

Clinical review

Extracts from "Best Treatments"

Treating head lice

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Description Head lice are parasites that usually infest the scalps of school age children, although adults also get them. Lice attach their eggs to hair shafts near the scalp and lay five to six eggs a day. Lice never willingly leave the head; they stay close to the scalp for food, shelter, warmth, and moisture. They are most often found behind the ears and at the back of the neck. Hatched eggshells (nits) may be confused with dandruff. The mature louse is the size of a sesame seed and has six legs and hook-like claws that grasp the strand of hair tightly, making it difficult to dislodge. It feeds on the host's blood every three to six hours, which can cause scalp itching, though most cases are asymptomatic. The diagnosis of lice infestation can be made definitively only if living lice are present.

Treatment

Treatments that are likely to work

Malathion

Malathion works as well as other agents used to kill lice. Malathion must be left on for at least eight hours for it to work. It is applied to dry hair until the scalp and hair are wet and thoroughly coated. If lice are found 7-10 days after treatment, treat again with the same or different medication. The alcohol in malathion lotion and the terpenoids may cause stinging. Malathion is considered safe in pregnancy or breastfeeding.

Lindane

Although lindane may work as well as other insecticide based agents, its use is limited by its potential neurotoxicity. It is applied, for only four minutes, to wet the hair and skin or scalp of the affected area and surrounding hairy areas. Treatment may be repeated after seven days if necessary. Lindane should be avoided in pregnancy and breastfeeding. If it must be used in pregnancy, it should only be used once.

Permethrin

Permethrin may work better than lindane, though most trials were done before permethrin was widely used and resistance to the drug developed. It is used as 1% creme rinse left on for 10 minutes. If the first application fails to kill the eggs (that is, if young hatching lice are found using a suitable detection comb) a second

treatment is indicated, usually seven days after the first treatment. Undertreatment in this situation could contribute to the development of resistance to the drug. There is no role for a third application, as this will contribute to resistance and is not likely to be effective. Permethrin has not been studied in pregnancy.

Pyrethrins

Pyrethrins are used as a 0.33% shampoo or mousse, by applying enough to thoroughly wet the hair and leaving it on for 10 minutes. All pyrethrum products that conform to the US Food and Drug Administration criteria for use in humans require a second application after 7-10 days, to ensure treatment of lice emerging from eggs that have not been killed by the first application. Pyrethrins work as well as permethrin.

Treatments that need further study

Herbal treatments and aromatherapy

Herbal treatments (including tea tree oil) and aromatherapy are sometimes used to treat head lice. No studies have evaluated their efficacy or possible toxicity.

Mechanical removal of lice or viable louse eggs by combing

There is insufficient evidence to determine the efficacy of "bug busting" (wet combing with conditioner). Many combs have been developed for lice removal, but many that are used are inappropriate. There is little evidence



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BestTreatments 
clinical evidence for patients and doctors

This is an extract from BestTreatments, which provides a shared online information resource for patients and doctors, based on Clinical Evidence (www.clinicalevidence.com). More information about head lice, including references for this BMJ article, is at <https://www.besttreatments.org/headlice>

to support the use of any combing method. In one trial, significantly more people treated with malathion than with bug busting had no lice at seven days (31/40 (78%) *v* 12/32 (38%)). A new study (which we have not yet added to the BestTreatments site) looked at permethrin creme rinse with and without combing; permethrin without combing was marginally more effective.¹

Misconceptions about head lice: what does the research really show?

- There is no evidence to support the cleaning of sheets and clothing, or the treating of earphones, baseball helmets, and furniture with insecticide sprays.
- Infection is spread between people only by relatively prolonged head to head contact; thus it is typically spread between people who know each other well. Lice seen on chairs, pillows, and hats are dead, sick, or elderly or are cast skins of lice—these cannot infect a person.
- School based “no-nits” policies (banning children with nits until all nits are removed) do not make

sense—less than 20% of school children with nits will go on to develop infestation within 14 days. About half of children sent home for head lice don't have them. Many public health experts believe that “no-nits” policies should be abandoned.

- Treatment should not be started unless live lice are found. Nits are not a sign of active infestation with head lice.
- Cutting hair, or tying it back, is not helpful and may increase the incidence of infestation by making it easier for lice to move off of and on to the scalp.
- Head lice are probably more common in girls because girls are more likely to have close contacts during play—not because they have longer hair.
- Head lice are harmless. If detached from their host they are vulnerable and effectively dead.

This extract from BestTreatments will remain available at bmj.com. The rest of the BestTreatments website (www.besttreatments.org) is currently available only to patients who are members of United Healthcare plans in the United States.

¹ Meinking TL, Clineschmidt CM, Chen C, Kolber MA, Tipping RW, Furtek CI, Villar ME, Guzzo CA. An observer-blinded study of 1% permethrin creme rinse with and without adjunctive combing in patients with head lice. *J Pediatr* 2002 Nov;141:665-70

Commentary: How to advise a patient when over the counter products have failed

Ian Burgess

First it is important to know whether treatment really has failed, so it is important that you or a nurse know how to reliably identify live lice at all developmental stages, and that you can differentiate hatched eggshells (nits) from potentially viable eggs. Nobody can reliably identify viable eggs, even with the aid of a microscope, unless the young louse can be seen moving inside the shell.

Failure with over the counter products may have two causes: improper use and insecticide resistance.

Improper use

Inadequate, incomplete or inappropriate applications are the most commonly encountered causes of treatment failure. These result from:

- Not using enough of the product to adequately cover the scalp and hair
- Not repeating the treatment after 7-10 days if louse eggs survive the first application of the product
- Inappropriate use of the product because the person does not have lice.

The presence of nits is insufficient evidence of infestation, and many items of debris, such as dandruff, dried hair spray, or pseudo-nits (peripilar keratin casts) have been mistaken for nits.

Pyrethrins and permethrin have a similar mode of activity. Consequently, permethrin may give no benefit if used on lice that have not responded to pyrethrins. In some cases, however, lice may be susceptible to pyrethrins even after permethrin has been unsuccessful.

Insecticide resistance

In recent years, resistance to insecticides has become an important factor in treatment failure. Resistance has been confirmed as affecting permethrin treatments. Similar resistance is suspected for pyrethrins but is not yet confirmed. Resistance to lindane has been identified in the Netherlands, Israel, Malaysia, and Denmark but has not yet been confirmed in the United States. Malathion is apparently resistance-free, except in the United Kingdom and France.

If a patient has adequately used over the counter products but still has lice, the most reliable prescription treatment is malathion. This product is less easy to apply than a shampoo because it is a freeflowing liquid and must be left on for at least eight hours. It has a pungent odour due to a high level of monoterpene components in the essential oils that were included to mask the odour of malathion. The monoterpenes contribute much of the pediculicidal and ovicidal activity of the product. Evidence for activity of malathion is good. About 2-3% of malathion applied to the scalp is absorbed transdermally.

In some cases, lindane may be prescribed instead of malathion. Evidence for lindane's efficacy is relatively poor, and lindane is about 4-10 times more toxic than malathion. A high proportion of lindane applied to the skin is absorbed transdermally.

Competing interests: IFB has been a consultant to various makers of pharmaceutical products, alternative therapies, and combs for treating louse infestation.

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Commentary: Information for patients: removal of lice and eggs by combing

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Little research has been done into whether combing helps to get rid of head lice, so it's difficult to say whether it works. Success seems to depend on how committed you are to carrying out this treatment.

What is it?

Combing wet hair with a special comb is called "bug busting" or "wet combing." You use a special finetooth comb that can pick out lice. They are supplied with some head lice shampoos. Otherwise, find a comb with very fine teeth: the space between the teeth of the comb should be no more than 0.3 mm (0.01 inch).

Here's how to remove lice by combing:

- First comb through wet hair with an ordinary comb to get rid of knots and tangles.
- Apply conditioner (or olive oil) to make it easier to comb the hair with the finetoothed comb.

- Comb through every bit of hair, pulling the comb from the scalp to the hair ends. If you find lice, rinse them off the comb and down the sink. Work through the hair until you've gone through it at least twice, flushing away any lice you find. Afterwards, rinse the conditioner out (or shampoo out any oil).

- Do this every three or four days to make sure that you catch any new lice that have hatched since you last combed the hair.

- Keep doing the combing until you no longer find any lice for at least two treatments in a row.

How can it help?

Combing works for just over a third of people. So for every 10 people who use combing, only four will be clear of head lice after two weeks.

Commentary: A parent's story: "I felt lost and hysterical"

A mother describes her experience treating her two daughters' head lice. Her daughters were 6 years old and 3 years old.

What was the diagnosis like?

My older daughter had long hair and had severe itching by the time we realised what was going on. I tried over the counter remedies, but the lice did not go away. My younger daughter and I also developed lice, and the treatment [permethrin] didn't work. My paediatrician (who I really like) had no suggestions. I felt lost

and hysterical. I did things that I now know were a bad idea, like treating furniture with insecticide spray, re-treating my children with medication that didn't work, and trying herbal remedies. The school kept sending my daughter home and instructing me to treat her again. We ultimately cut her hair (and mine and my other daughter's) and used mechanical techniques to remove the eggs. The process went on for months.

What was treatment like?

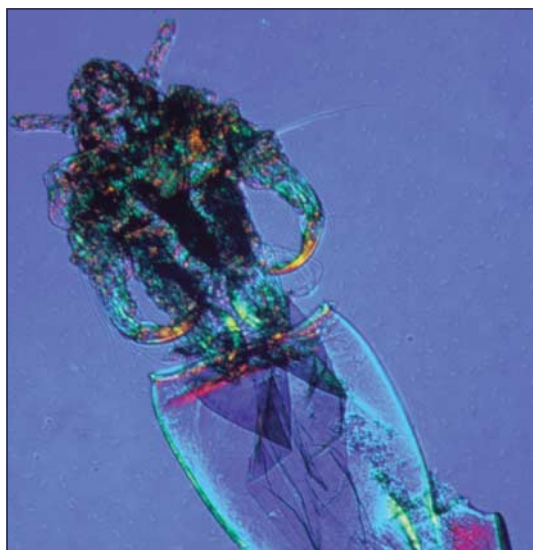
My children didn't really understand what was going on. The over the counter medicines were painless, but the "nit picking" was torture. My older daughter was humiliated by the way the school nurse treated her.

What is it like to live with this condition?

It is very isolating. There are few places to turn for information or support. School no-nits policies add to the feeling of isolation and shame.

What would you tell other people?

The most important things I learned are that lice are not spread on clothing or hats so there is no role for washing these. Also, if a medication is applied correctly but does not work, it is not going to work and it is harmful to use it again. If I had it to do over again, I would also avoid using unproved complementary therapies without first understanding the potential harms. Although dealing with lice can be humiliating, you have to keep telling yourself that this is a common, harmless condition.



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