Scaling and crusting in dogs: Part 1 – diagnostic approach

Scaling and crusting are common presentations in canine clinical practice. They can occur secondary to pruritus, infection, hormonal/nutritional/metabolic imbalances, and neoplasia, or be manifestations of a primary keratinisation defect. Primary keratinisation defects include idiopathic seborrhoea, ichthyosis, vitamin A-responsive dermatosis, zinc-responsive dermatosis, follicular dysplasia, acne, schnauzer comedo syndrome, and sebaceous adenitis. A primary keratinisation defect can be diagnosed only when secondary scaling and crusting disorders have been eliminated. A thorough, methodical diagnostic approach is required.

Key words: Scale, crust, keratinisation, pruritus, diagnosis, inflammation, primary, secondary.

Introduction
Over 20% of consultations in small animal practice are estimated to involve animals with a dermatological problem (Hill, 2006), the vast majority presenting with at least some degree of scaling and crusting. Scaling and crusting can occur secondary to pruritus, infection, hormonal/nutritional/metabolic imbalances, and neoplasia (secondary scaling and crusting disorders), or can indicate a primary, inherited keratinisation defect (Fig 1.2). Scaling and crusting in dogs are secondary in over 80% of cases (Shanley and Kwochka, 2003).

Lesion morphology

Scale
Scale is an accumulation of loose fragments of the horny layer (stratum corneum) of the skin (Miller, Griffin, Campbell, 2013). It may be seen when epidermal maturation, desquamation (shedding of corneocytes), keratinisation (synthesis of the principal fibrous proteins of the keratinocyte), apocrine or sebaceous glandular function, or intercellular lipid formation are abnormal. Scaling occurs frequently in chronic inflammation but also in primary keratinisation defects. Scale varies in colour (e.g. white, silver, yellow or brown) and consistency (e.g. fine, powdery, dry, greasy, loose or adherent) (Figure 3). The nature of the scale may be helpful in distinguishing certain secondary scaling disorders. Dry scale with minimal inflammation and pruritus may be seen in endocrinopathy, dermatophytosis, endoparasitism, cheyletiellosis, and demodicosis whereas waxy, greasy scale with inflammation and pruritus, is often associated with allergic dermatitis, sarcoptic mange and pyoderma (Figure 4).

Epidermal collarette
An epidermal collarette is a circular rim of scale from the remnants of a papule, pustule, vesicle or bulla (Figure 5). It is often seen in superficial bacterial folliculitis (pyoderma) but can also occur in other conditions including pemphigus foliaceus.

Follicular cast
A follicular cast is an accumulation of keratin and follicular material that adheres to the hair shaft. It can be seen in idiopathic seborrhoea, sebaceous adenitis and vitamin A-responsive dermatosis as well as in secondary scaling disorders such as dermatophytosis, demodicosis and pyoderma.

Comedones (singular: comedo)
Comedones are blackheads resulting from dilation of hair follicles with cornified cells and sebaceous material.

Crust
Crust is an accumulation of dried exudate, serum, pus, blood, cells, scales or medications on the skin surface. Primary crusting disorders include idiopathic seborrhoea and zinc-responsive dermatoses, and secondary crusting disorders include pyoderma and pruritic skin conditions. Crusts are rarely diagnostic but may contain important diagnostic indicators: dermatophyte spores and hyphae; acantholytic keratinocytes typical of pemphigus (Figures 6, 7, 8); and microorganisms such as bacteria and yeasts.

Seborrhoea
Seborrhoea is a confusing term. In this article, the word is used only in the context of Primary Idiopathic Seborrhoea, believed to be a primary keratinisation disorder.
Lesion Secondary scaling and crusting disorders Primary scaling and crusting disorders

Scale Chronic inflammation Primary idiopathic seborrhoea Ichthyosis Follicular dysplasia

Epidermal collarette Pyoderma Immune-mediated disease

Follicular cast Demodicosis Dermatophytosis Primary idiopathic seborrhoea Vitamin A-responsive dermatosis Sebaceous adenitis

Comedones Demodicosis Dermatophytosis Vitamin A-responsive dermatosis Schnauzer comedo syndrome

Crust Pyoderma Pruritus Primary idiopathic seborrhoea Zinc-responsive dermatosis Superficial necrolytic dermatitis

Follicular papules and pustules Pyoderma Demodicosis Dermatophytosis

Non-follicular papules and pustules Flea allergy dermatitis Sarcoptic mange

Follicular and non-follicular papules and pustules Pemphigus foliaceus Allergic dermatitis

Table 1: Lesions in primary and secondary scaling and crusting disorders

Figure 1: Crust and scale in a 12-year old Labrador with atopic dermatitis.

Figure 2: Focal crusting and alopecia in an English Bulldog with pyoderma.

Figure 3: Dry, diffuse, powdery, dorsal scale in a pruritic, atopic Greyhound.

Figure 4: Erythema, alopecia, papules and crusting in a West Highland White Terrier with allergic skin disease.

Figure 5: Epidermal collarette in a dog with superficial bacterial folliculitis.

Figure 6: Generalised scaling and crusting in a 7-year old cross breed dog with pemphigus foliaceus.

Figure 7: Focal crusts on the ventral abdomen of a 10-year old Jack Russell Terrier with pemphigus foliaceus.

Figure 8: Acantholytic cells, neutrophils (degenerate and non-degenerate) and some cocci.