

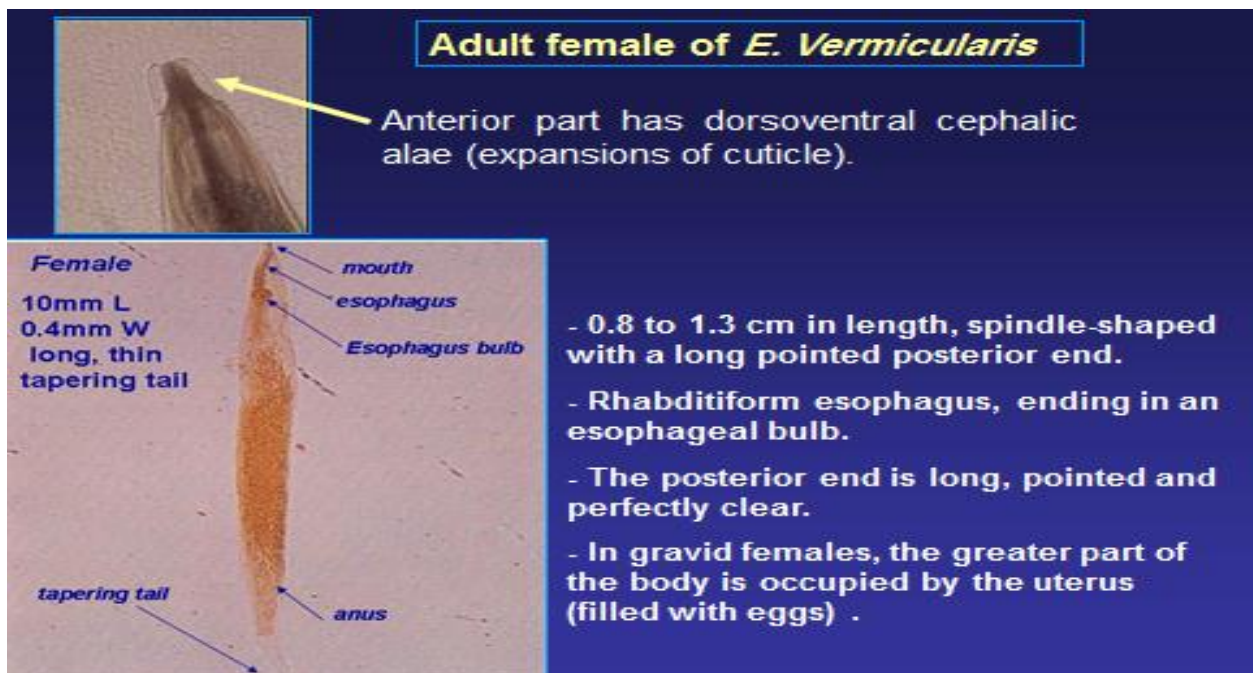
ENTEROBIUS VERMICULARIS: (PIN WORM OR Family worm)

Enterobius vermicularis is a small white worm with thread-like appearance. The worm causes enterobiasis. **Infection is common in children.**

Morphology

Male: The male measures 5 mm in length. The posterior end is curved and carries a single copulatory spicule.

Female: The female measures 13 mm in length. The posterior end is straight. The egg is 50x25 microns, Plano -convex and contains mature larva. **The Infective stage : embryonate eggs**



Mode of infection :

Infection is facilitated by factors including overcrowding, wearing soiled clothing, lack of adequate bathing and poor hand hygiene, **especially among young school-aged children.**

Infection follows ingestion of eggs which usually reach the **mouth on soiled hands or contaminated food.**

Transmission :

1- direct transmission (oral fecal transmutation) occurs via direct anus to mouth spread from an infected person , the anus Scratching can cause local perianal irritation and pruritus.

The Scratching leads to contamination of fingers, especially under fingernails and contributes **to autoinfection.**

2- Environmental contamination:- Airborne eggs that are in the environment such as contaminated clothing or bed linen.

Life cycle Adult worm lives in the large intestine. After fertilization, the male dies and the fertile female moves out through the anus to glue its eggs on the perianal skin. This takes place by **night migration .**

The infective stage egg is contains mature larva.(Embryonate egg)
When the eggs are swallowed, they hatch in the small intestine and the larvae migrate to the large intestine to become adult.

Pathogenicity and Clinical presentation.

The most common symptom is . related with migration of the worms during night migration.causes **perineal pruritus** and allergic reactions around the anus. This varies from mild itching to acute pain. Symptoms tend to be most trouble some at night and, as a result, infected

individuals often report **sleep disturbances, restlessness and insomnia.**

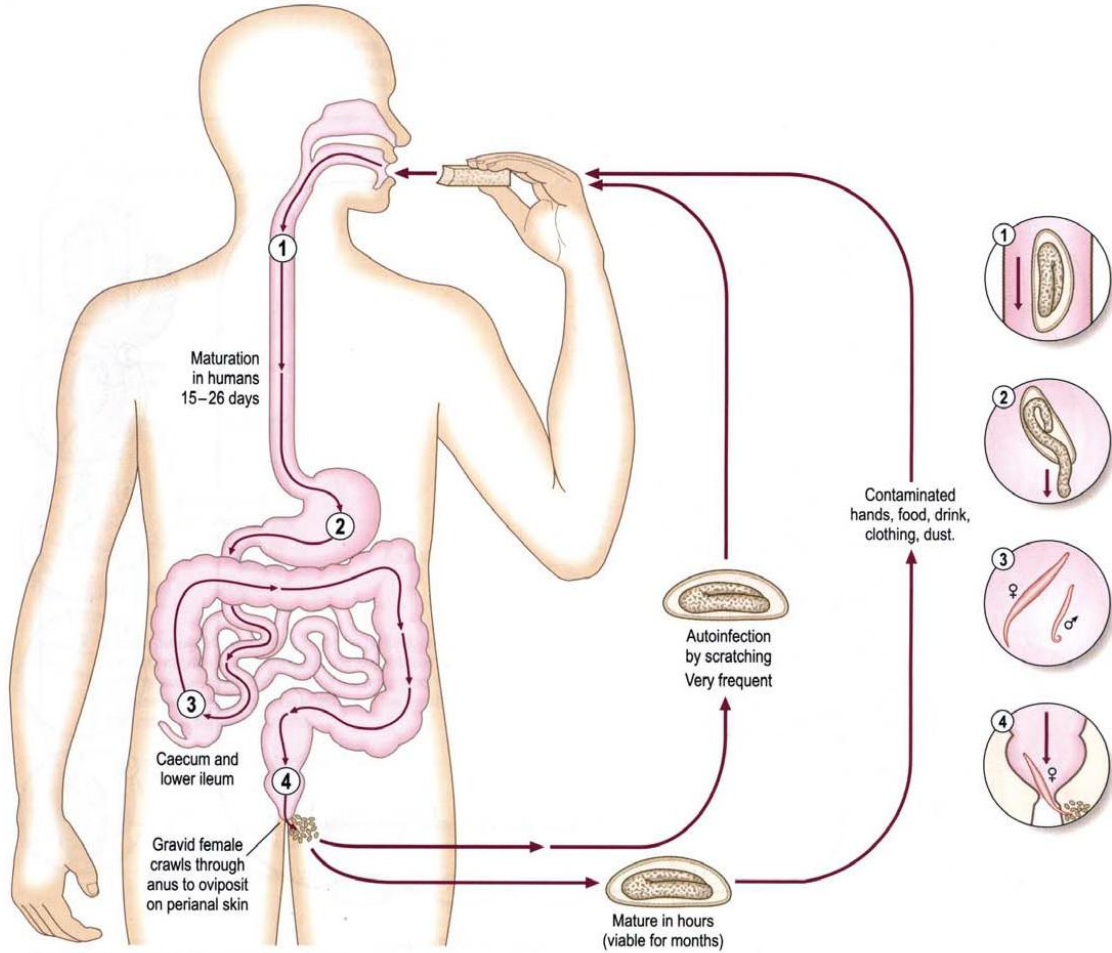
The most common complication of infection is **secondary bacterial infection of excoriated skin.** Folliculitis has been seen in adults with enterobiasis.

Gravid female worms can migrate from the anus into the female genital tract.

Nematode (round) worms

Enterobius vermicularis (thread or pin worm)

Life cycle



Distribution

350 million infected worldwide, often group or institutional infection.

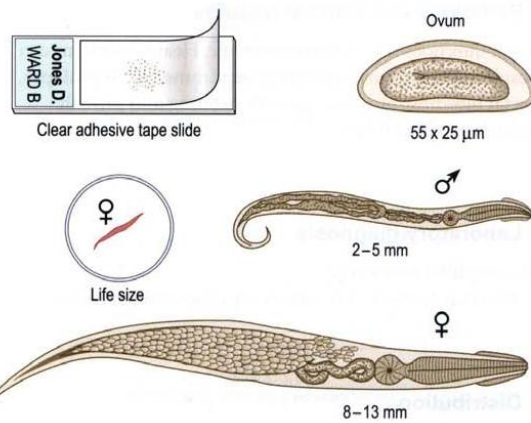
Pathology and Clinical features

Most infections are asymptomatic. Perianal itching may be troublesome. In females, migrating worms may cause pruritis vulvae or vaginitis. Rarely, urinary tract infection or appendicitis can occur. Migration into the peritoneal cavity has been recorded.

Laboratory diagnosis

Mild eosinophilia.

Ova can be recovered from the perianal area using clear adhesive tape or a cotton swab moistened with saline. Early morning collection before washing gives best recovery. In females, ova may occasionally be recovered from urine.



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Gravid female worms can migrate from the anus into the female genital tract.

Vaginal infections can lead to vulvitis, serous discharge and pelvic pain.

Diagnosis

- **1- Eggs in stool: Examination** of the stool by direct saline smear to detect the egg: this is positive in about 5% of cases because the eggs are glued to the peri-anal skin.
- **2-In the perianal region,** the adult female worm may be visualized as a small white “piece of thread”.

3-The most successful diagnostic method is the “Scotch tape” or “cellophane tape” method.

This is best done immediately after arising in the morning before the individual defecates or bathes.

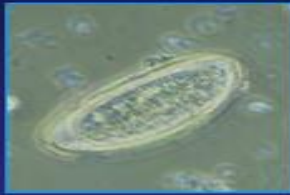
The **cellulose acetate tape is pressed against the anal or perianal skin several times. The strip is then transferred to a microscope slide with the adhesive side down.**

4- Vaseline paraffin swab methods may be done replacement **the cellulose acetate tape.** By using cotton swab in hot mixture(60C) contain four part of Vaseline and one part of paraffin and cooled the sab in Ambien temperature after that pot it in dry cliane glass test tube until used put the swab on or around the anal opining and make slid film.

The worms are white and transparent and the skin is transversely striated.

The egg is also colorless, measures 50-54 × 20-27 mm and has a characteristic shape .

Eggs of *Enterobius vermicularis*



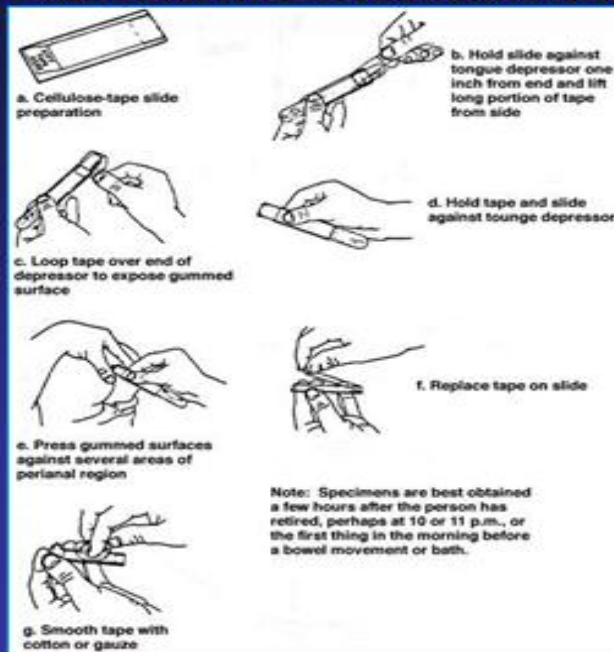
- Oval-elongated, but flattened on one side and curved in the other (D shaped).
- Thick colorless shell
- Doubly refractive wall
- Approx. 50-60 μm by 20-30 μm



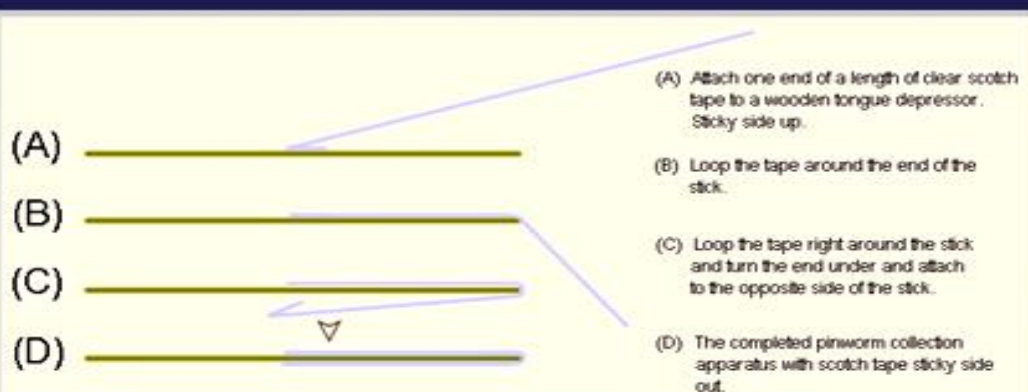
Enterobius vermicularis



Scotch tape test for *E. vermicularis* diagnosis



Scotch tape technique



When sampling is complete, cut the tape on both sides of the applicator stick at the arrow. With forceps transfer the tape to a glass slide. Procedure is complete. If a glass slide is not available please enclose the stick with tape left intact in a suitable container and transport to the laboratory.

Pinworm Collection - Scotch Tape Technique

ASCARIS Spp. (Round Worm)

Ascaris lumbricoides lives in humans and *A. suum* in pigs. Nearly all vertebrates have a specific species of *Ascaris*.

Morphology

The adult females of *A. lumbricoides* can be up to 35 cm long and the males up to 30 cm; and both can be about 1 cm wide, yellowish red in color..

Both live within the upper of the small intestine

A mature female can produce over a 100,000 **immature eggs** per day which pass out of the body via the faeces.

If the eggs are deposited in **suitable soil they become mature needed 2-3 weeks in moister environment to become embryonate eggs** and they can survive for a long period **remain until swallowed by the next host.**

Clinical features:

Adult worms in the intestine cause abdominal pain and may cause intestinal obstruction especially in children. Larvae in the lungs may cause inflammation of the lungs (Loeffler's syndrome) – pneumonia-like symptoms.

Diagnosis

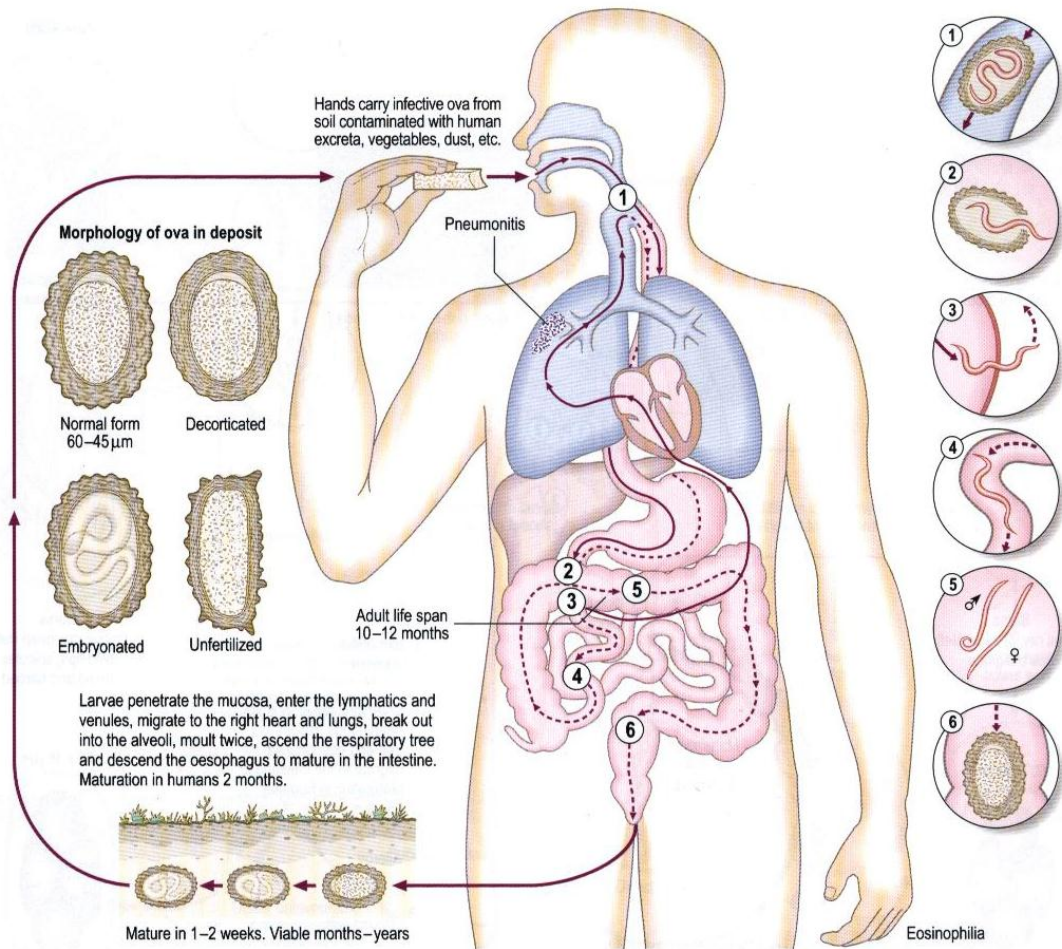
1- **General stool: Examination** of the stool by direct saline smear to detect the eggs ,the *Ascaris* fertile egg are very characteristic it is rounded and sharply edge and the unfertile egg elongated and without sharply edge.

2-A general increase in the number of eosinophils (eosinophilia) and the serum antibodies IgG and IgE is often symptomatic of this infection. Large numbers of mature adults can **cause mechanical blockages of the bowels.**



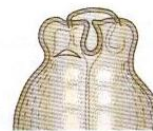
Ascaris lumbricoides (round worm)

Life cycle



Pathology and Clinical features

Larvae can cause pneumonitis with eosinophilia. Adult worms can cause obstruction of the small intestine, bile ducts and trachea; also appendicitis, pancreatitis and peritonitis. Children may vomit up a bolus of adult worms, or cough up immature worms.

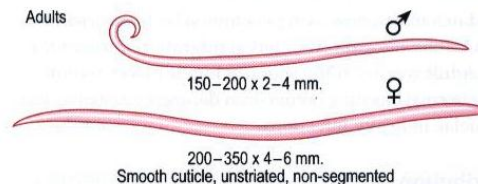


Head of adult to show arrangement of the three lips

Laboratory diagnosis

Ova may be recovered from faeces by concentration methods. Rarely larvae can be found in sputum, and must be distinguished from those of *Strongyloides*. Eosinophilia is present in the larval invasion stage.

No specific serology is currently available.



Distribution

TRICHURIS TRICHIURA (Whip Worm)

The worm is divided into a thin whip-like anterior part measuring 3/5 of the worm and a thick fleshy posterior part of 2/5 the length.

Male: The male measures 3-4.5 cm in length. Its posterior end is coiled and possesses a single cubicle.

Female: The female measures 4-5 cm in length. Its posterior end is straight

Infective stage and mode of infection

Infection is by ingestion of embryonated eggs (containing larvae) with contaminated raw vegetables.

Life cycle:

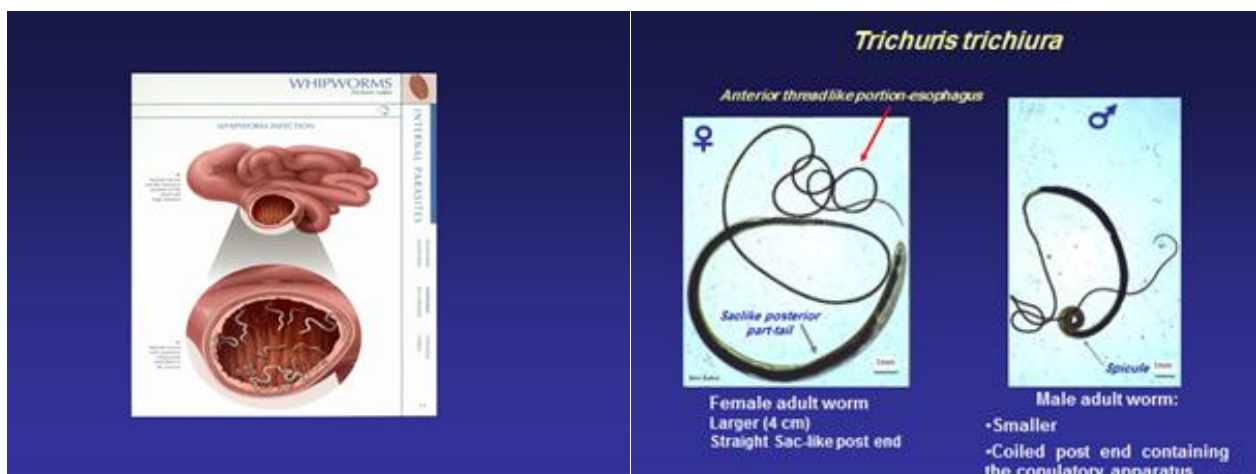
Ingested eggs hatch in the small intestine and the larvae migrate to the large intestine to become adult. After mating, the female lays immature eggs, which pass with the stool to the soil and mature in 2 weeks. **Symptoms**

1- The patient complains of dysentery (blood and mucus in stool together with tenesmus).

2- **(Rectal prolapse)** المستقيم تدلي is also possible.

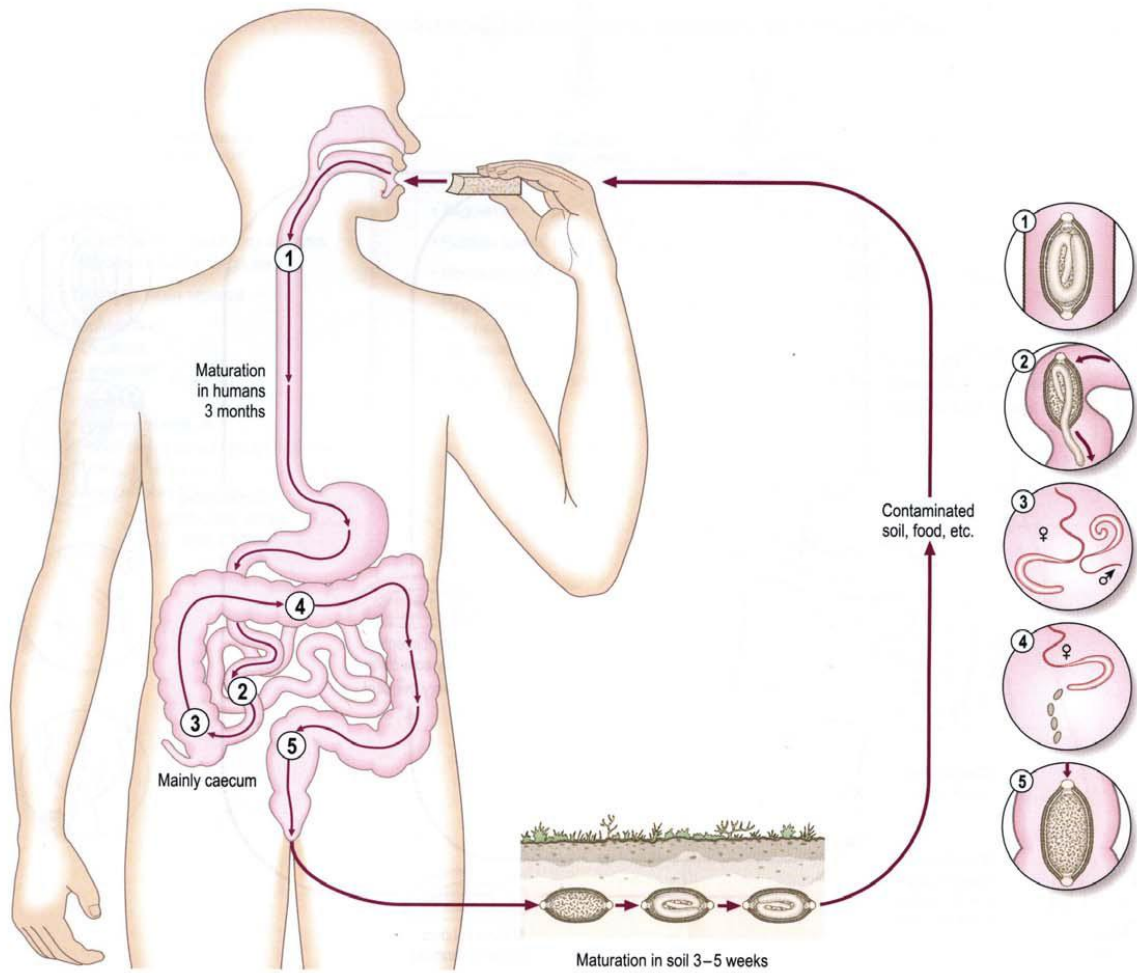
Diagnosis

Stool examination : Finding of characteristic eggs. The egg of trichuris is barrel-shaped, 50x25 microns. The shell is thick with a one mucoid plug at each pole.



Trichuris trichiura (whip worm)

Life cycle



Pathology and Clinical features

Light infections may be asymptomatic. Heavy infections can result in the trichuris dysentery syndrome, rectal prolapse, rectal bleeding, anaemia, growth stunting and growth retardation in children.

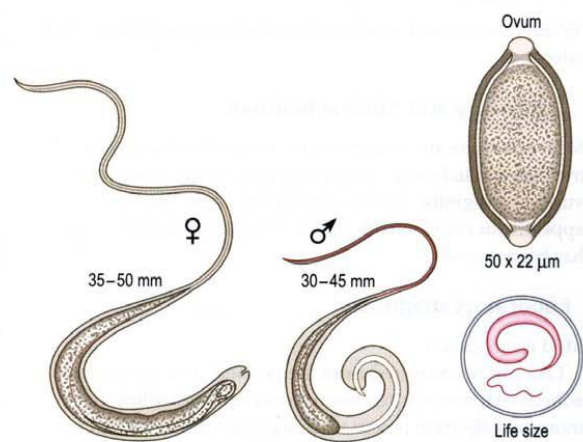
Laboratory diagnosis

Eosinophilia may occur.

Ova may be recovered in faeces by concentration methods.

Distribution

1.3 billion infected worldwide.



Hookworms

Ancylostoma duodenale

Necator americanus

Ancylostoma duodenale:

1. They look like an odd piece thread and are about 1cm. They are white or light pinkish when living. Female is slightly larger than male. The male's posterior end is expanded to form a copulatory bursa.

2-Head is slightly bent (hook) and the 'mouth' carries characteristic teeth.

3-The posterior end of the male worm is elaborated into a copulatory bursa.

4. Eggs: 60×40 μm in size, oval in shape, shell is thin and colorless. Content is 2-8 cells.

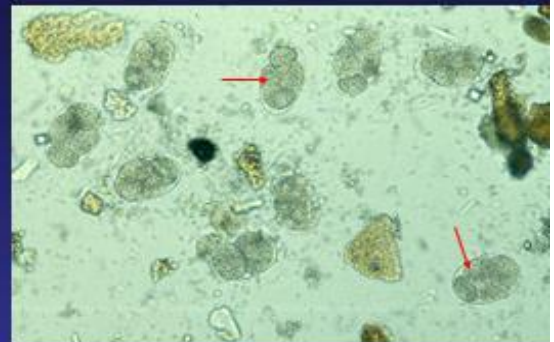
host: human.

Diagnostic stage : eggs in general stool examination.

Infective stage filariform larva through skin .

Blood-lung migration: skin, tissue , blood, right heart, lungs and after that esophagus, to small intestine.

Hookworm eggs



. 50-60μm by 40-45μm

. Thin wall.

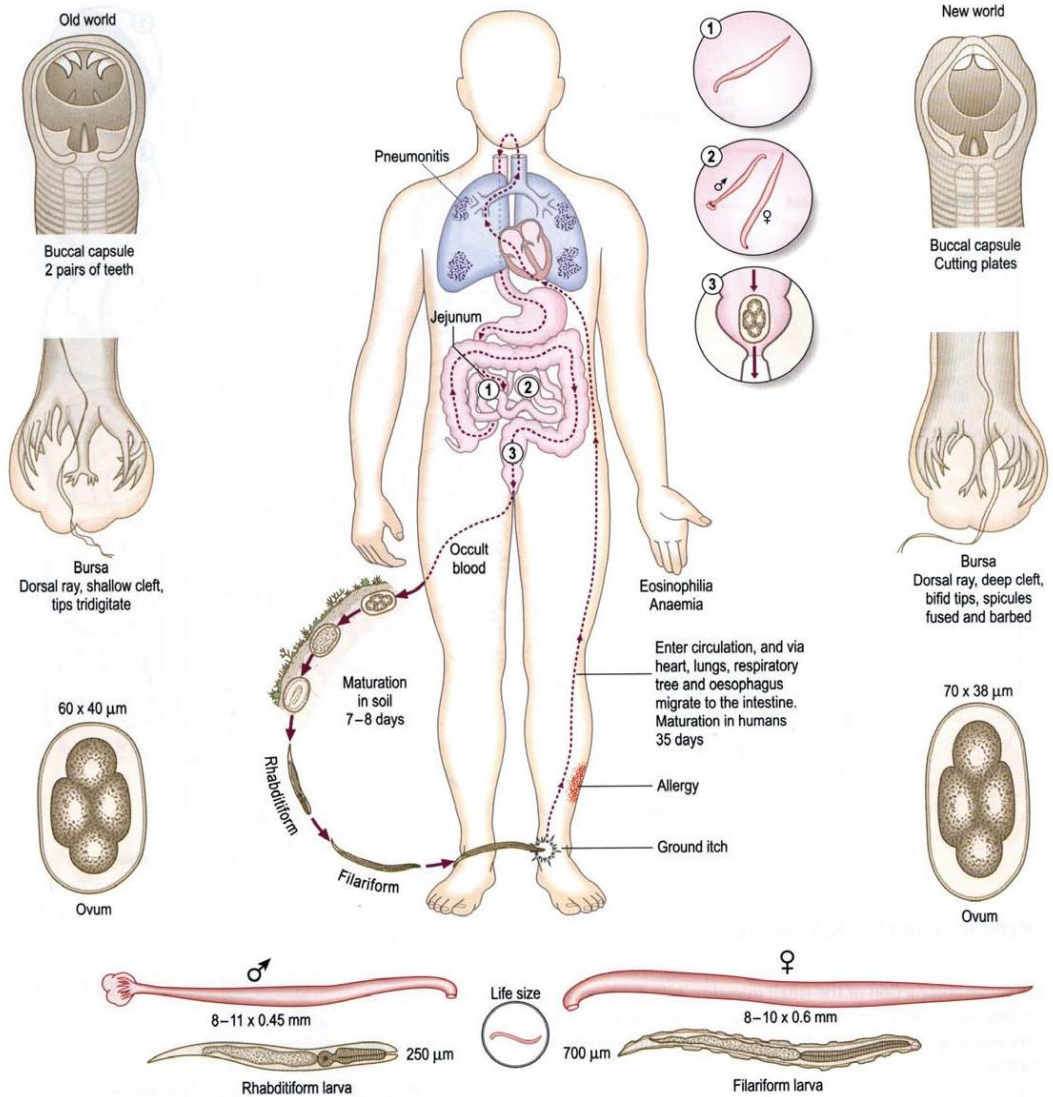
, colourless

Usually passed in fresh faeces in a 4-cell stage.

Hookworms

Ancylostoma duodenale

Necator americanus



Pathology and Clinical features

Ground itch may follow skin penetration by filariform larvae. Pneumonitis can result from larval migration through the lungs. Adult worms in the jejunum ingest blood. Occult gastrointestinal bleeding occurs. Iron deficiency anaemia and its sequelae in heavy infections.

Laboratory diagnosis

Eosinophilia.
Ova may be recovered from faeces by concentration methods. Rhabditiform larvae may be seen in old faecal specimens and must be distinguished from *Strongyloides* by the appearance of the buccal cavity.

