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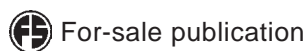
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The following images have been provided by
The National Pediculosis Association.



Microscopic image of adult head louse under artificial lighting



Size comparison between nits (eggs) and the head of a pin



Microscopic image of nit (egg) under artificial lighting



Head lice developmental stages: Adult (top). Nymph or immature (bottom)

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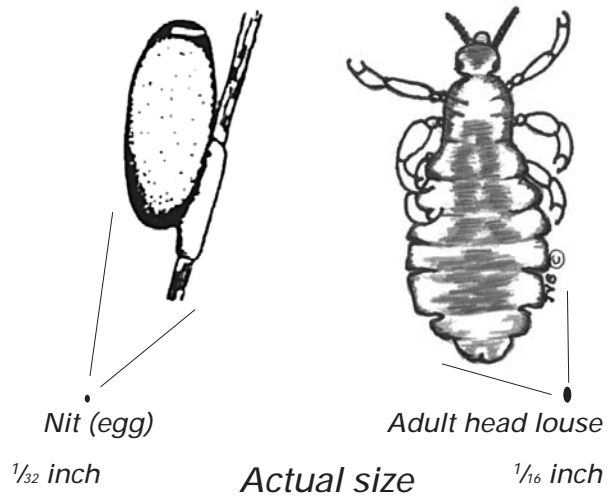
The following websites contain additional pertinent information about head lice:

- <http://www.headlice.org>
- <http://www.hsph.harvard.edu/headlice.html>
- <http://www.jcu.edu.au/school/phtm/PHTM/hlice/eggs.htm>

Head Lice

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Common name—head louse
Scientific name—*Pediculus humanus capitis*
De Geer
Order: family—Anoplura: Pediculidae

Head lice are very tiny, parasitic insects. They inhabit the hair and scalp of humans. Head lice feed only on human blood, which they require for nourishment. Head lice do not infest pets or livestock.

Despite common misconceptions, head lice can affect people of all ages, rich or poor. Head lice do *not* reflect one's socioeconomic status or social class. Furthermore, head lice are *not* signs of uncleanliness. Regular washing of the body or hair will not prevent head lice.

Head lice are spread from people who have head lice. Direct, head-to-head contact is the main way head lice are spread, but they also may be transmitted by sharing infested items such as hair-care items and clothing. Head lice can be considered a communicable disease, somewhat comparable to the common cold.

These tiny insects can be a major pest problem. Infestations can spread quickly among individuals. Head lice are big inconveniences, typically requiring weeks of periodic intervention and surveillance to combat an infestation.

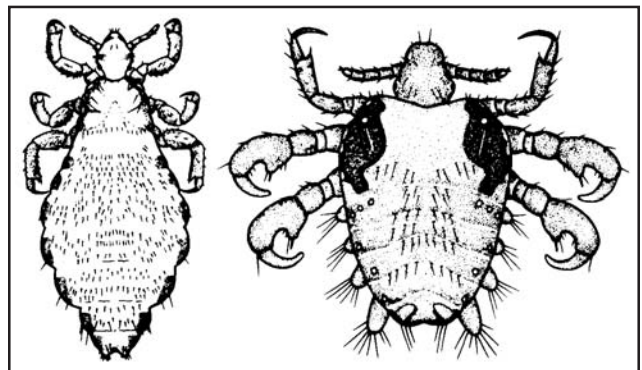
Pediculosis (pə-dīk'yə-lō'sīs) is the medical term for a lice infestation. This is an inclusive term that does not distinguish among the various types of human lice, such as body lice and crab lice. *Head lice are distinctly different from these other types of lice that occur on humans.* Body lice typically are found attached to clothing fibers. They periodically move to the human body to feed on blood. Body-lice infestations flourish in overcrowded, unsanitary conditions where clothing is not changed regularly. Crab lice are found primarily in the pubic region, where they feed on human blood. Crab lice are sexually transmitted.

Although head lice can infest humans of any age, they most commonly occur among children that have close contact with each other at school and at play. About 5-10 percent of all school children contract head lice at one time or another. Head lice ultimately are a community problem.

Educators, parents, and children need to understand that absolutely no shame should be associated with having head lice. How school educators handle the situation will greatly affect how the students treat each other. Do not call undue attention to any person having head lice. For example, it is *not* necessary to shave the hair. Anyone can get head lice—even you!

Description and Habits

The **head louse** is a tiny, soft-bodied insect that is somewhat flat. The adult stage is approximately $\frac{1}{16}$ inch long—about the size of a sesame seed. Immature stages (nymphs) are smaller. The head louse has a narrow head that is equipped with sucking mouthparts. Individuals often are grayish-white to tan but may become reddish-brown after feeding on human blood. The head louse is wingless and has six legs, each ending in a small claw (hook) that is designed for grasping hairs. These claws are better able to grasp hair that is round in cross-section, which is typical of



A head louse (left) and crab louse (right) are distinctly different.

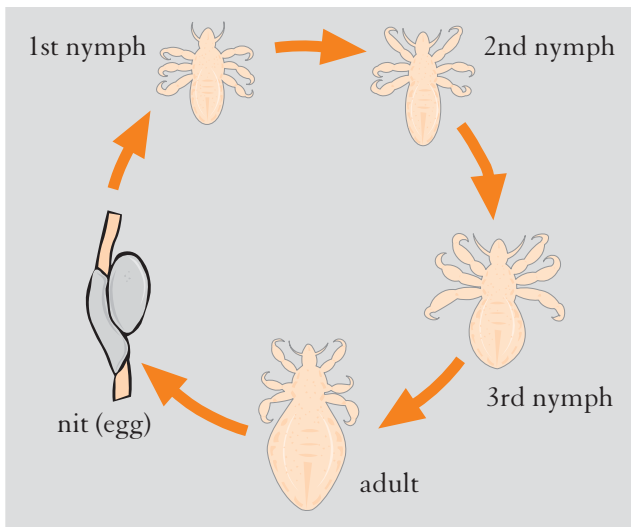
Caucasians. Adults and nymphs use their claws to cling to hair, and they do not fall off hair easily.

Head lice do not jump, hop, or fly. They do crawl a lot, and they can move quickly. They may be found anywhere on the human scalp and hair. The most typical locations are the crown of the head, above and behind the ears, and the nape of the neck.

Lice eggs are referred to as **nits**. Nits are oblong and usually pearly white, but they may darken to a tan or coffee-color as the young louse completes its development within the egg and nears hatching. Each nit is about $\frac{1}{30}$ inch long (less than the width of a #2 pencil lead). Each nit is attached (cemented) onto a hair shaft, typically very close to the scalp. Although nits are laid close to the scalp, they eventually may be found further down the hair shaft as the hair grows and elongates. Nits may occur on any region of the head, but often are found behind the ears or near the hairline at the back of the neck. Nits are not easily dislodged, and they may remain attached to hair strands that have been shed.

Life Cycle

The head-lice life cycle (egg to adult) requires about 21-27 days on the human host. Each adult female deposits anywhere from 50-150 eggs (nits) during her lifetime. Nits hatch in 5-9 days. Nymphs (immatures) molt three times before becoming sexually mature adults. Young and adult head lice feed on blood several times a day. The adult stage can live approximately one month (30-40 days).



Head louse life cycle.

Head lice are completely dependent on their human host for nourishment and warmth. In fact, head lice cannot complete their life cycle if they become separated from their host. Adults and nymphs can survive off their host for only 2-3 days, whereas nits can live for up to 14 days.

Injury

When a head louse inserts its mouthparts into human skin to obtain blood, it injects saliva that may cause intense irritation and subsequent itching of the scalp. Children less than 12 years old typically are more sensitive to head-lice bites than older children and adults.

Scratching of head-lice bites increases inflammation, sometimes leading to secondary bacterial infections. However, head lice are not known to be responsible for the direct spread of disease organisms.

Symptoms

Constant itching and scratching of the scalp often is the first outward sign that a person has head lice. However, some individuals are not sensitive to head-lice bites and may experience no symptoms.

Head lice also may be indicated if one finds tiny, black spots on bed pillows, sheets, or clothing near the neckline and shoulders. These black spots consist of digested blood excreted by a head louse after feeding.

Detection

Because of their tiny size, head lice and nits often are detected with the aid of a hand lens or magnifying glasses. (Magnifying glasses are most helpful because both hands are free to inspect the hair.) High-intensity lighting, even natural sunlight, is very helpful for detecting nits. However, adults and nymphs move very quickly away from a light source and its associated warmth.

Head lice may look like grayish specks moving rapidly on the scalp and hair. Diagnosis based on adult and immature stages is difficult; they are easily overlooked. A head-lice infestation is most often diagnosed by observing the stationary nits glued to hair shafts very near the scalp. Nits may look like dandruff, but they cannot be shaken off.

Spread of Head Lice

Head lice are spread from people who have head lice. Direct, head-to-head contact with an infested person is the most common way head lice are spread. Head lice also may be transmitted by sharing infested items. Such articles commonly implicated in the spread of head lice include *hair-care items and accessories* such as combs, hairbrushes, headbands, ribbons, barrettes, hair rollers, wigs, etc.; *head gear* such as helmets, headsets, ear phones, etc.; *clothing* items, including hats, caps, scarves, sweaters, costumes, etc.; and *sleep items* such as pillows, bed linen, stuffed animals, etc.

Lice can be transferred from coats, sweaters, scarves, hats, etc. contacting each other in cloakrooms, closets, and lockers. Placing your head where someone with head lice has *recently* laid theirs, such as on a couch, rug, mattress, bus seat, airplane seat, car seat, etc. also can result in the spread of head lice.

Prevention of Head Lice

Routine hair inspections at school and at home are very important to long-term prevention of head lice. When head lice remain undetected and untreated, their population only continues to grow. Children, parents, caregivers, educators, etc. need to be involved in the solution to the head-lice condition. They should know how to prevent the spread of head lice, how to inspect for them, and what treatment procedures should be followed.

As a precaution against spreading head lice, avoid sharing *hair-care items and accessories*, such as combs, hairbrushes, headbands, ribbons, barrettes, hair rollers, wigs; *head gear* such as helmets, headsets, ear phones; *clothing* items, including hats, caps, scarves, sweaters, costumes; and *sleep items* such as pillows, bed linen, stuffed animals, etc. Coats, sweaters, scarves, hats, etc. should not contact each other in cloakrooms, closets, and lockers. If storage space is limited, an option is to put each person's coats, sweaters, hats, etc. in a separate plastic bag marked with their name. Placing each person's personal items in a separate bag, particularly while dealing with a head-lice episode, will not call undue attention to any one individual that has head lice.

Education is an important tool to dispel myths and fears often associated with head lice. Teach and encourage that the condition *is not "the plague!"* Head lice are just pesky insects that nobody likes, but any infestation needs to be dealt with immediately. Head lice quickly spread when people don't notice the condition and do not seek early treatment. Informed children, parents, and caregivers realize the importance of immediately communicating any findings of head lice. *Early detection and proper action allow faster eradication and reduces the spread of head lice.*

Control Measures Using an Integrated Pest Management (IPM) Approach

A variety of control measures should be implemented *immediately*, because person-to-person contact can result in rapid spread of head lice to others in the school, family, and workplace. The earlier a head-lice infestation is detected, the faster it is to solve the problem.

It is important to concurrently take steps to eradicate head lice from the environment and the person. A stubborn cycle of repeated infestations can result if such control efforts are not made at the same time.

Some Steps to Eradicate Head Lice in the Environment

Chemical Sprays:

Treating the environment with insecticide sprays *is not necessary and is not recommended* since head lice can only live a short time apart from their human host. Furthermore, such chemicals have little, if any, impact on the nits. Insecticide sprays also should not be used on the body or clothing if you have head lice. Use of chemical sprays results in unnecessary exposure to insecticides.

Nonetheless, numerous products are marketed for household use. They are available for purchase either separately or within a package containing additional head-lice products. Some products that contain an insecticide include Pronto® Lice, Tick, and Flea Killing Spray containing 0.4 percent resmethrin; ValuRite® Bedding Spray containing 0.5 percent resmethrin; and R&C® Spray Lice Control Insecticide containing 0.4 percent resmethrin. Not Nice to Lice® Household Spray doesn't contain a conventional insecticide but instead contains enzyme cleaners with protease.

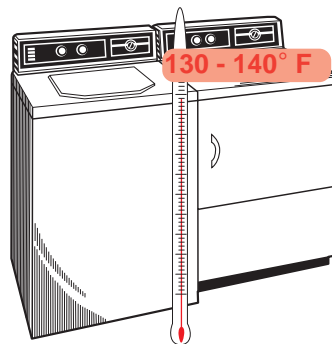
Vacuumping:

Thorough vacuuming is a safe, effective way to remove head lice from the environment. In addition to vacuuming all floors, be sure to vacuum mattresses, stuffed animals, upholstered furniture, rugs, car seats, etc. Immediately after vacuuming, seal the vacuum cleaner bag in a plastic bag, then throw it away in an outside trash receptacle.

Washing Items, Bagging Items:

It is important to isolate or sanitize any personal items that could be infested with head lice. Such items can be sealed within a plastic trash bag for at least 14 days. This is a good alternative for items that cannot be washed (dry-clean only quilts, pillows, stuffed animals, etc.). If items such as combs, hair clips, barrettes, etc. can tolerate chemicals or heat, place them in undiluted isopropyl alcohol for approximately 20 minutes or in a solution comprised of 1 teaspoon of ammonia added to 2 cups of hot water for 15 minutes. Or, you can boil them in water 10-15 minutes. As a last resort, throw away the infested items.

Bedding, clothing, towels, and other washable items that have



been in contact with an infested individual should be washed and dried at hot temperatures. These items should be washed for at least 10 minutes at a water temperature of 130-140° F. To reach this desired temperature, you may need to *temporarily* raise the temperature of the water heater. (*To avoid burns, remember to turn the water heater back down to a lower temperature after the lice ordeal.*) Wait between washings until the appropriate temperature is reached. Place washed items in a drier set at the highest suitable temperature. Dry for at least 20 minutes.

Some Steps to Eradicate Head Lice on the Person

Effective head-lice control includes specific measures against the egg stage (nit) as well as against the adult and nymphal stages. Just a few undetected nits, adults, or nymphs can result in a full-blown infestation of head lice. Nit-picking (egg removal) can be done either before or after use of an insecticidal or non-insecticidal treatment, which primarily kills head-lice adults and nymphs.

Extermination of Nits on Hair:

Nit-picker is a term associated with head-lice infestations. In fact, nit-picking is essential to head-lice eradication on the person, because nits are firmly attached or cemented to hair strands and are quite difficult to remove. Nits also tend to be more difficult to kill than adults or nymphs. The nervous system, which typically is the target of insecticide treatments, is incompletely developed during the egg stage of the head louse.

• Nit Combs

A specialized nit comb is an important tool when nit-picking. A regular hair comb will not remove head lice and nits. The best nit combs have closely spaced, metal teeth that are about 1½ inches long (i.e., Acu-



Med® lice comb, Hair Clean® 1-2-3 nit comb, LiceMeister® nit comb).

A variety of nit combs are packaged with head-lice products, and others are sold separately (available at some pharmacies). However, many of these are ineffective. Plastic combs are not useful because they are so flexible that the teeth

separate, and nits and head lice are bypassed as the comb is dragged through the hair. With a short-toothed comb, it is difficult to completely comb through most types of hair.

• Nit-Picking Step by Step

The initial steps as a nit-picker are to take several precautions to protect oneself from inadvertent transfer of head lice from the infested person. Make sure that you do not touch your hair while nit-picking. If necessary, secure your hair with hair clips, bobby pins, etc. or tie it back. Remove all jewelry from your hands and wrists (rings, watch, bracelets, etc.). Wear short sleeves. A convenient, inexpensive way to protect one's clothing is with a disposable apron cut from a large garbage bag such that it is open in the back and has holes to insert one's arms. When you have finished nit-picking, remove the apron by folding the plastic into itself—not by pulling it over your head.

Nit-picking is a “seek-and-destroy” mission. Be sure to have both hands free. Disposable gloves are neither needed nor desired; they are a hindrance to picking nits off of the hair. Do not be afraid to search. Just follow these 10 steps for nit-picking:

- 1) Work under bright lighting. If needed, wear magnifying glasses.
- 2) Shampoo the affected person's hair and rinse well. An option at this point is to then soak the hair with non-diluted vinegar, leaving it on for approximately 1 hour. The vinegar helps loosen the gluey substance that attaches each nit to a strand of hair. Rinse the hair to remove the vinegar, then shampoo, and proceed to the next step.
- 3) Put a thick hair conditioner on the hair to detangle it and to aid in searching for and removing nits. This also may reduce discomfort associated with subsequent combing.



Figure 1



Figure 2



Figure 3

- 4) It is a good idea to cover the affected person's clothing with a disposable plastic apron (described on page 4) or a towel. Inspect 1-inch sections of hair at a time (Figure 1). Use a specialized nit comb and one's fingers to start at the scalp (Figure 2) and drag nits to the end of the hair shaft (Figure 3), then off. Nits are particularly difficult to see on very light, blond hair, and you may need to feel along the hair shaft. The nits will feel like a grain of sand.
- 5) After inspecting each small section of hair, wipe the comb with a moist tissue, which then should be placed in a bowl of hot, soapy water (Figure 4). Periodically flush the contents down the toilet.
- 6) Curl up the inspected 1-inch section of hair with a bobby pin, then inspect an adjacent section (Figure 5).
- 7) Keep combing and nit-picking until all of the hair has been inspected and no more nits are seen (Figure 6).
- 8) Remove the bobby pins, then shampoo the hair thoroughly and rinse well.
- 9) When you have finished, throw away any materials used during the process or sanitize them as outlined above. (See *Some Steps to Eradicate Head Lice in the Environment.*)
- 10) Thoroughly wash your hands with soap and warm water, cleaning under your fingernails where lice or nits could be trapped. Rinse your hands well.



Figure 4

After the major “seek-and-destroy” mission, inspect the entire family every day for at least 14 days. Proper treatment of the individual, their belongings, and the environment does not ensure against possible re-infestation from an outside source. Each time that head lice or nits are found, start nit-picking again as outlined above.

Extermination of Head Lice Adults and Nymphs on Hair:

Use either an insecticidal or an alternative, non-insecticidal treatment on the hair to kill the head-lice adults and nymphs. Regardless of the approach, it also is necessary to concurrently sanitize the environment (vacuuming, bagging, etc.) and nit-pick using a nit comb and one’s fingers.

Beware of false advertising and misleading claims. Available products *do not prevent* head lice.

• Insecticidal Strategies

Although all members of the family need to be inspected for head lice, an insecticidal treatment for the hair should be applied *only* to individuals that have been confirmed as having head lice. Do not use an insecticidal strategy unless head lice have been detected.

The most common way to approach head-lice control has been to use a chemical treatment, called a

pediculicide. Such treatments come in various forms: shampoo, cream rinse, gel, mousse, and oil spray. These products can be quite expensive. Even though most of these products are available without a prescription, they contain an insecticide and should be given the same respect as a prescription drug.

Read the label to determine the active ingredient(s). Over-the-counter products that list permethrin (i.e., Nix®) or pyrethrins (also known as pyrethrum extract) contain insecticide(s). Pyrethrins often are combined with piperonyl butoxide, a synergist that increases their activity against head lice; some examples include LICEX®, RID®, Pronto®, R&C® Lice Treatment, Clear® Lice Killing Shampoo, etc. Ovide® is a prescription-only product that contains the insecticide malathion.

Lindane (Kwell®) is a potent insecticide that is available only by prescription and only as a second-line treatment for people who cannot tolerate other chemical therapies or where other products have failed. However, be aware that lindane is readily absorbed through human skin, has a long half-life, and is relatively toxic to mammals. Use of lindane has been associated with convulsions and seizures in humans. Because of human health concerns, lindane is seldom recommended for head-lice control; there are many less toxic alternatives for head-lice control.

Resistance to the insecticides found in head-lice products is a potential cause of treatment failures.



Figure 5



Figure 6

Resistance of head lice toward lindane has been documented over the years.

Several recent clinical studies also indicate that head-lice populations have developed varying levels of resistance to permethrin and malathion. Resistance currently seems to be less of a problem with pyrethrin/piperonyl butoxide combinations. However, be aware that lice can eventually develop resistance toward most, perhaps all, insecticides.

Do not keep using the same product over and over again. If one product is not working, try another approach or use a product that contains a different active ingredient. Consult your physician if you have difficulty getting rid of the head-lice infestation.

When using any insecticidal treatment, read and closely follow all instructions. *Be aware that over-treatment can be toxic to humans.* If the treatment is to be reapplied after 7-10 days, do so since head-lice eggs may have hatched within this period. *Do not apply the product any more or less often than is recommended on the label.* Consult your physician or pharmacist if you have questions or need additional information.

Take a number of precautions prior to using an insecticidal head-lice product. Contact your physician for medical advice if the person applying the treatment or receiving the treatment is pregnant or has asthma, allergies, or any other medical condition. Also, seek advice from your physician if the pediculicide will contact any open cuts in the skin, such as those caused by scratching.

Use disposable rubber gloves when applying an insecticidal product. Take care to treat only the head, not the rest of the body of the affected person. Keep the pediculicide out of the eyes, nose, mouth, and any mucus membranes. The affected individual should either sit, leaning head back, or they should lie on a cushioned counter with the hair draped into a sink or other receptacle. They should be in a comfortable position to help avoid squirming. (Do not apply to the affected person's head while they are in the tub. Do not have them lean their head forward, because of the increased possibility of inhaling fumes or having the chemical contact the face.) Apply the insecticidal product to a cool head. Warmth opens up the pores in the skin and an excessive amount of the chemicals can be absorbed.

Even after taking these precautions, if the chemical solution gets in the eyes, rinse quickly and gently with lukewarm water or normal saline solution (used for rinsing contact lenses) for 10-15 minutes or more. Apply a cool, wet cloth over the closed eyes and have the individual rest. Contact your physician if visual changes occur or burning persists.

• *Combination (Insecticidal and Non-Insecticidal) Strategies*

Some non-insecticidal products are marketed for use together with an insecticidal product. Such an approach can be expensive with the purchase of at least two products. Clear[®] Lice Egg Remover is a gel that contains a number of enzymes, including oxidoreductase, transferase, lyase, hydrolase, isomerase, and ligase. It is to be used after treating with Clear[®] Lice Killing Shampoo, which contains pyrethrum extract. LiceGuard[®] shampoo contains sodium laureth sulfate and is to be used after treating with a pyrethrin or pyrethrum product or the electronic LiceGuard[®] Robi Comb[®]. RID[®] gel contains cabbage extract and pineapple extract for dissolving the “glue” that attaches nits to hair. It is to be used following RID[®] shampoo, which contains pyrethrum extract.

• *Alternative (Non-Insecticidal) Strategies*

In recent years, a number of non-insecticidal alternative products have been developed and marketed for treatment of head lice. These head-lice products contain chemicals that are not classified as conventional insecticides. Furthermore, they do not require treatment with an insecticidal product prior to their use. An obvious advantage is that these treatments are relatively nontoxic. It is difficult to evaluate the effectiveness of many of these new products because there are few published reports.

Enzymes, Extracts, Oils, Etc.

Hair Clean[®] 1-2-3 contains various plant oils, such as coconut, anise, and ylang ylang oil, which aid in removing head lice and nits. However, to ensure long-term success, a second application is recommended 7 days after initial treatment. The enclosed long-toothed, metal nit comb kills the lice due to the physical combing action. This product has been on the market for several years. It has been evaluated in several clinical trials, which suggest promise for head-lice control.

Lice B Gone[®] contains enzymes of natural vegetable extract that soften the glue that attaches the nits to the hair. The hair then must be combed carefully (preferably with a metal nit comb) to remove all of the head lice and nits. This product typically requires only one application. Clinical trials suggest promise for head-lice control.

Not Nice To Lice[®] contains enzyme cleaners with protease, which work to “release” the nits. This product includes a cautionary statement that the cleanser can cause eye irritation and should be kept out of the eyes.

Acu-Med® Lice Cure contains tea tree oil, ylang-ylang, eucalyptus, and citronella. This spray helps remove lice eggs from the hair. The kit also contains a long-toothed, metal nit comb that kills the lice due to the physical combing action.

Licefreee® contains natrum muriaticum, a “homeopathic” pediculicide. A second treatment with this gel is recommended 7-10 days after the initial application.

LiceGuard® Head Lice Repellent Spray claims to “help prevent head lice infestations” with a patented CL-1 fragrance. The spray is applied to dry hair every 24 hours.

Electronic Devices

Electronic devices for insect control or eradication typically are not backed by conclusive research. In general, electronic devices are not effective in controlling insects. The LiceGuard® Robi Comb® has been marketed as an electronic head-lice detector and remover. This device is quite expensive (approximately \$40). Clinical tests have not demonstrated the need for the electronic component; the simple mechanical action of the comb may be sufficient.

Miscellaneous Home Remedies

Products that are not marketed specifically for head lice typically do not have clinical data to support their effectiveness. There are only anecdotal (word-of-mouth) suggestions that some alternative approaches may have value for treating head lice on hair. For the most part, there is no reliable evidence that oil-based treatments, conditioners, or shampoos actually kill head lice on a person’s head. However, these products may cause the nits to more readily slide off the hair, and they also appear to slow down the head lice so that they can be more easily removed with a nit comb. Such products are much less expensive than chemical treatments.

Advocates of non-insecticidal treatments suggest that head lice may be affected by soaking the hair of the affected person with olive oil, vegetable oil, or baby oil. A hair conditioner that frequently is mentioned as an alternative treatment is Queen Helene® Cholesterol Hair Conditioning Cream. This hair-care product is quite thick (heavy) and clings to the hair. The suggested procedure is to thoroughly apply one of these oils to the hair, then put a shower cap on the head and leave it on overnight. The next morning, complete the previously described process of nit-picking with a nit comb and your fingers. Follow-up by using a shampoo containing sodium laureth sulfate, which possibly affects head lice. Such shampoos include Herbal Essence®, Suave®, White Rain®, and many others.

Be aware that any of these oil-based treatments typically require repeated efforts with daily nit-picking

until nits are no longer seen. Also, it is necessary to continue overnight applications if live head lice are observed. The mechanical action of the comb may be responsible for ultimately providing head-lice control, rather than simply the oil component.

The disadvantages of some alternative, oil-based treatments outweigh their usefulness. Mayonnaise has been recommended as an alternative, but mayonnaise will become rancid by the next morning. (Furthermore, a dog or other pet may lick the mayonnaise, perhaps becoming ill.) Petroleum jelly is very sticky and quite difficult to remove from hair. Also, it is difficult to find the nits because lint, dust, and crumbs readily cling to this sticky substance.

Do not shave the head in a desperate attempt to get rid of head lice. Head-shaving does not get rid of all of the nits, which are attached at the base of the hair shaft and extremely close to the scalp. It is needlessly upsetting to children and can have a long-term impact on their self-image and socialization. It is unnecessarily traumatic, particularly for females, to resort to such a measure. Would you and older female relatives submit to this procedure?

Dangerous Home Remedies

Do not resort to desperate measures in an attempt to kill head lice. Do not apply kerosene, gasoline, isopropyl alcohol, or lighter fluid to the hair; *do not* use veterinarian products, agricultural or lawn-care chemicals, and any other insecticide that is not labelled for head lice. Each year, such home remedies kill or maim some children. In misusing such products, safety is ignored. As an example, kerosene is not only extremely flammable, but it is absorbed through the skin and can be toxic, even causing death. *Human safety always should be the main concern.*






Conclusions

Head lice are pesky insects that are a *very big inconvenience*. They are not known to carry any disease organisms. Head lice are *not* indicators of uncleanness, and they should not be associated with any social stigma or embarrassment. Head lice simply are spread by people who have head lice.




The whole experience of having head lice can be very frustrating, particularly to parents or caregivers. Address the issue of head lice. Do not avoid it by ignoring it. Avoidance will only increase misconceptions, unfounded fears, and confusion, and thus slow efforts to stop the spread of head lice.

Successful intervention includes immediate, concurrent measures to eradicate head lice and nits from the environment and the person. Be tenacious in your fight against head lice.

Some insecticide-based head lice products^a

Trade Name (Company)	Active Ingredient and Percent Concentration	Type of Product	Awareness Issues	“Claims” ^a and Additional Package Contents
Non-Prescription Insecticidal Treatments				
Nix® (Warner-Lambert) 	Permethrin 1%	Creme rinse	<ul style="list-style-type: none"> • May not kill nits (eggs). • Resistance has developed in many regions of the world. 	<ul style="list-style-type: none"> • Labeling on box indicates “prevents re-infestation,” whereas bottle indicates “protects against” “head lice re-infestation for 14 days.” • Requires “usually only one application.” • Kit includes a short-toothed, plastic nit comb.^b
Clear® (Care Technologies, Inc.) 	Pyrethrum extract 0.33% ^c	Shampoo	<ul style="list-style-type: none"> • May not kill nits (eggs). • Use with caution on persons allergic to ragweed; contact a physician before using if allergic to chrysanthemums and pyrethrin-containing compounds.^d 	<ul style="list-style-type: none"> • Treatment followed with nit removal is required to ensure complete effectiveness. • Use in conjunction with Clear® gel “to help prevent re-infestation.” • A second treatment must be done in 7-10 days to kill any newly hatched lice.
Pronto® (Del Pharmaceuticals Inc.) 	Pyrethrum extract 0.33% ^c	Shampoo plus conditioner	<ul style="list-style-type: none"> • May not kill nits (eggs). • Use with caution on persons allergic to ragweed; contact a physician before using if allergic to chrysanthemums and pyrethrin-containing compounds.^d 	<ul style="list-style-type: none"> • Kit includes a “100% effective” short-toothed plastic lice comb,^b crème rinse packet, plastic magnifier, and 4 hair strand separators. • A second treatment must be done in 7-10 days to kill any newly hatched lice.
R & C® Lice Treatment (Block Drug Co., Inc.) 	Pyrethrum extract 0.33% ^c	Shampoo plus conditioner	<ul style="list-style-type: none"> • May not kill nits (eggs). • Use with caution on persons allergic to ragweed; contact a physician before using if allergic to chrysanthemums and pyrethrin-containing compounds.^d 	<ul style="list-style-type: none"> • It is important to remove all of the nits after shampooing. • A second treatment must be done in 7-10 days to kill any newly hatched lice. • Kit includes a short-toothed, plastic nit comb^b
RID® (Bayer Consumer Care Division) 	Pyrethrum extract 0.33% ^c	Shampoo	<ul style="list-style-type: none"> • May not kill nits (eggs). • Use with caution on persons allergic to ragweed; contact a physician before using if allergic to chrysanthemums and pyrethrin-containing compounds.^d 	<ul style="list-style-type: none"> • “Kills lice and their eggs.” • Kit includes a short-toothed, plastic nit comb^b for “100% effective egg removal.”

Non-Prescription, Non-Insecticidal Products For Use After An Insecticidal Treatment

Clear® (Care Technologies, Inc.)	Enzymes (oxidoreductase, transferase, lyase, hydrolase, isomerase, ligase)	Gel 	<ul style="list-style-type: none"> • Use together with Clear® shampoo, which contains 0.33% pyrethrum extract. • Use “to help prevent re-infestation.” • Includes a short-toothed, plastic “exclusive ‘nit capturing’ comb.”^b
LiceGuard® Shampoo Lice Egg Remover (ARR Health Technologies, Inc.)	Sodium laureth sulfate	Shampoo 	<ul style="list-style-type: none"> • Use after treating with a pyrethrin or pyrethrum product or an electronic device. • Helps remove eggs, but does not kill lice. • “Triples number of nits removed” by loosening the glue bond between nits and hair. • Kit includes a short-toothed, plastic “extra fine” nit comb.^b
RID® (Bayer Consumer Care Division)	Cabbage extract and pineapple extract	Gel 	<ul style="list-style-type: none"> • Use together with RID® shampoo, which contains 0.33% pyrethrum extract. • “Helps dissolve the ‘glue’ that binds eggs to hair.” • Kit includes a short-toothed, plastic “patented RID® egg removal comb.”^b

Prescription-Only Insecticidal Treatments

Ovide® (Genderm)	Malathion 0.5%	Lotion	<ul style="list-style-type: none"> • Effectiveness is very dependent on inert ingredients (excipients). • Flammable. • Very strong odor. • Resistance has developed in many regions of the world.
Kwell® (Reed and Carnick)	Lindane 1%	Shampoo	<ul style="list-style-type: none"> • Can be obtained only by prescription for 2nd-line treatment. • Seldom recommended because of health concerns. • Potential neurotoxicity to humans. • Has been associated with seizures, convulsions, etc. • Readily absorbed by human skin. • Head lice have developed various levels of resistance throughout the world. • May not kill nits (eggs).






^aBeware of any false advertising. Carefully read the label and all directions before purchasing a product. It is **not** necessary or advisable to apply insecticides to clothing, mattresses, or other places in the environment for head lice control.






^bPlastic nit combs typically are not useful because the teeth tend to bend and spread apart and thereby bypass nits and head lice; they also tend to break easily. Short-toothed combs, whether plastic or metal, are ineffective in combing through many types of hair.

^cPiperonyl butoxide included as a synergist to increase insecticidal activity.

^dBe aware of potential for an allergic reaction. Immediately consult a physician if an allergic response is indicated, and avoid future use.

Some alternative (non-insecticidal) head lice products^a

Trade Name (Company)	Active Ingredients or Mode of Action	Type of Product	Awareness Issues, “Claims,” ^a and Additional Package Contents
<i>Gels, Shampoos, Sprays</i>			
HairClean 1-2-3® (Quantum) 	Coconut oil, anise oil, ylang ylang oil	Spray	<ul style="list-style-type: none"> • “Proven clinically.” • “Intended to remove and/or kill lice and nits from the head.*” (“*Lice/nit death results from physical combing action.”) • Apply product to dry hair and leave on for 15 minutes, then use comb to remove head lice and nits. • “To ensure long-term success, treatment must be repeated seven days after initial treatment.” • Kit includes a long-toothed, metal nit comb.
Lice B Gone® (Safe Effective Alternatives, Inc.)	Enzymes of natural vegetable extract 	Spray	<ul style="list-style-type: none"> • “Effective in removing head lice and nits.” • Apply product to dry hair and leave on for a minimum of 30 minutes in order to soften the glue, then comb hair carefully with a fine-tooth comb to remove all head lice and nits. • “Most cases require only one application.” • Available in 4 oz. or 16 oz. (4 applications) spray bottles.
Acu-Med® Lice Cure (Health Enterprises, Inc.)	Tea tree oil, ylang- ylang, eucalyptus, citronella	Spray 	<ul style="list-style-type: none"> • “All natural and non-toxic.” • “Effective in the removal of the eggs from the hair.” • Kit includes a long-toothed, metal nit comb, 5x magnifier, tweezers, and cleaning brush.
Licefree!® (Tec Laboratories, Inc.)	Natrum muriaticum 1x 	Gel	<ul style="list-style-type: none"> • “Homeopathic pediculicide.” • “Kills lice dead.” • Apply product to dry hair and leave on for at least 60 minutes with a shower cap, then use a fine-tooth comb to remove dead lice and their nits. • “A second treatment in 7-10 days to kill any newly hatched lice is recommended.” • Kit includes a short-toothed, plastic nit comb^b and 2 treatment (shower) caps.
Not Nice To Lice® (Ginesis)	Enzyme cleaners with protease 	Shampoo	<ul style="list-style-type: none"> • “Eliminates both lice and their eggs (nits).” • Directions specify a 4-step application process (30 minutes), then “comb through the hair with any fine tooth comb to assist in removing the nits that have been released.” • “It is important to keep this cleanser out of the eyes to prevent eye irritation.”

<i>Nit Combs^b</i>			
<p>Acu-Med® Lice Comb (Health Enterprises, Inc.)</p> 	<p>Mechanical action</p>	<p>Long- and short-tooth metal pin inserts ('ultimate comb'); long-toothed (1.5 inches), metal comb ('deluxe')</p>	<ul style="list-style-type: none"> • Two designs: the 'ultimate' comb and the 'deluxe' comb. The 'ultimate comb' plastic frame holds a short- or long-tooth metal pin insert. The 'deluxe' comb has a molded plastic handle with fine metal teeth. • The 'ultimate' comb "works on all hair types, lengths and styles." • Shampoo with a pediculicide before combing. • Can be sterilized by boiling for re-use. • A 5x magnifier, tweezers, and cleaning brush are included in the kit with either comb.
<p>Lice Comb by HairClean 1-2-3® (Quantum)</p> 	<p>Mechanical action</p>	<p>Long-toothed (1.5 inches), stainless steel, metal comb</p>	<ul style="list-style-type: none"> • "Easiest lice comb." • "Won't pull or tear hair." • "Use again and again." • "Sure-grip handle." • "Easy to clean."
<p>Family Medical Aids® Nit-Comb® (Apothecary Products, Inc.)</p> 	<p>Mechanical action</p>	<p>Short-toothed, aluminum metal comb</p>	<ul style="list-style-type: none"> • "Extra-fine tooth design." • Shampoo with a pediculicide before combing. • Run the comb through each small section of hair 3 times. • Boilable.
<p>LiceMeister® (National Pediculosis Association)</p> 	<p>Mechanical action</p>	<p>Long-toothed (1.5 inches), stainless steel, metal comb</p>	<ul style="list-style-type: none"> • "Makes lice and nit removal easier than ever before!" • "Boilable." • "Reusable." • "Sturdy plastic handle."
<i>Electronic Devices</i>			
<p>LiceGuard® Robi Comb® (ARR Health Technologies, Inc.)</p> 	<p>Electro-mechanical action</p>	<p>Hand-held electronic comb</p>	<ul style="list-style-type: none"> • Do not use on wet hair or in a room with high humidity. • Unit must be dry prior to use. • "Electronic head lice detector and remover." • "Electronically kills lice." • Use at least 5 minutes daily for about 2 weeks.

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^bPlastic nit combs typically are not useful because the teeth tend to bend and spread apart and thereby bypass nits and head lice; they also tend to break easily. Short-toothed combs, whether plastic or metal, are ineffective in combing through many types of hair.