

Head Lice: A Human Nuisance

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Head lice is an infestation of the human head louse, *Pediculus capitis*, a companion of the human species since antiquity. Head lice is most common among children 3 to 12 years of age. Infestations are usually just a nuisance, but can cause high levels of anxiety among parents.

Head lice are NOT a health hazard, and (unlike body lice) are NOT responsible for the spread of any disease. Rarely, scratching may cause impetigo (and poor sleep!) or other skin infection, which can lead to swollen nearby lymph nodes.

While poor hygiene certainly contributes to the likelihood of acquiring head lice, people at ALL levels of society can become infested. Social stigma, embarrassment, low self-esteem, and disgust often plague patients with head lice. Additionally, head lice infestations prevent school attendance, causing missed education, lost work for parents, and needless anxiety.

Everything You Wanted To Know (or not) About The Human Head Louse

The adult head louse is 2 to 3 mm long (the size of a sesame seed), has 6 legs, and is usually tan to grayish-white in color. In the U.S., where daily brushing and shampooing is routine for many, infested individuals rarely have more than a dozen live lice.

The female lives up to 3 to 4 weeks and, once mature, can lay up to 10 eggs per day. These tiny eggs are firmly attached to the base of the hair shaft within approximately 4mm of the scalp with a glue-like substance produced by the louse. Viable eggs camouflaged with pigment to match the hair color of the infested person often are seen more easily at the posterior hairline. Empty egg casings (nits) are easier to see because they appear white against darker hair.

The eggs are incubated by body heat and hatch in 8 to 9 days, but hatching can vary from 7 to 12 days depending on whether the air is hot or cold. Once it hatches, a nymph leaves the shell casing (nit) and passes through a total of 3 nymph stages during the next 9 to 12 days and then reaches the adult stage. If not treated, this cycle may repeat itself approximately every 3 weeks.

The louse feeds by injecting small amounts of saliva and sucking tiny amounts of blood from the scalp every few hours. Itching results from reaction to the saliva. With a first case of head lice, itching may not develop for 4 to 6 weeks, because it takes that amount of time for the body to become sensitized to the saliva.

Head lice usually survive for less than 1 day away from the scalp at room temperature, and their eggs cannot hatch at a temperature lower than that near the scalp.

How Are Lice Spread?

Lice cannot hop or fly; they crawl. Spread therefore in most cases occurs by direct contact with the head of an infested individual, or less likely with contact with their personal belongings (brushes, combs, hats).

A healthy louse is not likely to leave a healthy head unless there is heavy infestation. In other words, it is extremely unlikely that a child can acquire head lice from pillows, pillowcases, carpeting, furniture, or towels.

How Is Head Lice Infestation Diagnosed?

Finding a live head louse on the head, of course, is the definitive diagnosis, but this can be difficult because lice avoid light and can crawl quickly. It may be easier to determine infestation by using a louse comb, or by finding tiny eggs (often best spotted at the nape of the neck or behind the ears, or on hair shafts within 1 cm of the scalp). It is important not to confuse eggs or nits with dandruff, or with hair casts or other hair debris. Many presumed "lice" and "nits" submitted by parents to a laboratory

were found to be artifacts such as dandruff, hairspray droplets, scabs, dirt, or other insects (such as aphids blown by the wind and caught in the hair).

Can Head Lice Be Prevented?

It is impossible to entirely prevent all head lice infestations. Young children come into head-to-head contact with each other frequently. However, it is prudent for children to be taught not to share personal items such as combs, brushes, and hats.

How Is Head Lice Treated?

Never start treatment unless there is a clear diagnosis of head lice, such as finding a live louse.

The first therapy attempted should be an over-the-counter permethrin or pyrethrin product. These are natural compounds originating from the Chrysanthemum plant that, when used against the human louse, paralyze the louse's nervous system, preventing it from feeding. These products are incredibly safe, with only rare reported cases of asthma exacerbations noted in individuals with severe ragweed allergy.

Examples of permethrin & pyrethrin products include:

- Nix™ (1% permethrin) and Elimite™ (5% permethrin). Elimite requires a prescription.
- Rid™ (0.33% pyrethrin)

Nix™ is available as a cream rinse that is applied to damp hair that is first shampooed with a non-conditioning shampoo and then towel-dried. It is left on for 10 minutes then rinsed off. It leaves a residue on the hair that is designed to kill nymphs emerging from the 20 to 30% of eggs not killed immediately with the first application. Use of conditioner prevents this residue from adhering.

Re-treatment is recommended in 7 to 10 days (preferably day 9). Side effects are unusual to permethrin, and include itchiness, redness, and mild swelling.

Rid™ is an alternative to Nix, and is available in shampoo or mousse formulations that are applied to dry hair and left on for 10 minutes before rinsing out. Re-treatment is necessary, again in 7 to 10 days (preferably day 9).

Elimite™ is commonly used to treat scabies for children and infants older than 2 months. It is available as a cream that can be used in the same fashion as Nix (it is just a stronger concentration of the permethrin in Nix), and while it is safe, there have been no large studies in children to know if it is indeed more effective than Nix for the treatment of head lice.

These natural products have long been effective against head lice, but in recent years the human louse has become increasingly resistant to them, especially to the pyrethrins. Therefore, many doctors are turning to different treatment options. For children older than 24 months, malathion (Ovide™) is the next line of treatment.

Malathion is a common pesticide that in dilute concentrations is very effective against the human louse. It is available as a lotion that is applied to dry hair, and washed off after 8 to 12 hours. No cases of resistance have yet been reported, and about 80% of patients are cured with a single application, with the remainder requiring a second application 7 to 9 days later.

Malathion is available over-the-counter in most countries, but malathion treatment for head lice still requires a prescription in the U.S. The FDA has extensively studied malathion, and found it to be very safe for use in children. Additionally, the pesticide has an extremely unpleasant odor, which means that it is rarely ingested orally by small and curious children.

A concern about malathion is the high alcohol content of the product (78% propyl alcohol), which makes it highly flammable. Parents must allow the child's hair to dry naturally, not to use a hair dryer, curling iron, or flat iron while the hair is wet, and not to smoke near a child receiving treatment.

Even though the malathion used as a lotion for treatment of head lice is of significantly lower concentration than that used in agriculture, parents might understandably be nervous about applying a known pesticide to their child's head. For them, another alternative for treatment is Ulesfia (benzyl alcohol 5%), approved by the FDA in April 2009 for treatment of head lice in children older than 6 months. The product is not toxic, and kills the lice by asphyxiation. More than three-fourths of children are free of lice 14 days after initial treatment.

The most common side effects to benzyl alcohol after treatment include itch and redness. It is available by prescription, and is applied for 10 minutes and repeated in 7 days.

Are There Any Oral Medications That Can Be Used To Treat Head Lice?

Yes, but they are not ideal. The oral antibiotic agent sulfamethoxazole-trimethoprim (Septra™ or Bactrim™) has been cited as effective against head lice, especially when used in conjunction with 1% permethrin. But one in five children are allergic to sulfa agents, and rare severe allergic reactions are possible.

And the expensive anti-parasitic agent ivermectin given as a single oral dose and repeated in 10 days has been shown to be very effective, but cannot be used in small children, and has many potential side effects. However, a 1% topical preparation is under study and has shown promising results.

Are There Any "Natural" Products?

Again, permethrins and pyrethrins are natural products, and remain the best first-line treatment options for head lice.

Several other "natural" products are marketed for treatment of head lice are in wide use. Hair Clean 1-2-3 (made here in Eugene, and containing anise, ylang-ylang, coconut oils, and isopropyl alcohol) was found in studies to be as effective as Nix. Other parents have used essential oils, such as tea tree oil, but many children will experience mild topical allergic reactions or irritation to this product, and it is of unproven effectiveness for the treatment of head lice.

What About Occlusives?

Occlusive agents applied to suffocate the lice are widely used but are of uncertain effectiveness. Petroleum jelly, olive oil, butter, and even mayonnaise have been used by parents over the years. However, lice do not have air sacs or lungs but, rather, obtain air by both diffusion and air in channels that tunnel throughout their bodies. They can survive for prolonged periods without air.

Is There Anything Else I Can Do?

Complete hair removal (that is, shaving the head) seems effective, if dramatic. Because the lice require hair shafts to lay eggs, removing the hair prevents the lice from propagating. However, for girls, the cosmetic result is less than pleasing.

Combing the hair with a special, fine-toothed lice or nit comb has low cure rates when used as the ONLY therapy for an infestation. Cure rates range from 40 to 60 percent. Viable eggs are well camouflaged and often so close to the scalp that a lice comb cannot effectively reach them. Additionally, lice combing must be performed rigorously for many minutes over many consecutive days, which is not practical for most people. In other words, lice combing has some benefit, but only when combined with other treatment.

Removal of eggs and nits immediately after treatment with a topical medication is not necessary to prevent spread, because only live lice cause an infestation.

What Should I Do At Home When I Discover My Child Has Head Lice?

If a person is identified with head lice, all household members should be checked for lice, and those with live lice or eggs or nits within 1 cm of the scalp should be treated. It is prudent to also treat family members who share a bed with the person infested with lice, even if no live lice are found.

It is also prudent to clean hair care items and bedding used by the individual with infestation. Only items that have been in contact with the head of the person with infestation in the 24 to 48 hours before treatment should be cleaned. Such items might include clothing, head gear, pillows, stuffed animals, upholstered furniture, and carpeting. Items that can be washed should be cleansed in hot water, and dried in the dryer rather than line-dried. Furniture and carpeting can just be vacuumed. Non-washable items can be put into a garbage bag for 2 weeks and then returned. Hair care items can be soaked in near-boiling water for at least 15 minutes.

Please remember that head lice is not life-threatening, nor is it an after-hours emergency. If you discover nits or eggs or live lice on your child's head, please call us during regular office hours if this handout does not answer all of your questions. If the pharmacies are closed, it will not do much good to call after-hours for a prescription. Thank you!