

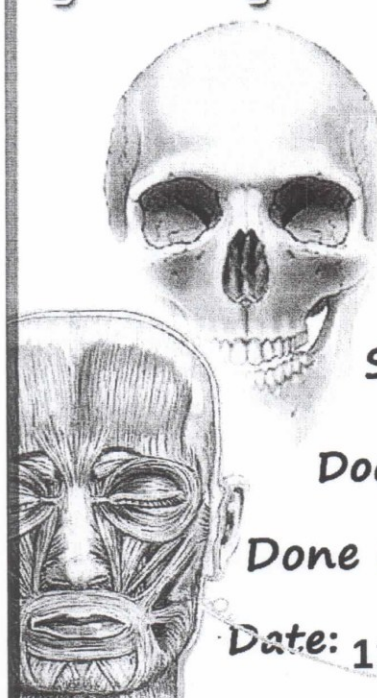
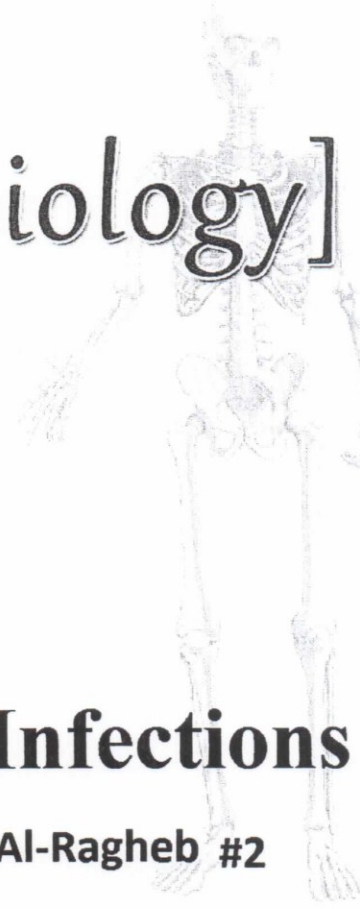
Lecture # : **2**



Medical Committee
The University of Jordan

MISS
Musculoskeletal System

[Microbiology]



Subject: **Skin Infections**

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Date: 11/2/2013

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Wuchereria bancrofti (Elephantiasis) :

Adult worm is 8-10 cm long, found in lymphatics. Microfilariae are laid by the worm and are found in the lymph and in the blood especially at night.

The adult worm may live up to 5 years.

Life cycle :

The microfilariae are ingested by the feeding mosquito, develop into infective larvae in muscle and migrate to the proboscis. On a subsequent feed the larvae leave the proboscis and settle on the skin, then they enter through the bite wound i.e. they are not injected directly, they pass to lymphatics and lymph nodes where they mature in about 6 months to produce microfilariae that pass in the blood.

The disease occurs in tropical and subtropical regions, many species of mosquitoes act as vector.

Symptoms and pathology :

Symptoms are caused by the adult worm dead or alive. Granulomatous reaction around the worm in the lymphatics leading to occlusion and narrowing with dilatation of lymphatics :

- 1)- Asymptomatic filariasis : in endemic areas where children are infected at an early age, there is microfilaraemia but little symptoms due to the adult worm. Eventually the adult dies and the infection subsides.
- 2)- Inflammatory disease : there is sensitisation to the adult worm either dead or live with resulting lymphangitis of the extremities mainly the legs, epididymitis and orchitis. Eosinophilia may be prominent. Yet most of the patients do not have microfilaraemia.
- 3)- Obstructive disease : this is the exception rather than the rule, < 10% of affected patients progress to elephantiasis, it is due to the fibrosis that follows the inflammatory process.

Diagnosis :

History and clinical findings.

Blood smear obtained at night, visualize actively motile microfilariae. They can be stained with Giemsa stain.

Microfilariae are not found early and in late stages of disease.

Treatment :

Diethylcarbamazine DEC kills microfilariae, but they return albeit to lower levels after 3-6 months. Ivermectin is also effective against microfilariae. No side effects because of slower killing.

NB Mazzotti reaction : fever, arthralgia, adenopathy, headache.

DEC may have an effect on adult worms as well but has to be prolonged.

Surgical intervention may be useful in elephantiasis.

Control of mosquitoes and mass administration of DEC.

Brugia malaya (Malayan filariasis) :

Adult worm is 6 cm long, the sheathed microfilariae do not show the same degree of nocturnal periodicity of *W. bancrofti*.

Several mosquitoes serve as vector.

It is prevalent in south-east Asia.

Symptoms and pathology :

Similar to *W. bancrofti*, but lymphangitis is more common in the extremities, while involvement of genitalia is less common.

Treatment and control :

Similar to *W. bancrofti*.

Onchocerca volvulus :

The cause of river blindness. The adult worm is found in subcutaneous tissues surrounded by a fibrous capsule (nodule).

The liberated microfilariae are present in the nodule (2 cm in diameter) and migrate in subcutaneous tissues but are rarely found in the blood and internal organs. Their migration into the eyes is responsible for the morbidity of this disease.

The vector is the black fly.

The worm becomes an adult in < 1 year and lives for 5 years.

Confined to West Africa and tropical America, on the banks of fast flowing rivers which are breeding grounds for the vector fly (2-3 miles on either side). Humans are the only source of infection.

Symptoms and pathology :

Nodules around the adult worm in the subcutaneous tissues gradually undergoing caseation fibrosis and calcification.

Chronic infection may lead to lizard skin.

The microfilariae may migrate to the eye where pathology occurs probably as an allergic reaction, symptoms in the eye resemble those of a foreign body. NB DEC should not be given to patients with eye involvement as this increases the danger of damage to the eye.

Diagnosis :

Clinical e.g. nodules, eosinophilia and ocular signs.

Demonstration of microfilariae in skin snips from nodules, the snips are kept in saline, the motile microfilariae emerge within minutes to 24 hours and can be visualised.

Treatment :

DEC and ivermectin are effective against microfilariae but not the adult. DEC is contraindicated with eye involvement, but ivermectin can be used as its effect on the microfilariae is slow.

Suramin is effective against the adult worm but is toxic.

Surgical removal of accessible nodules effectively removes the worms.

Ivermectin in single dose at intervals of 6-12 months is effective and practical for the control of microfilariae.

Control of the vector is expensive and hence impractical.

Loa Loa (eye worm, Calabar swelling) :

The adult worm inhabits the S/C tissues, the microfilariae appear in the blood and have a diurnal periodicity (day afternoon).

The life span of the worm is 4-17 years.

The vector is a mango fly. The infective larvae become adult worms in 12 months. It is a disease of Equatorial Africa.

Pathology and symptoms :

The parasite usually does not cause a lot of harm to the host.

The adult worm migrates in the s/c tissues and can be found in any site in the body.

Allergic reactive swelling (Calabar swelling) that appear spontaneously and last for about one week, anywhere in the body but especially on the hands and around the orbit.

These may reach the size of a hen egg.

High grade eosinophilia is usually present.

The worms may be found in the eye.

Some patients may experience crawling sensation of the worm.

Diagnosis :

Residence in endemic areas, clinical symptoms e.g. calabar swellings and eosinophilia should suggest the diagnosis, it is confirmed by finding microfilariae in blood samples taken in the afternoon.

Treatment :

DEC is effective against worms and microfilariae NB Mazzotti type reaction. Steroids may be necessary for this.

DEC once weekly is effective in preventing the disease.

Control of the vector fly.

Dracunculus medinensis (guinea worm) :

This is an animal parasite that may infect Humans. The adult worm is 50-120 cm long and 1-1.5 mm thick, it inhabits cutaneous and s/c tissues, it has a life span of 12-18 months.

The gravid female migrates to parts of the body likely come in contact with water. The anterior end of the worm produces a nodule in the skin which eventually ulcerates, when the ulcer comes in contact with water the worm discharges its larvae into the water. Wells where people stand in the water.

The larvae are ingested by cyclops which in turn are ingested in drinking water by humans or animals. The larvae penetrate the wall of the GIT and migrate to loose connective tissue where they develop into the adult worm.

Diagnosis :

Local lesion with demonstration of worm or larvae

Treatment :

Flagyl, mebendazole and surgical removal (care is taken not to break the worm to avoid allergic reactions).

Hygiene is useful for control.

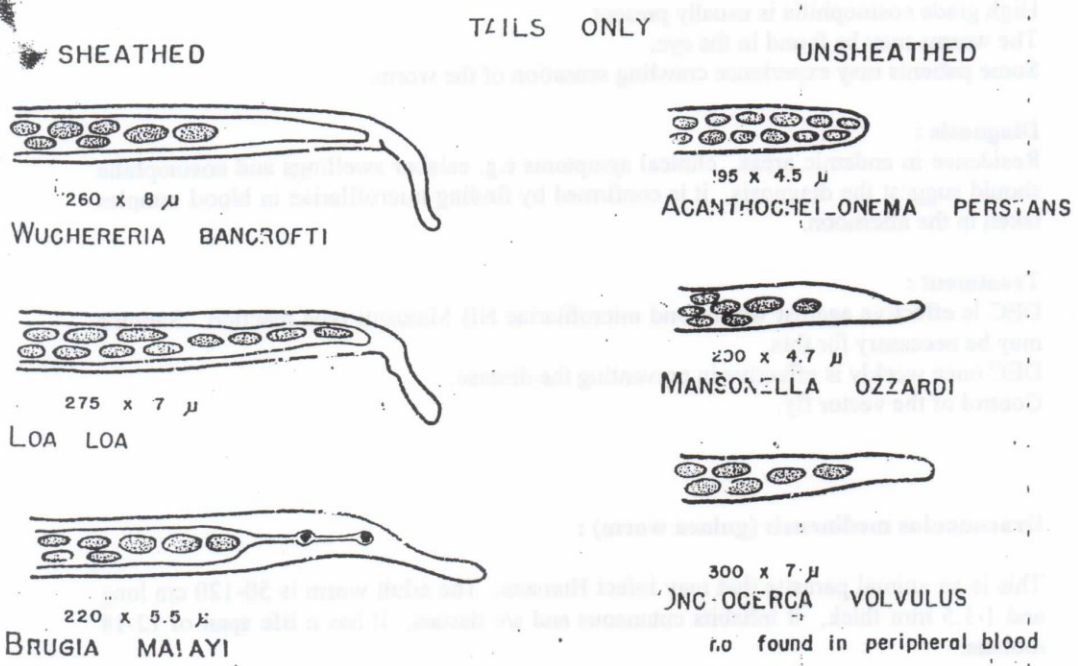
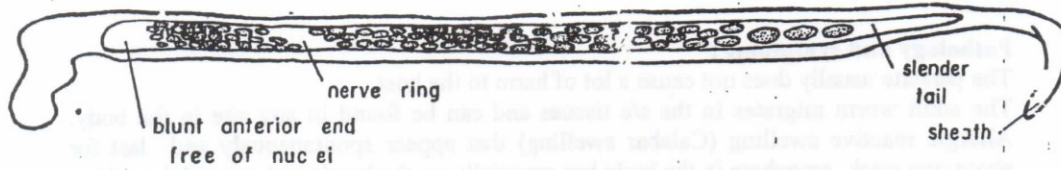


Figure 7-2. Microfilariae of humans: diagnostic characteristics.

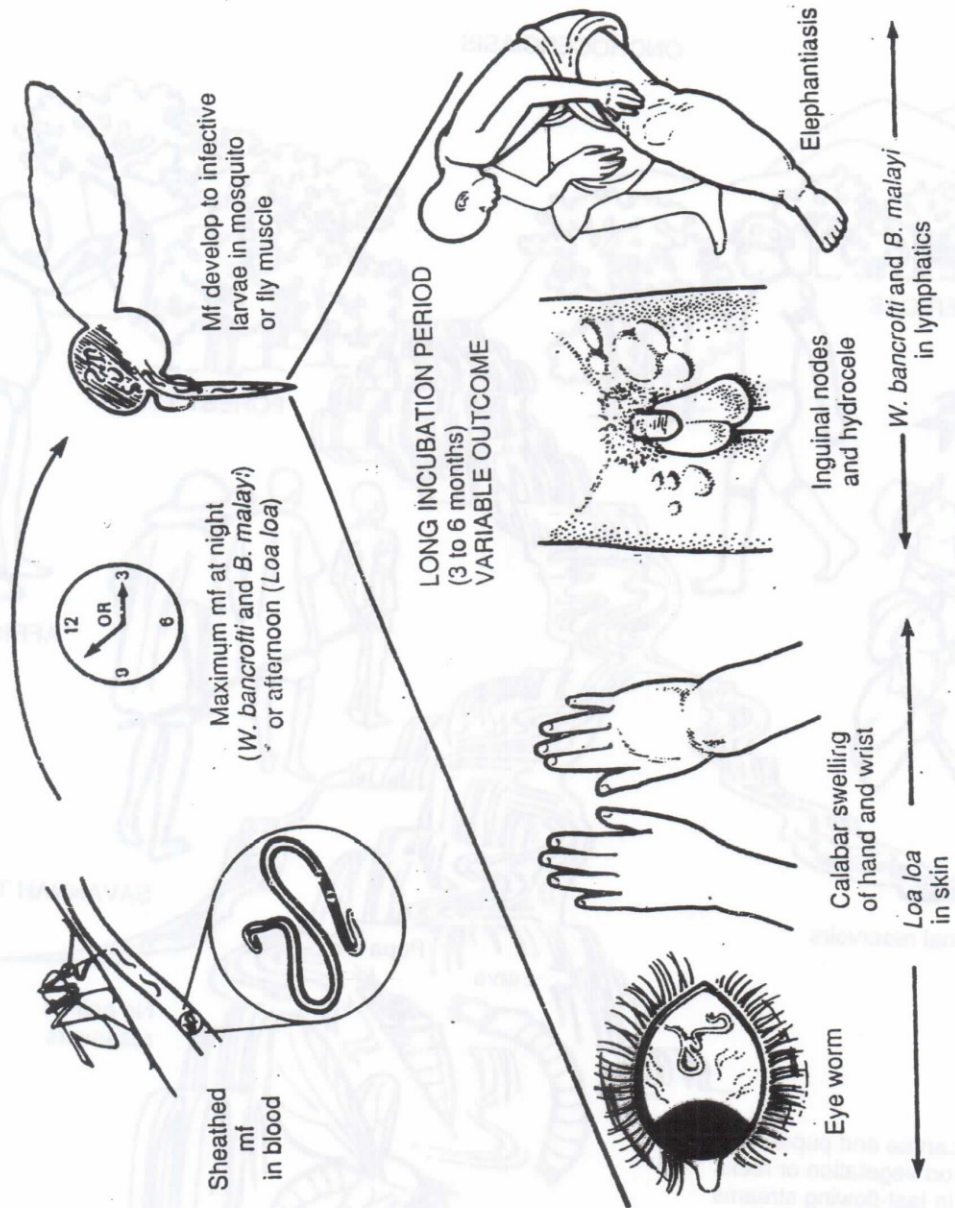


Figure 7-4. General life cycle of filarial parasites. mf=microfilariae.



Figure 7-6. Life cycle of *Onchocerca volvulus*. Adult worm and microfilariae in skin cause nodules and dermatitis. Microfilariae in the eye cause blindness.

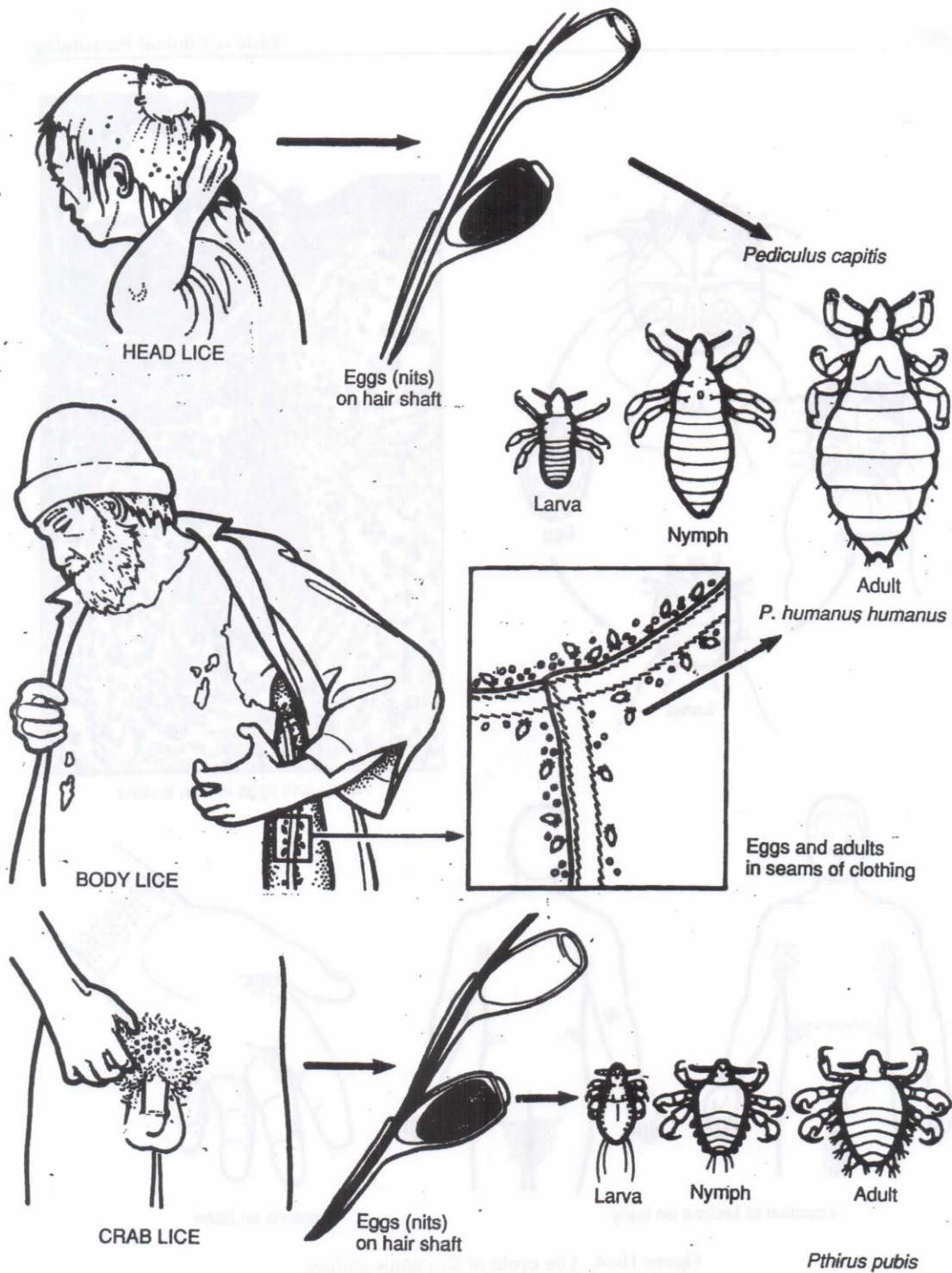


Figure 15-3. Life cycle of head, body, and crab lice.

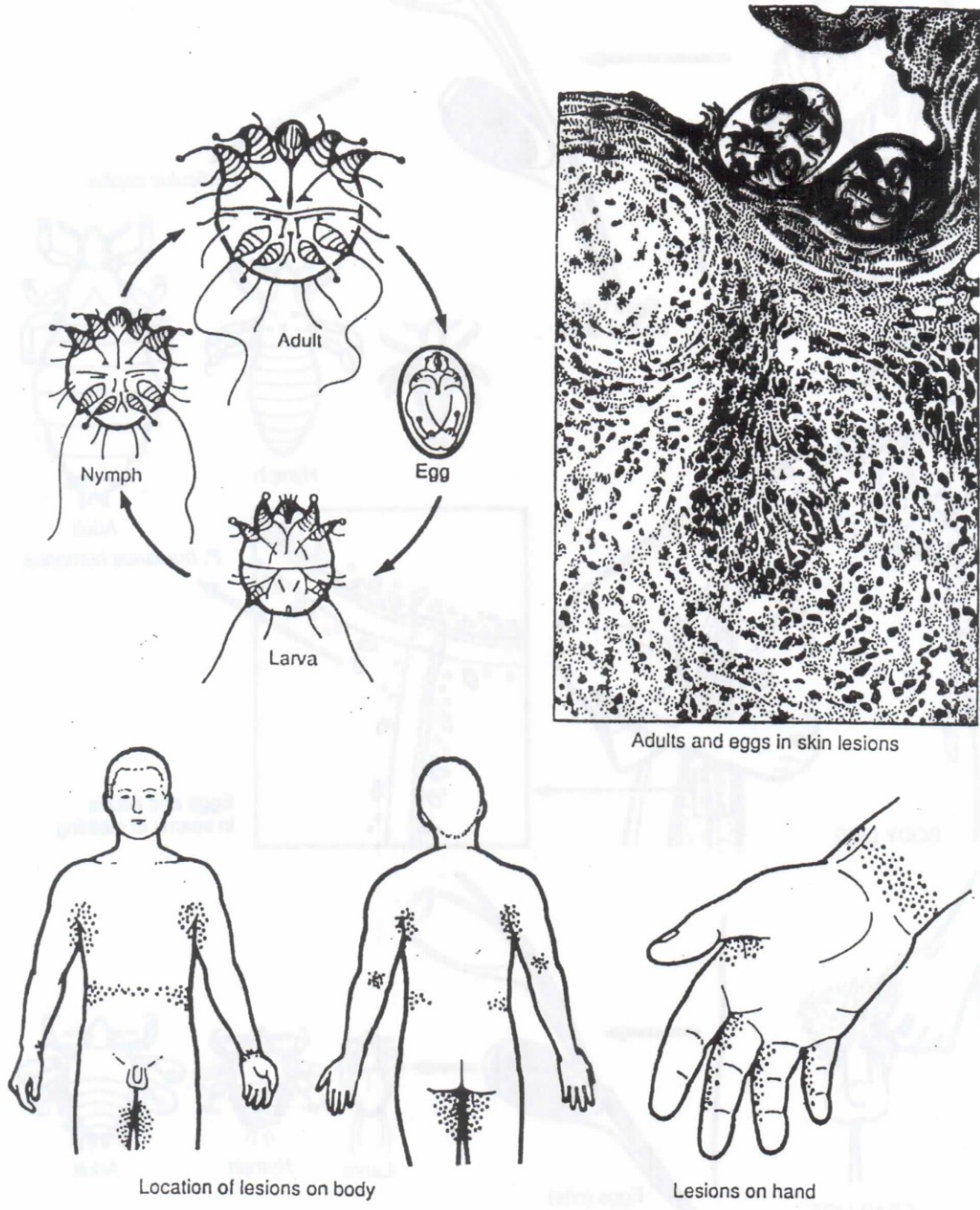


Figure 16-4. Life cycle of *Sarcoptes scabiei*.

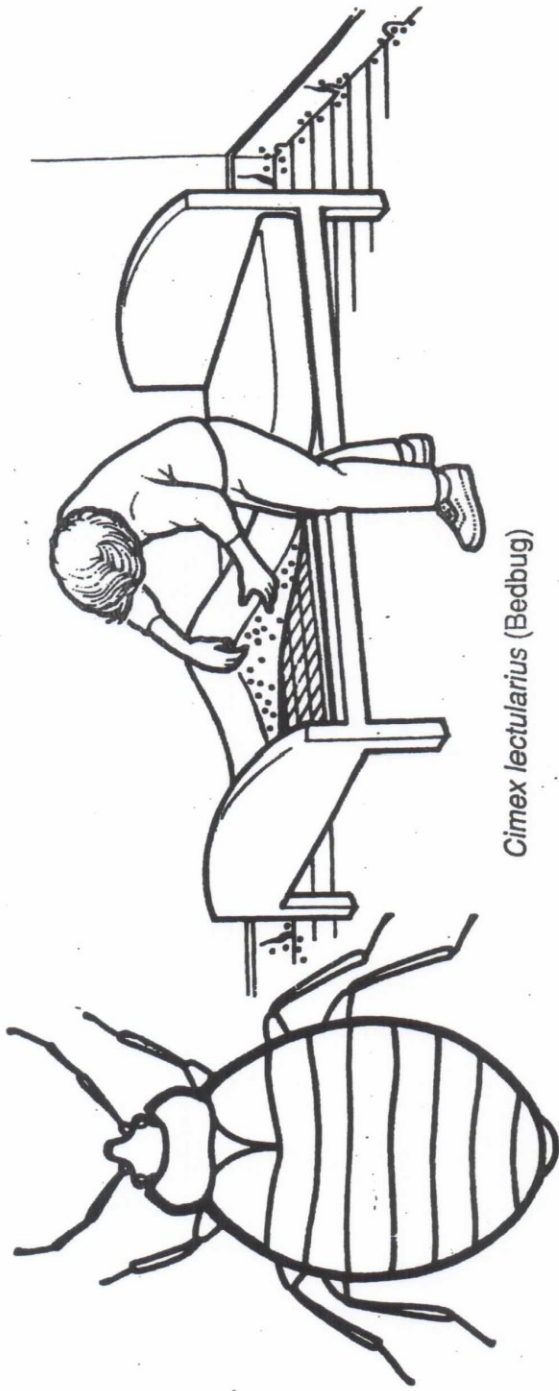


Figure 15-5. Habitat of *Cimex lectularius*, the human bedbug.