Nail disease can involve the nail, the nail fold or both, and may result from infectious, immune-mediated or neoplastic aetiologies. Diseases involving the nail or nail fold exclusively are uncommon in the dog and cat.

In this paper the clinical signs of nail disease will be described, together with an approach to diagnosis. The more common nail diseases in the dog and cat will be described in more detail.

ANATOMY

The nail is a specialised dermal structure. It is based upon the continuation of the dermis overlying the bony distal phalanx. The nail bed is continuous with the local epidermis, and growth is most active in the coronary band and dorsal ridge, producing a curved claw. The horn is a modified stratum corneum.

CLINICAL SIGNS

Whilst nail and nail fold diseases can have many different aetiologies, there are a few clinical signs which are shared by many of these problems. These signs are summarised in Table 1.

TABLE 1: Clinical signs of nail and nail fold diseases

<table>
<thead>
<tr>
<th>Condition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onychodystrophy</td>
<td>Abnormal nail growth</td>
</tr>
<tr>
<td>Onychogryphosis</td>
<td>Hypertrophic nails</td>
</tr>
<tr>
<td>Onycholysis</td>
<td>Separation of nail plate, starting distally</td>
</tr>
<tr>
<td>Onychomadesis</td>
<td>Sloughing of nails</td>
</tr>
<tr>
<td>Onychomalacia</td>
<td>Softening of nails</td>
</tr>
<tr>
<td>Paronychia</td>
<td>Inflammation of nail fold</td>
</tr>
<tr>
<td>Leuconychia</td>
<td>Depigmentation of nails</td>
</tr>
</tbody>
</table>

Nail or nail fold disease may present with any or several of the signs described, together with lameness or pain on examination.

Paronychia is perhaps the most common presentation, with swelling, erythema, crustung or oozing from the nail fold. Pain is variable, and may occur with no visible changes. Affected animals are often depressed and lethargic, and may resent exercise on hard or uneven surfaces.

Disease may affect single or multiple digits, on one or more feet. Solitary disease is more likely to be associated with trauma to the nail or with neoplasia. Widespread disease is more likely to have an immune-mediated aetiology, or be associated with infection secondary to immunosuppression.

CLINICAL APPROACH

As with all dermatoses, the clinical approach relies upon thorough history taking, careful clinical examination and well-chosen diagnostic tests.

History

History taking should include a general history with questions related to possible systemic disease, and to identify signs of foot pain if present. This may be followed by history of skin disease and specifically nail or nail fold disease. Some clinicians find it more useful not to curb the owners’ enthusiasm to describe the nail disease first and then probe in other areas. The author would rather impose a set structure on the proceedings if possible!

Clinical examination

A thorough clinical examination should be undertaken to identify signs of systemic disease. This is in order to rule
out underlying diseases, such as those resulting in immunosuppression, and also to identify those cases unsuitable for anaesthesia if further, invasive tests are required. In cases of suspected neoplasia local lymph nodes should be examined for enlargement.

Examination of the skin should be comprehensive, as nail disease is often a component of a more generalised dermatosis. Examples would include pemphigus foliaceus in the cat, where crusting is often found on the face and ears, and hypothyroidism, where signs of bacterial infection secondary to immunosuppression may be found at other sites, together with the more common sign of symmetrical alopecia.

Examination of the nails and nail folds should address the following:

- presence of pain
- presence of exudate, either in the nail fold, or under the separated nail plate
- swelling of the nail bed, with or without nail plate loss
- pigmenatry changes to the nail or nail bed
- numbers of limbs/digits affected

**Diagnostic tests**

**Cytology**

Perhaps the most useful diagnostic test in the presence of nail or nail fold disease is the examination of stained samples or exudate, or impression smears taken from eroded or ulcerated areas. Sedation or anaesthesia may be necessary if the feet are painful. Exudate may be found in large quantities in some cases, whereas little or no material may be available in others. Material may be collected from within the nail fold, or from under separated nail plates, before or immediately after removal. Samples from bleeding nail beds after nail plate removal are rarely of value. The use of fine wire swabs may be useful for collection of material from within the nail fold. Material should be gently rolled onto a glass slide, and stained with a rapid Romanowski stain (e.g. Rapi-Diff).

Findings include:

- bacteria +/- degenerate neutrophils
- fungal elements - *M* *alasse*ia yeasts or dermatophytes
- non-degenerate neutrophils +/- acantholytic keratinocytes
- neoplastic cells (keratinocytes or melanocytes)

**Biopsy**

Two techniques are suitable for biopsy of the nail and nail fold. Submission of sloughed nail plates is rarely of any value.

**Biopsy techniques**

a. Surgical removal of the third phalanx and nail unit complete: if affected, the dewclaw is the most useful digit to remove.

b. Recently a technique of onychobiopsy has been described in order to preserve the digit. This involves the use of a biopsy punch to sample the horn, bone of the distal phalanx and skin on the lateral aspect of the digit (Mueller and Olivry, 1999).

**Dermatopathology**

Interpretation of the pathological changes found in nail bed and nail fold disease can be difficult, and a histopathologist experienced in the interpretation of skin samples should be consulted.

**COMMON NAIL DISORDERS**

**Bacterial nail infection**

When individual nails are affected with non-neoplastic disease, the most frequent diagnosis is bacterial infection. *Staphylococcus intermedius* is the organism most often isolated from nail infections in the dog. Bacteria are likely to enter via traumatic damage to the nail plate, either due to blunt trauma or trimming nails too short.

Multiple nail bed infection may occur with underlying immunosuppression. This can be associated with endocrinopathies (hypothyroidism, hyperadrenocorticism) in the dog, and viral infection (FIV, FeLV) in the cat. Failure to respond to rational therapy, or rapid recurrence should prompt investigation for immunosuppressive disease.

Clinical signs include pain, onychodystrophy, onychomadesis and local lymphadenopathy.

Diagnosis is based on history, examination and cytological examination of exudate for bacteria and degenerate neutrophils.

The treatment of bacterial nail infection includes the use of systemic antibiotics until pain, erythema and exudation have resolved. Removal of the nail plate (not short...
trimming of the nail) may speed recovery by allowing drainage of the nail fold.

**Pemphigus foliaceus**

In the cat, the most common cause of symmetrical paronychia is pemphigus foliaceus.

Clinical signs include scaling of face and/or pinnae, and severe caesous paronychia. Single or multiple digits may be involved, and affected digits may be painful. Affected cats are sometimes systemically unwell. Many cases are idiopathic, although some are the result of drug eruptions.

Diagnosis is based on examination of cytology samples: non-degenerate neutrophils and acantholytic keratinocytes may be found in samples from under crusts, or from purulent exudate taken from nail folds.

Treatment involves immunosuppression with prednisolone, starting at 1 mg/kg q 12h or methyl prednisolone +/- chlorambucil at 1 mg/cat q 24h, reducing once remission has occurred.

**Canine lupoid onychodystrophy**

The most common cause of symmetrical nail disease in the dog is lupoid onychodystrophy. This interface dermatitis of the nail bed may be a reaction pattern rather than a single entity, and may involve secondary bacterial infection.

Clinical signs include onychomadesis, often starting with one digit, but usually progressing rapidly to involve other nails. Lameness and pain on palpation may be evident. Affected nails can regrow, but are often poorly formed, soft and brittle.

Diagnosis is made on clinical signs, lack of complete response to antibacterial therapy and demonstration of interface dermatitis on biopsy (see above).

Treatments that have proven successful in the treatment of this condition include essential fatty acids (n-6 and n-3 fatty acids) and a combination of oxytetracycline/doxycycline and niacinamide. Tetracycline is used at a dosage of 250 mg q 8h for dogs under 10 kg body weight, and 500 mg q 8h for larger dogs. The author uses oxytetracycline in combination with Vitamin B compound tablets which are high in niacinamide, giving one per 250 mg tetracycline tablet. Immunosuppressive therapy with glucocorticoids may be necessary in refractory cases.

**Neoplasia**

Dog: Neoplasia of the nail bed in the dog is more common in older, large-breed dogs (e.g. Golden Retriever, Standard Poodle). Two neoplasms are seen most often: squamous cell carcinoma (most often seen in black dogs) and malignant melanoma (paradoxically often found in non-pigmented digits).

Clinical signs include swelling and pain affecting the distal phalanx. Onychomadesis is common. Local spread or distant metastasis may occur.

Diagnosis is based on history, examination, exfoliative cytology and biopsy. Assessment of local lymph nodes is essential, with fine needle aspirates or biopsy if enlarged. Radiography may demonstrate destruction of the distal phalanx.

Fig. 3: Malignant melanoma of the digit often occurs in non-pigmented dogs.

Fig. 4: Squamous cell carcinoma in a black Standard Poodle.

Fig. 5: Non-degenerate neutrophils and acantholytic keratinocytes.
Phalanx, and assessment of the chest for metastases is important.

Treatment requires radical excision of the affected digit, although signs of metastasis are accompanied by a poor prognosis.

**Cat:** The most common neoplastic disorder of the nail in the cat is metastatic disease from asymptomatic bronchiogenic or squamous cell carcinoma of the lung. Multiple digits are often affected, with ulceration and destruction of the phalanges. There is no effective treatment for this condition.

**Further Reading**


These multiple choice questions are based on the above text. Readers are invited to answer the questions as part of the RCVS CPD remote learning program. Answers appear on the inside back cover. In the editorial panel's view, the percentage scored, should reflect the appropriate proportion of the total time spent reading the article, which can then be recorded on the RCVS CPD recording form.

1. Which bacterium is most often associated with bacterial paronychia in the dog?
   a. *Streptococcus canis*
   b. *Bacillus* sp.
   c. *E. coli*
   d. *Staphylococcus intermedius*

2. The presence of non-degenerate neutrophils and acantholytic keratinocytes are suggestive of which condition?
   a. lupoid onychodystrophy
   b. pemphigus foliaceus
   c. squamous cell carcinoma
   d. bacterial paronychia

3. Radiology is helpful in the assessment of which of these nail conditions?
   a. squamous cell carcinoma
   b. malignant melanoma
   c. lupoid onychodystrophy
   d. all of the above

4. Possible causes of immunosuppression leading to bacterial nail disease include:
   a. atopic dermatitis
   b. pemphigus foliaceus
   c. systemic lupus erythematosus
   d. hypothyroidism

5. Which of the following immunosuppressive medications are indicated in the treatment of pemphigus foliaceus in the cat?
   a. chlorambucil
   b. azathioprine
   c. cyclosporine
   d. cyclophosphamide