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Ringworm in Dogs

What is ringworm and what causes it?

"Ringworm" is the common name given to a fungal infection of the superficial layers of the skin, hair and nails. Ringworm infections can occur in humans and in all domesticated species of animals. The name comes from the classical appearance of the round, red, raised 'ring' marking the boundary of inflammatory lesions in people infected with the disease. The common name of ringworm is somewhat misleading, in that it is not an infection caused by a worm, and the infected areas are not always ring-shaped. The fungi responsible for ringworm infections belong to a specialized group known as *dermatophytes*, so the medical name for this disease is dermatophytosis.

There are a number of distinct species of dermatophytes. Some species of dermatophytes are species specific, meaning that they will only infect one species, whereas others can be spread between different species of animals, or from animals to man. The three most common fungal species that may cause ringworm in dogs are *Microsporum canis*, *Microsporum gypseum* and *Trichophyton mentagrophytes*. These three species of ringworm are zoonotic, meaning they can also infect humans.

"Ringworm fungi feed on the keratin that is found in the outer layers of skin, hair and nails."

Ringworm fungi feed on the keratin that is found in the outer layers of the skin, hair and nails. In animals, the fungi commonly infect hair follicles, which causes the affected hair shafts to break off at the skin line. This usually results in round patches of hair loss. As the fungus multiplies, the lesions may become irregularly shaped and spread over the dog's body.

What does ringworm look like?

In the dog, ringworm lesions usually appear as areas of hair loss (alopecia) that are roughly circular. As these circular lesions enlarge, the central area heals and hair may begin to regrow in the middle of the lesion. The affected hair shafts are fragile and easily broken. These lesions are not usually itchy, but sometimes they become inflamed and develop a scabby covering. In most cases, there are several patches of alopecia scattered throughout the body. Occasionally fungal infection of the nails (onychomycosis) may occur. The claws become rough, brittle and broken.

Some dogs may have ringworm fungi present in their hair or skin without showing any clinical signs of disease. These dogs can spread ringworm to other animals or people despite having no obvious skin lesions, and are called "asymptomatic carriers." Asymptomatic carriers are especially problematic in multi-animal environments such as animal shelters or kennels.

How is ringworm transmitted?

"Ringworm is contagious and can be passed between infected and non-infected individuals through direct contact or by contact with contaminated objects."

Ringworm is contagious and transmission occurs by direct contact with the fungus. It may be passed by direct contact with an infected animal or person, or by handling contaminated objects or touching contaminated surfaces.

The fungal spores may remain dormant on combs, brushes, food bowls, furniture, bedding, carpet or other environmental surfaces for many months (reportedly up to 18 months). Spores may be killed with a solution of chlorine bleach and water (one pint of chlorine bleach (500 ml) in a gallon of water (4 liters), or a dilution of 1:10 to 1:100), where it is feasible to use it.

Contact with ringworm fungus does not always result in an infection. The amount of environmental contamination is an important factor in the development of a ringworm infection, as is the age of the exposed person or animal. Healthy adult humans usually are resistant to infection unless there is a break in the skin such as a scratch. Elderly people, young children, and adults with immune system weaknesses or skin sensitivities are especially susceptible to ringworm infection. If your child has ringworm, he or she may have acquired it from your pet or from another child at school. If you or your family members have suspicious skin lesions, check with your family physician immediately.

How long does it take to get it?

The incubation period between exposure to ringworm fungus and the development of ringworm lesions usually ranges from seven to fourteen days; some cases may take up to 21 days before signs of infection develop.

How is a ringworm infection diagnosed?

Diagnosis is made in one or more of the following three ways:

- Identification of the typical "ringworm" lesions on the skin. This method is not very accurate and may lead to misdiagnosis.
- Fluorescence of infected hairs under a special ultraviolet light known as a Wood's lamp. Most cases of canine ringworm caused by *M. canis* will glow with a yellow-green fluorescence when the skin and coat are examined in a dark room with a Wood's lamp. However, not all cases of *M. canis* will fluoresce, and neither *T. mentagrophytes* and *M. gypseum* fluoresce under a Wood's lamp. Some skin ointments and other materials will fluoresce and may give a false positive result. While this technique is acceptable in certain situations as a rapid screening tool in multi-animal facilities, diagnosis made on Wood's lamp evaluation is not always reliable. The preferred method for diagnosing ringworm in dogs is by fungal culture of a sample of hair or skin cells. This method is the most accurate. A positive culture can sometimes be confirmed within a couple of days, but in some cases the fungal spores may be slow to grow. Therefore, a suspected sample cannot be called negative for at least a month.

There are numerous causes for hair loss in dogs. Before making a diagnosis of ringworm, your veterinarian may recommend additional testing to rule out some of these causes.



How is ringworm treated?

Regardless of the severity of the case, treatment of ringworm in dogs is always necessary to avoid the spread of infection to children or other pets. The specific method of treatment recommended by your veterinarian to treat your dog will depend on the severity of the infection, how many pets are involved, if there are children or susceptible adults in the household, and how difficult it will be to disinfect your pet's environment.

"...treatment of ringworm in dogs is always necessary to avoid the spread of infection..."

The most common way to treat ringworm in dogs is to use a combination of topical therapy (application of creams, ointments or shampoos) and systemic therapy (administration of anti-fungal drugs by mouth). In order for treatment to be successful, all environmental contamination must be eliminated.

1. Topical therapy

Occasionally, topical therapy is used alone for treatment of ringworm, but more commonly it is used in combination with oral medications. Various creams and ointments are available to apply to localized areas of skin affected by ringworm. If there are only one or two affected areas, shaving of the hair from these areas may be sufficient. If there is more generalized disease, or if your dog has long hair, your veterinarian may recommend clipping



your dog's hair short to aid in treatment, along with bathing your dog with a medicated shampoo at least twice weekly. It is extremely important *only* to use preparations that have been specifically provided or recommended by your veterinarian for topical treatment of dogs. Topical treatment will usually be necessary for a period of several weeks to several months.

After bathing or treating your dog, be sure to wash your hands and sanitize any surfaces your dog has been in contact with.

2. Oral therapy

In the majority of cases of ringworm, effective treatment will require administration of an oral anti-fungal drug. The most widely used drug for this purpose is *griseofulvin*, although newer drugs such as *itraconazole* or *terbinafine* (*Lamasil*) are being used more frequently and are often preferred since they have fewer side effects. The response of individual dogs to treatment varies and if therapy is stopped too soon, the disease may recur. Treatment must usually be continued for a minimum of six weeks, and in some cases much longer therapy is required. Ringworm cultures are generally taken one to two weeks after the start of treatment to determine if your pet is still infected. Typically two consecutive negative ringworm cultures indicate your pet has been successfully treated, at which time treatment can be discontinued.



If there is more than one pet in the household, try to separate infected from non-infected animals and just treat the infected ones. In some situations it may be preferable to treat all of the pets. Your veterinarian will advise you on the best treatment given your individual circumstances.

3. Environmental cleaning

Infected hairs contain numerous microscopic fungal spores that can be shed into the environment. Infection of other animals and humans can occur, either by direct contact with an infected dog or through contact with fungal spores in a contaminated environment. In addition to minimizing direct contact with an infected dog, it is also important to attempt to keep the environment as free of spores as possible. Clipping of infected hairs (with careful disposal) combined with topical antifungal treatment of affected areas of skin may help to reduce environmental contamination. Use a damp mop or electrostatic cleaner to remove pet hair from floors or furniture.

"It is also worthwhile restricting the dog to rooms of the house that are easy to clean."

It is also worthwhile restricting the dog to rooms of the house that are easy to clean. Environmental contamination can be minimized by thorough damp mopping or vacuum cleaning of all rooms or areas that are accessible to your dog; this should be done as frequently as is possible (e.g. daily). In addition, the use of diluted bleach (1:10–1:100 dilution in water) is recommended in areas that can be readily disinfected.

In multi-animal facilities such as animal shelters or kennels, treatment of ringworm can be extremely challenging and costly and environmental contamination can be difficult to contain.

How long will my dog be contagious?

Infected pets remain contagious for about three weeks if aggressive treatment is used. The ringworm will last longer and remain contagious for an extended period of time if only minimal measures are taken or if you are not faithful with the prescribed approach. Minimizing exposure to other dogs or cats and to your family members is recommended during this period.

Ringworm cultures are generally taken several weeks after the start of treatment to determine if your pet is still infected. Typically, two consecutive negative cultures indicate that your dog has been successfully treated.

Will my dog recover from ringworm?

The vast majority of dogs, if treated appropriately, will recover from a ringworm infection. Symptoms may recur if the treatment was discontinued too early or was not aggressive enough (i.e. only topical treatment was used), or if the pet has some underlying disease compromising the immune system. Occasionally symptoms recur because the dog is a carrier of ringworm.

What about the risk to humans?

Ringworm can be transmitted quite easily to humans, especially young children, and it is important to take appropriate steps to minimize exposure to the fungus while the dog is being treated (see *Environmental Cleaning* above).

"If any humans in the house develop skin lesions such as small patches of skin thickening and reddening with raised scaly edges, early medical attention should be sought."

If any humans in the house develop skin lesions such as small patches of skin thickening and reddening with raised scaly edges, early medical attention should be sought. Ringworm in humans generally responds very well to treatment. The ringworm fungus can remain infective up to 18 months in the environment and re-infection may occur.

This client information sheet is based on material written by: Ernest Ward, DVM

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