

## Diseases of the Canine Digit

Diseases of the digit are relatively common and are particularly frustrating in terms of therapy. Unlike many other areas of skin, persisting diseases of the digit will almost always require biopsy to distinguish among a very long list of radically different etiologic possibilities. One cannot tell, just by looking at it, whether the digital swelling is chronic inflammation or squamous cell carcinoma, or whether the lump on the side of the digit is a harmless plasmacytoma or a potentially fatal amelanotic malignant melanoma.

### 1. Multiple nails that are brittle, deformed, or fall out:

Most textbooks will provide a very long list of diseases of the nail and nail bed, but in practical terms I see only one syndrome: lupoid onychodystrophy. Bacterial and fungal paronychia, for example, is so rare in my collection that I have some skepticism that it even exists! The syndrome of lupoid onychodystrophy is seen in young mature dogs (1-5 years), and these animals present with a complaint of deformed nails that are periodically lost. The disease affects multiple digits on multiple feet, often eventually affecting all nails on all feet. The lesion is a lupus-like destructive disease (lymphocytic interface dermatitis with single cell necrosis) of the basal cells of the nail bed epithelium. As is true with similar histologic reactions affecting the nasal planum, gingiva, or conjunctiva, it is not yet clear whether this highly repeatable histologic pattern is really a reflection of a single disease, or is simply the way that the nail bed epithelium responds to a variety of different injuries. At the moment this is considered a clinical syndrome; whether it will be proven to be truly a single disease or not is impossible to predict!

Although there has been a publication of a technique for obtaining suitable biopsies with less than P3 amputation, it is still my opinion that the only way to *reliably* obtain a suitable histologic sampling of that epithelium is to do a P3 amputation. That is such an unpalatable choice for establishing a definitive diagnosis that it is quite permissible to make the diagnosis solely on the basis of clinical evidence, and treat accordingly. There is virtually no other disease that causes progressive deformity and loss of multiple nails on multiple feet. Treatment consists of long-term supplementation with essential fatty acids, treatment with combinations of tetracycline and niacinamide, or immunosuppressive therapy with corticosteroids, azathioprine, or pentoxifylline. As with any disease in which there are so many different recommended treatments, none of these treatments works all of the time. Furthermore, spontaneous remissions and disease recurrence in the face of ongoing treatment make it difficult to reliably assess the efficacy of any therapy. In published studies, combinations of tetracycline (or doxycycline) and niacinamide were effective in half the cases. Essential fatty acid supplementation was effective in one third.

### 2. Interdigital proliferative cellulitis:

This very familiar syndrome is one of multifocal coalescing proliferative interdigital nodules which, based on clinical appearance, could be either neoplasia or proliferative inflammatory disease. The histopathology is very repetitive: the nodules consist of deeply embedded fragments of hair which create persisting suppurating granulomas, as well as fibrosis and dysplastic proliferation of hair follicles and sebaceous glands. These are commonly submitted as possible interdigital tumors, but the interdigital area is actually a very infrequent target for any neoplasm. Occasionally, I will see Demodex or ringworm as a trigger for the follicular rupture, but most cases have no proven etiology or pathogenesis. The histologic similarity to what we see in traditional lick granulomas is striking, and it makes sense to consider interdigital cellulitis as a site-specific example of lick granuloma. The same dilemma faces us in both interdigital cellulitis and traditional lick granulomas: is the primary disease something like interdigital seborrhea or atopy, which triggers a cycle of licking, folliculitis, follicular rupture, and then more licking? Is it a purely mechanical issue, with a combination of foot configuration and stout short hairs predisposing to the mechanical implantation of hair as the dog walks? Or is it truly psychogenic in its initial development?

**3. Persistently swollen, painful digit:**

This is a very common history for me to receive. Ordinarily, the digit has been subjected to prolonged antibiotic therapy with minimal response. Radiographs will usually show osteolysis, and the usual sample that I receive is a digital amputation with a differential diagnosis of chronic inflammation, osteomyelitis, or neoplasia. In over 90% of these cases, the histologic diagnosis will be well-differentiated subungual squamous cell carcinoma.

*Subungual squamous cell carcinoma* is a disease of the nail bed, not of the skin itself. The tumor will slowly grow into the digit, routinely creating osteolysis and suppuration. The literature is quite contradictory in terms of prognosis. There are some papers that claim a 40% metastatic rate. My own data, gathered from Ontario practices, indicates a metastatic rate of less than 5%. I presume this discrepancy relates to the fact that early amputation is an important part of disease management. In other locations, most squamous cell carcinomas will eventually metastasize if the primary tumor is ignored; the behavior of digital tumors may follow the same pattern.

Before leaving this subject, I remind you that *black* standard poodles have a strong predilection for developing multiple digital squamous cell carcinomas. I have had some dogs that have lost 5-6 digits over a period of as many years. We occasionally see it in other large black dogs, notably giant schnauzers, bouviers, and black labradors. We do not know why being *black* is a strong risk factor for this multiple tumor syndrome.

**4. Other neoplasms of the canine digit:**

Although subungual squamous cell carcinoma is by far the most common neoplasm of the canine digit, other tumors with a predilection for the digit include benign cutaneous histiocytoma, benign plasmacytoma, osteosarcoma, and subungual melanoma. The prognosis for melanomas of the digit depends on the site of origin. Those tumors arising from the haired skin of the digit behave as melanomas arising anywhere else in skin, meaning that the vast majority are discrete and behaviorally benign. They are excellent candidates for surgical cure without the need for wide margins. In contrast, those arising specifically from melanocytes at the nail bed are dangerous malignancies with an invasive growth habit and a very high metastatic risk to lymph node and then to lung.

**4. Ulcerative and exfoliative inflammatory diseases of the footpad:**

There are three important and serious diseases that affect the bottom of the feet. The best known of these is probably pemphigus foliaceus, which is claimed to create discrete ulcers on the pads. Frankly, it is a diagnosis I make very infrequently in this particular clinical context, although pemphigus foliaceus itself is a relatively common diagnosis (but one based on vesicles on the ear pinna or in dogs with a generalized pustular disease). More prevalent, in my caseload, is cutaneous vasculitis giving rise to epidermal infarcts/ulcers. I will also see examples of hepatocutaneous syndrome (necrolytic migratory erythema) causing an exfoliative dermatitis characterized by extreme crusting and ulceration of the digital skin, particularly the ventral aspect of the foot. Liver disease is hardly ever clinically obvious, and may not even be biochemically detectable, at the onset of the skin disease. Most dogs will also have an exfoliative facial dermatitis that has been very resistant to routine therapeutic efforts. The biochemical basis linking liver failure with the development of skin lesions remains unknown. The histologic lesions of dramatic basal cell hyperplasia, vacuolation of stratum spinosum, and diffuse parakeratosis combined with a mild interface dermatitis are virtually specific.