

Nail Lesions in Dogs and Cats: A Randomized Clinical Study

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ABSTRACT

Background: The nail is the horn-like structure of the fingertip. Pathologies in the nail and nail bed of cats and dogs may be primarily related to the nail or may be the clinical symptom of many systemic diseases. Symmetrical or asymmetrical localization of nail lesions may also give clues about the underlying diseases. Although nail pathology in dogs and cats has been previously described, there has not been a randomized clinical study in which nail diseases have been evaluated. Therefore, in this clinical study, it was aimed to randomly determine the nail lesions encountered in dogs and cats brought to our clinics with complaints of another disease and to evaluate the nail lesions encountered.

Materials, Methods & Results: The material of the study was formed 26 cats and 35 dogs in different age, gender and breed, which was brought to surgery clinics for different reasons within 1 year and has randomized nail problems. Anamnesis was taken from the patient owners and all the nails of cats and dogs were examined with the help of a magnifying glass in terms of nail integrity, missing or excessive nail formation, nail lesions and pain presence, nail - nail bed and periconnective nail tissue swelling and exudation. All findings were recorded in the "Nail Pathology Follow-up and Evaluation Form". After nail lesions were divided according to their extremity, the nail lesions of all patients were 1st divided into 2 groups. Asymmetric and symmetrical distribution rates were determined for each nail lesion in groups. Then, with only 1 or more nail lesions in 1 extremity were grouped asymmetrically, and those with 1 or more lesions in multiple extremities were grouped symmetrically. Nail lesions caused by systemic disease were specifically treated and excessive and deformed nails were cut properly by preserving normal nail anatomy. In dogs, 59.56% of the nail lesions were located on the front limbs and 40.44% on the hind limbs, while 41.11% of the nail lesions in cats were located on the front and 58.89% on the hind limbs. In dogs, 62.86% of nail lesions were symmetrical and 37.14% were asymmetrical. In cats, the rates of symmetrical and asymmetrical nail lesions were 38.46% and 61.54%, respectively. In dogs, the nail lesion observed asymmetrically was onychomalacia, while the lesion observed symmetrically is onycholysis. The nail examination findings revealed the most common nail lesion was onychogryposis in 42.85% of the dogs. Onychogryposis was found on the forelimbs in 57.69% and was symmetrical in 60%. In cats, paronychia was the most common nail lesion with a rate of 50%. This lesion was observed asymmetrically in 76.92% of the cases and 56.25% of the cases were located on the front limbs.

Discussion: The nails of cats and dogs are biomechanically and histopathologically different from those of humans. Although these terms are not sufficient for the specific diagnosis of the disease, they provide clues about the pathology. In dogs and cats, nails should be trimmed properly and at regular intervals to maintain foot health and help the locomotor system to function normally. Abnormally shaped or deformed nails predispose to gait problems, trauma and the development of some diseases such as pododermatitis. The nails, which are part of the locomotor system, are affected by many local and systemic diseases and nail lesions are often overlooked in clinical practice. In this randomized clinical study, nail lesions encountered in dogs and cats were evaluated comprehensively with their etiologies and clinical descriptions, and the importance of nail diseases in small animal practice was re-emphasized.

Keywords: canine, feline, nail lesion, pododermatitis, systemic diseases, infectious, nutritional, metabolic disorders.

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INTRODUCTION

Nail (unguis, onyx) is the cornified tissue covering of the fingertip [11,17]. The shapes and functions of nails vary according to species [6]. The epidermis layer of the nail, which is an extension of the skin, is formed in a keratinized structure, forming a curved horn [1]. Nail growth slowly from the nail matrix within the nail bed adjacent to the epidermis [14]. In dogs and cats, the curvature of the nail is related to the direction of nail growth. When the nail matrix is damaged, nail deformations occur [1,14]. Nail and nail bed pathologies are frequently encountered problems in veterinary practice, particularly in older animals [3].

Nail pathologies encountered in cats and dogs are: onychitis, onychomalacia, onychomycosis, onychomadesis, onychogryposis, onychoschisis, onycholysis, onychodystrophy and paronychia [1,16,17]. The nail disorders usually do not present as a single disease finding [8,10]. Lesions seen in the same extremity or in different extremities may indicate some underlying diseases [18]. Various lesions are encountered in the nails due to systemic diseases, infectious, immunologic, genetic, nutritional, neoplastic, environmental, idiopathic and metabolic disorders. Asymmetric lesions may be due to traumatic, neoplastic or infectious causes. Symmetrical findings with multiple nail lesions in more than 1 extremity usually occur due to a primary disease [9,10].

Cats and dogs kept at home may have progressive nail problems even though they are not recognized by their owners [9]. In this clinical study, it was aimed to randomly determine the nail lesions encountered in dogs and cats brought to our clinics with complaints of another disease and to evaluate the nail lesions encountered.

MATERIALS AND METHODS

Materials and study design

The material of this randomized study consisted of 26 cats and 35 dogs of different ages, breeds and sexes who were brought to small animal surgery clinics in 2023 with different clinical complaints and were randomly identified with nail lesions. In the anamnesis, the owners of the patients were asked about the complaints they brought their patients to the clinic, whether the patients had nail

or nail bed lesions in the past, whether the patient was currently taking any medication, if there was a recurrent disease, whether this disease had been treated in the past, whether the patient had a skin disease, whether the patient was currently taking any medication that suppresses the immune system, and the answers were recorded.

Clinical diagnostic approach

Clinically, the vital parameters of the 26 cats and 35 dogs were checked and their healthy situations were examined for possible lameness. With the help of a magnifying glass, the nails on all extremities of cats and dogs were inspected. All nails were examined for nail integrity, missing or excessive nail formation, nail lesions and the presence of pain, swelling and exudate in the nail, nail bed and periconnective nail tissue. Specific nail lesions such as onychalgia, onychitis, onychomalacia, onychomycosis, onychogryposis, onychoschisis, onychodystrophy, onycholysis and paronychia were also determined. These findings were recorded on the "Nail Pathology Follow-up and Evaluation Form" prepared separately for each animal.

Grouping

The nail lesions of all patients were 1st divided into 2 groups according to the type of nail lesions after the nail lesions were divided according to the extremity in which they were found. Asymmetric and symmetric distribution rates were determined for each nail lesion in the groups. Then, those with 1 or more nail lesions in only 1 extremity were grouped as asymmetric and those with 1 or more lesions in more than 1 extremity were grouped as symmetric.

Nail lesions caused by systemic disease were specifically treated in our clinics. Locally determined nail lesions were treated considering the previously defined procedures [2,9,15], while excessive and deformed nails were cut properly by preserving normal nail anatomy.

Descriptive analytics

Percentage calculations of data regarding age, gender, extremity where the nail lesion is located (front-hind limbs), asymmetric and symmetric appearance of the nail lesion of the cats and dogs evaluated in the study were made using the Microsoft Excel program.

RESULTS

The signalment of dogs and cats and the nail lesions encountered are detailed in Tables 1 and 2, respectively. When the ages of the dogs with nail lesions were analyzed: 8.57% were less than 1-year-old, 54.29% were between 1 and 10-years-old and 37.14% were 10-years-old or older. Of these dogs, 60% were female and 40% were male. 57.14% of female and 92.85% of male dogs were not neutered (Table 1). When the ages of cats with nail lesions were analyzed; 19.23% were less than 1-year-old and 80.77% were between 1 and 10-years-old. Of these cats, 53.85% were female and 46.15% were male. 64.28% of female and 91.66% of male cats were not neutered (Table 2).

Tables 3 and 4 show the symmetrical and asymmetrical appearance of nail lesions in dogs and cats and the distribution of these lesions according to the front and hind limbs. Consequently, 59.56% of the nail lesions in dogs were located on the front limbs and 40.44% on the hind limbs, while 41.11% of the nail lesions in cats were located on the front and 58.89% on the hind limbs. In dogs, 62.86% of nail lesions were symmetrical and 37.14% were asymmetrical.

In cats, the rates of symmetrical and asymmetrical nail lesions were 38.46% and 61.54%, respectively. In dogs, the nail lesion observed asymmetrally was onychomalacia, while the lesion observed symmetrically is onycholysis. Onychitis, onychomycosis, onychomadesis, onychogryposis, onychoschisis, onychodystrophy and paronychia nail lesions were observed both symmetrically and asymmetrically in dogs (Figure 1). In cats, asymmetric lesions were onychomalacia, onychomadesis and onychoschisis, while symmetrical lesion was onychomycosis (Figure 2). Onychitis, onychogryposis, onychodystrophy and paronychia lesions were observed both asymmetrically and symmetrically in cats. No onycholysis lesion was ever encountered in cats.

According to the nail examination findings, the most common nail lesion was onychogryposis in 42.85% of the dogs. Onychogryposis was found on the forelimbs in 57.69% and was symmetrical in 60%. In cats, paronychia was the most common nail lesion with a rate of 50%. This lesion was observed asymmetrically in 76.92% of the cases and 56.25% of the cases were located on the posterior extremities.



Figure 1. Some nail lesions observed in dogs. A- Onychitis, onychomadesis and onychodystrophy in case 11. B- Onychodystrophy in case 15. C- Onychitis and paronychia in case 19.

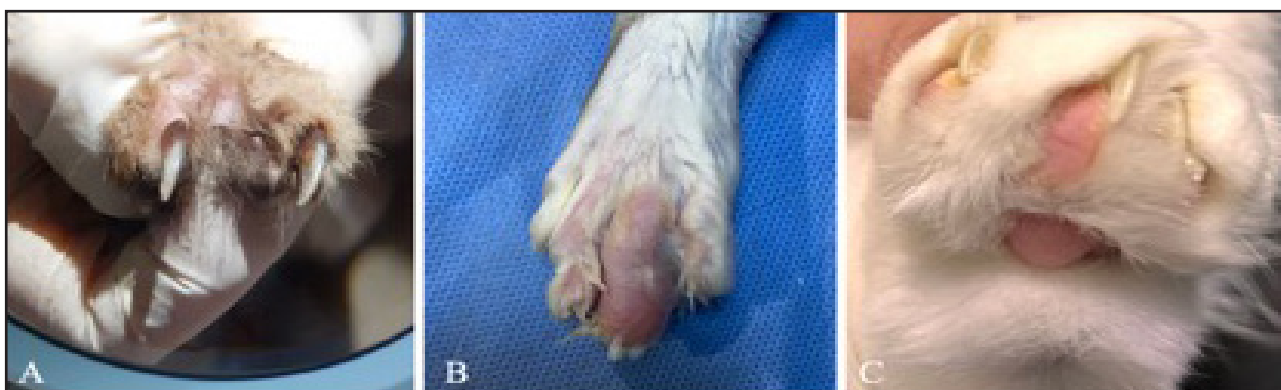


Figure 2. In cats, diagnosed some nail lesions. A- Onychomycosis in case 17. B- Onychomadesis and Paronychia in case 3. C- Onychogryposis in case 25.

Table 1. Signalments of the 35 dogs and respective nail lesions of the cases.

Case no	Signalment			Nail Lesions								
	Breed	Age	Sex	ONY	ONM	ONK	ONS	ONG	ONZ	OND	ONL	PRN
1	Husky	13	F (x)	-	-	-	-	-	-	1	-	-
2	Terrier	9	F	-	1	-	-	-	-	1	-	-
3	Saint Bernard	11	F	-	-	-	-	2	-	-	-	-
4	Anatolian Shepherd	5	M	-	-	-	-	1	-	-	-	-
5	Golden Retriever	15	F (x)	-	-	-	-	-	-	1	-	-
6	Mix breed	1	F	-	-	-	-	1	-	-	-	-
7	Mix breed	1	M	-	-	-	1	-	-	-	-	-
8	Jack Russel Terrier	2	M	1	1	-	-	1	-	-	-	1
9	Mix breed	1	M	-	-	-	-	1	-	-	-	-
10	Terrier	6	F	-	-	-	1	-	-	-	-	-
11	Golden Retriever	9	F (x)	2	-	2	2	-	-	4	-	2
12	Pekingese	12	F	-	-	-	-	1	-	2	2	-
13	Anatolian Shepherd	1	F	-	-	-	-	-	-	4	2	-
14	Terrier	15	F	-	-	-	-	-	-	2	-	2
15	Golden Retriever	11	F	-	-	2	-	-	-	2	-	-
16	Pinscher	10	M	-	-	-	-	2	-	2	-	-
17	Terrier	7	F (x)	-	-	2	-	-	1	2	-	-
18	Mix breed	8	M	-	1	1	-	-	-	2	-	1
19	Papillon	10	M	4	-	4	-	2	-	-	-	4
20	Mix breed	2	F (x)	-	-	-	-	2	-	-	-	-
21	Pekingese	2	M	-	-	2	-	-	-	-	-	-
22	King Charles	10	F (x)	-	-	-	-	2	-	-	-	-
23	Chihuahua	1	F	-	-	-	-	-	-	2	-	-
24	Anatolian Shepherd	3	F	-	-	-	-	4	-	-	-	-
25	Anatolian Shepherd	1	F	-	-	2	-	-	-	-	-	2
26	Cocker Spaniel	3	F	2	-	-	-	-	2	-	-	-
27	Anatolian	9	F (x)	-	-	-	-	2	-	-	-	-
28	Cocker Spaniel	11	M	-	-	-	-	2	1	-	-	3
29	Maltese Terrier	15	F	-	-	-	-	-	-	4	-	-
30	Mix breed	3	M (x)	-	-	-	-	2	-	-	-	-
31	English Setter	3	M	-	-	1	-	-	1	-	-	-
32	Golden Retriever	11	M	-	-	-	-	-	-	-	-	1
33	Mix breed	1	F (x)	-	-	3	-	-	-	-	-	-
34	Doberman	1	F (x)	1	-	-	-	-	-	-	-	1
35	Chihuahua	11	F	-	-	-	-	1	-	1	-	-

F: Female; M: Male; (x): Neutered; ONY: Onychitis; ONM: Onychomalacia; ONK: Onychomycosis; ONS: Onychomadesis; ONG: Onychogryposis; ONZ: Onychoschisis; OND: Onychodystrophy; ONL: Onycholysis; PRN: Paronychia.

Table 2. Signalments of the 26 cats and respective nail lesions of the cases.

Case no	Signalment	Age	Sex	Nail Lesions								
	Breed			ONY	ONM	ONK	ONS	ONG	ONZ	OND	ONL	PRN
1	Persian	8	F (x)	-	-	-	-	4	-	-	-	-
2	Calico	1	F	1	-	-	-	-	-	-	-	-
3	Calico	1	F	-	-	-	1	-	-	-	-	1
4	Scottish Fold	2	F (x)	1	-	-	-	1	-	-	-	-
5	Mix breed	2	F	-	-	-	1	-	-	-	-	1
6	Tabby cat	1	M	-	1	-	-	-	1	-	-	-
7	Tabby cat	1	M	-	-	-	-	-	-	-	-	1
8	Tabby cat	1	F	-	-	-	-	-	-	-	-	1
9	British Shorthair	1	F	-	-	-	1	-	-	-	-	-
10	Siamese	1	M (x)	1	-	-	-	-	-	-	-	1
11	Persian	5	F (x)	-	-	-	1	-	1	-	-	1
12	Mix breed	1	F	-	-	-	1	-	-	-	-	-
13	Tabby cat	1	M	1	-	-	-	-	-	-	-	1
14	Mix breed	1	M	-	-	-	-	-	-	1	-	-
15	Siamese	1	F (x)	1	-	-	-	-	-	-	-	-
16	Scottish Fold	1	M	-	-	2	-	-	-	-	-	-
17	Tabby cat	5	F (x)	2	-	2	1	-	-	-	-	2
18	Tabby cat	1	F	1	-	-	-	-	1	-	-	1
19	Mix breed	2	M	1	-	-	-	-	-	-	-	1
20	Mix breed	4	F	1	-	-	-	-	-	-	-	2
21	Tabby cat	1	F	-	-	4	-	-	-	-	-	-
22	Tabby cat	3	M	2	-	-	1	-	-	-	-	2
23	Mix breed	1	M	-	-	2	-	-	-	-	-	-
24	Scottish Fold	6	M	2	-	-	-	-	1	-	-	1
25	Scottish Fold	1	M	-	-	-	-	-	-	4	-	-
26	Scottish Fold	1	M	-	-	-	-	4	-	-	-	-

F: Female; M: Male; (x): Neutered; ONY: Onychitis; ONM: Onychomalacia; ONK: Onychomycosis; ONS: Onychomadesis; ONG: Onychogryposis; ONZ: Onychoschisis; OND: Onychodystrophy; ONL: Onycholysis; PRN: Paronychia.

Table 3. Distribution of the nail lesions in dogs according to localization on the extremities.

Nail Lesion	Front limb left	Front limb right	Hind limb left	Hind limb right	Total Nail Lesion	Symmetric	Asymmetric	Total
Onychitis	3	3	3	2	11	3	2	5
Onychomalacia	1	0	1	1	3	0	3	3
Onychomycosis	7	6	2	4	19	7	2	9
Onychomadesis	2	1	1	0	4	1	2	3
Onychogryposis	9	6	7	4	26	9	6	15
Onychoschisis	2	1	1	1	5	1	3	4
Onychodystrophy	10	9	4	7	30	10	4	14
Onycholysis	2	1	1	0	4	2	0	2
Paronychia	5	4	4	4	17	5	4	9

Table 4. Distribution of the nail lesions in cats according to localization on the extremities..

Nail Lesion	Front limb left	Front limb right	Hind limb left	Hind limb right	Total Nail Lesion	Symmetric	Asymmetric	Total
Onychitis	3	2	4	5	14	3	8	11
Onychomalacia	0	1	0	0	1	0	1	1
Onychomycosis	2	2	3	3	10	4	0	4
Onychomadesis	3	1	2	1	7	0	7	7
Onychogryposis	2	2	3	2	9	2	1	3
Onychoschisis	0	1	1	2	4	0	4	4
Onychodystrophy	1	1	2	1	5	1	1	2
Onycholysis	0	0	0	0	0	0	0	0
Paronychia	5	2	5	4	16	3	10	13

DISCUSSION

In dogs and cats, nails should be trimmed properly and at regular intervals to maintain foot health and help the locomotor system to function normally. Abnormally shaped or deformed nails predispose to gait problems, trauma and the development of some diseases such as pododermatitis [8]. Animal nails are resistant to environmental influences, have a flexible structure and have important functions such as attack, defense and grasping. Since the nails take a long time to grow, treatment of nail pathologies can sometimes take months. Therefore, regular nail care is essential for both foot health and normal limb movement in dogs and cats. [1,14,18]. In the presented study, the nails of cats and dogs were evaluated by onychological examination, and nail problems that could be ignored in routine clinical practice were detected during routine clinical examinations.

In order to avoid misdiagnoses of the nail diseases, it is necessary to know the anatomical details of the nail and nail bed well. Each abnormal nail appearance and lesion is defined by a different name in the literature [1]. Most of the nail abnormalities

encountered can be seen together in the same nail or in different nails of the same animal [14]. Nail lesions can be seen in cats and dogs of all ages, genders and breeds [8]. In the presented study, specific definitions for nail lesions in cats and dogs were used, and the defined nail lesions of the cats and dogs included in the study, and the animal's identity information are given in Table 1. While nail lesions were investigated randomly, care was taken to ensure that the breed, gender and age ranges of cats and dogs were different.

During the clinical examination of the nails, detecting a lesion in a single nail or more than one nail is important for diagnosis [1,8]. Nail lesions that appear asymmetrical may occur due to infection, trauma or neoplasia. Symmetrical observed nail lesions can usually be caused by systemic diseases, genetic and nutritional factors [8,9,12,19]. In cats and dogs, nail lesions are generally observed asymmetrally [8]. In the presented study, encountered nail lesions in cats were mostly asymmetrical, and the majority of these nail lesions were caused by either secondary infection or trauma. Symmetrical lesions were more common in dogs.

Traumatic nail lesions are more common in dogs and are usually asymmetrical [8,15]. In the present study, nail lesions were traumatic in 11.76% of dogs and 42.30% of cats and these lesions were asymmetrical. Paronychia is a secondary disease that occurs in small animals due to bacterial or fungal infections as a result of foreign body penetration into the nail bed [2]. It is reported that bacterial paronychia has been described in cats so far [3] and paronychia is seen in approximately 40% of dogs with nail and nail bed problem [1]. In the present study, the rates of paronychia in cats and dogs were 50% and 25.71%, respectively. There was no other nail lesion in 15.38% of the cats with paronychia, while in the remaining cats had paronychia and associated with different nail lesions. Paronychia may also cause onychogriposis by triggering abnormally rapid nail growth in the animals encountered [8]. Similarly, in this study, onychogriposis was also detected in the same nail in 3 cases of paronychia.

Nail lesions encountered asymmetrically in geriatric cats and dogs may be due to neoplasms [1,9,16]. Primary and metastatic digital neoplasms are rare in cats [4]. According to some retrospective studies, the mean age of cats with metastatic digital carcinoma was reported to be between 11.7-13.8 years [4,5,7]. The cats presented in this study were between 0-8 years of age and we did not encounter any neoplasia. Although the dogs were between 0-15 years of age, no nail lesion associated with any neoplasia was observed.

Nail lesions in dogs and cats can be due to bacterial and fungal infections, demodicosis, neoplasia, systemic lupus erythematosus, autoimmune diseases,

drug eruption (reaction), leishmaniasis, malassezia dermatitis, vaccine reaction, nutritional disorders, vascular problems, dermatoses, metabolic and endocrinological causes such as hypothyroidism in dogs, hyperthyroidism in cats, diabetes mellitus, hyperadrenocorticism, superficial necrotic dermatitis, acromegaly and traumas [8,12,13]. In the presented study, there was pemphigus foliaceus due to autoimmune disease in a dog, onychodystrophy due to systemic lupus erythematosus in a dog, symmetrically formed onychogriposis due to leishmaniasis in a dog and asymmetrically localized onychogriposis due to hyperadrenocorticism in a dog. In cats, symmetrical nail lesions were detected in two cats due to dermatitis. In addition to the treatment procedures for the systemic diseases, normal nail anatomy was maintained by taking care of the nails.

CONCLUSIONS

The nails, which are part of the locomotor system in dogs and cats, are affected by many local and systemic diseases and nail lesions are often overlooked in clinical practice. In this randomized clinical study, nail lesions encountered in dogs and cats were evaluated comprehensively with their etiologies and clinical descriptions, and the importance of nail diseases in small animal practice was re-emphasized.

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