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# Comparative dermatology—pavement paws: frictional dermatosis in puppies analogous to pool toes

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## Abstract

Dogs are susceptible to a diverse spectrum of dermatologic conditions, several of these skin disorders are analogous to dermatologic conditions occurring in humans. Pool toes appears on the plantar surface of the feet and toes; it is an aquatic pool-associated frictional dermatosis that results from repeated rubbing of the feet and toes against the rough cement at the bottom of the pool or its border. A frictional dermatosis that can develop on the uncalloused paw pads of puppies, resulting from repeated rubbing of the paws against ambient temperature, not heated, paved road is pavement paws. Neither pool toes nor pavement paws result from contact with a hot surface; these dermatoses are distinctive from beach feet, a thermal-associated superficial burn to the skin resulting from the hot temperature of the sand that contacts that the plantar feet and toes. In conclusion, similar to pool toes, the pathogenesis of pavement paws is a frictional dermatosis that can develop on the uncallused paw pads of puppies resulting from repeated rubbing of the paws against ambient temperature, not heated, pavement.

*Keywords: beach, canine, dermatosis, dog, feet, frictional, pavement, paws, pool, puppies, puppy, toes*

## Introduction

Canines are susceptible to a diverse spectrum of dermatologic conditions; several of these skin disorders are analogous to dermatologic conditions occurring in humans. Dermatitis, and infections (from bacteria, yeast, and dermatophytes), and infestations (from lice, and mites) are common skin problems in dogs. The mechanism of pathogenesis for some of these conditions can be similar to that observed in humans [1-4].

Pool toes is a dermatosis that appears on the plantar surface of the feet [5-23]. It results from physical trauma to the sole of the foot from the abrasive surface of the pool. Pavement paws is an analogous dermatosis that can present on the plantar surface of a dog's paw.

A 4-month-old Basenji puppy developed pavement paws during her first 5-mile walk on rough pavement. Skin conditions and tumors that are similar to those that can occur in humans are summarized. Pavement paws can be added to the list of dermatoses that can occur in dogs whose paws are unconditioned.

## Discussion

A healthy 4-month-old Basenji puppy had recently finished the full-set of recommended vaccinations and was excited to go on her first walk outside on the road surrounding a nearby lake. She had spent the prior four months inside. All outside ventures had been on the grass in the yard behind the home she lived in. She had to wait until after receiving her final parvo vaccination prior to going to public places where she would be exposed to other animals. Examination of her paw pads prior to the walk showed non-tender intact soft pink pads (**Figure 1**).

The ambient temperature on the day of her walk was only 60F. The pavement of the road was cool to

**Figure 1**. *Clinical presentation of the non-callused paws of a 4-month Basenji puppy. The unaltered pink paw pads are readily observed on the paws on the back legs.*

touch. The walk was five miles and began at 4:20 PM as the sun was setting and concluded at 6:26 PM.

The puppy was wearing a harness that fitted beneath her chest. She was extremely excited during the entire walk. She would often raise her shoulders and strongly pull forward and push off her hind legs. This dragging maneuver repeatedly created friction with the underlying pavement as she dragged her human for nearly the entire distance.

After arriving back at home. She appeared to be ambulating properly. Examination of her paws revealed several areas where friction blisters had formed. Some of the paws demonstrated not only blisters, also the peripheral edges of the blisters (**Figure 2**).

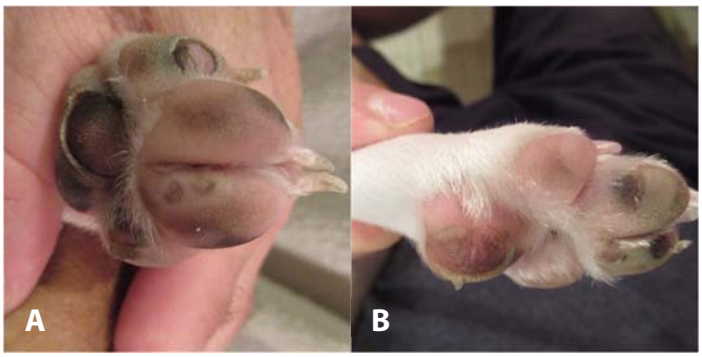


**Figure 2**. *Pavement paws on the plantar surface of a 4-month basenji puppy.* ***A)*** *The right front paw, and* ***B)*** *the left hind paw, show acute changes of pavement paws. The young puppy pulled with tremendous force throughout an entire five mile walk on the cool pavement surface of a road surrounding a lake. Blisters and the edges of the friction-created blisters are observed on the surfaces of the paws.*

Correlation of the clinical history and the morphologic presentation of the affected paw pads established the diagnosis of *pavement paws*, a canine dermatosis analogous to pool toes. An ointment containing a topical antibiotic (mupirocin 2%) was used to lubricate the open areas on the paw pads twice daily.

Examination on the dog's paws on the fifth day after the walk showed that all of the roofs of the friction blisters had shed. The bases of the blister beds were healing. The paws completely healed with thickening of the affected areas within 7 days.

Pool toes is a frictional dermatosis that occurs on the non-callused plantar surface of the toes and sole of the foot. Its nomenclature originated from the initial observation of the dermatosis on the ventral surface of the fingers and the palms (**Table 1**), [5-24]. Pavement paws is a similar frictional dermatosis that is analogous in pathogenesis to pool toes and was observed on the non-callused paw pads of a young Basenji puppy.

The dermatosis resolved with conservative topical management, consisting of the application of a topical antibiotic in an ointment base. The paws rapidly healed in less than a week. The dermatosis did not recur in the puppy.

Pavement paws is a self-limited and typically non-recurrent condition. The young puppy continued to exert strenuous effort during the walking sessions around the lake beginning a week after she developed the dermatosis. This is similar to pool toes, once the plantar feet of the affected individual have developed callouses, the condition does not recur provided the callouses are maintained [23].

Other dermatoses have been observed on human feet in the aquatic setting. Beach feet, is a thermal-induced dermatosis resulting from a superficial burn from the sand to the plantar surface of the feet. In contrast to pool toes, beach feet is not primarily a frictional dermatosis. Pool feet, is the name of the

**Table 1**. *Summary of the history of the nomenclature of pool-associated palmar and plantar frictional dermatoses occurring on the palms and soles*[a].

| Years | Comment | Reference |
|---|---|---|
| 1987 | To describe persons with special susceptibility who, when exposed to a combination of prolonged water contact, friction, chemical and microbes, the term a 'wet dermatitis' was coined | [5,6] |
| 1992 | The term 'pool palms' was introduced | [7,8] |
| 1995-2008 | Subsequently it was proposed that the condition be named 'juvenile palmar (or palmoplantar) dermatitis acquired at swimming pools' | [9-12] |
| 2003 | The plantar version of pool palms was originally described as 'pool toes' in November 2003 | [13] |
| 2005-2021 | None of these latter designations--'juvenile palmar (or palmoplantar) dermatitis acquired at swimming pools'--gained acceptance in the literature. The dermatosis--whether occurring on the hands, feet, or both--continued to be referred to as pool palms | [14-21] |
| 2005, 2020 | Additional reports of the pool-associated frictional dermatosis of the soles and plantar toes were published in 2005 and 2020 | [22,23] |

[a]In contrast to pool toes, the term pool feet was introduced in November, 2020 to describes a heat-associated injury to the sole of the feet and the plantar aspects of the toes caused by contact with the hot cement or tile adjacent to the pool; it is analogous to beach feet which is a thermal injury to the plantar surface of the feet and toes from the hot sand [24].

thermal-related dermatosis resulting from the potential hot temperature of the cement or tile surrounding a pool. If the canine suffered a thermal injury to their paws secondary to the temperature of the walking surface, it could be referred to asphalt paws [23,24].

## Conclusion

Pool toes is an aquatic pool-associated frictional dermatosis. Pavement paws is a pavement-associated frictional dermatosis that occurs in young puppies. In contrast to beach feet, a thermal-associated superficial burn to the skin resulting from the hot temperature of the sand that contacts that the plantar feet and toes, neither pool toes nor pavement paws are heat-related injuries resulting from contact with a hot surface. The pathogenesis of pool toes is related to repeated rubbing of the plantar surface of the feet and toes against the rough cement at the bottom of the pool or its border. Similar to pool toes, the pathogenesis of pavement paws is secondary to the friction injury that developed when the uncallused paw pads of the puppy repeatedly rubbed against the non-heated, ambient temperature, pavement.

## Potential conflicts of interest

The author declares no conflicts of interest.

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