiotics include Cephalexin, Amoxicillin/Clavulanic acid and Cefovecin. Many cases require skin and sometimes bone biopsies for histopathology as this is often the key to the diagnosis in a feline pododermatitis case.

Serum chemistries, FIV and FeLV tests, radiographs and ultrasound examinations are also indicated in some cases. Radiographs of the third phalanx and thorax should be performed if a tumour is suspected. It is often not possible to differentiate between osteomyelitis and a tumour based on radiological findings alone, necessitating histopathological diagnosis, often requiring an excisional biopsy of the third phalanx.

Specific conditions:

Bacterial paronychia

Bacterial infections of the nail beds are common.

Causes: Where one or two nail beds are affected, local trauma, ingrown nails or tumours are the most important differential diagnoses. Where several or all nail beds are affected, systemic conditions and conditions resulting in an impaired immune system (e.g. FeLV infection, FIV infection, diabetes mellitus, hyperadrenocorticism, glucocorticoid or hormonal treatments, and internal tumours) as well as onychomycosis, pemphigus foliaceus and nail chewing are the main differential diagnoses.

Clinical signs: The nail beds are usually swollen, erythematous, and painful. Crusts and erosions are often present with malodorous exudation common. Affected digits can be thickened and very painful in cases of osteomyelitis and tumours.

Diagnosis: The diagnosis is based on clinical signs and skin cytology. Bacterial culture and sensitivity are used to guide therapy. Causative agents include Staphylococcus spp., Streptococcus spp., Pseudomonas spp., and Proteus spp.

Treatment: Topical and systemic treatment is recommended. Suitable topical antibacterial agents include Chlorhexidine, Silver sulphadiazine and Fusidic acid. As topical treatment in cats may be difficult, systemic antibiotics are mostly the mainstay of treatment. Empirical antibiotic selection is acceptable for first presentation, uncomplicated infections with cocci present on cytology. These include Cephalexin, Amoxycillin/Clavulanic acid, Clindamycin and Lincomycin with Cefovecin included where medication is difficult or owner compliance poor. Culture and sensitivity testing should be performed where rods are seen on cytology, with poor response to empirical treatment, previous treatment with many different antibiotics and in deep pyoderma cases. Second-line antibiotics include Cefovecin, Cefpodoxime, Enrofloxacin and Marbofloxacin. Systemic antibiotics should be continued at least 2 weeks past clinical resolution, generally for 4 to 6 weeks as bacterial paronychia is considered a deep infection. The prognosis depends on the underlying cause. Most traumatically induced infections respond well to treatment. Where systemic conditions are present, the prognosis depends on the success of the treating the condition itself.

Fungal dermatoses (Onychomycosis)

Causes: Mostly Malassezia yeast and dermatophyte infections, less commonly Candida and Cryptococcus infections.

Malassezia yeast infections are common and can cause severe pedal pruritus. Accumulations of brown, waxy debris are not normally seen on cat nails and are typical of Malassezia infections. This is a common problem in cat breeds with abnormal hair coats (e.g. Devon and Cornish Rex, Sphynx) as well as cats with systemic illnesses (e.g. diabetes mellitus) and allergic skin diseases. The diagnosis is easy to confirm with large numbers of yeast organisms present on cytology. Systemic antifungal agents will resolve the pruritus or significantly reduce it. Where the condition is caused by an underlying disease, this should be treated, otherwise the infection will recur. Management of Malassezia infections in the abovementioned cat breeds is more difficult and requires a combination of systemic therapy and a lifelong regime of topical treatment of the paws and nail beds.

Dermatophyte infections of the nail beds are rare in cats and often associated with an impaired immune system. These infections resemble many of the other inflammatory conditions affecting the nail beds. The diagnostic work up should include a thorough history and clinical examination (examine cat for other lesions suggestive of/or diagnostic for dermatophytosis), cytology, Wood's lamp examination and fungal culture. It is also recommended to evaluate the immune system, including FeLV/FIV serology and diagnostic screening for diabetes mellitus and hyperadrenocorticism. Severe dermatophytosis involving all the digits can be indistinguishable from pemphigus foliaceus and bacterial paronychia, therefore it is crucial to make a diagnosis prior to treatment. Successful treatment requires both topical and systemic treatments. Topical treatment can be carried out with enilconazole or miconazole solutions. Itraconazole (5-10 mg/kg daily, may use every other week) is the drug of choice for systemic treatment. The prognosis depends on the underlying disease.

Mosquito Bite Hypersensitivity

Mosquitoes bite thinly haired areas such as the nose bridge, pinnae and foot pads, creating immediate and delayed hypersensitivity reactions to mosquito salivary antigens. Typically, the initial bite becomes a wheal within 20 minutes, papules appear in 24 hours and it becomes encrusted within 48 hours. Cats that are chronically bitten develop lesions such as scaling, alopecia, and pigment changes. Histopathology demonstrates highly eosinophilic dermatitis.

Cats that become hypersensitive to mosquito bites are usually affected repeatedly, but not every cat bitten by mosquitoes develops a hypersensitivity reaction. Management options include confining the cat to a mosquito-free environment and using topical mosquito repellent on areas susceptible to bites. Systemic glucocorticoids are indicated for cats that cannot be confined.

Feline Eosinophilic Granuloma Complex

Eosinophilic plaques and granulomas occasionally affect the foot pads or foot pad/skin junctions. In most cases allergies are the underlying cause, but idiopathic cases have been described. Cytology typically reveals large numbers of eosinophils, smaller numbers of other inflammatory cells and bacteria where secondary infections are present. The diagnosis is confirmed by histopathology. These cases generally respond well to systemic glucocorticoids. Treatment with Prednisolone is started at 1 - 2 mg/kg/day and then tapered down. Spontaneous resolution has been reported.

Pemphigus foliaceus

Pemphigus foliaceus is a common autoimmune condition in cats.

Clinical signs: The foot pads and nail beds are often affected. Foot pad lesions include swelling, hyperkeratosis, scaling, crusting, hardening and fissuring. Pain is variable but may be severe in some cases, often disproportionately severe for the degree of pad change present. Affected nail beds resemble bacterial paronychia and often contain caseous exudate.

All the digits are almost always affected. Lesions may also occur in other areas, such as the face, ear pinnae, dorsum, ventrum, chin and tail. Initial lesions are often only subtle pustules or crusts. More generalised skin involvement with crusting and hyperkeratosis occurs as the disease progresses.

Diagnosis: The diagnosis is suggested by cytology samples from under crusts or intact pustules (large numbers of acantholytic keratinocytes and neutrophils with variable numbers of eosinophils; bacteria are usually absent but may be present with secondary infections) and confirmed by histopathology. Multiple skin biopsies should be taken from several affected areas.

Treatment: Options include Prednisolone, start at 2 – 4 mg/kg/day, then taper after 2 weeks if effective; Dexamethasone, start at 0.1 - 0.2 mg/kg OID, then taper and where glucocorticoids alone are not effective, Chlorambucil (2 mg/m^2 every 48h) or Ciclosporin (5 mg/kg/day) may be added. Cats respond well to treatment in general and maintenance of remission with fewer side effects is more common than in dogs.

Feline Plasma Cell Pododermatitis

The cause of this condition is unknown, but an immune mediated pathogenesis is suspected. Affected cats may be FIV positive.

Clinical signs: The foot pads are mainly affected in this condition. Multiple foot pads are usually affected, especially the metacarpal/metatarsal foot pads and rarely the digital foot pads. The foot pads are mostly swollen, usually non-painful unless ulcerated, have a dough-like, spongy texture and may indent on palpation. A violet colour is frequently seen in light coloured foot pads. Multiple white striae criss-crossing pads is frequently seen. The foot pads may ulcerate, particularly in outdoor cats, resulting in lameness, prompting veterinary care. Rarely, affected cats have concurrent plasmacytic stomatitis, glomerulonephritis or renal amyloidosis. The most important differential diagnosis is eosinophilic granuloma. The latter normally affects only one pad and is not doughy texture on palpation.

Diagnosis: The diagnosis is made on the typical clinical signs, but fine needle aspirates or biopsies of the swollen pads can confirm the diagnosis. Aspirates usually reveal red blood cells mixed with plasma cells and some neutrophils. Typical histopathology findings include perivascular accumulation of plasma cells, with smaller numbers of lymphocytes and neutrophils. Early lesions often have significant eosinophil infiltration.

Treatment: In asymptomatic, mainly indoor cats, observation without treatment is appropriate. In symptomatic cats, the following may be used: Doxycycline (10 mg/kg OID) should always be administered with food or a water bolus to minimise the risk of oesophagitis. Improvement should be seen within one to two months. Where Doxycycline is not effective, systemic glucocorticoids can be used. Prednisolone (starting dose 4 mg/kg OID, tapered to lower doses once improvement is noted, usually within 3 weeks) and Dexamethasone (starting dose 0.5 mg OID, tapered to once every 3 days) may be effective in unresponsive cases. Another option is Ciclosporin (5 mg/kg OID, tapered once improvement is noted, usually 2 to 6 weeks). In cases nonresponsive to medical treatment, surgical removal of affected pads is an option. In the absence of complications such as glomerulonephritis or renal amyloidosis, the prognosis is good.

Feline Lung Digit Syndrome

This syndrome is mostly associated with bronchial and bronchioloalveolar carcinomas and metastases at atypical sites. The distal phalanges of the front paw digits are mostly affected. Multidigit and multi limb involvement is common. The pathogenesis is not well-understood. The metastatic lesions are believed to arise via arterial embolization from the tumour.

Clinical signs: This condition is usually seen in older cats (mean age: 12 years, range: 2-20 years), with no breed or sex predilection. There is usually a history of non-weightbearing lameness. Clinical findings may include painful, firm swellings on the toes and purulent inflammation and erythema of the digits and nail beds. The clinical presentation is more like inflammatory pododermatitis than a neoplastic condition.

Diagnosis: Histopathology is needed to confirm the diagnosis. Radiographs typically reveal extensive osteolysis of the distal phalanges. Thoracic radiographs often show a single primary lung mass, but diffuse nodular disease has also been reported. No clinical signs of respiratory distress in affected cats has been reported.

Treatment: Treatment is only palliative, including analgesia and supportive care. Nonsteroidal anti-inflammatory drugs may be beneficial because of their analgesic/anti-inflammatory effects and COX-2 inhibitory activity. COX-2 is involved in tumour angiogenesis and these drugs may slow tumour growth. Meloxicam (0.1 mg/kg for 1 - 2 days, then 0.1 mg (total dose) every 1 to 3 days) has been used in cats. Renal function should be monitored to avoid renal toxicity. Excision of affected digits may help to alleviate pain and discomfort but microscopic metastasis to other digits or locations is likely already present, therefore limiting the effectiveness of this approach. Removal of the primary lung neoplasm will not improve the condition of the digits. The prognosis is poor.

Feline paraneoplastic alopecia associated with visceral neoplasia

This condition generally affects cats aged 10 years and older. It has an acute onset, is rapidly progressive and affects the ventrum and extremities. Affected cats groom excessively and have characteristic glistening/shiny (but not fragile), completely alopecic, abdominal skin. The foot pads or foot pad/skin junctions may be dry, scaly/crusty, fissured and painful. Secondary Malassezia infections may be present. Affected cats are systemically ill with weight loss, anorexia, and lethargy suggesting an underlying systemic disease. Abdominal ultrasound may reveal visceral neoplasia, usually a pancreatic adenocarcinoma. Skin biopsy findings, i.e. severe follicular and adnexal atrophy and alopecia-associated epidermal thickening can aid in tumour identification. It is speculated that the tumour releases factors that cause follicular shrinkage. Unfortunately, once alopecia is noticed, the tumour has likely already metastasised and removing the primary tumour provides only temporary relief. The prognosis is grave.

Cutaneous horns

Cutaneous horns are composed of keratin overgrowth and may affect one/multiple foot pads. They are often thin and horn-like (hence the name) and may appear like second "nails" close to the nails on the digital pads. These lesions do not cause any discomfort, but when on weightbearing surfaces, they may cause discomfort/lameness. Cutaneous horns may be spontaneous (often the case on foot pads), or associated with papillomavirus infection, FeLV, and SCC. Diagnosis is usually based on the appearance of the lesions. Affected cats should be tested for FeLV. Single horns associated with scaly skin lesions should be biopsied to rule out SCC. If the horns do not cause discomfort/lameness, they are often ignored. Otherwise they can be removed by trimming but will often recur.

Nail chewing

Behavioural disorders may be associated with nail chewing in cats. This can lead to secondary bacterial paronychia. History is mandatory to establish a diagnosis in these cases. Nail chewing can also be seen in cats recovering from neurotmesis, as sensation returns to the paws.

Idiopathic onychodystrophy

This is a condition associated with abnormal nail growth. In these cases, the abnormally long or shaped nails can penetrate the foot pad skin and cause lameness. Several nails can be affected. The condition is usually seen in older cats whose ability to retract their claws seems to diminish with age. Regular nail clipping can help to prevent injury to the skin of the foot pads.

MULTIPLE-CHOICE QUESTIONS

QUESTION 1

Which of the following statements is TRUE? In cases of feline pododermatitis

a. the foot pads and nails are mostly affected, less often the nail beds and seldomly the interdigital skin.
b. the foot pads, nail beds and nails are mostly affected, less often the interdigital skin.
c. the foot pads, nail beds and nails are mostly affected, seldomly the interdigital skin.
d. the foot pads and nail beds are mostly affected, less often the interdigital skin and seldomly the nails.
e. the foot pads and nail beds are mostly affected, less often the nails and seldomly the interdigital skin.

QUESTION 2

Which of the following statements regarding bacterial paronychia is FALSE:

a. Where 1 or 2 nail beds are affected, local trauma, ingrown nails or tumours are the most important DDs
b. Where several/all nail beds are affected, systemic conditions and conditions resulting in a strong immune system, onychomycosis and pemphigus foliaceus are the main DDs.
c. The nail beds are usually swollen, erythematous and painful with malodorous exudation.
d. Affected digits can be thickened and very painful in cases of osteomyelitis and tumours.
e. Empirical antibiotic treatment is acceptable for uncomplicated infections with cocci present on cytology.

QUESTION 3

Which of the following statements is TRUE? Malassezia yeast infections

a. are uncommon and can cause severe pedal pruritus.
b. typically cause accumulations of brown, waxy debris on cat nails.
c. are a common problem in cat breeds with normal hair coats.
d. are not easy to confirm with small numbers of yeast organisms present on cytology.
e. are generally successfully treated with topical antifungal agents.

QUESTION 4

Which of the following statements regarding Mosquito Bite Hypersensitivity is FALSE:

a. The nose bridge, pinnae and foot pads are most commonly affected
b. Mosquito salivary antigens cause immediate and delayed hypersensitivity reactions
c. Cats that are chronically bitten develop lesions such as crusting, hyperkeratosis and fissuring.
d. Not every cat bitten by mosquitoes develops a hypersensitivity reaction.
e. Management options include confining the cat to a mosquito-free environment and topical mosquito repellent on areas susceptible to bites.

QUESTION 5

Which of the following statements regarding Pemphigus foliaceus is TRUE:

a. Pemphigus foliaceus is an uncommon autoimmune condition in cats.
b. Lesions commonly occur on the face and ear pinnae, but the foot pads and nail beds are rarely affected.
c. Affected nail beds resemble bacterial paronychia and often contain caseous exudate.
d. Initial lesions are typically generalised with crusting and hyperkeratosis common.
e. Lesions are only painful with severe and deep lesions.

QUESTION 6

Which of the following statements is TRUE? Pemphigus foliaceus is

a. diagnosed when cytology samples reveal large numbers of acantholytic keratinocytes and neutrophils with large numbers of bacteria present.
b. diagnosed when cytology samples reveal large numbers of acantholytic keratinocytes and neutrophils with large numbers of bacteria and yeasts present.
c. diagnosed with histopathology of skin biopsies collected from multiple affected areas.
d. treated with one or more of the following drugs: prednisolone, dexamethasone, chlorambucil, azathioprine and ciclosporin.
e. a condition with a poor prognosis in cats as cats in general do not respond well to treatment.

QUESTION 7

Which of the following statements regarding Feline plasma cell pododermatitis is FALSE:

a. The cause is unknown, but an immune mediated pathogenesis is suspected.
b. The foot pads are mainly affected, especially the metacarpal/metatarsal foot pads.
c. The foot pads are mostly swollen and non-painful unless ulcerated.
d. Multiple violet striae criss-crossing pads is frequently seen.
e. The most important differential diagnosis is eosinophilic granuloma.

QUESTION 8

Which of the following statements is TRUE? Feline lung digit syndrome

a. is mostly associated with pancreatic carcinomas and metastases at atypical sites.
b. is usually seen in young cats.
c. presents more like inflammatory pododermatitis than a neoplastic condition.
d. is confirmed by radiography of the affected digits
e. can successfully be resolved where the primary tumour can be removed.

QUESTION 9

Which of the following statements is TRUE? Feline paraneoplastic alopecia associated with visceral neoplasia

a. is a chronic condition seen in cats aged 10 years and older.
b. is rapidly progressive and affects the dorsum and extremities.
c. is characterised by glistening/shiny, very fragile skin.
d. can affect the foot pads which can be dry, scaly/crusty, fissured and painful.
e. is often associated with primary lung tumours.

QUESTION 10

Which of the following statements regarding Cutaneous horns is FALSE:

a. Cutaneous horns may affect one or multiple foot pads.
b. Cutaneous horns can be associated with papillomavirus infection, FIV and SCC.
c. Diagnosis is usually based on the appearance of the lesions.
d. Single horns associated with scaly skin lesions should be biopsied to rule out SCC.
e. If the horns cause discomfort/lameness, they can be removed by trimming.



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