



Bridgeport Veterinary Hospital

Hookworms

Hookworms (*Ancylostoma caninum*, *Ancylostoma braziliense*, *Uncinaria stenocephala*) are intestinal parasites of the cat and dog that get their name from the hook-like mouthparts they use to anchor themselves to the lining of the intestinal wall. They are only about 1/8" (2-3 mm) long and so small that it is very difficult to see them with the naked eye. Despite their small size, they ingest large amounts of blood from the tiny blood vessels in the intestinal wall. A large number of hookworms can cause inflammation in the dog's intestine, as well as a life-threatening decrease in the number of red blood cells (called **anemia**). Anemia is most common in puppies, but can occur in adult dogs.

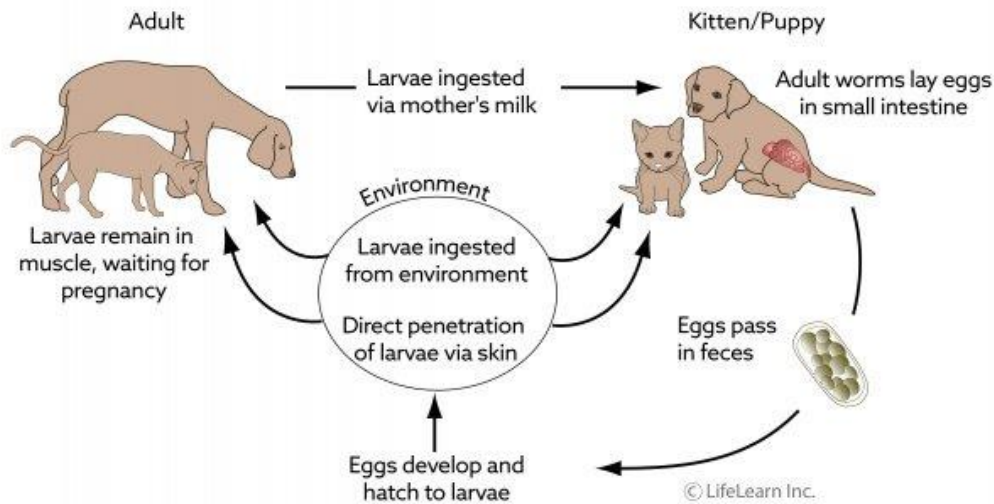


Are some dogs more likely to get hookworms?

Hookworms are more common in warm, moist environments. **Conditions of overcrowding and poor sanitation contribute to infection.**

How do dogs get hookworms?

Dogs may become infected with hookworms by one or all of four routes:



- orally
- through the skin
- through the mother's placenta before birth (**in utero**)
- through the mother's milk

Female hookworms pass hundreds of microscopic eggs in the feces of infected dogs, where they contaminate the environment. Larvae hatch from the eggs and can remain infective in the soil for weeks or months. A dog may become infected when it inadvertently swallows hookworm larvae, often by grooming its feet, or from sniffing feces or contaminated soil.

Most larvae that are ingested will move to the intestinal tract to complete their life cycle. A few larvae may make their way into the **trachea** (windpipe), and are then coughed up and swallowed. The larvae may also burrow into the skin if the dog walks or lies on contaminated ground. Once in the host's body, the larvae migrate to the lungs and trachea. The dog will then cough up and swallow the larvae which then migrate to the intestinal tract, where they mature and complete their life cycle. Part of the life cycle of

the hookworm involves migration through muscle tissues, where they may become dormant (alive, but temporarily inactive).

"Prenatal and transmammary infections are an important route of infection for puppies."

If a pregnant dog had hookworms in the past, the pregnancy may reactivate dormant larvae, which then enter the female's bloodstream and infect the puppies in the uterus (**prenatal infection**). Puppies may also become infected after birth through mother's milk (**transmammary**) during nursing. Prenatal and transmammary infections are an important route of infection for puppies.

What are the clinical signs of hookworm infection?

The most significant clinical signs are related to intestinal distress and anemia. The parasites anchor themselves to the intestinal lining so that they can feed on tissue fluids and blood, injecting an anti-coagulant substance which prevents the blood from clotting. This can cause continued bleeding after the hookworm has detached from the feeding site. Therefore, the dog can suffer blood loss from the hookworm's feeding, as well as continued bleeding into the bowel from the attachment sites, causing anemia. Pale gums and weakness are common signs of anemia. Some dogs experience significant weight loss, bloody diarrhea, dull and dry hair coat or failure to grow properly with hookworm infection. It is not uncommon for young puppies to die from severe hookworm infections. Dogs may also exhibit coughing in severe cases.

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Skin irritation and itching, especially of the paws, caused by larvae burrowing into and along the skin, can be signs of a heavily infested environment.

How are hookworms diagnosed?

Hookworms are diagnosed with a microscopic examination of a stool sample by a technique called fecal flotation. The stool is mixed with a solution that causes the parasite eggs to float to the top of the solution and adhere to a glass slide placed on its surface. Since there are many eggs produced daily and the eggs have a unique appearance, hookworm infections are easily detected.

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It takes 2-3 weeks for hookworm larvae to mature and begin producing eggs. For this reason, fecal examination may be less reliable in very young puppies than in adult dogs.

Adult hookworms are small in size and firmly attach to the intestinal wall, which is why they are rarely detected in stool.

How is a hookworm infection treated?

There are several effective drugs, called **anthelmintics**, which will eliminate hookworms. Most are given orally and have few, if any, side effects. However, these drugs only kill the adult hookworms.

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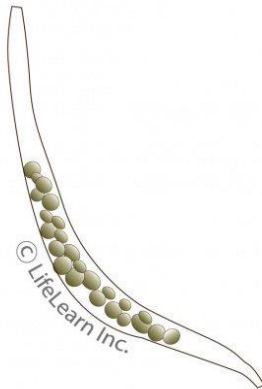
Therefore, it is necessary to treat an infected dog again in about two to four weeks to kill any newly developed adult worms that were larvae at the time of the first treatment.

In rare cases, a blood transfusion may be necessary in dogs with severe anemia.

Since the dog's environment can be infested with hookworm eggs and larvae, it is critical that you remove any feces from your yard promptly. Hookworm larvae can

survive weeks in cool, moist soil but will not survive long in extremely cold or warm, dry temperatures. Use gloves to place the feces in plastic bags and discard in your trashcan. There are currently no approved available products to eliminate hookworm larvae from your yard. The best prevention is to remove feces from your yard daily and have your pets on a monthly heartworm preventive that also protects against hookworm infection.

Are canine hookworms infectious to people?



Magnification of a
hookworm with eggs
(actual size 1/8" or 2-3 mm)

Adult hookworms do not infect humans; however, the larvae can burrow into human skin (usually through bare feet). This causes itching, commonly called 'ground itch', but the worms do not mature into adults and will die within several weeks. More dangerous is the condition in which hookworm larvae migrate throughout the body, damaging the eyes and internal organs. This is called cutaneous larval migrans.

Direct contact of human skin to moist, hookworm infested soil is required. Fortunately, this is extremely rare if normal hygiene practices are observed.

In rare instances, the canine hookworm will penetrate into deeper tissues and partially mature in the human intestine. A few reports of hookworm enterocolitis (small and large intestinal inflammation) have occurred in the recent past.

What can be done to control hookworm infection in dogs and to prevent human infection?

All puppies should be treated with a veterinary-approved anthelmintic product at two to three weeks of age. In addition, prompt deworming should be given if the parasites are detected. Periodic deworming may be appropriate for pets at high risk for infection.

Prompt disposal of dog feces should occur, especially in yards, playgrounds, and public parks.

Strict hygiene is important, especially for children. Do not allow children to play in potentially contaminated environments. Frequent hand washing and bathing are essential in preventing human infections.

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Nursing female dogs should be de-wormed at the same time their puppies are. Pregnancy and nursing may reactivate a dormant hookworm infection in the female dog, which will then infect her puppies.

Most heartworm prevention products contain medication to treat hookworm infections. Some of these products kill the adults, while others will also kill larval stages and prevent infestations. Your veterinarian can advise you of the spectrum of activity for the product prescribed for your dog.