

Alopecia as a manifestation of skin diseases in dogs: causes, treatments, and analysis of the case studies.



Joanna Karaś-Tęcza, DVM, Dermawet, Dermatological clinic for dogs and cats in Warsaw

Alopecia in dogs is defined as the loss of hair on the skin regions where hair grows. The condition should not be confused with hair thinning (hypotrichosis), which is about a 30% reduction in the physiological number of hairs.

Alopecia and/or hypotrichosis is considered a clinical symptom of many genetic and congenital skin diseases.

As for genetic skin conditions, two factors may induce alopecia: an abnormal formation of hair follicles or a disturbed formation of hair in hair follicles. The pathology begins as early as in the foetal life or after birth; in the latter case, the animal may develop the symptoms up to 3 years of age. In the case of genetic-related hair loss, i.e. after birth, the owner usually cannot identify the problem in the first weeks of life. The manifestation of alopecia occurs later in life, and only then it becomes a concern for the owner. The canine genetic diseases with delayed alopecia include:

- Breed-related dysplasia of hair follicles: for instance, dysplasia of hair follicles in the Lagotto Romagnolo,
- Alopecia X: nowadays, a common problem in the Pomeranian,
- Seasonal flank alopecia: diagnosed, for example, in English bulldogs, Boxers or Salt and Pepper Schnauzers,
- Canine pattern alopecia, typical for dachshunds.

Treatment for genetic alopecia is difficult and can be ineffective. Over the last few years, new therapeutic solutions have emerged, such as melatonin implants, trilostane or fractional puncturing with hyaluronic acid; however, even these therapies are sometimes unsuccessful.

Acquired alopecia and acquired hypotrichosis

Acquired alopecia or acquired hypotrichosis often involves the destruction of hair follicle structure or disturbance of the hair growth cycle. These conditions are associated with skin diseases of various aetiology. For acquired alopecia, performing a full diagnostic examination and developing a management protocol is necessary to eliminate the underlying cause and restore the normal hair growth cycle. If an incurable disease

(e.g., atopic dermatitis) is diagnosed, the goal is to control the underlying cause. Taking a history from the dog owner is extremely important; collecting information serves to determine the onset of skin lesions and define the presence and nature of pruritus.

Efficacy of dermo-cosmetic products in the management of alopecia: presentation of the trial and results.

The efficacy of Vet Expert's Stimuderm Ultra product line (Stimuderm Ultra shampoo for short-haired dogs, Stimuderm Ultra shampoo for long-haired dogs, and Serum Stimuderm Ultra) was evaluated at Dermawet Dermatology Referral Service for Dogs and Cats. These products contain the ACTIVE NTM™ molecule.

The objective of the trial with the Stimuderm Ultra dermo-cosmetic products was to evaluate the efficacy of the products in patients with alopecia or hypotrichosis secondary to or related to comorbidities.

The time and frequency of baths were the same for all dogs included in the trial, and the serum was applied over the affected areas (alopecia or hypotrichosis) according to the same protocol:

1. The first and second baths at a 5-day interval.
2. Subsequent baths once a week until regrowth of hair was reported; if no improvement was seen, bathing was continued for a maximum of 6 weeks.
3. Application of the serum every 24 hours for 14 days and then every 48 hours for another 14 days; next, the product was applied twice a week to complete the treatment period of 6 weeks in total.

The bathing instruction was simple: after soaking the whole skin and coat with water, the shampoo was applied over the skin until it foamed; then, the haircoat and skin were massaged for at least 5 minutes (recommendation: up to 15 minutes).

Table with Group 1 results

24 dogs – that group involved: Short-haired brachycephalic dogs (12 subjects: pugs and French bulldogs) and long-haired dogs of various breeds (12 subjects).

	Improvement after 2 baths	Improvement only after 4 baths	Improvement only after 6 baths	Improvement only after 8 baths	No improvement
Group 1	1	3	4	1	3
Group 2	0	2	5	1	4

It is worth mentioning that the word shampoo comes from Hindu and means 'massage', which highlights how important the application method is for administering local treatments.

The serum was applied over hypotrichosis- or alopecia-affected areas by homogeneous spraying. The study was carried out with 75 patients that were divided into five groups according to the final diagnosis or during a differential diagnostic process.

- Group no. 1: 24 dogs with atopic dermatitis diagnosed according to the 2021-2023 diagnostic specifications. The procedures were performed on patients in remission and with reported excessive hair loss and/or visible alopecia and excoriations.
- Group no. 2: 14 dogs with excoriations and intensive hair loss following completed antibiotic treatment for *Staphylococcus* skin infection.
- Group no. 3: 15 dogs during a differential diagnostic process, with suspected food allergy and clinical alopecia related to pruritus; itchiness in combination with the other clinical symptoms suggested food allergy. Shampoo therapy and a diet with protein hydrolysate were administered for six weeks.
- Group no. 4: 14 dogs with hypothyroidism were diagnosed based on the clinical symptoms and a thyroid profile (TSH, ft4, and T4). Topical therapy was administered together with thyroid hormone supplementation.
- Group no. 5: 8 dogs with diagnosed alopecia X (AX) based on histopathological examination and/or ACTH-stimulated 17-hydroxyprogesterone values (one Chihuahua with oestrogen-dependent progressive skin alopecia was included in the group; the disease was diagnosed based on histopathological examination and medical history).

Test results are provided in the following tables:

Group 2 table
14 dogs of various breeds divided into the following subsets, according to hair length: 1 – short-haired dogs, 2 – long-haired dogs

	Improvement after 2 baths	Improvement only after 4 baths	Improvement only after 6 baths	Improvement only after 8 baths	No improvement
Group 1	2	1	2	1	1
Group 2	0	2	3	0	2

Group 3 table
15 dogs of various breeds: eight short-haired dogs, seven long-haired dogs.

	Improvement after 2 baths	Improvement only after 4 baths	Improvement only after 6 baths	Improvement only after 8 baths	No improvement
Group 1	1	3	1	1	2
Group 2	0	1	1	2	3

Group 4 table
A group of 14 dogs divided into the following subgroups: Seven short-haired dogs (two Rhodesian ridgebacks, two dachshunds, two American Staffordshire terriers, and one mixed-breed dog), Seven long-haired dogs (including two Gordon setters, two Irish setters, and three mixed-breed dogs).

	Improvement after 2 baths	Improvement only after 4 baths	Improvement only after 6 baths	Improvement only after 8 baths	No improvement
Group 1	0	1	3	2	1
Group 2	0	0	2	2	3

Group 5 table
A group of eight dogs including: seven dogs of miniature Spitz, one chihuahua breed dog

	Improvement after 2 baths	Improvement only after 4 baths	Improvement only after 6 baths	Improvement only after 8 baths	No improvement
Group 1	0	0	0	0	0

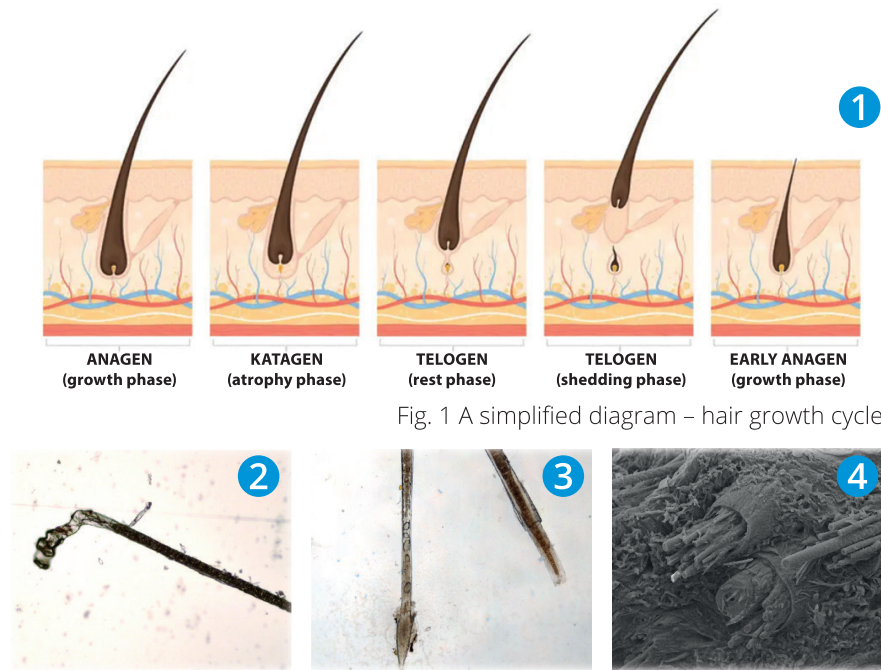


Fig. 1 A simplified diagram – hair growth cycle.

Fig. 2-4 Microscopic image of a dog's hair

What kind of ancillary tests have been performed during follow-up visits after subsequent baths to assess the products' efficacy?

1. A trichogram.
2. An assessment involving rolling and stretching the skin under Wood's lamp.
3. A visual clinical examination.

In the case of primary inflammatory alopecia, a veterinarian should take into consideration infectious and immunological skin diseases since, in both cases, hair follicles and/or hair are severely damaged. In both pyoderma and dermatophytosis, severe destruction of hair follicles is also reported; a similar process involves the follicles in alopecia areata or pseudo alopecia areata, i.e., immune-mediated skin diseases.

From the practical point of view, the making of a diagnosis of primary non-inflammatory alopecia reveals that apart from genetic conditions, patients with diseases leading to dysregulation of the hair cycle are most consulted. A group of these diseases includes common endocrinological diseases such as:

- hyperadrenocorticism,
- hypothyroidism,
- hypoestrogenism.

The mechanisms regulating the hair cycle are disturbed in all of them.

Apart from endocrine diseases, an acquired dysregulation of the hair cycle is also reported in oncological patients with anagen effluvium or telogen effluvium; in these disorders, there are many causes of alopecia (such as stress or diseases accompanied by high body temperature above 40°C).

Moreover, it is worth mentioning the whole group of dermatopathies, e.g., dermatomyositis or post-vaccination dermatopathies, because these diseases are associated with non-inflammatory alopecia and acquired dysregulation of the hair growth cycle. Additionally, the latter phenomenon is also observed in diseases associated with secondary alopecia, which is a result of inflammation and pruritus due to such allergic skin reactions as:

- atopic dermatitis,
- food allergy,
- contact allergy,
- canine allergic dermatitis.

In dogs, hair loss is an effect of many distinct conditions with diverse aetiologies, and therefore, as pruritus is, also alopecia is certainly one of the most common canine conditions referred for dermatological appointments.

Normal regulation of the hair growth cycle depends on the physiological and undisturbed progress of all hair growth phases. In this cycle, anagen is the most active phase. However, the follicle enters this stage provided that there is an active exogen phase, namely active hair loss called moulting when a signal is transmitted to the hair

follicle via a neurogenic pathway, and the anagen phase is induced.

The normal growth cycle is influenced by many factors, such as oxygen access since the demand for blood supply is extremely high in the hair follicles. Oxygen itself is not sufficient as a high level of the following elements is also required:

- provitamins B3 and zinc,
- unsaturated omega-3 and omega-6 fatty acids.

Apart from treating the underlying cause of the disease associated with alopecia, stimulating the regrowth of beautiful and healthy haircoat requires inducing and prolonging the anagen phase, improving microcirculation in the hair follicles and dermis, and it is also essential to use anti-inflammatory products and formulations which strengthen the hair follicles. To achieve these effects, it is worth including the innovative Active NTM™ molecules in the topical treatment; these molecules perfectly fit into the requirements and management, being a carrier of provitamin B3 at the same time.

Feedback from the dog owners (excluding group 5)

As early as after two baths and with no visible hair growth over alopecic areas, the owners of the short-haired dogs emphasized that hair was better embedded in the hairy skin.

Regardless of the treatment effects at alopecic sites, the owners of the long-haired dogs pointed out better hair quality and reduced hair loss at home. During the treatment with the shampoo and serum, the following tests were performed on the investigated patients while they were participating in the clinical study:

- trichogram,
- brushing test
- a comparative analysis of hair embedment at the border of alopecia and the area with hair regrowth,
- a comparison of the size of alopecia in correlation with the number of baths.

Trichogram was performed before the treatment and after 14 and 21 days. The objective of rolling and stretching the skin under the Wood's lamp was to assess hair embedment before the treatment and after 14 and 21 days.

Then, a visual clinical examination with complete photographic documentation was performed.

The paper features marketing content.

References:

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Summary and conclusions

While assessing the efficacy of the Stimuderm Ultra dermo-cosmetics line, it is worth emphasizing that the serum or shampoo therapy is implemented when the complications have been successfully treated and pruritus management has been started in atopic dermatitis, a superficial skin fungal infection has been eliminated or after treating various forms of pyoderma, regardless of managing the primary disease.

It is worth considering implementing the Stimuderm product line in atopy management since each form of hydrotherapy favourably affects the skin and hair follicles (but not every shampoo stimulates hair growth).

In patients with hypothyroidism and resulting issues with disturbed hair growth cycle (the so-called "follicular arrest"), the ACTIVE NTM™ molecule in the Stimuderm Ultra range may turn out to be a perfect choice for topical therapy.

An innovative line of Stimuderm Ultra dermo-cosmetics will probably be a more common choice for topical treatment not only in patients with atopy, pyoderma, or hypothyroidism but also for managing less frequent diseases which negatively impact the hair growth cycle and are discussed by the author in the paper.

EFFICACY OF STIMUDERM ULTRA SKIN THERAPY CONFIRMED IN VETERINARY STUDIES

After eight baths with the shampoo and a regular application of the serum, a visible improvement of hair regrowth has been confirmed respectively in:

71% of dogs – TREATMENT GROUP: alopecia caused by atopic dermatitis.

79% of dogs – TREATMENT GROUP: excoriations caused by *Staphylococcus*.

67% of dogs - TREATMENT GROUP: alopecia caused by hypothyroidism.

71% of dogs - TREATMENT GROUP: alopecia caused by food allergy.

0% of dogs - TREATMENT GROUP: with diagnosed alopecia X.

The study was performed with 75 dogs by J. Karaś-Tęcza, DVM.



Fig. 5-10 The photographs were taken as a part of the studies performed by J. Karaś-Tęcza, DVM, with the selected patients (with atopic dermatitis, food intolerance, and hormonal disturbances). The images show the condition of the haircoat before, during and upon completion of skin therapy with the STIMUDERM ULTRA product line.



Product description in VetPharmacy