

4% dimethicone lotion: a subsidised treatment for head lice

From 1 May, 2017, 4% dimethicone lotion can be prescribed fully subsidised for the treatment of head lice, which adds another treatment option to the currently subsidised 0.5% phenothrin shampoo. Lice are unlikely to develop resistance to dimethicone lotion as it is not an insecticide and instead kills lice by suffocation.

KEY PRACTICE POINTS:

- Ensure that parents and caregivers are aware that subsidised head lice treatments are available on prescription
- Dimethicone is a highly effective head lice treatment, with a low risk of adverse effects: two applications of dimethicone one week apart results in successful eradication in at least 70% of patients
- Dimethicone is not an insecticide. It kills lice by suffocation and disrupting their ability to regulate water. Products with this mechanism of action may become the preferred treatment for head lice as it is unlikely lice will develop resistance, which can occur with insecticide-based treatments
- After successful treatment, non-viable eggs and empty egg casings may remain in the hair, but can be combed out to reduce possible embarrassment and stigmatisation of children


Head lice infestation is a perennial problem in New Zealand, mainly affecting children. An infestation can easily spread to other members of the household, friends or classmates. Head lice often cause itching or irritation of the scalp, which may result in discomfort and disruption of sleep. In some children with a heavy infestation, scratching of the scalp can result in bacterial skin infection.¹

People often first notice itching and visible eggs

An itchy scalp is often the first symptom of a head lice infestation. Pruritus results from a delayed hypersensitivity reaction after repeated exposures to louse saliva during feeding (see: "Head lice biology: know your enemy").² However, head lice infestation is not always accompanied by itch.³ The first time a person's hair is infested with lice, the infestation is likely to be initially asymptomatic, with pruritus developing

after approximately four to six weeks.^{1,2} Pruritus is then likely to develop earlier during any subsequent infestations, and may persist even after successful treatment.

Most people will initially notice eggs rather than live lice in the hair. The hairline behind the ears and at the nape of the neck are often the best sites for locating and identifying eggs.² Lice can be more difficult to observe and children usually have less than 20 lice on the scalp at a time during an infestation.¹ Detection combing is recommended to check for live lice.

 Instructions on how to perform detection combing are available at: www.bpac.org.nz/BPJ/2008/June/headlice.aspx

Treatment with a lice-killing product may not be necessary for people with eggs only in their hair, as these may be non-viable eggs or empty egg casings, possibly from a previous infestation.^{1,2} Consider whether the person has had a previous infestation, whether they combed out eggs after treatment, and how far from the scalp the eggs are, i.e. over 1 cm, to help decide if these may be non-viable eggs or egg casings (see: “Head lice biology: know your enemy”).

If live lice are found, check other members of the household.

All members of the household should be checked and treated if live lice are identified.

Dimethicone has a different mechanism of action to insecticides

Dimethicone is derived from silicone oil.⁵ It is not an insecticide, but eradicates adult and nymph lice via disruption of water homeostasis and suffocation (see: “Head lice biology: know your enemy”).⁶ Due to the mechanism of action of dimethicone, it is thought to be highly unlikely that lice will develop resistance. This may make it a preferable treatment option to insecticide-based treatments, to which lice can develop resistance. Increasing rates of resistance have limited the effectiveness of insecticide-based treatments in other countries.⁷

Adverse effects from using a dimethicone lice treatment are unlikely; in clinical trials of 4% dimethicone lotion, itching or irritation of the scalp or neck was reported by less than 2% of participants.⁵ Advise caregivers to avoid lotion dripping into the child’s eyes, which can cause irritation; this was reported by less than 1% of participants in clinical trials.⁵ Dimethicone

Head lice biology: know your enemy

Eggs

Lice lay their eggs close to the scalp as they require body heat to incubate, and usually hatch after eight to nine days.² Eggs are approximately 1 mm in size, and are visible to the naked eye, although it can be difficult to distinguish viable eggs from empty egg casings. As the hair grows, eggs or egg casings will move progressively away from the scalp, and it is generally thought that eggs found further than 1 cm from the scalp are likely to be hatched or non-viable.⁴ Non-viable eggs or empty egg casings can remain attached to the hair for up to a year, if not successfully combed out.

Young and adult lice

After hatching, young lice (nymphs) mature over 9–12 days to become adult lice, at which point they are able to reproduce. Adult head lice are approximately the size of a sesame seed. They feed by sucking blood from the scalp and are unlikely to survive beyond 48 hours if detached from a human host.² Lice can appear grey to white in colour when unfed, or dark if filled with blood after feeding.



Louse and egg images adapted from Gilles, San-Martin – www.flickr.com

lotion is also used in emollients and cosmetics, and is not absorbed via the skin.^{5,8}

4% dimethicone lotion successfully eradicates lice in the majority of people, with little risk of adverse effects

Clinical trials of 4% dimethicone lotion report cure rates of 69–92% after two applications one week apart, compared to cure rates of 75% for phenothrin and 33% for malathion.^{5,9,10}

It is likely that 4% dimethicone lotion has some ability to kill eggs before they hatch.^{11,12} However, two applications are recommended, one week apart, in order to treat any nymphs (young lice) which hatch from surviving eggs. This interval means that the second application can kill any newly hatched nymphs before they reach the adult stage of development and are able to reproduce. Occasionally some eggs can hatch after a longer interval, resulting in treatment failure in a small number of cases.¹³

Instructions for treating head lice with 4% dimethicone lotion⁵

- Apply the lotion to dry hair, covering the full length of hair and working systematically around the head
- Use enough product to thoroughly moisten the hair and scalp
- Once applied to the whole head of hair, combing the hair with an ordinary comb can ensure even coverage and distribution of the lotion
- Leave the product to dry naturally and wait at least eight hours before washing the hair with usual shampoo
- Covering the hair with a wrap is not necessary to increase effectiveness or prevent lice escaping. Head lice become immobilised within a minute of being covered with 4% dimethicone lotion.⁶
- A fine-toothed comb can be used to remove remaining eggs after treatment and any dead lice which were not washed out; a specialised “head lice comb” can be used for this purpose but is not essential. Eggs are firmly attached to the hair shaft and need to be manually removed regardless of the treatment used. Applying conditioner or water to the hair before combing loosens the eggs from the hair shaft and makes combing easier.¹⁴
- Repeat the application process in seven days

What if treatment does not work?

Treatment failure could occur for a number of reasons, including incorrect use of the product, re-infestation, or some eggs hatching after the second application. If treatment with two applications of 4% dimethicone lotion is ineffective, the treatment can be repeated with two further applications. Ask patients or caregivers about how they used the product and emphasise applying sufficient amounts to thoroughly coat hair, waiting the recommended time before washing hair, and taking steps to avoid re-infestation (see below). Other treatment options include subsidised 0.5% phenothrin shampoo or an unsubsidised over-the-counter product from a pharmacy. Repeated detection combing can also be used as a means of manually removing lice; however, this method requires a substantial time investment. Success rates for repeated detection combing as a method of eradication have been reported to range from 38–53%.¹⁵


Preventing transmission and re-infestation

Head lice are wingless and do not fly, hop or jump. Transmission occurs by lice crawling from one person’s hair to another’s.² Humans are the only known host for head lice and pets are not thought to be an intermediary.²

Fomite transmission or re-infestation, e.g. via items such as hair brushes, combs, clothing, bedding or towels, is less likely than direct transmission from person-to-person, as head lice require regular feeding from the scalp to remain alive.² Although not necessary, if caregivers wish to decontaminate these items to reduce any risk of transmission, they can be instructed to wash items used in the previous 24 to 48 hours in water which is at least 55°C to kill lice or eggs.² Items that cannot be washed can be sealed inside a plastic bag and left for two weeks, by which time any viable eggs would have hatched and the lice would have died.²

Tips for caregivers to reduce transmission if someone in their household has a lice infestation include:⁴

- Clean combs after using on an affected person’s hair; soak them in hot water which is at least 55°C for five to ten minutes
- Advise children not to share combs or brushes
- Keep long hair tied up to reduce the chance of lice being transmitted from one person’s hair to another
- Avoid sharing frequently worn hats, hair accessories or sports headgear
- Avoid taking closely grouped photos with anyone who has an active infestation, e.g. selfies with friends

 Further information on head lice for caregivers is available at: www.health.govt.nz/your-health/conditions-and-treatments/diseases-and-illnesses/head-lice

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