Hookworms: (A. braziliense, A. tubaeforme, Uncinaria stenocephala)

Drs. Foster & Smith Educational Staff

Hookworms in Cats (Ancylostoma, Uncinaria) Hookworms in Cats: (*Ancylostoma braziliense, A. tubaeforme, Uncinaria stenocephala*)

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Hookworms (*Ancylostoma* and *Uncinaria*) are the most common intestinal parasites of cats and dogs (especially kittens and puppies), and can cause severe disease including anemia and serious diarrhea. Hookworms have either teeth-like structures or cutting plates with which they attach themselves to the wall of the intestine and feed on the animal's blood. Hookworms can cause a skin disease in humans called cutaneous larval migrans. The common names of the hookworms and animals they infect are shown below.

Latin Name	Common Name	Hosts Infected
A. tubaeforme	Feline hookworm	Cat
A. braziliense	Canine and feline hookworm	Cat, dog, fox, human (skin)
U. stenocephala	Northern canine hookworm	Cat, dog, fox
A. caninum	Canine hookworm	Dog, fox, possibly humans (intestine)

Hookworms are found throughout North America, although *A. braziliense* is more common in semitropical and tropical areas, and *U. stenocephala* in the colder north. Their life cycle has an unusual twist – animals can be infected by ingestion of larvae either from contaminated soil or water; by eating an infected transport host; through larvae penetrating their skin, and by larvae infecting fetuses or the young via the uterus or mammary glands.

What is the life cycle of hookworms?

The adult worms live in the small intestine where they attach themselves and feed on the host's blood. The adults lay eggs that pass out in the feces. In 1-3 weeks, the eggs have hatched and the larvae are released. These larvae are excellent swimmers that travel through raindrops or dew on leaves and vegetation and wait for a cat to come along. The larvae enter a host either by being ingested or by burrowing through the host's skin.

Through the Skin: Larvae entering through the skin migrate through the bloodstream to the lungs and trachea, and are coughed up and swallowed. They attach themselves to the intestinal wall and thus complete the life cycle.

Through Ingestion: Larvae may be ingested through contaminated food or water, from moist surfaces, or through eating transport hosts that have been infected by the larvae. Most larvae that are ingested usually pass down to the intestine where they remain. A few however, may migrate through tissues of the body and ultimately to the trachea where they are coughed up and swallowed. Some larvae will stop their migration midway and encyst in muscles.

Through the Uterus or Milk: Larvae that encyst in the muscle can subsequently migrate to the uterus of a pregnant animal and infect the fetuses. They can also migrate to the mammary glands of a lactating queen and infect nursing kittens.

What are the signs and symptoms of a hookworm infection in animals?

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Hookworms can cause severe disease. By feeding on the blood of the host, hookworms can rapidly cause anemia. The mucous membranes e.g., gums will appear pale, the animal will become weak, and sometimes black, tarry stools can be seen. Growth in young animals is stunted, and the haircoat may appear dull and dry. Animals may become emaciated and eventually die from the infection.

How do hookworms infect humans and what are the signs of infection?

A hookworm produces an anticoagulant in its saliva so the host's blood does not clot at the site the hookworm attaches. If the worm moves from that site to reattach itself at another, the first site may continue to bleed, sometimes seriously.

Hookworm larvae can penetrate the surface of a person's skin (usually through bare feet) and migrate through it, causing a disease called 'cutaneous larva migrans' or 'creeping eruption.' The lesions appear as red lines under the skin and sometimes break open at the skin's surface. These lesions cause severe itching. Usually, the larvae will die in several weeks and the condition will disappear. In severe cases, the larvae may make their way through the skin and enter deeper tissues. This may cause lung disease and painful muscles.

There have been some reports of humans having intestinal infections with canine hookworms. Generally, these infected people do not show clinical signs of disease.

How is an infestation with hookworms in cats and dogs diagnosed?

Diagnosis is made by finding the eggs in the feces. In very young animals, severe disease may be present before the adult worms have started to lay eggs. Diagnosis must then be made by evaluating the signs of disease.

The adult worms are small, ½ to ¾ inches long, and are rarely detected in the stool because of their size and ability to firmly attach themselves to the intestinal wall.

How is a hookworm infection treated?

Most of the wormers that kill roundworms, except piperazine, will also kill hookworms. Common wormers are listed below; those that are effective against hookworms have an 'H' in the 'Effective Against' column.

Oral Treatments for Gastrointestinal Parasites in Cats

Ingredient(s)	Example	Range of Efficacy*	Minimum Age/Weight
piperazine salts	Hartz Advanced Care Liquid Wormer/Sergeants Worm Away	R	> or = 6 weeks
pyrantel pamoate/praziquantel	Drontal	R,H,T,F	> or = 4 weeks, and > or = 1.5 lbs
praziquantel	Droncit Feline Cestocide, Tradewinds Tapeworm Tabs	T,F	> 6 weeks
epsiprantel	Cestex	T,F	> or = 7 weeks

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milbemycin oxime	Interceptor**	R,H	> or = 6 weeks and > or = 1.5 lbs
selamectin	Revolution**	R,H	> or = 8 weeks

*Efficacy for intestinal worms: > means greater than
R = Roundworms
H = Hookworms
T = Taeniid tapeworms
F = Flea tapeworms
**Also prevents heartworm

Strategic deworming is a practice recommended by the American Association of Veterinary Parasitologists (AAVP) and the Centers for Disease Control and Prevention (CDC).

Kittens*

- In kittens, because prenatal infection does not occur, egg excretion begins later than in puppies, and in most areas, the risk of roundworms and hookworms in cats is comparatively lower; deworming for kittens can be started effectively at 3 weeks of age and be repeated at 5, 7, and 9 weeks.

Nursing Queens

- Treat concurrently with kittens.

Adult Cats

- Treat regularly for prevention. Also monitor and eliminate parasites in pet's environment.

Newly Acquired Animals

- Worm immediately, after 2 weeks, and then follow above recommendations.

*** Drs. Foster and Smith suggest that owners of newly acquired kittens should obtain the deworming history of their new pet and contact their veterinarian to determine if additional deworming is needed.**

Many times supportive care must be given, including high-protein diets and iron supplements. In severe cases, blood transfusions may be necessary.

What can be done to prevent hookworm infections in pets, breeding animals, and people?

To prevent hookworm infections, we need to remember how animals become infected – either through contaminated soil or water, or through their mothers.

Treating the Environment: The larvae of hookworms can live several weeks in cool, moist soil, but die rapidly in freezing or hot, dry conditions. Yards and litter boxes should be cleaned daily. If there is fecal material on surfaces, it should be removed, since organic material will decrease the effectiveness of cleaning solutions. A bleach solution of 3 cups of household bleach to a gallon of cool water should be sprayed or mopped on the area. For your safety and comfort, use the bleach solution in a well-ventilated area. Eye goggles and rubber gloves are also recommended.

Any feces in yards should be picked up on a daily basis. Flaming the surface soil can kill the larvae.

Medical Treatment and Isolation: As with any infection, animals infested with hookworms should be kept separate from other animals until their infection is cleared.

A fecal examination should be performed at the time the kittens are weaned, 4-8 weeks after the last treatment of an infestation, at the time of your animal's annual physical exam, and before females are bred. Some owners choose to worm their animals on a regular basis. Many veterinarians suggest animals be wormed on at least an annual basis.

To prevent human infection, good hygiene is extremely important. Teach children, especially, to wash their hands after playing and before eating. Do not let children play in areas where cats or dogs may have defecated. Do not allow cats to use sandboxes or the garden as litter boxes. Persons who will have contact with the ground, especially for long periods of time, e.g.; plumbers or electricians working in crawl spaces, should place an impervious material between themselves and the ground. (Hookworm infestation in man is sometimes known as 'plumber's itch.'

Sunbathers, especially those lying on wet sand or ground may also be at an increased risk of becoming infected. Animals should not be allowed to defecate on beaches, and people should not walk barefoot through the sand.

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