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PEDICULOSIS (HEAD LICE)

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Pediculosis is the infestation caused by head lice (*Pediculus humanus capitis*).

Epidemiology

The head louse, *Pediculus humanus capitis*, inhabits only humans and is not carried by animals or plants. The head louse does not carry disease. Humans provide the louse with the proper temperature and the food (human blood) which the louse requires for survival.

Each night the adult female attaches 3-4 tiny eggs (nits) at the base of the hair shaft at the scalp. In a week, if left on the human host, the eggs will hatch. The newly hatched nymphs require a blood meal within 24 hours in order to survive and become egg-laying adults in 6-10 days. The life span of the adult on the host is 30 days. Lice can live for 2 days separated from the human host. Some nits may hatch if returned to the human host in ten days. Lice do not jump or fly; they can only crawl.

Transmission occurs by direct contact with infested individuals or indirectly by contact with their personal belongings such as clothing, head gear and combs or brushes. Fomites play a major role in body louse transmission, a minor role in head louse transmission and practically no role in pubic louse transmission.

Pubic lice are usually transmitted through sexual contact. Only body lice have been implicated as vectors of disease (epidemic typhus, trench fever and relapsing fever).

Head lice infestation in school-aged children and pubic lice infestations in adolescents and young adults occur in epidemic proportions in the United States and many other countries. Head lice infestations occur in all socioeconomic groups.

Head or pubic louse infestation is not an indication of uncleanness. However, body lice cannot become permanently established in the clothing of the person who maintains good personal hygiene, including regular changes and washing of clothing and bedding.

Head lice have not been shown to transmit any disease. However, head lice are so prevalent that most schools in the nation have children with an infestation every year. Pediculosis is a major problem because the community reaction often borders on hysteria and all segments of the community must work closely together to control the problem. Because this infestation is so common, the aim of schools must be to control head lice rather than to totally eliminate the problem. The community should put enough effort into controlling a problem with head lice so the problem is decreased in severity to an acceptable level.

Clinical Description

Lice and nits are most commonly found at the nape of the neck and behind the ears although all areas of the head must be thoroughly examined. Since persons rarely have more than ten crawling lice at any one time, the diagnosis is most often made by finding nits. Great care must be exercised to make sure that dandruff, hair spray globules, or hair casts are not mistakenly identified as nits.

Misidentification of artifacts in hair as nits is not the only thing that may precipitate unnecessary treatment and anxiety. In many instances nits are correctly identified, but their presence is misinterpreted. The mere presence of nits is not adequate evidence of a current infestation. The nits could be left over from a past infestation. To determine whether a person is currently infested with head lice, one must either observe a louse or find nits positioned on the hair shaft at a distance of 1/4 inch or less from the scalp. The position of nits on the hair shaft can be used to distinguish between current and past infestations because female lice attach their nits to the base of the hair shaft at the scalp line. In one week (the incubation period of the louse nits), human hair grows about 1/4 inch carrying the nits with it. Therefore, nits greater than 1/4 inch from the scalp have either hatched or will never hatch. Unless nymph or adult lice are found on these persons, they should not be treated.

Treatment

The most important step in treating a head lice infestation is to treat the person and other family members with head lice with medication to kill the lice. Wash clothing and bedding worn or used by the infested person in the 2-day period just before treatment is started.

Treatment of the infested person:

Combing: Evidence suggests that combing can safely and effectively stop head lice. However, most plastic or metal combs do not do the job as promised. Use a comb which has a set of metal teeth in a permanently sealed handle. It is inexpensive and can be re-used, since it can be boiled between uses. When combing through a child's (or adult's) hair according to the directions provided, this comb can treat lice by removing the live lice and their eggs. Combs are available from pharmacies and by contacting the National Pediculosis Association, the only nonprofit health and information organization dedicated to stopping the use and abuse of dangerous chemicals on children's heads.

For children under 2 years of age, remove crawling bugs and nits using a nit comb is the best treatment. The safety of head lice medications has not been tested in children 2 years of age and under.

Treatment of older children or adults may require using an over-the-counter (OTC) or prescription medication. Follow these treatment steps:

- Before applying treatment, remove all clothing from the waist up.
- Apply lice medicine, also called pediculicide according to label instructions. If the child has extra long hair (longer than shoulder length), a second bottle may be needed. Instructions are on the bottle regarding how long the medication should be left on and whether rinsing the hair is recommended after treatment.

Warning:

- Do not use a creme rinse or combination shampoo/conditioner before using lice medicine. Do not re-wash hair for 1-2 days after treatment.
- Have the infested person put on clean clothing after treatment.
- If a few live lice are still found 8-12 hours after treatment, but are moving more slowly than before, do not retreat.
- Comb dead and remaining live lice out of the hair. The medicine may take longer to kill lice.

- If, after 8-12 hours of treatment, no dead lice are found and lice seem as active as before, the medicine may not be working.
- If using OTC pediculicides, retreat in 7-10 days.
- If using the prescription drug malathion, retreat in 7-10 days ONLY if crawling bugs are found.
- Use a different medication; follow treatment directions.
- Nit (head lice egg) combs, often found in lice medicine packages, should be used to comb nits and lice from the hair shaft or use special metallic combs (see below). Many flea combs made for cats and dogs may also be effective.
- After treatment, check hair and comb with a nit comb to remove nits and lice every 2-3 days. Continue to check for 2-3 weeks until you are sure all lice and nits are gone.

Treat the household:

Head lice do not survive long if they fall off a person and cannot feed. There is no need to spend a lot of time or money on housecleaning activities.

To kill lice and nits, machine-wash all washable clothing and bed linens that the infested person wore or used during the 2 days before treatment. Use the hot water (130°F) cycle. Dry laundry using high heat for at least 20 minutes.

Dry clean clothing that is not washable, (coats, hats, scarves, etc.).

OR

Store all clothing, stuffed animals, comforters, etc., that cannot be washed or dry cleaned into a plastic bag; seal for 2 weeks.

Soak combs and brushes for 1 hour in rubbing alcohol, Lysol[®], or wash with soap and hot (130°F) water.

Vacuum the floor and furniture. The risk of getting re-infested from a louse that has fallen onto a carpet or sofa is very small. Just vacuum the places where the infested person usually sits or lays. Do not use fumigant sprays; they can be toxic if inhaled or absorbed through the skin.

Prevent Reinfestation:

Lice are most commonly spread directly by head-to-head contact and much less frequently by lice that have crawled onto clothing or belongings. As a short-term measure to control a head lice outbreak in a community, school, or camp, teach children to avoid playtime and other activities that are likely to spread lice.

- Avoid head-to-head contact common during play at school and at home (sports activities, on a playground, slumber parties, at camp).
- Do not share clothing, such as hats, scarves, coats, sports uniforms, or hair ribbons.
- Do not share infested combs, brushes, or towels.
- Do not lie on beds, couches, pillows, carpets, or stuffed animals that have recently been in contact with an infested person.

Medication kills crawling bugs, but is not able to penetrate the eggs.

It is very difficult for head lice medication to penetrate the nit shell. Medication may effectively kill crawling bugs, but may not treat the nits. This is why follow-up treatment is recommended

Many head lice medications are available over the counter (OTC). Each OTC product contains one of the following active ingredients:

Pyrethrins - often combined with piperonyl butoxide:

Brand name products include A-200[®], Pronto[®], R&C[®], Rid[®], Triple X[®].

Pyrethrins are natural extracts from the chrysanthemum flower. Though safe and effective, pyrethrins only kill crawling lice, not unhatched nits. A second treatment is recommended in 7-10 days to kill any newly hatched lice. Treatment failures are common.

Permethrin: Brand name product: Nix[®].

Permethrins are similar to natural pyrethrins. Permethrins are safe and effective and may continue to kill newly hatched lice for several days after treatment. A second treatment may be necessary in 7-10 days to kill any newly hatched lice that may have hatched after residual medication from the first treatment was no longer active. Treatment failures are common.

Note: [®]*Use of trade names is for identification purposes only and does not imply endorsement by the Public Health Service or by the U.S. Department of Health and Human Services or by the Louisiana Department of Health & Hospitals.*

Prescription drugs used to treat head lice:

Malathion (Ovide[®]): When used as directed, malathion is effective in treating lice. Some medication remains on the hair and can kill newly hatched lice for seven days after treatment. Malathion is intended for use on people 6 years of age and older. Few side-effects have been reported. Malathion may sting if applied to open sores caused by scratching. The medication is flammable.

Lindane (Kwell[®]): When used as directed, the drug is probably safe. Overuse, misuse, or accidentally swallowing Lindane can be toxic to the brain and other parts of the nervous system. For those reasons Lindane is generally used only if other medications have failed. Lindane should not be used if excessive scratching has caused open sores on the head. It should be used with caution in persons who weigh less than 110 pounds.

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Misdiagnosis of a head lice infestation.

A diagnosis can be made if a person has crawling bugs on the head or many lice eggs within 1/4 inch (about the width of a little finger) of the scalp. Nits found on the hair shaft further than 1/4 inch from the scalp have already hatched. Treatment is not recommended for people who only have nits further than 1/4 inch away from the scalp.

Common mistakes

- making the hair too wet with water before applying a pediculicide — this dilutes the pediculicide
- using a creme rinse or conditioner shampoo before applying a pediculicide — this interferes with the medication
- failure to leave the pediculicide on long enough — follow drug label instructions
- re-shampooing the hair again immediately after applying the pediculicide — don't rewash hair for 1-2 days after treatment
- inadequate amount of medication — extra long hair may require two bottles of pediculide to fully wet the hair
- not combing. Using medication alone may not be enough to cure a head lice infestation. Combing the hair to remove lice and eggs has been shown to help.

New infection.

Children often get re-infested from a playmate. If your child is infested, discuss it with parents of the children your child plays with. Treating all infested children at the same time will help prevent reinfestation.

Resistance: If head lice medication does not kill any crawling bugs within 24 hours, then resistance is likely. If the medication kills some of the bugs or the bugs are twitching 24 hours after treatment then resistance to medication is probably not occurring.

Permethrin was a prescription product (Nix) in the U.S. from 1986-1990, when it became an OTC. Permethrin also has a residual effect. The first reports of resistance to permethrin emerged in 1990, with reports coming from Israel, the Czech Republic and Britain in 1995. In 1997, the Medical Letter stated that resistance was increasing.

Avoid

1-Sprays to treat the environment, pillows, beds and mattresses. Any head lice away from the head will die shortly since they cannot get the blood they need to survive. A thorough vacuuming may be done. Sprays are NOT recommended since a child might breathe them in all night if the mattress and pillows are covered with them. They are of unknown safety.

2-Products that promise to kill or remove lice, but contain nothing more than diluted table salt in water (labeled as natrum muriaticum), neon paint, dimethicone and others containing herbs such as rue, tea tree oil, paw paw, sage, rosemary, thyme, pennyroyal and essential oils. None of these is yet proven safe and effective.

3-Suffocating treatments designed to cover the head with olive oil, salad dressing, full-fat mayonnaise, petrolatum and other thick, gooey or oily substances. They have to stay overnight underneath several layers of plastic wrap. Removal of these greasy oils can involve several courses of regular shampoo, which can irritate the scalp. These methods have never been proven to kill head lice in any case.

4-Never resort to potentially deadly treatments such as gasoline, kerosene and lantern oil. These have all exploded in flash fires in people's homes, killing them and causing severe burns. Never use any type of garden or pet insecticide and never use any industrial strength chemicals.

Surveillance

Pediculosis is not a reportable condition. However school and day care staff often call for advice.

Case Definition

A case of pediculosis is defined as any individual who has been examined and identified by a health care professional as having eggs, nymphs or lice (which can be seen with the naked eye).

Control

No case investigation is required. However, since close contacts (household, school, etc.) of infested individuals should be examined for signs of infestation, the health department may be asked for guidance or assistance.

In the event of an outbreak or if assistance is requested:

1. Instruct school, family, etc. to check contacts for evidence of infestation and require identified cases to be treated. Care should be taken to prevent transmission to the person examining the children and to other persons being examined. Measures should be taken to preserve the dignity and right to privacy of students.

- The examiner can wear disposable gloves to examine children's hair and must consider gloving change between each child.
- The examiner can check the children's hair without use of gloves, provided thorough handwashing after each child is examined.
- The examiner can use the 'two sticks' applicator method using wooden applicators to separate the hairs to observe for lice/nits and discarding them after use on each child.

2. Exclusion: Children should be allowed to return to school or child care center the morning after their first treatment.

3. Avoid physical contact with infested individuals and their belongings, especially clothing and bedding.

4. Regular direct inspection of all primary school children for head lice and when indicated, of body and clothing, particularly of children in schools, institutions, nursing homes and summer camps.

5. If the school requests information on head lice that can be sent home to the parents, see attached sample letter. Note: This letter to parents is to be sent out on the school letterhead and not sent by the health department.

6. Some school systems have adopted a nit-free policy to eliminate the confusion over lice and dead nits. This is not in agreement with the state policy.

7. The nurse's role includes:

- Instructing teachers, principals, school nurses or other designated persons how to examine for head lice. (This should include the use of separate tongue blades per child to part the hair and inspect the scalp.)
- Providing the most up-to-date information concerning control measures.
- Be available for consultation and/or home visits regarding problem situations, (families who become repeatedly infested). In repeated infestation problems, particularly at schools that do not have a school nurse, the public health nurse should offer to visit the institution and inspect for deficiencies that may contribute to prolonging the occurrence of the infestation (i.e., mats or rugs used by young children for naps may be shared unwittingly and if not being cleaned or vacuumed, may harbor live lice).

Precautions: Contact isolation until 24 hours after application of effective insecticide.

Sample Letter to be Typed on School Stationary

Dear Parent:

Your child was sent home from school today because he or she was found to have head lice. This is an easily treated condition that is generally not associated with any serious medical complications. This letter will acquaint you with the nature of this infestation and what should be done to get rid of it.

How You Get It: Head lice are usually transmitted through close personal contact with another infested individual or through use of common combs, brushes and other grooming aids: through sharing hats, caps, wigs, coats; or through mixing of these items at the homes of friends, at school, at church or other public places. Most parents have the impression that lice become established on persons who are unclean. In the case of head lice, this is NOT true. Frequent bathing will neither prevent head lice nor eliminate an infestation once it has become established.

What To Look For: Head lice are elongated insects about this long (-) and are grayish-white with dark margins. Lice do not have wings and therefore, cannot fly. They do not jump, but do move very quickly; this makes them difficult to find in a child's hair. Since crawling forms are so difficult to see, the diagnosis of head louse infestation is frequently made on the basis of finding nits. A nit is a louse egg. Nits are teardrop in shape and vary in color from yellowish-brown to white. Head lice attach each nit to a hair shaft with a waterproof, cement-like substance. Thus, nits cannot be washed out or brushed out of the hair like dandruff or other debris that sometimes look like nits to the naked eye. Lice and nits are most commonly found at the nape of the neck and behind the ears although all areas of the head must be thoroughly examined.

Treatment: Treatment is directed at the infested individual and his personal articles, e.g., caps, combs, brushes, towels and bedding. Fumigation of or use of insecticides in the home, school and school buses is not recommended by the U.S. Public Health Service.

A. Individual Treatment:

1. Remove all your child's clothing and place him or her in a bath or shower stalls.
2. Apply head louse shampoo according to your physician's instructions or label instructions provided by the drug manufacturer. Several medicated shampoos (pediculicides) are available for head lice (NIX[®], RID[®], Kwell[®], A-200[®], pyriate, XXX[®], etc.*). Kwell[®], is available by prescription only; the others may be purchased without a prescription from the drug store. There is no published evidence to indicate that one shampoo product is superior to the others.
3. Have your child put on clean clothing after treatment.
4. Repeat treatment in 7-10 days with all pediculicides except NIX[®], (one treatment is reported to be sufficient). While the pediculicides mentioned above rapidly kill crawling lice, they do not kill all the nits. Therefore, the treatment should be repeated in 7-10 days to kill newly hatched lice. The 7-10 day interval corresponds to the incubation period of a louse's egg.

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