



Enterobius vermicularis

Common Name: Pinworm, Seatworm, Threadworm

E. vermicularis is considered to be **world's most common** parasite, which specially affects the children.

Habitat

Adult worms are found in the caecum, appendix, and adjacent portion of ascending colon.

Morphology

Adult Worm

The adults are short, white, fusiform مغزلية worms with pointed مدببة ends, looking like bits اجزاء of white thread.

- The mouth is surrounded by 3 wing-like cuticular expansions (cervical alae) اجنحة عنقية, which are transversely striated.
- The esophagus has a double-bulb structure تركيب بصلي مزدوج, a feature unique to this worm.

Male Worm

The male worm is 2–5 mm long and 0.1–0.2 mm thick.

- Its posterior end is tightly curved ventrally and carries a prominent copulatory spicule
- Males live for about 7–8 weeks.

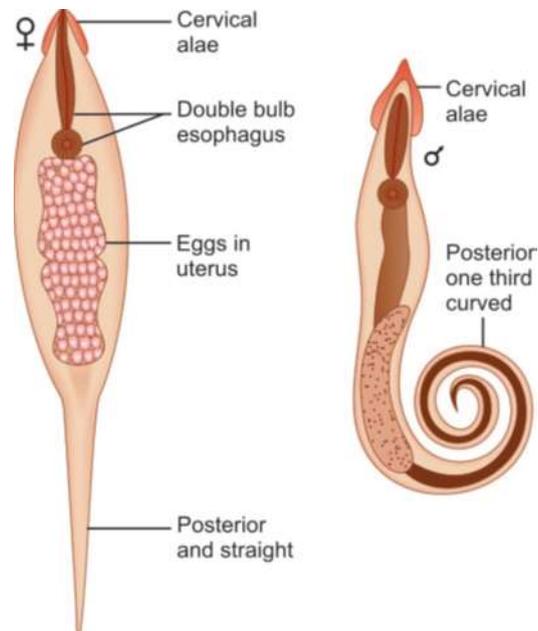
Female Worm

The female is 8–13 mm long and 0.3–0.5 mm thick.

- Its posterior third is drawn into a thin pointed pin-like tail.
- The vulva is located just in front of the middle third of the body and opens into the single vagina, which leads to the paired uteri, oviducts, and ovaries. In the

gravid female, virtually the whole body is filled by the distended uteri carrying thousands of eggs.

- The worm is **oviparous**.
- Females survive for 5–12 weeks.

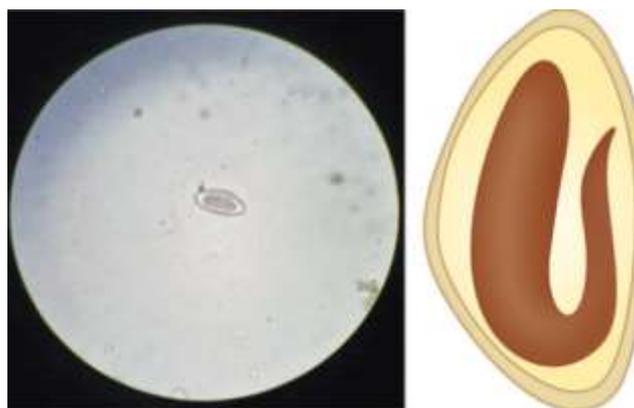


Adult worm of *E. vermicularis* (male and female)

Egg

The egg is elongated ovoid, colorless and not bile-stained.

- It floats in saturated salt solution.



- Measuring 50–60 μm by 20–30 μm
- The egg shell is double layered and relatively thick, though transparent. The outer albuminous layer makes the eggs stick يلتصق to each other and to clothing and other objects.

- The egg contains a **tadpole-shaped** (شرغوف) coiled embryo, which is fully formed, but becomes infectious only 6 hours after being deposited on the skin. Under cool moist conditions, the egg remains viable for about 2 weeks.
- A single female worm lays 5,000–17,000 eggs.

Life Cycle

E. vermicularis is monoxenous, passing its entire life cycle in the human host. It has no intermediate host and does not undergo any systemic migration.

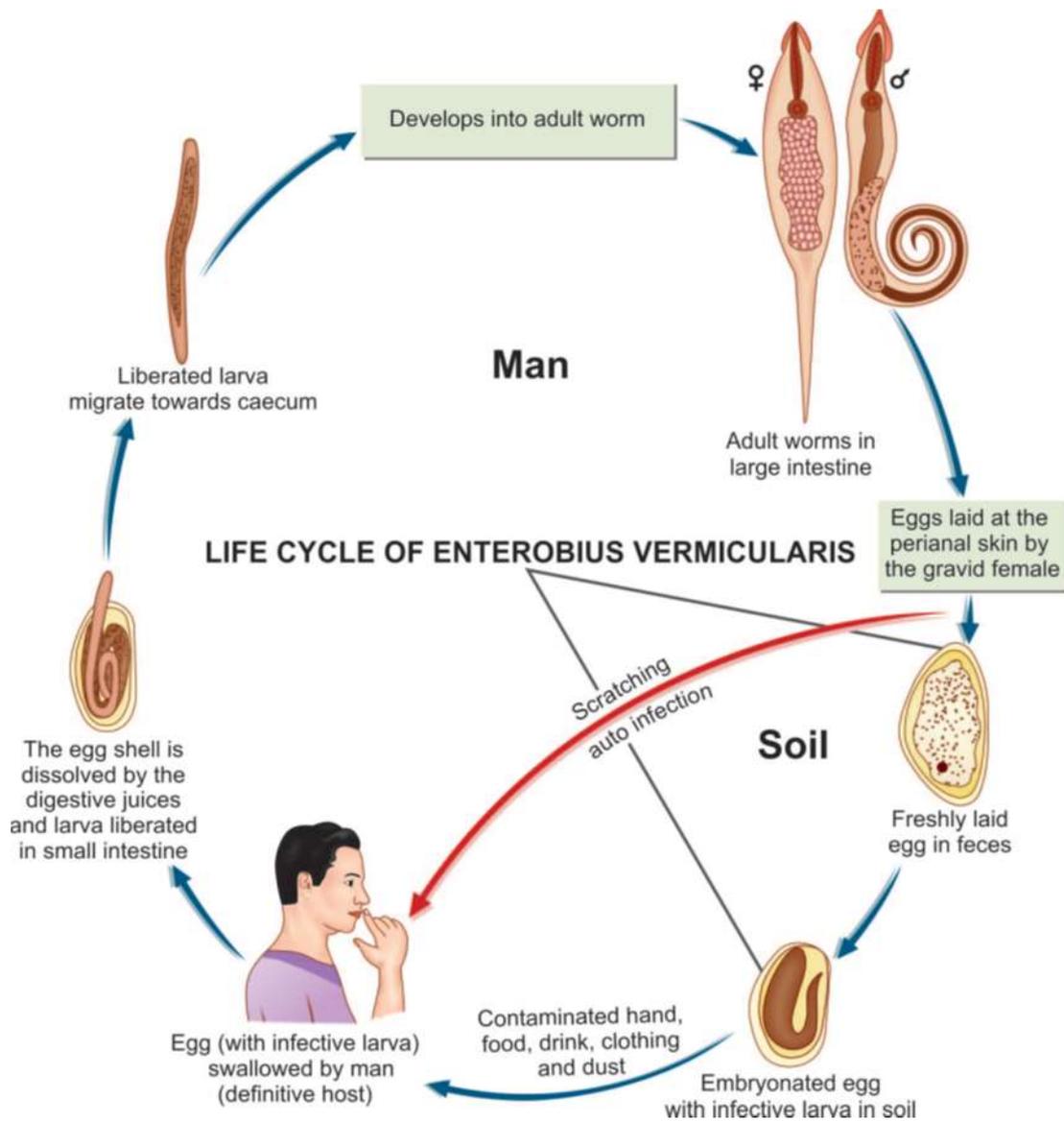
Natural host: Man.

Infective form: Embryonated eggs

Mode of infection

Man acquires infection by ingesting embryonated eggs containing larva by means of

- Contaminated fingers
- Autoinfection
- Eggs laid on perianal skin containing infective larvae are swallowed and hatch out in the intestine.
- They moult in the ileum and enter the caecum, where they mature into adults.
- It takes from 2 weeks to 2 months from the time the eggs are ingested, to the development of the gravid female, ready to lay eggs.
- The gravid female migrates down the colon to the rectum. At night, when the host is in bed, the worm comes out through the anus and crawls about on the perianal and perineal skin to lay its sticky eggs. The worm may retreat into the anal canal and come out again to lay more eggs.
- The female worm may wander into the vulva, vagina and even into the uterus and fallopian tubes, sometimes reaching the peritoneum.
- The male is seldom نادراً seen as it does not migrate. It usually dies after mating and is passed in the feces.



*When all the eggs are laid, the female worm dies or gets crushed **تسحق** by the host during scratching **حك**. The worm may often be seen on the feces, having been passively carried from the rectum. The eggs, however, are only infrequently found in feces, as the female worm lays eggs in the perianal area and not the rectum.

*Crawling of the gravid female worm leads to pruritis **حكة** and the patient scratches the affected perianal area. These patients have eggs of *E. vermicularis* on fingers and under nails leading to autoinfection.

Autoinfection

Ingestion of eggs due to scratching of perianal area with fingers leading to deposition of eggs under the nails. This type of infection is mostly common in children. This mode of infection occurs from anus to mouth.

Retroinfection

In this process, the eggs laid on the perianal skin immediately hatch into the infective stage larva and migrate through the anus to develop into worms in the colon. This mode of infection occurs from anus to colon.

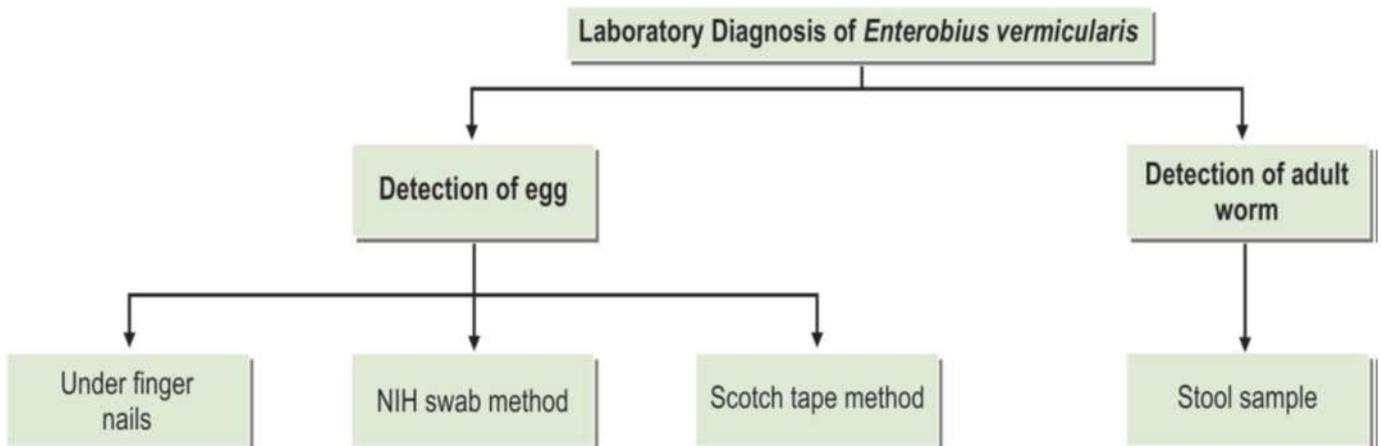
Pathogenicity and Clinical Features

Enterobiasis occurs mostly in children. It is more common in females than in males. About one-third of infections are asymptomatic.

- The worm produces intense irritation تهيج شديد and pruritus of the perianal and perineal area (**pruritis ani** حكة الشرج), when it crawls out of the anus to lay eggs. This leads to scratching and excoriation قشط of the skin around the anus.
- As the worm migrates out at night, it disturbs انزعاج sleep. **Nocturnal enuresis** يسلس البول الليلي sometimes seen.
- The worm crawling into the vulva and vagina causes irritation and a mucoid discharge. It may migrate up to the uterus, fallopian tubes and into the peritoneum. This may cause symptoms of cervicitis, peritonitis, and recurrent urinary tract infections.
- The worm is sometimes found in surgically removed appendix and has been وُزِع claimed to be responsible for **appendicitis**.

Laboratory Diagnosis

Pinworm infestation can be suspected from the history of perianal pruritus. Diagnosis depends on the demonstration of the eggs or adult worms.



Demonstration of Eggs

Eggs are present in the feces only in a small proportion of patients and so feces examination is not useful in diagnosis.

- They are deposited in large numbers on the perianal and perineal skin at night and can be demonstrated in swabs collected from the sites early morning, before going to the toilet or bathing. Swabs from perianal folds are most often positive.
- The eggs may sometimes be demonstrated in the dirt collected from beneath the finger nails in infected children.

NIH Swab Method

The NIH swab (named after National Institutes of Health, USA) has been widely used for collection of specimens. This consists of a glass rod at one end of which a piece of transparent cellophane is attached with a rubber band. The glass rod is fixed on a rubber stopper and kept in a wide test tube. The cellophane part is used for swabbing by rolling over the perianal area. It is returned to the test tube and sent to the laboratory, where the cellophane piece is detached, spread over a glass slide and examined microscopically.

Scotch Tape Method

Another method for collection of specimens is with scotch tape (adhesive transparent cellophane tape) held sticky side out, on a wooden tongue depressor. The mounted tape is firmly pressed against the anal margin, covering all sides.

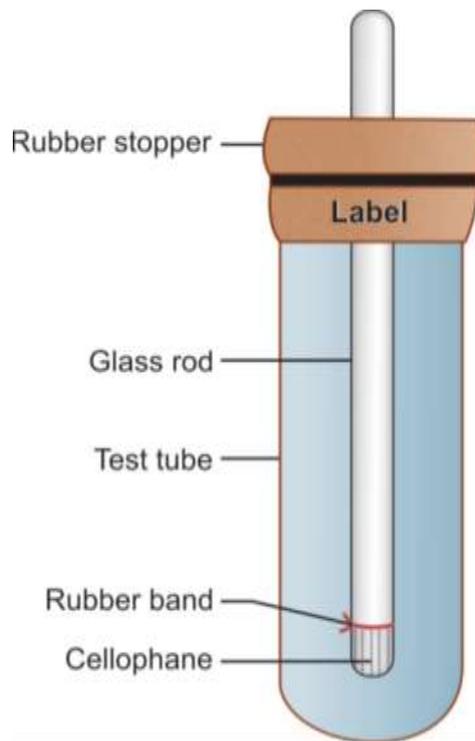
The tape is transferred to a glass slide, sticky side down, with a drop of toluene for clearing and examined under the microscope.

Demonstration of Adult Worm

The adult worms may sometimes be noticed on the surface of stools.

- They may occasionally be found crawling out of the anus while the children are asleep.
- They may be detected in stools collected after an enema حقنة شرجية and may be in the appendix during appendectomy استئصال الزائدة الدودية.

Note: Unlike the other intestinal nematodes, *Enterobius* infection is not associated with eosinophilia or with elevated IgE.



NIH swab. A piece of transparent cellophane is attached with rubber band to one end of a glass rod, which is fixed on a rubber stopper and kept in a wide test tube.

Key points of *Enterobius vermicularis*

- Adult worm lives in caecum and appendix.
- Mouth is surrounded by 3 wing-like cervical alae. Esophagus has a double bulb structure.
- Worm is oviparous.
- Eggs are colorless, not bile-stained; planoconvex in shape.
- **Natural host:** Humans. *E. vermicularis* passes its entire life cycle in human host. No intermediate host is required.
- **Infective form:** Embryonated egg containing infective larva.
- **Mode of infection:** By ingestion of eggs or autoinfection. Seen mostly in children and among family members.
- **Clinical features:** Pruritis ani, nocturnal enuresis. Sometimes, salpingitis, peritonitis, appendicitis, etc. may be seen.
- **Diagnosis:** Detection of eggs by NIH swab and cellophane scotch tape method. Detection of adult worm in finger nails or from stool after enema.
- **Treatment:** Mebendazole, albendazole, or pyrantel pamoate.