

Managing Head Lice Safely

Lancaster County

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The incidence of head lice has increased in the last 25 years. This means more kids are carrying around head lice and have the chance to expose even more kids to head lice. What can parents do that is safe and effective? This educational resource discusses how to detect head lice and the steps required to eliminate lice and prevent re-infestation. You'll learn about insecticidal treatments, but combing is emphasized as the most important action parents can take to eliminate head lice from their child's head. Because of the limitations of insecticidal products, even after using head lice treatments, proper combing is important to break the head lice life cycle.

Background

Head lice are found in children of all socioeconomic classes. They are very contagious and can spread easily. While there is no reason to panic (head lice do not carry serious diseases), taking action quickly is the best way to prevent the infestation of other family members. It is also important for parents to remain calm because they will need the cooperation of their child to successfully treat this problem.

Identification and Biology

It is important to understand a little about head lice biology and habits. Head lice are obligate blood



Figure 1. Adult head lice are 1/10 to 1/8" long and are tan to grayish-white (highly magnified view).

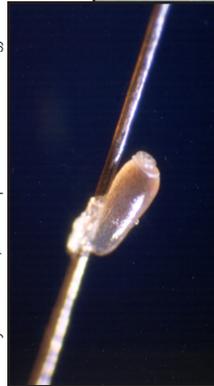


Figure 2. Eggs (called nits) are glued to individual hair strands about 1/2-inch from the scalp (highly magnified view).

feeders, which means they need human blood to grow, develop and lay eggs. When on a human host, they are usually found close to the scalp, but may be found on the eyebrows or eyelashes.

Head lice are quite small. Adults are 1/10 to 1/8 of an inch long and the immature lice are even smaller. The tiniest lice are not much larger than the nit. Head lice are tan to grayish-white (Figure 1). Head lice cannot fly or hop like fleas, but they can crawl quickly through the hair at a rate of nine inches per minute.

An adult female head louse lays

an average of 6–7 eggs per day and the average life span is about 32 days. Eggs hatch within 7–10 days after being laid. Immature lice pass through three stages before becoming adults, which takes another 8–9 days. One pregnant adult female can produce enough offspring so a significant infestation can occur within a month. A child having a significant infestation has been infested for at least a month or more. Scientists believe children are most contagious when they have adult lice on their head.

Eggs are white when they are first laid and turn brown before they hatch (Figure 2). Once they hatch, eggs are called *nits*. Eggs are glued to individual hair strands about 1/2-inch from the scalp. This glue is so strong the eggs cannot be as easily removed as dandruff and other hair debris. Researchers have found the glue is chemically similar to components in human hair, making it difficult to develop a safe solvent to aid in nit removal.

Head lice require the warm, humid environment of the human scalp for survival. They feed frequently and quickly become dehydrated if they fall off their host. Eggs removed from the human head won't hatch at room temperature. While not impossible, it is extremely unusual for someone to become infested from lice or eggs that fall off a host. Studies indicate head-to-head contact is primarily how head lice spread from one person to another.

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Inspection

If you see your child scratching his/her head or if the school or daycare has reported a louse infestation, look for signs of head lice. Many parents routinely examine their child's head on a weekly basis (Figure 3). Look for:

- **Live lice:** Part the hair with a rat-tailed comb. Check all areas of your child's scalp, especially at the nape of the neck and around the ears; these are favorite spots for lice. Also look for lice feces, that look like tiny black specks on your child's scalp. If you see black specks, carefully examine the rest of the head for live lice.
- **Eggs:** Female lice typically attach eggs 1/2-inch from the scalp. There can be from a few to several hundred nits in a child's hair. Use a magnifying glass and a good light to help distinguish between nits and dandruff. Eggs are oval-shaped and glued securely to only one side of the hair shaft. The nit stays attached to the hair shaft even after hatching (Figure 4).



Figure 3. Look for signs of head lice by examining all areas of the scalp. Look for live lice and/or eggs.

Photo by Barb Ogg

with head lice and find it does detect head lice, even tiny immature lice. The manufacturer claims lice trapped in the teeth are electrocuted, but we have not always found this to be true. Unfortunately, this comb will not detect eggs. The electronic comb should only be used on dry hair and care should be taken to avoid direct contact with ears, eyes and mouth. Be sure to read and follow directions for safe use of this comb. The cost of this comb is about \$30; it can be found at many pharmacies or over the internet.

Treatment Options

What probably won't work—

Some home remedies include cooking oil, mayonnaise, vinegar and other combinations. Studies have shown lice can survive in hair covered with olive oil, mayonnaise and even petroleum jelly—even when it is left on the hair overnight. Shampooing with ordinary shampoo won't kill lice; lice can survive through two consecutive shampooings, even when the hair is not rinsed for an hour after the second shampooing. Lice don't drown easily. Research has shown lice can survive when immersed in water for 14 hours at 86–98 degrees F.

Insecticidal Treatments—To reduce the number of live lice on your child's head, you may want to use an insecticidal product labeled for head

lice control.

- **Pyrethrins (permethrin):** Pyrethrin products currently on the market are NIX®, RID®, A-200®, Clear® and store brands with similar active ingredients. When used correctly, these over-the-counter products are pretty safe; only a few children will exhibit minor problems such as itching, a minor rash or an allergic reaction. However, research in the U.S. has shown lice are resistant to the pyrethrin/pyrethroid products, which means live lice will still be found after treatment. As these products continue to be used, resistance will increase, making these products less and less effective.
- **Malathion:** A product reintroduced to the U.S. market several years ago is Ovide®. It has been used in European countries for many years. The active ingredient in this lotion is malathion, an organophosphate insecticide. Lice resistant to pyrethrin products may be better controlled with this product. This prescription product has an unpleasant odor and is flammable. But, the biggest drawback to using this product is the way it is to be used. Instructions say to soak the child's hair with Ovide® and leave it on for 8 to 12 hours.
- **Kwell®:** Another shampoo product available only by prescription is Kwell®. It has been used in the U.S. for lice for about 50 years. Head lice resistance to lindane, the active ingredient in Kwell®, has been reported in many parts of the world, including the United States. This product is less effective than many other head lice treatments, taking longer to kill adults and nymphs. Kwell® should be used with extreme caution—neurotoxic reactions, carcinogenicity in lab animals and blood disorders have been reported as a result of using lindane shampoos. Because of these adverse effects, we don't recommend Kwell®.
- **Hair-Clean-1-2-3®:** This is a non-traditional treatment with some independent research showing it has similar or greater effectiveness to Nix®. It was studied at the Miami School of Medicine and in Israel at Hebrew University-Hadassah

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Figure 4. Nits stay attached to the hair shaft even after hatching (highly magnified view).

Photo by Barb Ogg

Studies have shown even trained professionals occasionally miss live lice because the immature lice are so small and hard to see. It is also easy to mistake dandruff or hair casts for nits. Using an electronic comb may be helpful in determining whether live lice are present.

Electronic Comb—There is an electronic comb on the market, called the Robi Comb™ (manufactured by LiceGuard™) that will detect live head

Medical School. Hair-Clean-1-2-3® is a mixture of anise oil (flavoring in black licorice), coconut oil and ylang ylang oil in an isopropyl alcohol carrier. It has a very strong (almost overpowering) licorice smell and it should be used with caution because the alcohol makes it flammable. Spray dry hair thoroughly and leave it for 15 minutes. Then, remove lice and nits with a metal nit comb (which comes with the product). Like other products, a second application is needed 7–10 days after the first. This product is most likely to be found in health food stores.

Effectiveness—Parents sometimes report these products are not effective and often blame resistant lice or the product. *However, sometimes parents are not using these products exactly as directed on the label.* The most frequent problems are:

- The treatment is not repeated 7–10 days later as directed on the label. The head lice nit stage is resistant to chemicals, and the treatment must be repeated to kill lice that hatched after the first treatment.
- Less product is used than is recommended on the label. Because these products are expensive, parents understandably want to save the product to treat another child or for a later treatment. It is important to use the entire amount recommended on the label. Any less can reduce the effectiveness of the shampoo. Parents may need to use more product on children with lots of hair—for example, girls with long hair.
- These products should not be used like regular shampoos or hair treatments. Read and follow all label directions. If you are confused, most product manufacturers have a consumer line and will help you. The telephone number will be found on the package.
- Remember, resistance has been documented with the pyrethrin/pyrethroid products. The more these products are used, the more resistance will be found. But parents should be aware that even the most effective product may not be 100 percent effective. This is why using a lice comb is so important.

Aerosols—Some aerosol insecticides

are sold to kill lice on environmental surfaces, but we recommend vacuuming as a much safer alternative. Studies have shown lice are nearly always found on the host and rarely, if ever on environmental surfaces so the benefits of using these aerosols are low. Aerosol products may cause respiratory problems for sensitive individuals, especially those who have allergies.

Combing: a safe, non-toxic method of lice control—Combing is the oldest and safest method of lice control; nit combs have been found in Egyptian tombs. Combing is completely safe. When done properly, it takes time and requires patience on the part of parent and child. You can completely avoid insecticide shampoos/rinses if you comb the hair to remove lice and nits, but you must be diligent. Even if you use an insecticidal shampoo, combing is the only way to remove eggs/nits from the hair.

Preventing Re-infestations

Sometimes parents have used head lice products and combed, only to find their child has another head lice infestation. Most of the time, the children did not become re-infested from other children; instead the parents likely did not completely eliminate the lice at first. Missing only a few tiny lice will be enough to start the infestation all over again. It may be helpful to use an electronic comb after you wash your child's hair to see if there are live lice you missed.

To prevent re-infestation, continue to examine all family members, including parents and treat only if lice or nits are found.

Laundering—Wash bedding, towels and recently worn clothing in hot, soapy water in a washing machine. Drying in a 140 degree F dryer will kill both lice and nits. Clothes washing is only necessary when you treat the child or when he/she is re-infested and does not have to be repeated daily.

Vacuuming—Vacuum carpets, pillows, mattresses and overstuffed furniture. Vacuum the car seats. It

is recommended you vacuum these items instead of using insecticidal sprays.

Items such as stuffed animals and pillows which are not washable can be stored in tightly sealed plastic bags for two weeks. Lice and their eggs will be killed if they freeze so some items can be placed in a freezer overnight.

Combs and Brushes—Family combs and brushes should be soaked for 15 minutes in very hot water. It might be a good time to get every member of the home their own comb and brush if they don't already have them.

Instruct children not to share combs, brushes, hats or other articles of clothing at school, play or other activities.

Cutting Hair—Head lice have claws on their legs which help them grasp hair (Figure 6). Children with long hair may contact infested children and stray lice

more frequently than children with short hair. For children that have repeated infestations of head lice, choosing a short hair style and cutting the hair may help.



Photo by Barb Ogg

Figure 6. Head lice have claws which help them grasp hair.

No-Nit Policy

Many schools and daycare centers have adopted the “no nit”

policy recommended by the National Pediculosis Association. This policy means children cannot attend school if nits are found in their hair. None of the insecticide treatments mentioned above will remove nits from the head. There is no safe solvent for the glue that the female louse uses to attach her eggs to the hair even though there are products that make such claims. Combing is the only sure way to remove nits from hair.

Because children spend so much time at school or day care, these facilities are sometimes accused of being the places where head lice get transmitted from child to child. Head-to-head contact is the most likely way lice are transmitted from one child to another.

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How to Use a Lice Comb to Remove Lice and Nits

1. Getting ready—First, purchase a comb (metal combs are best) specifically designed so the tines of the comb are narrower than the eggs. Be careful about using plastic combs that are flexible enough to allow nits and lice to pass through. If you cannot find a metal lice comb, ask your pharmacist to order one. Other items you will need are:

- comb and/or brush
- bobby pins or hair clips (for long hair)
- a large towel to place around the child's shoulders during combing
- box of facial tissue
- bowl of water with a little dish-washing liquid added.

Combing should be done in a well lighted area. Seat the child so her/his head is just below eye level. It is a good idea to provide some entertainment for the child that doesn't require much physical activity. Consider reading, modeling clay, coloring or videos.

2. Preparing the hair—Cover the child's hair with salad or olive oil. You can also use hair conditioner instead of the oil. Using the oil or a hair conditioner prevents the hair from tangling, prevents the hair from drying out and makes it easier to use the lice comb. Use a regular comb or brush to remove the snarls.

3. Combing—Separate a mass

of hair slightly wider than the width of your lice comb and about 3/4 inch in the other direction. It is important to separate the hair into small sections so you can more easily see lice and nits.

Hold the mass of hair with one hand. With the other hand, hold the lice comb in a slanting position with the teeth toward the head (Figure 5).



Photo by Barb Ogg

Figure 5. When combing, hold the mass of hair with one hand. With the other hand, hold the lice comb in a slanting position with the teeth toward the head.

Insert the comb into the hair as close to the scalp as possible since the eggs are first laid within 1/2-inch of the scalp. Pull the comb slowly through the hair several times.

Comb one section at a time and check each section to make sure it is clean, then pin it out of the

way, curling it flat against the head. Whenever you comb out nits or live lice, dunk the comb in the soapy water. Make sure the comb is clean before you use it on the hair again. Frequently remove the hair and other debris from the comb with a tissue. When the tissue becomes soiled, place it in the bowl of soapy water. When the bowl is full, flush its contents down the toilet and refill the bowl with soapy water.

When all the hair has been combed, shampoo the hair twice to remove the oil or hair conditioner. Once the hair is completely dry, again check the entire head for stray nits and remove those hairs individually with a pair of small, pointed scissors.

4. Cleaning Up—Soak the lice comb in hot ammonia water, prepared by adding one tablespoon of ammonia to one quart of hot water for 15 minutes. Metal combs can be boiled in plain water for 15 minutes. A comb cleaned either way can be reused on other family members. Scrub the teeth of the comb with a nail brush or an old toothbrush to remove debris. Wash towels in a washing machine in hot, soapy water and followed with a hot dryer. At this time, you may want to wash bedding and recently worn clothing.

Head Lice FAQ's

Q. Why do I have more lice problems with my daughter who has the longest hair? I have two other daughters and one son.

A. Loose long hair is more likely to come into contact with lice than short hair. It is also more difficult to inspect, treat and comb a person who has long hair, so managing a lice infestation is more difficult. Hanging hair is a liability. Putting your child's hair up in a ponytail or bun will be helpful

or work with your daughter to choose a new, shorter hair style.

For some inexplicable reason, lice seem to survive or be attracted to some people more than others and some children in the family are more likely to get lice than others.

Q. Can we get head lice from our pets? Do we need to treat our pets?

A. Humans are the only hosts for head lice, body lice and crab lice. Other closely related lice infest monkeys or apes, but not dogs, cats, rodents or

birds. Many animal species have their own compliment of lice that cannot infest humans. You don't need to treat your pets for human lice.

Q. I am having a hard time knowing what nits look like. And, how would I know if nits are alive, dead or hatched?

A. Nits are laid on the hair and glued to one side of the hair shaft. They are usually laid on single strands of hair, close to the scalp, but not on it. Nits are not round, but oval. They

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are light-colored when first laid (yellowish or gray), but darken to a tan or coffee color as the embryo develops. Once the egg hatches, the spent shell (the nit) remains attached to the hair shaft, but it is white. As the hair grows, the nit grows with it and is farther from the scalp. Without the aid of a microscope or magnifying glass, it is hard to tell if the nit is alive, dead or hatched.



Photo by Jim Kalisch, UNL Department of Entomology

Figure 7. Head lice egg with a dead embryo.

Q. My doctor didn't recognize head lice even though my daughter had sores from scratching her head. He said that she had "winter itch" How can doctors miss this?

Q. My school nurse and after school daycare provider say my daughter has head lice nits in her hair. I see small white round things that seem to be attached to the hair shaft. But nobody, including me, can see any live lice at all. What could be going on?

A. The possibility for both of these parents is their children are being incorrectly diagnosed. Studies have shown that some health care workers sometimes misdiagnose head lice infestations, both by declaring lice were present when they weren't (false positive) and by not finding lice when they were there (a false negative). It is difficult for even well-trained individuals

to correctly diagnose the difference between dead nits and live nits. Figure 7 shows what an egg with a dead embryo looks like. Compare it with Figure 2.

There are obvious problems when children are not diagnosed properly. When lice are under-diagnosed, contagious children may spread lice to others. When lice are over-diagnosed, children may be over-treated with lice products and parents are frustrated.

The message here is that, unless you see live lice (ones that move) or brown nits, the child may not be infested at all. Be cautious before you come to that conclusion though. . . it can be difficult to detect an infestation of only a couple lice and tiny ones are very hard to see.

A very helpful way to check for live lice is an electronic comb, like the Robi Comb™. Although it doesn't detect nits, it can detect even the tiniest lice before they grow to adults and lay eggs. Combing will still be needed to remove nits.

Q. I am pregnant and my child has head lice. I am concerned about exposure to any insecticides. What should I do?

A. If you are pregnant or nursing, contact your physician before using

any insecticidal products on yourself or your child. Remember, you can completely avoid insecticide shampoos/rinses if you comb the hair (using oil or conditioner) to remove lice and nits, but you must be diligent.

Q. I carpool and have transported children with head lice. How do I treat the vehicle?

A. It is not likely that lice will end up on car seats and upholstery. Surface sprays are not recommended because insecticidal sprays marketed for treating lice can cause allergic reactions for people who have allergies or respiratory problems. If you want to take some action, vacuuming seats will be as effective as treating with a chemical.

Q. Some of my students have head lice. Should I ask to have my classroom sprayed with insecticides?

A. School classrooms should NEVER be sprayed for lice. An Australian study was conducted in a school where head lice were found on more than 21 percent of the children. Floors were vacuumed with a filter designed to catch lice, but, even with the abundance of infested children in the school, researchers did not find any lice on floors. These results suggest few lice fall off the host and environmental treatments are mostly a waste of time and money.

ADDITIONAL RESOURCES

- "Removing Head Lice Safely," an eight-minute videotape demonstrating head lice management in an easy-to-understand format. The video features highly-magnified live lice, a combing demonstration on a child and actions that will help prevent re-infestations. Cost: about \$13, including shipping & handling. The video and accompanying materials were developed by the University of Nebraska-Lincoln Extension and State of Nebraska Department of Health and Human Services.
- "Quick Guide for Removing Head Lice Safely," an educational resource guide which provides, practical, simple directions on head lice control for families: <http://lancaster.unl.edu/enviro/pest/factsheets/030-99.htm>.
- Head Lice Resource You Can Trust Web site at <http://lancaster.unl.edu/enviro/pest/Lice.htm>.
- The UNL Extension's Integrated Pest Management (IPM) in Schools Web site provides low-toxic methods of controlling pests in schools. Check out: <http://schoolipm.unl.edu/>.

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