BMJ Best Practice

Pediculosis capitis

Straight to the point of care

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Summary

Head lice infestations (pediculosis capitis) are associated with little morbidity but can cause strain and distress to parents, carers, and teachers.

Effective pediculicides exist, but head lice in some areas have developed resistance to products with a neurotoxic mode of action.

Products with a physical mode of action are an alternative to neurotoxic treatments; they are nontoxic, and lice are less likely to develop resistance.

Physicians should take an active role in the treatment of head lice infestations by being available to confirm active cases and being knowledgeable about first- and second-line treatment options in their communities.

Knowledge of the life cycle of lice and the mode of transmission emphasise that 'no nit' policies in schools are not effective and should be abandoned.

Definition

The head louse (*Pediculus humanus capitis*) is an obligate ectoparasite that lives on human beings and feeds on human blood.[1] Head lice infestation (pediculosis capitis) mainly affects individuals who are in frequent close contact with others, particularly young children.

Epidemiology

Prevalence has been estimated in some communities, revealing significant variation not only between communities but also among schools within the same community.[5] Some examples include Australia (prevalence in school children of 13%, with a range between schools of 0% to 28%), the UK (prevalence of 2%), China (prevalence of 14%, with a range of 0% to 52%), and Tunisia (prevalence of 18%).[6] [7] [8] [9]

Infestations in the US are most common among children aged 3-12 years. True prevalence and incidence data in the US are unavailable as there is no standardised system for collecting such information. Estimates are often based on the sales of pediculicides, a method likely to overestimate the actual incidence of infestations. All socioeconomic groups are affected. It has been suggested that race or ethnicity influences rates of infestation, but head lice are common worldwide.[5] [10] [11] In developing countries, prevalence in children may be up to 60%; in such settings, head lice infestation may also be frequently present in adults.[12]

Infestations are more common in girls than in boys.[2] [9][13] [14] Head lice do not infest animals.

Aetiology

Head lice are spread most commonly by direct head-to-head contact, which allows lice to crawl from one head to another.[2] [3] [4] [13] Head lice cannot fly or jump; they are restricted to the scalp or hair of the infested person.

Pathophysiology

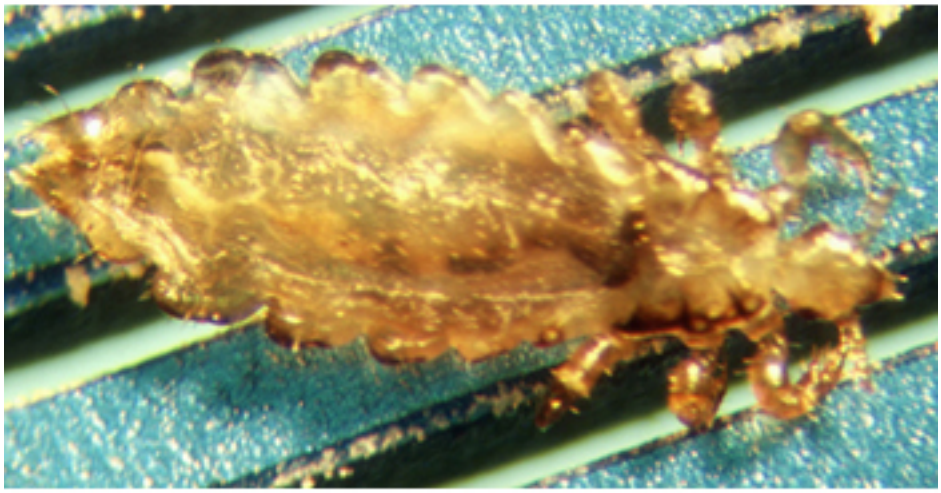
Adult head lice are generally 2-3 mm long (i.e., the size of a sesame seed) and are usually pale grey, although colour may vary. Female lice can live up to 3-4 weeks, and lay approximately 10 eggs a day. These eggs are firmly attached to the hair shaft approximately 3-4 mm from the scalp with a glue-like substance. Viable eggs develop an 'eye spot' seen on microscopic examination within several days of being laid. Eggs are most easily seen along the hairline at the nape of the neck and behind the ears.[2] [3] [4] [13] [15]

The eggs are incubated by body heat and hatch in 7-14 days. Empty egg casings (often referred to as nits, although many use the same term to refer to both live and hatched eggs) are white and easier to see, but will be located farther from the scalp as the hair grows. Hatched nymphs grow for about 9-12 days, then mate, and then females lay eggs. If not treated, the cycle can repeat itself about every 3 weeks. Lice rarely survive more than 24 hours away from a host head.[2] [3] [4] [13] [15]

Head lice require frequent blood meals, and feed by injecting small amounts of saliva and taking tiny amounts of blood from the scalp every few hours. This saliva usually causes an allergic reaction presenting as an itchy irritation. Itching may not develop for 4-6 weeks or longer in an initial infestation because it takes time to develop sensitivity to lice saliva. With a re-infestation, itching can develop quickly. However, some individuals do not develop an allergic reaction and they remain asymptomatic.[3] [4] Head lice, like body lice, may act as disease vectors.[16] [17] [18] [19]

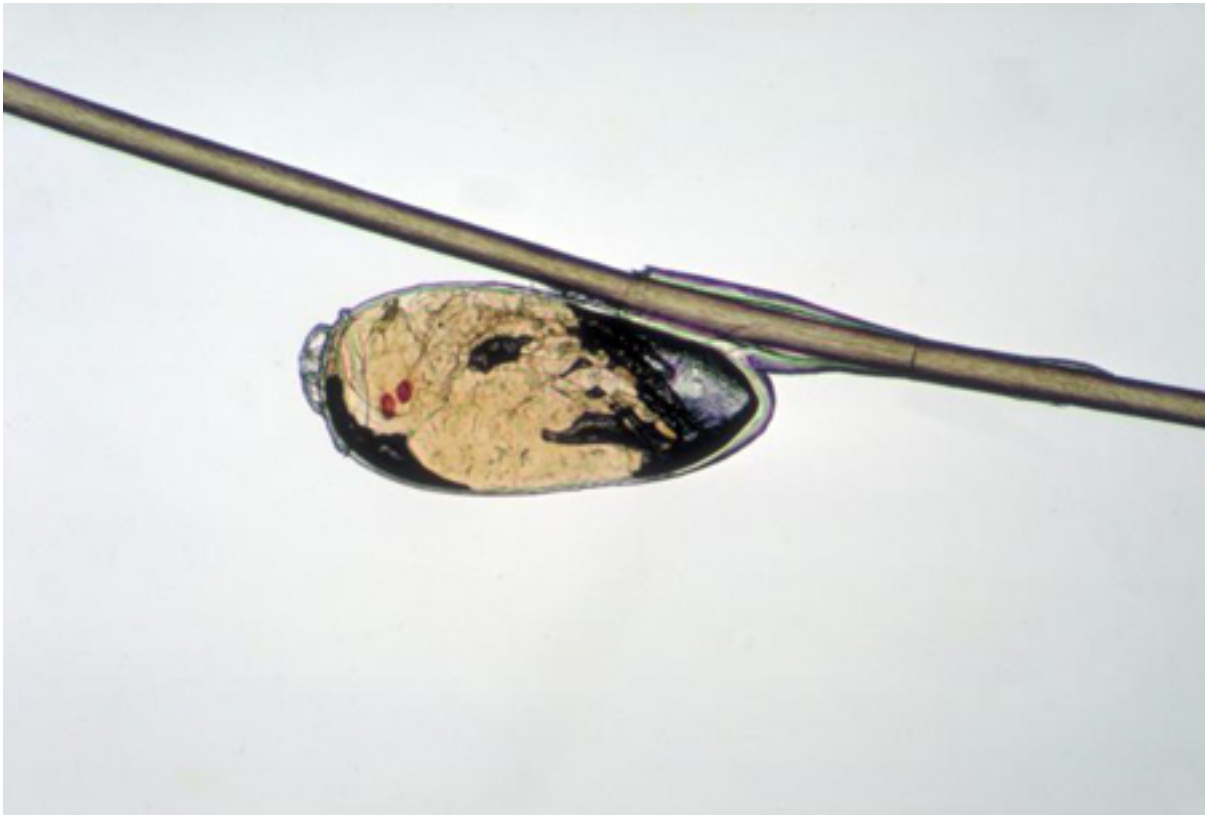
Lice only consume a few microlitres of blood in their lifetime, and infested individuals rarely harbour more than a dozen live lice. Anaemia from blood loss due to head lice infestation has never been documented.[3] [4]

Intense itching can occasionally disrupt sleep, and vigorous scratching that disrupts the integrity of the skin can rarely be associated with scalp impetigo and local adenopathy.[2] [3] [4] [13] [15]



Adult louse seen under a microscope

From the collection of Dr Richard Pollack; used with permission



Unhatched nit of a head louse

Public Health Image Library (PHIL); used with permission

Nymph of head louse about to emerge from egg

Public Health Image Library (PHIL); used with permission

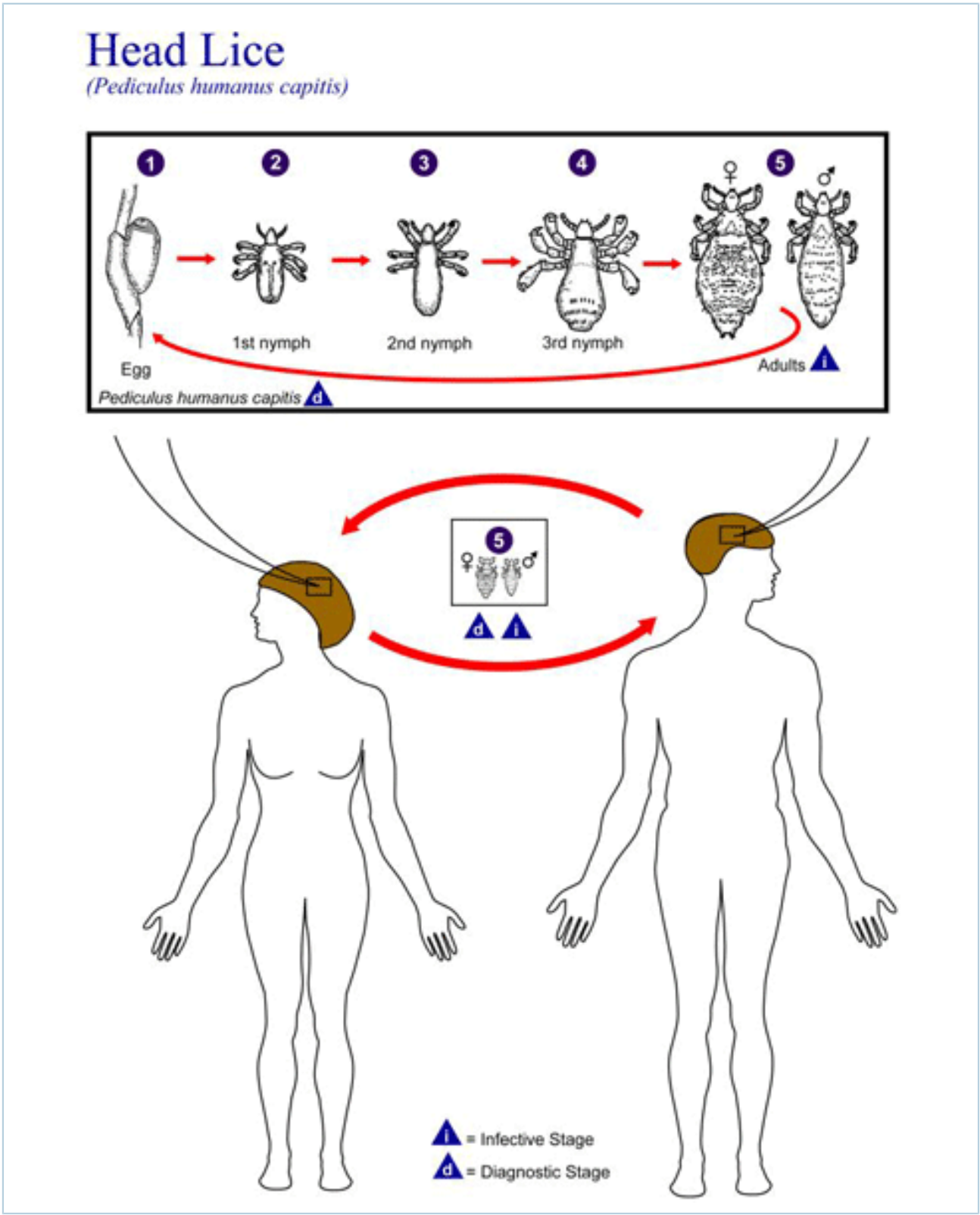


Illustration of life cycle of head lice

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THEORY

Case history

Case history #1

A 7-year-old girl presents to the school nurse. She was referred by her teacher, who noted she was scratching her head a lot. The school nurse knows there have been no active cases of head lice identified in this student's class recently, but the girl says she had been to a 'sleepover' about 1 month ago. The girl has shoulder-length hair, and claims she has never had head lice before. When the school nurse examines the nape of the girl's neck, she finds small whitish spots within 1 cm of the scalp that are firmly adhered to the hair shaft. As the nurse continues to examine the girl's scalp under bright light, she sees a sesame seed-sized insect-like object crawl quickly away from the area.

Case history #2

An 5-year-old girl presents to be checked for lice because her mother is concerned she may have an infestation. She has treated her daughter with over-the-counter pediculicide 3 times in the past 2 months, but admits she is not sure what to look for - she treats when she hears about a case in her daughter's class. When examining her scalp under a bright light, dozens of small white objects firmly adherent to the hair shaft can be seen, but all are more than 1 cm from the scalp. Microscopic examination of one shows it to be an empty louse egg case, indicating that the girl most probably had an infestation 2 months ago that has resolved.

Other presentations

An atypical presentation would involve a bacterial infection (i.e., scalp impetigo caused by streptococci and/or staphylococci) with posterior cervical lymphadenopathy, secondary to a longstanding infestation with excoriated skin from frequent scratching. This would be seen most commonly in situations where there is overcrowding (e.g., homeless shelters) or where access to proper treatment may be limited.[2] [3] [4]

Approach

The diagnosis of pediculosis capitis (head lice infestation) should rest on the discovery of a live nymphal or adult louse by a healthcare professional.[31] [32] Nits that are within 6 mm from the scalp are usually viable and are highly suggestive of an active infestation.[3] [4] A viable nit has a dark eyespot on microscopic examination.

History

Most studies of head lice in industrialised countries report the highest incidence in elementary school-aged children (aged 3-12 years).[2] [11] [15] Lice do not hop or jump, they can only crawl, so adults with head lice are most likely to be parents of children with lice, or those living in overcrowded conditions.[10] Indirect transmission through contact with personal belongings is much less likely to occur. Most studies that report incidence of head lice infestation by sex in school-aged children indicate about a 2 to 3:1 female-to-male ratio.[2][14] [15]

Other key risk factors include overcrowding or close living conditions (e.g., sleepovers or camp in the preceding month; boarding school), and close contact with an infected individual.[2] [11] [15] Lice spread most readily through head-to-head contact. Any situation that brings infested children into close contact with others is very likely to cause spread of that infestation.[23] [26] Therefore, having a family member or bedmate with head lice greatly increases the risk.[23]

Generally, a parent or teacher will observe excessive scalp scratching in the child, or a child may complain of a pruritic scalp.

Physical examination

People who are suspected of having head lice, including those who have been in close contact with an individual with head lice, should have a careful scalp examination, even in the absence of symptoms. Also, anyone who is noted to have a scalp infection (e.g., impetigo or pyoderma) or otherwise unexplained lymphadenopathy in the head or neck region should be carefully checked for the presence of head lice infestation.[2] [3] [4]

The definitive standard for diagnosis is finding a live louse or lice on the head.[1] [10] [33] This can be difficult because lice tend to crawl quickly. The child should be positioned with his or her head tilted to the chest and the hair closest to the nape of the neck and behind the ears examined under good light, separating the hair into segments with fingers, sticks/throat culture swabs, or tongue depressors.

Combing is more accurate than visual inspection at diagnosing infestation. Visual inspection has been reported to underestimate the true prevalence of active infestation by a factor of 3.5, although visual inspection had a higher sensitivity for the diagnosis of historic infestation.[34]

The hair is moistened with water (to make it easier for lice to stick to the comb) or conditioner (to slow the lice and make combing easier). The moistened hair should be combed with a fine-toothed nit comb, especially near the nape of the neck and behind the ears, checking for nymphs or adult lice. Dry combing can produce false-negative results because the lice are apt to crawl away quickly from the site being combed. In addition, dry combing should be undertaken with caution, as vigorous combing with a plastic comb can generate enough static electricity to eject lice, which can then set up an infestation elsewhere, depending on where they land.[28][30] [31] [32] [35]

Some will accept the presence of live eggs within 1 cm of the scalp as a diagnosis of head lice infestation, but several investigators have shown that many patients with eggs alone never 'convert' to an active infestation.[28] [33] [36] Finding empty egg cases (nits) >1 cm from the scalp should not be accepted as a diagnosis of a lice infestation.

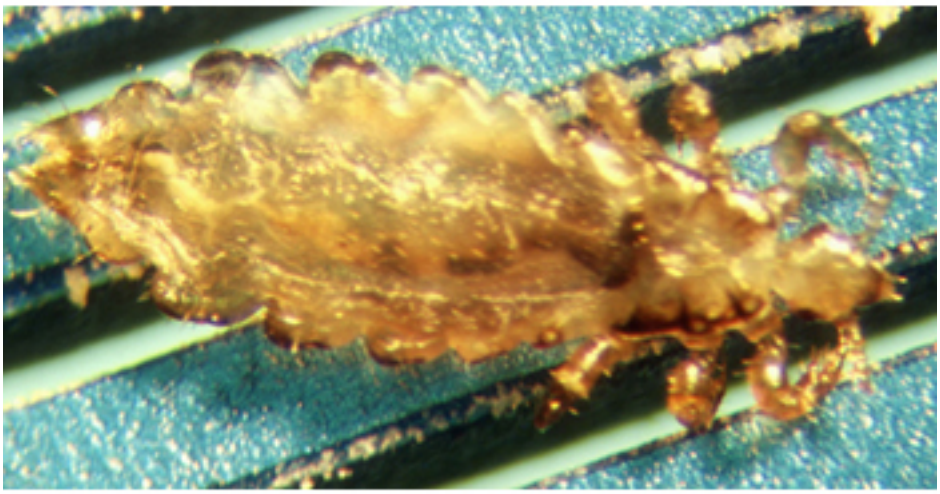
Although not always seen, tiny papules at the nape of the neck just below the hairline are not uncommon, and represent louse bites. Surrounding inflammation is secondary to the body's reaction to the louse saliva.[13]

Lice very rarely leave a head, but can occasionally be seen on the collar area of clothing in an unusually severe infestation. Lice discovered on the collar area of clothing could either be head lice (most likely diagnosis for a child) or body lice.[33]

Examination with magnifying lens, trichoscope or microscope

In cases where the diagnosis is in question, examination with a magnifying lens, trichoscope, or microscope can distinguish between a nymph or adult louse and other insects or hair debris. An egg with an eye spot can be distinguished from an empty egg case, or nit. A nit can be distinguished from dandruff or other hair debris, which can sometimes be difficult to distinguish on casual observation with the naked eye. Nits are firmly attached to the hair shaft, and can be removed using fingernails or a fine-toothed lice comb. An alternative is plucking the hair with the nit, and examining that under the microscope.

Because school nurses rarely have these devices available, referral to a primary healthcare provider may be required.[33]



Adult louse seen under a microscope

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History and exam

Key diagnostic factors

presence of risk factors (common)

- Key risk factors include elementary school-aged children (3-12 years), female sex, overcrowding or close living, or close contact with an infested individual.[1] [2] [3] [4]

scalp pruritus (common)

- An intensely itchy scalp is often the first symptom of head lice infestation, although it can take an individual with a first-time infestation up to 1-3 months to become sensitised to the louse saliva and experience pruritus. With subsequent infestations, itching will develop sooner.[2] [3] [4] [13]

live nymphal or adult louse (common)

- Finding live lice is pathognomonic to the diagnosis.
- Lice can be difficult to find because they tend to crawl quickly away from any disturbance; however, they are more common near the nape of the neck.
- Wet combing with a fine-toothed comb is the best way to detect an infestation, but is not necessary if a louse is seen on casual observation.[31] [32]
- Inspect teeth of comb for lice after each stroke or two. If unsure of whether the insect removed is indeed a louse, examination with magnifying lens or microscope will reveal the classic shape of a head louse.[31] [32]

eggs visible on hair shaft within 1 cm of scalp (common)

- Live eggs within 1 cm of the scalp are diagnostic of an infestation, but can be difficult to see.
- Empty egg casings (nits) are more easily visible, but suggest past infestation.
- Live eggs develop an eye spot several days after being laid, and the empty egg casings of hatched lice take on a whitish appearance.[1] [3] [4]
- Because not all eggs will hatch, finding eggs alone without documenting the presence of live lice is not an accurate diagnosis.[13]
- Examination with a magnifying lens or microscope can distinguish nits from other hair debris.

Other diagnostic factors

small red papules under hairline at nape of neck (common)

- Although not always seen, tiny papules at the nape of the neck just below the hairline are not uncommon, and represent louse bites. Surrounding inflammation is secondary to the body's reaction to the louse saliva.[13]

lymphadenopathy (uncommon)

- Pea-sized, mobile, non-tender posterior occipital lymph nodes when palpated.
- Infestation rarely causes lymphadenopathy, unless there is a secondary infection because of disrupted skin integrity secondary to scratching. If enlarged lymph nodes are found with an infestation, look carefully for a secondary bacterial infection.[2] [3] [4] [13]

erythema with honey-coloured crust on scalp (uncommon)

- Impetigo can accompany head lice infestations. It is usually rare but may be common in settings where children are not cared for properly and diagnosis is delayed. Impetigo is caused by skin surface bacteria, such as streptococci and *Staphylococcus aureus* , entering through a break in the skin secondary to scratching, and not from the lice themselves. Head lice should be carefully looked for if impetigo is found.[37]

Risk factors

Strong

aged 3-12 years

- Most studies of head lice in industrialised countries report the highest incidence in young school-aged children. This may be because children of this age tend to maintain a closer 'personal space' than adolescents and adults.[2] [13]
- Lice are associated with nursery and school attendance primarily because these settings bring children into close contact with one another - nurseries and schools do not harbour lice. School nurses often detect an infestation before parents do, further reinforcing the perceived association between lice and schools.[6] [7] [20]
- In non-industrialised countries, infestations are common in adults.[11] [15] [21]
- Very few studies have been done involving younger children and infants in childcare settings.

female sex

- Most studies that report incidence of head lice infestation by sex in school-aged children indicate about a 2 to 3:1 female-to-male ratio.[2] [13] [14] A 2024 study conducted among primary school children in a Tunisian community found that infestation rates were five times higher in girls (29.1%) compared with boys (6.3%).[9]
- This may be due to the fact that girls spend more time in close play. In addition, girls with longer hair could have nits (i.e., hatched eggs) from past infestations in their hair for longer periods of time, whereas boys would have those nits eliminated with more frequent, shorter haircuts.[2] [13] [14]
- Finally, it may be more difficult to eliminate an infestation in a girl with longer, thicker hair.[2] [13] [14]

close contact with an infested individual

- The most common way for head lice to spread is by direct head-to-head contact. Thus, individuals with close contact with an index case should be examined carefully and treated appropriately. Many investigators suggest treating bedmates of infested individuals routinely.[2] [13] [15]

overcrowding or close living conditions

- Any situation where there is overcrowding and therefore closer-than-usual contact with other people would be an ideal situation for the spread of head lice.
- Therefore, children at sleepover parties, camps, and boarding schools would be at increased risk of spreading an infestation.[8] [15] [21]

Weak

low socioeconomic status

- Head lice have been shown to affect children of all socioeconomic levels.[13]
- The link of head lice to low socioeconomic status happens only when there is concomitant overcrowding, such as that occurring when several people share sleeping quarters, or in homeless shelters.
- One study in Belgium did show a reduced prevalence of head lice in higher socioeconomic status children, presumably due to easier access to and better compliance with treatment.[22]

poor hygiene

- Worldwide, it has not been shown that head lice prefer unclean hair. However, it is thought that in cultures where daily brushing and combing is the norm, it is possible that the inevitable killing of lice that would happen with this practice could keep serious infestations to a minimum.[23]

contact with contaminated clothes, hair care items, bedding

- Most investigators agree that fomite (i.e., an inanimate object that can carry infectious organisms) transmission of head lice is not the major route of transmission, although it is possible.[2] [13] [15] [23] [24] [25] [26]
- Most head lice will cling firmly to the hair closest to the scalp, and are reluctant to leave except under extenuating circumstances.[13]
- Lice recovered from combs and brushes are usually dead or injured and no longer capable of reproducing. The claws of lice are not adapted to crawl on smooth surfaces such as plastic, glass, and wood.[13]
- In temperate climates, lice rarely survive more than 24 hours away from the host's scalp. Even after close contact with an infested individual, pillowcases were found to harbour remarkably few lice.[27] However, it is advisable to avoid head contact with potentially contaminated items, and to carry out routine cleaning of belongings used by an individual with a known infestation.[15] [23] [24] [25] [26] [27]

Investigations

1st test to order

Test	Result
no tests required • Diagnosis depends on the discovery of a live nymphal or adult louse by a healthcare professional.[31] [32]	**clinical diagnosis**

Differentials

Condition	Differentiating signs / symptoms	Differentiating tests
Seborrhoeic dermatitis	• Dandruff easily falls from the head with scratching, and often can be seen on the shoulder area of clothing.	• Diagnosis can easily be confirmed using a magnifying lens or by microscopic examination.[33]
Other objects in hair	• Hair casts, hairspray droplets, scabs, dirt, paint flecks, and even other insects, such as aphids that may get blown into the hair, may be mistaken for head lice or nits. • Intense pruritus is usually absent.	• Diagnosis can easily be confirmed using a magnifying lens or by microscopic examination.[33]

Criteria

Live lice on the head

Finding live lice on the head is the definitive standard of diagnosis. Sometimes this can be accomplished by casual observation, separating sections of hair at the nape of the neck or behind the ears with fingers or sticks. Hair can be combed with a fine-toothed comb, with inspection of the comb for lice between strokes. The highest yield is from combing hair moistened with water or conditioner (wet combing), as this slows down the movement of the lice.[10][30]

Eggs visible on hair shaft within 1 cm of scalp

When combing is not convenient, some will accept the presence of live eggs on hair shafts within 1 cm of the scalp as a diagnostic criterion for head lice infestation. Live eggs develop an eyespot that can be seen microscopically within several days of being laid. Not all children with eggs alone will go on to develop an actual infestation. Empty egg cases (nits), especially on hair shafts >1 cm from the scalp, should not be considered criteria for diagnosing head lice infestation.[28]

Screening

Screening by parents of children who have been exposed

Parents of school-aged children are often asked to screen their asymptomatic children for head lice infestation if their child has been exposed or had close contact with someone with an infestation. The circumstances could be an exposure in a school classroom, camp, or sleepover party in the preceding month. The parent should receive instructions on how to effectively look for live lice. Alternatively, parents of young school-aged children could assume exposure could take place at any time, and screen their children for live lice on a weekly basis, using the same effective technique (wet combing).[10][30]

Screening in the school setting

Screening large groups of asymptomatic children in the school setting is time consuming, disruptive to the learning environment, and has never been shown to be effective, although many feel this is a necessary duty of the school nurse.[38]

If screening does take place, it should be conducted by individuals who are formally trained, have the necessary equipment (a suitable magnifying device), and be legally qualified (an MD or appropriate nursing credential) to make a diagnosis. Teachers, custodians, and parent volunteers should not screen children and make diagnoses of head lice infestations.[33] [38]

School nurses should be able to diagnose head lice infestation in a symptomatic child referred for a head-check. In circumstances where there are an unusually high number of children with infestations, school nurses could assist by evaluating the environment for high-risk exposure situations, provide accurate information to staff, students, and parents, and aid in screening affected children and close contacts.[38]

Routine classroom or school-wide screenings have not shown to be helpful and should be discouraged.[10] These mass screenings either give a false sense of security (because wet combing is rarely used, and casual observation could miss many cases) or result in many more children being recommended for treatment than is necessary (when eggs or nits alone are used as the diagnostic criteria).[28] [29] [33]

School nurses can play a valuable role by instructing parents in proper diagnostic technique, and offering their expertise to families having difficulty with diagnosis or treatment.[6] [13] [33] [36] [38]

Approach

Treatment differs according to location and local guidelines should always be consulted.

Many products and techniques exist for the treatment of head lice, but the efficacy of many has not been proven. Additionally, products that have previously worked well are no longer consistently effective due to the development of resistance.[29] [39] [40] [41]

The goals of treatment are eradication of the infestation in the individual patient and minimisation of spread to others. Because there is no mortality and minimal morbidity associated with infestation, the focus is on effective and well-tolerated treatments.[42] Choice of product or technique will depend on a number of factors, including local resistance patterns (if known), parental preference, and ease of compliance. Healthcare professionals need to be knowledgeable about each treatment method, so it can be determined if a treatment failure represents head lice resistant to the product or non-compliance in usage of the product.[43] [44]

General approach to treatment

Typical first-line treatment would be a pediculicide with a neurotoxic mode of action for at least 2 treatments (preferably days 0 and 9).

For patients who prefer not to use pediculicides with a neurotoxic mode of action, products with a physical mode of action or wet combing are reasonable alternatives.[39] [40] [45]

Because head lice are very rarely spread via fomites, extensive hygiene practices are not necessary. Focusing more time on treating the infested child's head will yield better results.[30]

Pediculicides

Recommendations for the management of head lice infestation are based on the best available evidence obtained from randomised controlled trials of head-louse treatment. However, great heterogeneity in trial methodologies currently exist, such as types of treatments compared, randomisation unit, blinding, treatment-administration site, diagnosis method and criteria, and primary outcome measures. An expert panel has recommended an optimal design to standardise head-louse treatment trials, but the procedure has rarely been followed.[46] Interpretation of current recommendations should take this into account.

Dimeticones are generally considered a first-line treatment but permethrin 1%, as well as pyrethrins and organophosphate compounds (with or without piperonyl butoxide), may also be recommended depending on local guidelines.[47] Dimeticones have a physical mode of action.

There is widespread resistance to permethrin 1% or pyrethrins plus piperonyl butoxide products, especially where they have been widely used over many years. Resistance patterns are complex and are usually not known for the location in which the patient lives.[48] [49] [50] [51] [52] There are also safety concerns.[53] [54]

Manufacturer's directions for use need to be followed closely to ensure a safe and effective outcome. Most compounds require a second treatment after 8-10 days to ensure elimination of all parasites. In this case, parents need to be informed and reassured that seeing live lice (nymphs) after the first treatment does not necessarily indicate treatment failure or resistance and they should continue to administer the additional treatments at the recommended intervals.

In areas with known resistance to over-the-counter pediculicides, a prescription-only drug is recommended. Ivermectin topical lotion, spinosad, or malathion are suitable options. These products should only be used in patients ≥6 months of age (except malathion, which is recommended in children ≥6 years of age only).[10] Benzyl alcohol is also used in some countries, but is not available in the US. Recommendations may differ in different locations and local guidelines should be consulted.

Lindane is an organochlorine that has central nervous system toxicity in humans if used incorrectly. The US Food and Drug Administration (FDA) has issued a Public Health Advisory concerning the use of lindane, and its use has been banned in California. It has also been banned in Europe and Canada, and it is no longer recommended for the treatment of head lice.[55] [56]

Essential oils and other plant-derived compounds have been widely used in traditional medicine for the eradication of head lice, but due to the variability of their constitution in commercial products, the effects may not be reproducible. Although many plants naturally produce insecticides such as pyrethrins, these agents can produce toxic effects when used by humans. The safety and efficacy of herbal products are not regulated by the FDA or other agencies, and there is insufficient evidence to recommend their use.[13] [43] [57] [58]

Mechanical removal

There are two main methods, nit picking and wet combing, and both can be used in any age group.

Nit picking (removal of eggs and hatched egg casing) is generally not recommended as a sole technique as lice and eggs can be difficult to find and remove. It may be used to augment the efficacy of treatment with permethrin and other compounds with a neurotoxic mode of action because these have no ovicidal activity. However, repeated use of a pediculicide may kill the newly hatched nymphs without having to remove all the eggs, so it is not absolutely necessary. If undertaken, a fine-toothed lice comb can aid in removal of the nits. A fine-toothed metal comb has been shown to be best.[59] One study found that eggs can be effectively removed from the hair with the use of a commercial conditioner.[60]

Wet combing involves shampooing hair twice a week with ordinary shampoo, then vigorous combing out of wet hair with a special fine-toothed comb.[61] [62] [63] Success can be variable and depends largely on good technique. Combing of dry hair does not seem to have the same effect, and some have postulated that vigorous dry combing or brushing in close quarters may actually spread lice by making them airborne via static electricity.[61] [64]

Battery-operated louse combs or combs with oscillating teeth may not effectively reach to the scalp and do not kill or remove nits, so offer little advantage over a well-designed traditional louse comb.[65] Battery-operated combs have not been tested in younger children, and directions state that they should not be used in anyone with a known seizure disorder. Some products claim to loosen the attachment of eggs to the hair shaft; however, vinegar-based products have not been shown to have any clinical benefit. A variety of other substances, including acetone, bleach, vodka, and mechanical releasing oils, have proved to be ineffective in loosening nits from the hair shaft and present an unacceptable risk.[66] [67]

Shaving the hair on the head, while effective, is not generally a socially accepted course of action and can cause emotional trauma.

A specialist device can be used to deliver controlled heated air to desiccate lice, but currently there is insufficient evidence to advocate its widespread use.[68] A regular blow-dryer should not be used to

accomplish the same result, because normal blow-dryers can cause live lice to become airborne and spread to others in the vicinity.[68] Hot air guns should never be used.

Compounds with a physical mode of action

There are several products used, and choice depends primarily on location and the age of the patient.

Dimeticones belong to the group of synthetic silicone oils. The chain length and the solvent determine the viscosity of the product and other physical properties.[69] Dimeticones with low surface tension can perfectly coat microscopic surfaces. They have a purely physical mode of action and are not neurotoxic. If applied on a louse, they coat the cuticle of the insect, enter into the spiracles (tiny tracheae-like tubes leading into the louse body), and displace the air needed for breathing. They may also disrupt water management and cause subsequent osmotic stress and probable rupture of the gut. This causes death of the parasite with a delay of several hours.[70] [71] A 4% dimeticone solution in cyclomethicone showed an efficacy rate of between between 70% and 92%.[72] [73] [74] Another mixture of two dimeticones showed an efficacy rate of 97% in a population with a high intensity of infestation in Brazil.[75] In randomised control trials, dimeticones performed significantly better than permethrin 1% and malathion.[72] [75] [76] Some products also show high efficacy against eggs; however, there are no randomised controlled trials to support this.[77] [78] [79] Dimeticones are colorless and odorless and are considered nontoxic. Because of their mode of action, the development of resistance in lice is very unlikely. A systematic review concluded that dimeticones should be considered as the first-line treatment.[47] Dimeticones are not currently available in the US, but are used as a main treatment option in many countries in Europe, including the UK.

Isopropyl myristate/cyclomethicone is available as a hair rinse in regions such as Canada, Australia, and Europe, and is a common treatment option in these countries.[10] [55] It dissolves the waxy exoskeleton of the louse, leading to dehydration and death.[80] [81] It is not ovicidal. Isopropyl myristate/cyclomethicone should not be used in children younger than 4 years old. It is not available in the US.[55]

Petroleum jelly is thought to obstruct the respiratory spiracles of the adult louse and block holes in the operculum of the eggs. It can be used in any age group.

The Nuvo method uses Cetaphil® cleanser (a hydrating emollient containing glycerin) applied to the hair and scalp, dried on with a blow-dryer, then washed out 8 hours later, with the treatment repeated once a week for 3 weeks. One study reported a 96% cure rate but the study design was inappropriate (i.e., not controlled, randomised, or blinded).[82] [83] This method is only recommended in older children and adults.

Other occlusive substances have been suggested (e.g., mayonnaise, tub margarine, herbal oils, olive oil), but to date no information is available concerning efficacy.

Specific treatment strategies

There are several products used, and choice depends primarily on location and the age of the patient. Some agents may not be recommended in certain locations. Consult your local guidelines to aid decisions on the most suitable treatment.

Infants aged <2 months

- Head lice rarely occurs in this age group. Mechanical removal can be safely used. If a patient in this age group has head lice, the infestation is likely to be minimal and individual head lice can easily

be seen as the hair is very thin. It is better to remove these few head lice by hand instead of putting newborns at risk of adverse effects from other treatments.

Infants aged ≥2 months and <2 years

- Dimeticones are the first-line agent in these patients. Permethrin 1%, or pyrethrins plus piperonyl butoxide, may also be considered. Human toxicity seems to be low in adults.[84] Pyrethrins have slightly higher absorption rates compared with permethrin 1%; they can cause allergic reactions in individuals sensitive to ragweed, and should be avoided in patients allergic to chrysanthemums. Because neither product is ovicidal, experts suggest treatment at days 0 and 8-10.[45] [85] Permethrins are not recommended for use in the UK, as the formulations and licensed application methods of currently available products make them unsuitable for treating head lice. Additionally, there is evidence of resistance, further limiting their effectiveness.[30]
- Ivermectin topical lotion, or spinosad are recommended in the US in areas with known resistance to first-line drugs.[10] Benzyl alcohol is also used in some countries, but is not available in the US. Recommendations for alternative options in other countries may differ and depend on availability. Local guidelines should be consulted.
- Patients who cannot or do not want to use pediculicides with a neurotoxic mode of action, or run the risk of inducing resistance, can use mechanical removal (i.e., nit picking or wet combing).

Children aged ≥2 years and adults

- Dimeticones are the first-line agent in these patients. Permethrin 1%, or pyrethrins plus piperonyl butoxide, may also be considered. Human toxicity seems to be low in adults.[84] Pyrethrins have slightly higher absorption rates compared with permethrin 1%; they can cause allergic reactions in individuals sensitive to ragweed, and should be avoided in patients allergic to chrysanthemums. Because neither product is ovicidal, experts suggest treatment at days 0 and 8-10.[45] [85] Permethrins are not recommended for use in the UK, as the formulations and licensed application methods of currently available products make them unsuitable for treating head lice. Additionally, there is evidence of resistance, further limiting their effectiveness.[30]
- Isopropyl myristate/cyclomethicone is available as a hair rinse in regions such as Canada, Australia, and Europe, and is a common treatment option in these countries.[10] [55] It dissolves the waxy exoskeleton of the louse, leading to dehydration and death.[80] [81] It is not ovicidal. Isopropyl myristate/cyclomethicone should not be used in children younger than 4 years old. It is not available in the US.
- Ivermectin topical lotion, spinosad, or malathion are recommended in the US in areas with known resistance to first-line drugs.[10] Benzyl alcohol is also used in some countries, but is not available in the US. Recommendations for alternative options in other countries may differ and depend on availability. Local guidelines should be consulted.
- Malathion is an organophosphate (cholinesterase inhibitor). Due to reports of cross-resistance with pyrethroids and safety concerns (it is highly flammable), it is considered a third-line treatment.[86] [87] [88] [89] Although head lice resistant to malathion are common in the UK, where it has been used for decades, the preparation available in the US contains additional ingredients that themselves have a 50% cure rate, and this may delay development of resistance in the US.
- Patients who cannot or do not want to use pediculicides with a neurotoxic mode of action, or run the risk of inducing resistance, may use mechanical removal (i.e., nit picking or wet combing).

Pregnant and lactating women

- Most pediculicides can be used by pregnant women. However, all agents should be used with caution in lactation due to a lack of data.

- For women who want an extra margin of safety, mechanical removal or compounds with a physical mode of action can be safely used instead.

Supportive measures

Supportive measures (e.g., cleaning hair items, bedding, or fabric items that have been in contact with an individual with an infestation) are still recommended in the US, but generally not in other countries.

Treatment of contacts

Household and other close contacts of infested individuals should be examined and treated if infested. Some experts recommend prophylactic treatment of household contacts, particularly siblings of the infested individual. Children should not be excluded or sent home early from school because of head lice. Parents of infested children (defined by visualisation of live lice) should be notified and informed that their child should be treated, ideally, before returning to school the next day. The presence of nits alone does not justify treatment.[2] [3] [4]

Treatment of recurrence

Treatment of recurrence depends on whether the cause is due to resistance to a particular pediculicide, incorrect initial use of a pediculicide (or other method), or re-infestation from a contact. The cause is hard to prove, and the physician may have to make an educated guess after carefully questioning the patient about the steps that were followed when using pediculicide.

If resistance to a pediculicide with a neurotoxic mode of action is likely to be the cause, an alternative treatment with a physical mode of action is recommended. If incorrect use of a pediculicide (or other method) is suspected, it is important that instructions are made clear. In this case, re-infestation can be treated as for initial infestation.

Treatment algorithm overview

Please note that formulations/routes and doses may differ between drug names and brands, drug formularies, or locations. Treatment recommendations are specific to patient groups: see disclaimer

Acute (summary)		
children aged <2 months		
	1st	**mechanical removal**
	plus	**treatment of contacts**
children aged ≥2 months and <2 years		
	1st	**pediculicide**
	plus	**treatment of contacts**
	2nd	**mechanical removal or occlusive agent**
	plus	**treatment of contacts**
children aged ≥2 years and adults		
	1st	**pediculicide**
	plus	**treatment of contacts**
	2nd	**mechanical removal or occlusive agent**
	plus	**treatment of contacts**

Treatment algorithm

Please note that formulations/routes and doses may differ between drug names and brands, drug formularies, or locations. Treatment recommendations are specific to patient groups: see disclaimer

Acute

children aged <2 months

1st **mechanical removal**

» Head lice rarely occur in this age group. Mechanical removal can be safely used. If a patient in this age group has head lice, the infestation is likely to be minimal and individual head lice can easily be seen as the hair is very thin. It is better to remove these few head lice by hand instead of putting newborns at risk of adverse effects from other treatments.

plus **treatment of contacts**

Treatment recommended for ALL patients in selected patient group

» Household and other close contacts of infested individuals should be examined and treated if infested. Some experts recommend prophylactic treatment of household contacts, particularly siblings of the infested individual.[2] [3] [4]

children aged ≥2 months and <2 years

1st **pediculicide**

Primary options

» dimeticone topical: apply to the hair and scalp as directed, leave for 30 minutes to 8 hours (depending on product) before rinsing; repeat treatment after 8-10 days

OR

» permethrin topical: (1%) apply to the hair and scalp as directed, leave for 10 minutes before rinsing

OR

» pyrethrin topical: apply to the hair and scalp as directed, leave for 10 minutes before rinsing

Secondary options

» benzyl alcohol lotion: infants ≥6 months of age: (5%) apply to the hair and scalp as directed, leave for 10 minutes before rinsing

Acute

OR

» ivermectin topical: infants ≥6 months of age: (0.5%) apply to the hair and scalp as directed, leave for 10 minutes before rinsing

OR

» spinosad topical: infants ≥6 months of age: (0.9%) apply to the hair and scalp as directed, leave for 10 minutes before rinsing

» Dimeticones are the first-line agent in these patients. They have the advantage of being nontoxic and are highly effective. Due to their physical mode of action, development of resistance is highly unlikely. Permethrin 1%, or pyrethrins plus piperonyl butoxide, may also be considered. Human toxicity seems to be low in adults.[84] Pyrethrins have slightly higher absorption rates compared with permethrin 1%; they can cause allergic reactions in individuals sensitive to ragweed, and should be avoided in patients allergic to chrysanthemums. Because neither product is ovicidal, experts suggest treatment at days 0 and 8-10.[45] [85] There is widespread resistance to permethrin 1% or pyrethrins plus piperonyl butoxide products, especially where they have been widely used over many years. Resistance patterns are complex and are usually not known for the location in which the patient lives.[48] [49] [50] [51] [52] There are also safety concerns.[53] [54]

» Local guidance should be consulted when selecting a specific pediculicide.[47]

» Manufacturer's directions for use need to be followed closely to ensure a safe and effective outcome. Parents need to be informed and reassured that seeing live lice (nymphs) after the first treatment does not indicate treatment failure or resistance, and they should continue to administer the additional treatments at the recommended intervals.

» Ivermectin topical lotion, or spinosad are recommended in the US in areas with known resistance to first-line drugs.[10] Benzyl alcohol is also used in some countries, but is not available in the US. Recommendations for alternative options in other countries may differ and depend on availability. Local guidelines should be consulted.

plus **treatment of contacts**

Acute

Treatment recommended for ALL patients in selected patient group

» Household and other close contacts of infested individuals should be examined and treated if infested. Some experts recommend prophylactic treatment of household contacts, particularly siblings of the infested individual.[2] [3] [4]

2nd **mechanical removal or occlusive agent**

» Patients who cannot or do not want to use pediculicides with a neurotoxic mode of action, or run the risk of inducing resistance, can use mechanical removal.

» Mechanical removal methods include nit picking, shaving hair, or the preferred method, wet combing. Occlusive agents that may be used in this age group include petroleum jelly.

» Nit picking (removal of eggs and hatched egg casing) is generally not recommended as the sole technique for eradication of an infestation. If undertaken, a fine-toothed, metal lice comb can aid in removal of the nits.[13] [59]

» Wet combing involves shampooing or conditioning hair twice a week with ordinary shampoo, then vigorous combing out of wet hair with a special fine-toothed comb. Success can be variable and depends largely on good technique.[61] [62] [63]

» Petroleum jelly is thought to obstruct the respiratory spiracles of the adult louse and block holes in the operculum of the eggs. About 30-40 g of standard petroleum jelly is massaged on the entire surface of the hair and scalp and left on overnight. Repeated shampooing over the following 7-10 days removes the residue, and nits should be removed.

» Re-infestation can be treated as for initial infestation.

plus **treatment of contacts**

Treatment recommended for ALL patients in selected patient group

» Household and other close contacts of infested individuals should be examined and treated if infested. Some experts recommend prophylactic treatment of household contacts, particularly siblings of the infested individual.[2] [3] [4]

children aged ≥2 years and adults

1st **pediculicide**

Acute

Primary options

» dimeticone topical: apply to the hair and scalp as directed, leave for 30 minutes to 8 hours (depending on product) before rinsing; repeat treatment after 8-10 days

OR

» permethrin topical: (1%) apply to the hair and scalp as directed, leave for 10 minutes before rinsing

OR

» pyrethrin topical: apply to the hair and scalp as directed, leave for 10 minutes before rinsing

OR

» isopropyl myristate/cyclomethicone topical: children ≥4 years of age and adults: apply to the hair and scalp as directed, leave for 10 minutes before rinsing

Secondary options

» benzyl alcohol lotion: (5%) apply to the hair and scalp as directed, leave for 10 minutes before rinsing

OR

» ivermectin topical: (0.5%) apply to the hair and scalp as directed, leave for 10 minutes before rinsing

OR

» spinosad topical: (0.9%) apply to the hair and scalp as directed, leave for 10 minutes before rinsing

Tertiary options

» malathion topical: (0.5%) apply to the hair and scalp as directed, leave for 8-12 hours before rinsing

» Dimeticones are the first-line agent in these patients. They have the advantage of being nontoxic and are highly effective. Due to their physical mode of action, development of resistance is highly unlikely. Permethrin 1%, or

Acute

pyrethrins plus piperonyl butoxide, may also be considered. Human toxicity seems to be low in adults.[84] Pyrethrins have slightly higher absorption rates compared with permethrin 1%; they can cause allergic reactions in individuals sensitive to ragweed, and should be avoided in patients allergic to chrysanthemums. Because neither product is ovicidal, experts suggest treatment at days 0 and 8-10.[45] [85] There is widespread resistance to permethrin 1% or pyrethrins plus piperonyl butoxide products, especially where they have been widely used over many years. Resistance patterns are complex and are usually not known for the location in which the patient lives.[48] [49] [50] [51] [52] There are also safety concerns.[53] [54]

» Isopropyl myristate/cyclomethicone is an alternative option in some regions and should not be used in children under 4 years old.[10] [55]

» Local guidance should be consulted when selecting a specific pediculicide.[47]

» Manufacturer's directions for use need to be followed closely to ensure a safe and effective outcome. Parents need to be informed and reassured that seeing live lice (nymphs) after the first treatment does not indicate treatment failure or resistance, and they should continue to administer the additional treatments at the recommended intervals.

» Ivermectin topical lotion, or spinosad are recommended in the US in areas with known resistance to first-line drugs.[10] Benzyl alcohol is also used in some countries, but is not available in the US. Recommendations for alternative options in other countries may differ and depend on availability. Local guidelines should be consulted.

» Malathion is an organophosphate (cholinesterase inhibitor). Due to reports of cross-resistance with pyrethroids and safety concerns (it is highly flammable), it is considered a third-line treatment.[86] [87] [88] [89] Although head lice resistant to malathion are common in the UK, where it has been used for decades, the preparation available in the US contains additional ingredients that themselves have a 50% cure rate, and this may delay development of resistance in the US.

» Most pediculicides can be used in pregnant women. However, all agents should be used with caution in lactation due to a lack of data.

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For women who want an extra margin of safety, mechanical removal or compounds with a physical mode of action can be safely used instead.

plus **treatment of contacts**

Treatment recommended for ALL patients in selected patient group

» Household and other close contacts of infested individuals should be examined and treated if infested. Some experts recommend prophylactic treatment of household contacts, particularly siblings of the infested individual. Children should not be excluded or sent home early from school because of head lice. Parents of infested children (defined by visualisation of live lice) should be notified and informed that their child should be treated, ideally, before returning to school the next day. The presence of nits alone does not justify treatment.[2] [3] [4]

2nd **mechanical removal or occlusive agent**

» Patients who cannot or do not want to use pediculicides with a neurotoxic mode of action, or run the risk of inducing resistance, may use mechanical removal.

» Mechanical removal methods include nit picking, shaving hair, or the preferred method, wet combing.

» Nit picking (removal of eggs and hatched egg casing) is generally not recommended as the sole technique for eradication of an infestation. If undertaken, a fine-toothed, metal lice comb can aid in removal of the nits.[13] [59]

» Wet combing involves shampooing or conditioning hair twice a week with ordinary shampoo, then vigorous combing out of wet hair with a special fine-toothed comb. Success can be variable and depends largely on good technique.[61] [62] [63]

» Occlusive agents that may be used in this age group include petroleum jelly, or use of the Nuvo method.

» Petroleum jelly is thought to obstruct the respiratory spiracles of the adult louse and block holes in the operculum of the eggs. About 30-40 g of standard petroleum jelly is massaged on the entire surface of the hair and scalp and left on overnight. Repeated shampooing over the following 7-10 days removes the residue, and nits should be removed.

Acute

» The Nuvo method uses Cetaphil® cleanser (a hydrating emollient containing glycerin) applied to the hair and scalp, dried on with a blow-drier, then washed out 8 hours later, with the treatment repeated once a week for 3 weeks.[82] [83]

» Re-infestation can be treated as for initial infestation.

plus **treatment of contacts**

Treatment recommended for ALL patients in selected patient group

» Household and other close contacts of infested individuals should be examined and treated if infested. Some experts recommend prophylactic treatment of household contacts, particularly siblings of the infested individual. Children should not be excluded or sent home early from school because of head lice. Parents of infested children (defined by visualisation of live lice) should be notified and informed that their child should be treated, ideally, before returning to school the next day. The presence of nits alone does not justify treatment.[2] [3] [4]

Emerging

Permethrin 5%

In patients who do not respond to standard treatments, permethrin 5% may be used. It is available as a cream for scabies and pubic pediculosis, but has been recommended for the treatment of head lice that appear to be recalcitrant to other treatments. One study suggested that lice resistant to treatment with permethrin and other compounds with a neurotoxic mode of action in a normal dose will not succumb to higher concentrations of the chemical. The risk for toxic adverse events is higher than with permethrin 1%.[90] [91] It is not commonly used in the US or in other countries. Permethrins are not recommended for use in the UK, as the formulations and licensed application methods of currently available products make them unsuitable for treating head lice. Additionally, there is evidence of resistance in the UK and other countries, further limiting their effectiveness.[30] [92]

Oral ivermectin

A single dose, repeated in 10 days, has been shown to be effective against head lice if sufficient concentration is present in the blood at the time a louse feeds. For a difficult-to-treat head-lice infestation, oral ivermectin, given twice with a 7-day interval, had superior efficacy as compared with topical 0.5% malathion lotion, a finding that suggests that ivermectin could be an alternative treatment.[93] If ivermectin gets across the blood-brain barrier, it blocks essential neural transmission; young children may be at higher risk for this adverse drug reaction. Therefore, ivermectin should not be used for children who weigh less than 15 kg and are younger than 5 years old. However, one study reported one seizure in the ivermectin group even with children >15 kg.[94] Ivermectin is not licensed for this indication anywhere in the world.

Crotamiton

Available as a lotion used to treat scabies. A single study showed it to be effective against head lice when applied to the scalp and left on for 24 hours before rinsing out.[95] However, its true efficacy is not known. It is only available in some countries.

1,2-octanediol

A surfactant that can be applied as a lotion or an alcohol-free mousse. 1,2-octanediol has been found to eliminate head louse infestation. It is thought to disrupt the insect's cuticular lipid, resulting in dehydration. The alcohol-free mousse has been shown to result in significantly fewer adverse reactions than the lotion.[96] It is only available in some countries.

Tocopheryl acetate

Tocopheryl acetate is a viscous, oily fluid used in some skin and scalp care products. In one randomised trial that enrolled 45 people, a tocopheryl acetate 20% spray preparation was found to be more effective at eliminating head lice than permethrin 1% (57% vs 23%).[97] It is available in some countries but not currently in the US.

Primary prevention

Although fomite (i.e., an inanimate object that can carry infectious organisms) transmission is relatively insignificant, primary prevention can be attempted by teaching children to avoid sharing personal items such as brushes, combs, and hats belonging to others. Parents should avoid advising their children to completely refrain from close contact with others.

There is some controversy about whether it is appropriate for school nurses to routinely examine the heads of children in the school setting. No studies exist that prove the efficacy of this approach. It would be time consuming for a school nurse to accomplish this at school. It seems more appropriate for school nurses to alert parents of students if there is a significant number of cases of head lice in a particular setting, inform parents of the proper way to diagnose and treat head lice infestations, and be available to advise parents

who have particular questions. Because of the prevalence of head lice in young school-aged children, parents of these students should assume that their child can be exposed at any time. Checking for head lice routinely once a week could aid in early diagnosis, make treatment easier, and prevent excessive spread.[6] [28] [29]

Parents of school-aged children are often asked to screen their asymptomatic children for head lice infestation if their child has been exposed or had close contact with someone with an infestation. The circumstances could be an exposure in a school classroom, camp, or sleepover party in the preceding month. The parent should receive instructions on how to effectively look for live lice. Alternatively, parents of young school-aged children could assume exposure could take place at any time, and screen their children for live lice on a weekly basis, using the same effective technique (wet combing).[10][30]

Secondary prevention

Head lice infestations are almost impossible to prevent. Because head-to-head contact is the major mode of spread, close contact with others can be discouraged, but probably cannot be eliminated. At best, children can be instructed to avoid sharing personal items such as brushes, combs, and hats. Spread of infestations can be decreased by early detection of new cases and prompt treatment with effective and safe products or methods. Early detection can best be accomplished by weekly screening at home by parents of children most at risk (3- to 12-year-old school children). Parents should be encouraged to check their child by wet combing before and after sleepover events, including camp experiences. School nurses can help with case detection of symptomatic children. If there is an unusually high incidence of lice infestation in a particular classroom, school nurses can help with additional case finding. There are no convincing data that show enforced exclusion policies are effective in reducing the transmission of lice, and 'no nit' policies are discouraged by organisations such as the National Association of School Nurses and the American Academy of Pediatrics.[10][98] Schools and health authorities can assist with the detection and proper treatment of head lice infestations by having available appropriate educational materials and policies if necessary.

Patient discussions

Patients or parents need to be sure of the correct diagnosis before initiating treatment. A method of head lice eradication that is safe and effective should be chosen. Instructions for use should be followed very carefully. Because no method is 100% ovicidal, patients should expect to see live lice (nymphs) that have hatched since the day of treatment. The treatment should be performed exactly as described by the manufacturer of the product. Patients should pay close attention to the suggested interval between treatments. They should be sure to check all other household members for evidence of head lice infestation and consider treating any bedmates of the infested individual. The child should attend school during this process and parents/caregivers should not accept a 'no nits' policy. The child should be reminded not to share hair care items with others.

Monitoring

Monitoring

After treatment with a compound known to be effective in the location where the patient lives, follow-up is not necessary. For school children, the school nurse can help determine if live lice are present or refer to the healthcare provider for more extensive examination if warranted. All should be aware that live lice (nymphs) can be present until the correct number of timed treatment cycles have been completed (usually two but dependent on the product or method). If adult lice are seen after treatment is completed, it should be determined whether this represents improper administration of the treatment, re-infestation, or a true treatment failure, in which case an alternative treatment should be initiated.

Complications

Complications	Timeframe	Likelihood
pruritus-related sleep disturbance	**short term**	**medium**
Many have reported sleep disturbance due to pruritus in children with significant infestations. Eradicating the infestation will eliminate the pruritus, although it may take several weeks in some individuals for the pruritus to dissipate. Use of oral antihistamines at bedtime can alleviate this complication.		
impetigo	**short term**	**low**
If the skin is disrupted by vigorous scratching, impetigo can occur. The overall incidence of impetigo associated with head lice infestations has not been reported. Look for erythematous areas with honey-coloured crust. Cervical adenopathy may be present. Treatment is with topical or oral antibiotics with *Staphylococcus* and *Streptococcus* coverage. It would be possible to have an infection with MRSA associated with head lice infestation in a susceptible individual, but this has not been reported. This complication may be avoided by keeping the infested person's fingernails short to prevent skin damage while scratching, and treating pruritus with oral antihistamines.		

Prognosis

The typical course of head lice infestation is eradication with treatment, noting that a treatment requires 2 to 4 timed cycles to kill all hatching nymphs. The number of cycles depends on the product. Empty egg cases

(nits) may remain on the hair shafts for months if not removed, and can be visible several centimetres from the scalp as the hair grows.

Recurrence

Nits alone do not represent a recurrence, and do not require treatment other than removal by hand or with a fine-toothed lice comb and washing the hair with a conditioner, if desired.

Recurrence of head lice infestation is not uncommon, and can occur for several reasons; the most common cause is improper use of the original pediculicide or other method resulting in self-re-infestation from hatching eggs that were not killed or picked/combed out. A second common cause would be re-infestation from a family member or other close contact that was not treated simultaneously with the index case. Re-infestation can also occur any time the index case comes into close contact with any other person with head lice infestation. None of these would necessarily indicate resistance to the original product.

If the original product/method is being used properly, and there are no further contacts with infested individuals, resistance to the product may be the cause of recurrence. An alternate product or method may need to be used, and the health care provider may need to be consulted.[10] Resistance is only documented for products with a neurotoxic mode of action.

Diagnostic guidelines

United Kingdom

Head lice: evidence-based guidelines based on the Stafford report - 2012 update (https://www.nhsggc.org.uk/media/239960/stafford-head-lice-2012.pdf)

Published by: Public Health Medicine Environmental Group **Last published:** 2012

North America

Clinical report: head lice (https://publications.aap.org/pediatrics/collection/521/Clinical-Reports)

Published by: American Academy of Pediatrics **Last published:** 2022

Head lice infestations: a clinical update (https://www.cps.ca/en/documents/position/head-lice)

Published by: The Canadian Paediatric Society **Last published:** 2018 (re-affirmed 2024)

Treatment guidelines

United Kingdom

Head lice: evidence-based guidelines based on the Stafford report - 2012 update (https://www.nhsggc.org.uk/media/239960/stafford-head-lice-2012.pdf)

Published by: Public Health Medicine Environmental Group (UK) **Last published:** 2012

North America

Treatment of head lice (https://www.cdc.gov/lice)

Published by: Centers for Disease Control and Prevention **Last published:** 2024

Clinical report: head lice (https://publications.aap.org/pediatrics/collection/521/Clinical-Reports)

Published by: American Academy of Pediatrics **Last published:** 2022

Head lice infestations: a clinical update (https://www.cps.ca/en/documents/position/head-lice)

Published by: The Canadian Paediatric Society **Last published:** 2018 (re-affirmed 2024)

Oceania

Staying healthy: preventing infectious diseases in early childhood education and care services, fifth edition (https://www.nhmrc.gov.au/about-us/publications)

Published by: National Health and Medical Research Council (Australia) **Last published:** 2013

Key articles

- American Academy of Pediatrics, Nolt D, Moore S, et al. Head Lice. Pediatrics. 2022 Oct 1;150(4):e2022059282. Full text (https://publications.aap.org/pediatrics/article/150/4/e2022059282/189566/Head-Lice) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/36156158?tool=bestpractice.bmj.com)
- Cummings C, Finlay JC, MacDonald NE et al. Head lice infestations: a clinical update. Paediatr Child Health. 2024 Jan 11;23(1):e18-24. Full text (https://cps.ca/documents/position/head-lice)

References

1. Burgess IF, Silverston P. Head lice. Clin Evid (Online). January 2015 [internet publication]. Full text (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4294162) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/25587918?tool=bestpractice.bmj.com)
2. Burgess I. Human lice and their control. Ann Rev Entomol. 2004;49:457-81. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/14651472?tool=bestpractice.bmj.com)
3. Ko CJ, Elston DM. Pediculosis. J Am Acad Dermatol. 2004 Jan;50(1):1-12. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/14699358?tool=bestpractice.bmj.com)
4. Leung AK, Fong JH, Pinto-Rojas A. Pediculosis capitis. J Ped Health Care. 2005 Nov-Dec;19(6):369-73. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/16286223?tool=bestpractice.bmj.com)
5. Falagas ME, Matthaiou DK, Rafailidis PI, et al. Worldwide prevalence of head lice. Emerg Infect Dis. 2008 Sep;14(9):1493-4. Full text (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2603110) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/18760032?tool=bestpractice.bmj.com)
6. Counahan M, Andrews R, Buttner P, et al. Head lice prevalence in primary schools in Victoria, Australia. J Paediatr Child Health. 2004 Nov;40(11):616-9. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/15469530?tool=bestpractice.bmj.com)
7. Harris J, Crawshaw JG, Millership S. Incidence and prevalence of head lice in a district health authority area. Commun Dis Public Health. 2003 Sep;6(3):246-9. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/14708276?tool=bestpractice.bmj.com)
8. Fan CK, Liao CW, Wu MS, et al. Prevalence of pediculus capitis infestation among school children of Chinese refugees residing in mountainous areas of northern Thailand. Kaohsiung J Med Sci. 2004 Apr;20(4):183-7. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/15191220?tool=bestpractice.bmj.com)
9. Farjallah D, Belgacem S, Remadi L, et al. Prevalence of pediculosis among primary school children in Tunisia. East Mediterr Health J. 2024 Sep 1;30(8):561-9. Full text (https://applications.emro.who.int/EMHJ/V30/08/1020-3397-2024-3008-561-569-eng.pdf) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/39559973?tool=bestpractice.bmj.com)

10. American Academy of Pediatrics, Nolt D, Moore S, et al. Head Lice. Pediatrics. 2022 Oct 1;150(4):e2022059282. Full text (https://publications.aap.org/pediatrics/article/150/4/e2022059282/189566/Head-Lice) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/36156158?tool=bestpractice.bmj.com)

11. Downs A, Oxley J. Head lice infestations in different ethnic groups. Int J Derm. 2001 Mar;40(3):237-8. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/11422534?tool=bestpractice.bmj.com)

12. Lesshafft H, Baier A, Guerra H, et al. Prevalence and risk factors associated with pediculosis capitis in an impoverished urban community in lima, peru. J Glob Infect Dis. 2013 Oct;5(4):138-43. Full text (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3958982) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/24672174?tool=bestpractice.bmj.com)

13. Meinking TL. Infestations: pediculosis. Curr Probl Dermatol. 1996;24:157-63. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/8743266?tool=bestpractice.bmj.com)

14. Estrada JS, Morris RI. Pediculosis in a school population. J Sch Nurs. 2000 Aug;16(3):32-8. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/11885087?tool=bestpractice.bmj.com)

15. Gratz NG; World Health Organization/WHOPES. Human lice: their prevalence, control and resistance to insecticides - a review, 1985-1997. August 1997 [internet publication]. Full text (https://apps.who.int/iris/bitstream/handle/10665/63791/WHO_CTD_WHOPES_97.8.pdf)

16. Houhamdi L, Parola P, Raoult D. Les poux et les maladies transmises à l'homme [in French]. Médecine Tropicale. 2005;65:13-23.

17. Feldmeier H. Lice as vectors of pathogenic microorganisms. In: Heukelbach J, ed. Management and control of head lice infestation. Bremen: UNIMED; 2010:132-5.

18. Boutellis A, Mediannikov O, Bilcha KD, et al. Borrelia recurrentis in head lice, Ethiopia. Emerg Infect Dis. 2013 May;19(5):796-8. Full text (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3647509) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/23648147?tool=bestpractice.bmj.com)

19. Antinori S, Mediannikov O, Corbellino M, et al. Louse-borne relapsing fever among East African refugees in Europe. Travel Med Infect Dis. 2016 Mar-Apr;14(2):110-4. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/26872415?tool=bestpractice.bmj.com)

20. Speare R, Thomas G, Cahill C. Head lice are not found on floors in primary school classrooms. Aus N Z J Pub Health. 2002;26(3):208-11. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/12141614?tool=bestpractice.bmj.com)

21. Heukelbach J, Wilcke T, Winter B, et al. Epidemiology and morbidity of scabies and pediculosis capitis in resource-poor communities in Brazil. Br J Derm. 2005 Jul;153(1):150-6. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/16029341?tool=bestpractice.bmj.com)

22. Willems S, Lapeere H, Haedens N, et al. The importance of socio-economic status and individual characteristics on the prevalence of head lice in schoolchildren. Eur J Dermatol. 2005 Sep-Oct;15(5):387-92. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/16172050?tool=bestpractice.bmj.com)

23. Chunge RN, Scott FE, Underwood JE, et al. A pilot study to investigate transmission of head lice. Can J Public Health. 1991 May-Jun;82(3):207-8. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/1884317?tool=bestpractice.bmj.com)

24. Maunder JW. Human lice: some basic facts and misconceptions. Bull Pan Am Health Organ. 1985;19(2):194-7. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/4052692?tool=bestpractice.bmj.com)

25. Burkhart CN. Fomite transmission with head lice: a continuing controversy. Lancet. 2003 Jan 11;361(9352):99-100. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/12531574?tool=bestpractice.bmj.com)

26. Burkhart CN, Burkhart CG. Fomite transmission in head lice. J Am Acad Derm. 2007 Jun;56(6):1044-7 Abstract (http://www.ncbi.nlm.nih.gov/pubmed/17187895?tool=bestpractice.bmj.com)

27. Speare R, Cahill C, Thomas G. Head lice on pillows, and strategies to make a small risk even less. Int J Derm. 2003 Aug;42(8):626-9. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/12890107?tool=bestpractice.bmj.com)

28. Williams LK, Reichert A, MacKenzie WR, et al. Lice, nits, and school policy. Pediatrics. 2001 May;107(5):1011-5. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/11331679?tool=bestpractice.bmj.com)

29. Mumcuoglu KY, Meinking TA, Burkhart CN, et al. Head louse infestations: the "no nit" policy and its consequences. Int J Derm. 2006 Aug;45(8):891-6. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/16911370?tool=bestpractice.bmj.com)

30. Public Health Medicine Environmental Group. Head lice: evidence-based guidelines based on the Stafford Report - 2012 update [internet publication]. Full text (https://www.nhsggc.org.uk/media/239960/stafford-head-lice-2012.pdf)

31. Mumcuoglu KY, Friger M, Ioffe-Uspensky I, et al. Louse comb versus direct visual examination for the diagnosis of head louse infestations. Ped Derm. 2001 Jan-Feb;18(1):9-12. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/11207962?tool=bestpractice.bmj.com)

32. Burgess I. Detection combing. Nurs Times. 2002 Nov 12-18;98(46):57. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/12478939?tool=bestpractice.bmj.com)

33. Pollack RJ, Kiszewski AD, Spielman A. Overdiagnosis and consequent mismanagement of head louse infestation in North America. Pediatr Infect Dis J. 2000 Aug;19(8):689-93. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/10959734?tool=bestpractice.bmj.com)

34. Jahnke C, Bauer E, Hengge UR, et al. Accuracy of diagnosis of pediculosis capitis: visual inspection vs wet combing. Arch Dermatol. 2009 Mar;145(3):309-13. Full text (http://archderm.jamanetwork.com/article.aspx?articleid=711918) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/19289764?tool=bestpractice.bmj.com)

35. Balcioglu C, Burgess IF, Limoncu ME, et al. Plastic detection comb better than visual screening for diagnosis of head louse infestation. Epidemiol Infect. 2008 Oct;136(10):1425-31. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/18177517?tool=bestpractice.bmj.com)

REFERENCES

36. Hootman J. Quality improvement projects related to pediculosis management. J School Nursing. 2002 Apr;18(2):80-6. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/12017250?tool=bestpractice.bmj.com)

37. Feldmeier H. Pediculosis capitis: new insights into epidemiology, diagnosis and treatment. Eur J Clin Microbiol Infect Dis. 2012 Sep;31(9):2105-10. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/22382818?tool=bestpractice.bmj.com)

38. Pollack RJ. The role of the school in battling head lice. Our children (US National PTA). 2007 [internet publication]. Full text (https://identify.us.com/idmybug/head-lice/head-lice-documents/pta_battling_lice.pdf)

39. Jones KN, English JC. Review of common therapeutic options in the United States for the treatment of Pediculosis capitis. Clin Inf Dis. 2003 Jun 1;36(11):1355-61. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/12766828?tool=bestpractice.bmj.com)

40. Downs AM. Managing head lice in an era of increasing resistance to insecticides. Am J Clin Derm. 2004;5(3):169-77. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/15186196?tool=bestpractice.bmj.com)

41. Meinking TL, Entzel P, Villar ME, et al. Comparative efficacy of treatments for Pediculosis capitis infestations. Arch Dermatol. 2001 Mar;137(3):287-92. Full text (https://archderm.jamanetwork.com/article.aspx?articleid=478258) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/11255326?tool=bestpractice.bmj.com)

42. Burkhart CG, Burkhart CN. Safety and efficacy of pedulicides for head lice. Expert Opin Drug Saf. 2006 Jan;5(1):169-79. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/16370965?tool=bestpractice.bmj.com)

43. Burkhart CG, Burkhart CN. Head lice therapies revisited. Derm Online J. 2006 Oct 31;12(6):3. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/17083883?tool=bestpractice.bmj.com)

44. Burkhart CG. Relationship of treatment-resistant head lice to the safety and efficacy of pediculicides. Mayo Clin Proc. 2004 May;79(5):661-6. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/15132409?tool=bestpractice.bmj.com)

45. Lebwohl M, Clark L, Levitt J. Therapy for head lice based on life cycle, resistance, and safety considerations. Pediatrics. 2007 May;119(5):965-74. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/17473098?tool=bestpractice.bmj.com)

46. Do-Pham G, Le Cleach L, Giraudeau B, et al. Designing randomized-controlled trials to improve head-louse treatment: systematic review using a vignette-based method. J Invest Dermatol. 2014 Mar;134(3):628-34. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/24121401?tool=bestpractice.bmj.com)

47. Feldmeier H. Treatment of pediculosis capitis: a critical appraisal of the current literature. Am J Clin Dermatol. 2014 Oct;15(5):401-12. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/25223568?tool=bestpractice.bmj.com)

48. Kristensen M, Knorr M, Rasmussen AM, et al. Survey of permethrin and malathion resistance in human head lice populations from Denmark. J Med Entomol. 2006 May;43(3):533-8. Full text (https://jme.oxfordjournals.org/content/43/3/533.long) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/16739412?tool=bestpractice.bmj.com)

49. Kasai S1, Ishii N, Natsuaki M, Fukutomi H, et al. Prevalence of kdr-like mutations associated with pyrethroid resistance in human head louse populations in Japan. J Med Entomol. 2009 Jan;46(1):77-82. Full text (https://jme.oxfordjournals.org/content/46/1/77.long) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/19198520?tool=bestpractice.bmj.com)

50. Hunter JA, Barker SC. Susceptibility of head lice (Pediculus humanus capitis) to pediculicides in Australia. Parasitol Res. 2003 Aug;90(6):476-8. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/12827503?tool=bestpractice.bmj.com)

51. Durand R, Millard B, Bouges-Michel C, et al. Detection of pyrethroid resistance gene in head lice in schoolchildren from Bobigny, France. J Med Entomol. 2007 Sep;44(5):796-8. Full text (https://jme.oxfordjournals.org/cgi/pmidlookup?view=long&pmid=17915510) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/17915510?tool=bestpractice.bmj.com)

52. Bailey AM, Prociv P. Persistent head lice following multiple treatments: evidence for insecticide resistance in Pediculus humanus capitis. Australas J Dermatol. 2000 Nov;41(4):250-4. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/11105372?tool=bestpractice.bmj.com)

53. Sendzik J, Stahlmann R. Arzneimittel gegen Kopflausbefall. Toxikologie und Wirksamkeit [in German]. Med Monatsschr Pharm. 2005 May;28(5):167-72.

54. Menegaux F, Baruchel A, Bertrand Y, et al. Household exposure to pesticides and risk of childhood acute leukaemia. Occup Environ Med. 2006 Feb;63(2):131-4. Full text (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2078075) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/16421392?tool=bestpractice.bmj.com)

55. Cummings C, Finlay JC, MacDonald NE et al. Head lice infestations: a clinical update. Paediatr Child Health. 2024 Jan 11;23(1):e18-24. Full text (https://cps.ca/documents/position/head-lice)

56. US Food and Drug Administration. FDA public health advisory: safety of topical lindane products for the treatment of scabies and lice. 2009 [internet publication]. Full text (https://www.fda.gov/Drugs/DrugSafety/PostmarketDrugSafetyInformationforPatientsandProviders/ucm110845.htm)

57. Takano-Lee M, Edman JD, Mullens BA, et al. Home remedies to control head lice: assessment of home remedies to control the human head louse, Pediculus humanus capitis. J Ped Nursing. 2004 Dec;19(6):393-8. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/15637580?tool=bestpractice.bmj.com)

58. Priestley CM, Burgess IF, Williamson EM. Lethality of essential oil constituents towards the human louse, Pediculus humanus, and its eggs. Fitoterapia. 2006 Jun;77(4):303-9. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/16707234?tool=bestpractice.bmj.com)

REFERENCES

59. Speare R, Canyon DV, Cahill C, et al. Comparative efficacy of two nit combs in removing head lice (Pediculosis capitis) and their eggs. Int J Dermatol. 2007 Dec;46(12):1275-8. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/18173523?tool=bestpractice.bmj.com)

60. Lapeere H, Brochez L, Verhaeghe E, et al. Efficacy of products to remove eggs of Pediculus humanus capitis (Phthiraptera: Pediculidae) from the human hair. J Med Entomol. 2014 Mar;51(2):400-7. Full text (https://jme.oxfordjournals.org/content/51/2/400.long) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/24724290?tool=bestpractice.bmj.com)

61. Bainbridge CV, Klein GL, Neibart SI, et al. Comparative study of the clinical effectiveness of a pyrethrin-based pediculicide with combing versus a permethrin-based pediculicide with combing. Clin Pediatr (Phila). 1998 Jan;37(1):17-22. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/9475695?tool=bestpractice.bmj.com)

62. Plastow L, Luthra M, Wright J, et al. Head lice infestation: bug busting vs traditional treatment. J Clin Nursing. 2001 Nov;10(6):775-83. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/11822849?tool=bestpractice.bmj.com)

63. Tebruegge M, Runnacles J. Is wet combing effective in children with pediculosis capitis infestation? Arch Dis Child. 2007 Sep;92(9):818-20. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/17715448?tool=bestpractice.bmj.com)

64. Monheit BM, Norris MM. Is combing the answer to head lice? J Sch Health. 1986 Apr;56(4):158-9. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/3515048?tool=bestpractice.bmj.com)

65. O'Brien E. Detection and removal of head lice with an electronic comb: zapping the louse! J Pediatr Nurs. 1998 Aug;13(4):265-6. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/9753913?tool=bestpractice.bmj.com)

66. Burkhart CN, Burkhart CG, Pchalek I, et al. The adherent cylindrical nit structure and its chemical denaturation in vitro: an assessment with therapeutic implications for head lice. Adolesc Med. 1998 Jul;152(7):711-2. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/9667548?tool=bestpractice.bmj.com)

67. DeFelice J, Rumsfield J, Bernstein JE, et al. Clinical evaluation of an after-pediculicide nit removal system. Int J Dermatol. 1989 Sep;28(7):468-70. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/2674043?tool=bestpractice.bmj.com)

68. Goates BM, Atkin JS, Wilding KG, et al. An effective nonchemical treatment for head lice: a lot of hot air. Pediatrics. 2006 Nov;118(5):1962-70. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/17079567?tool=bestpractice.bmj.com)

69. Heukelbach J, Oliveira FA, Richter J, et al. Dimeticone-based pediculicides: a physical approach to eradicate head lice. Open Dermatol J. 2004 Sep;114(3):e275-9. Full text (https://benthamopen.com/contents/pdf/TODJ/TODJ-4-77.pdf)

70. Richling I, Böckeler W. Lethal effects of treatment with a special dimeticone formula on head lice and house crickets (Orthoptera, Ensifera: Acheta domestica and Anoplura, phthiraptera: Pediculus

humanus). Insights into physical mechanisms. Arzneimittelforschung. 2008;58(5):248-54. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/18589559?tool=bestpractice.bmj.com)

71. Burgess IF. The mode of action of dimeticone 4% lotion against head lice, Pediculus capitis. BMC Pharmacol. 2009 Feb 20;9:3 Full text (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2652450) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/19232080?tool=bestpractice.bmj.com)

72. Kurt O, Balcioğlu IC, Burgess IF, et al. Treatment of head lice with dimeticone 4% lotion: comparison of two formulations in a randomised controlled trial in rural Turkey. BMC Public Health. 2009 Dec 1;9:441. Full text (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2794865) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/19951427?tool=bestpractice.bmj.com)

73. Burgess IF, Brunton ER, Burgess NA. Single application of 4% dimeticone liquid gel versus two applications of 1% permethrin creme rinse for treatment of head louse infestation: a randomised controlled trial. BMC Dermatol. 2013 Apr 1;13:5. Full text (https://www.biomedcentral.com/1471-5945/13/5#B2) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/23548062?tool=bestpractice.bmj.com)

74. Burgess IF, Brown CM, Lee PN. Treatment of head louse infestation with 4% dimeticone lotion: randomised controlled equivalence trial. BMJ. 2005 Jun 18;330(7505):1423. Full text (https://www.bmj.com/cgi/content/full/330/7505/1423) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/15951310?tool=bestpractice.bmj.com)

75. Heukelbach J, Pilger D, Oliveira FA, et al. A highly efficacious pediculicide based on dimeticone: randomized observer blinded comparative trial. BMC Infect Dis. 2008 Sep 10;8:115. Full text (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2553415) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/18783606?tool=bestpractice.bmj.com)

76. Burgess IF1, Lee PN, Matlock G. Randomised, controlled, assessor blind trial comparing 4% dimeticone lotion with 0.5% malathion liquid for head louse infestation. PLoS One. 2007 Nov 7;2(11):e1127. Full text (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2043492) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/17987114?tool=bestpractice.bmj.com)

77. Strycharz JP, Yoon KS, Clark JM. A new ivermectin formulation topically kills permethrin-resistant human head lice (Anoplura: Pediculidae). J Med Entomol. 2008 Jan;45(1):75-81. Full text (https://jme.oxfordjournals.org/content/45/1/75.long) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/18283945?tool=bestpractice.bmj.com)

78. Heukelbach J, Sonnberg S, Becher H, et al. Ovicidal efficacy of high concentration dimeticone: a new era of head lice treatment. J Am Acad Dermatol. 2011 Apr;64(4):e61-2. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/21414492?tool=bestpractice.bmj.com)

79. Burgess IF, Burgess NA. Dimeticone 4% liquid gel found to kill all lice and eggs with a single 15 minute application. BMC Res Notes. 2011;4:15. Full text (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3038924) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/21266024?tool=bestpractice.bmj.com)

80. Burgess IF, Lee PN, Brown CM. Randomised, controlled, parallel group clinical trials to evaluate the efficacy of isopropyl myristate/cyclomethicone solution against head lice. Pharm J. 2008;280:371-5.

REFERENCES

81. Kaul N, Palma KG, Silagy SS, et al. North American efficacy and safety of a novel pediculicide rinse, isopropyl myristate 50% (Resultz). J Cutan Med Surg. 2007 Sep-Oct;11(5):161-7. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/17942025?tool=bestpractice.bmj.com)

82. Pearlman DL. A simple treatment for head lice: dry-on, suffocation-based pediculicide. Pediatrics. 2004 Sep;114(3):e275-9. Full text (https://pediatrics.aappublications.org/content/114/3/e275.full) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/15342886?tool=bestpractice.bmj.com)

83. Pearlman D. Cetaphil cleanser (Nuvo Lotion) cures head lice. Pediatrics. 2005 Dec;116(6):1612. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/16322200?tool=bestpractice.bmj.com)

84. Tomalik-Scharte D, Lazar A, Meins J, et al. Dermal absorption of permethrin following topical administration. Eur J Clin Pharmacol. 2005 Jul;61(5-6):399-404. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/15947923?tool=bestpractice.bmj.com)

85. Gao JR, Yoon KS, Lee SH, et al. Increased frequency of the T929I and L932F mutations associated with knockdown resistance in permethrin-resistant populations of the human head louse, Pediculus capitis, from California, Florida, and Texas. Pestic Biochem Physiol. 2003 Nov;77(3):115-24.

86. Meinking TL, Vicaria M, Eyerdam DH, et al. A randomized, investigator-blinded, time-ranging study of the comparative efficacy of 0.5% malathion gel versus Ovide Lotion (0.5% malathion) or Nix Creme Rinse (1% permethrin) used as labeled, for the treatment of head lice. Ped Derm. 2007 Jul-Aug;24(4):405-11. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/17845167?tool=bestpractice.bmj.com)

87. Meinking TL, Vicaria M, Eyerdam DH, et al. Efficacy of a reduced application time of Ovide lotion (0.5% malathion) compared to Nix creme rinse (1% permethrin) for the treatment of head lice. Ped Derm. 2004 Nov-Dec;21(6):670-4. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/15575855?tool=bestpractice.bmj.com)

88. Yoon KS, Gao JR, Lee SH, et al. Permethrin-resistant human head lice, Pediculus capitis, and their treatment. Arch Dermatol. 2003 Aug;139(8):994-1000. Full text (https://archderm.jamanetwork.com/article.aspx?articleid=479452) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/12925385?tool=bestpractice.bmj.com)

89. Meinking TL, Serrano L, Hard B, et al. Comparative in vitro pediculicidal efficacy of treatments in a resistant head lice population in the United States. Arch Dermatol. 2002 Feb;138(2):220-4. Full text (https://archderm.jamanetwork.com/article.aspx?articleid=478698) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/11843643?tool=bestpractice.bmj.com)

90. Abramowicz M, ed. Drugs for head lice. Med Lett Drugs Ther. 1997 Jan 17;39(992):6-7. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/9008683?tool=bestpractice.bmj.com)

91. Pollack RJ, Kiszewski A, Armstrong P, et al. Differential permethrin susceptibility of head lice sampled in the United States and Borneo. Arch Pediatr Adolesc Med. 1999 Sep;153(9):969-73. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/10482215?tool=bestpractice.bmj.com)

92. Alsaady IM, Altwaim S, Gattan HS, et al. Prevalence of permethrin-resistant kdr mutation in head lice (Pediculus humanus capitis) from elementary school students in Jeddah, Saudi Arabia. PeerJ.

2023;11:e16273. Full text (https://peerj.com/articles/16273) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/37901472?tool=bestpractice.bmj.com)

93. Chosidow O, Giraudeau B, Cottrell J, et al. Oral ivermectin versus malathion lotion for difficult-to-treat head lice. New Engl J Med. 2010 Mar 11;362(10):896-905. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/20220184?tool=bestpractice.bmj.com)

94. POEMs Research Summaries. Ivermectin safe and effective for treatment of resistant head lice. J Natl Med Assoc. 2010;102:662-3.

95. Karacic I, Yawalker SJ. A single application of crotamiton lotion in the treatment of patients with pediculosis capitis. Int J Dermatol. 1982 Dec;21(10):611-3. Abstract (http://www.ncbi.nlm.nih.gov/pubmed/7160954?tool=bestpractice.bmj.com)

96. Burgess IF, Lee PN, Kay K, et al. 1,2-Octanediol, a novel surfactant, for treating head louse infestation: identification of activity, formulation, and randomised, controlled trials. PLoS One. 2012;7(4):e35419. Full text (https://www.plosone.org/article/info%3Adoi%2F10.1371%2Fjournal.pone.0035419) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/22523593?tool=bestpractice.bmj.com)

97. Burgess IF, Burgess NA, Brunton ER. Tocopheryl acetate 20% spray for elimination of head louse infestation: a randomised controlled trial comparing with 1% permethrin creme rinse. BMC Pharmacol Toxicol. 2013 Sep 3;14:43. Full text (https://www.biomedcentral.com/2050-6511/14/43) Abstract (http://www.ncbi.nlm.nih.gov/pubmed/24004959?tool=bestpractice.bmj.com)

98. National Association of School Nurses (US). Head lice management in the school setting: position statement. January 2016 [internet publication]. Full text (https://www.nasn.org/PolicyAdvocacy/PositionPapersandReports/NASNPositionStatementsFullView/tabid/462/ArticleId/934/Head-Lice-Management-in-the-School-Setting-Revised-2016)

Images

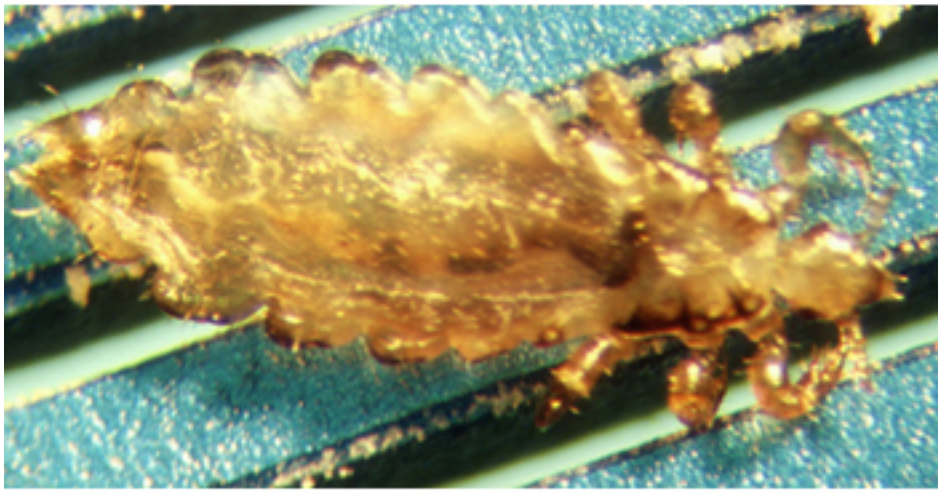

Figure 1: Adult louse seen under a microscope

From the collection of Dr Richard Pollack; used with permission

Figure 2: Unhatched nit of a head louse

Public Health Image Library (PHIL); used with permission

Figure 3: Nymph of head louse about to emerge from egg

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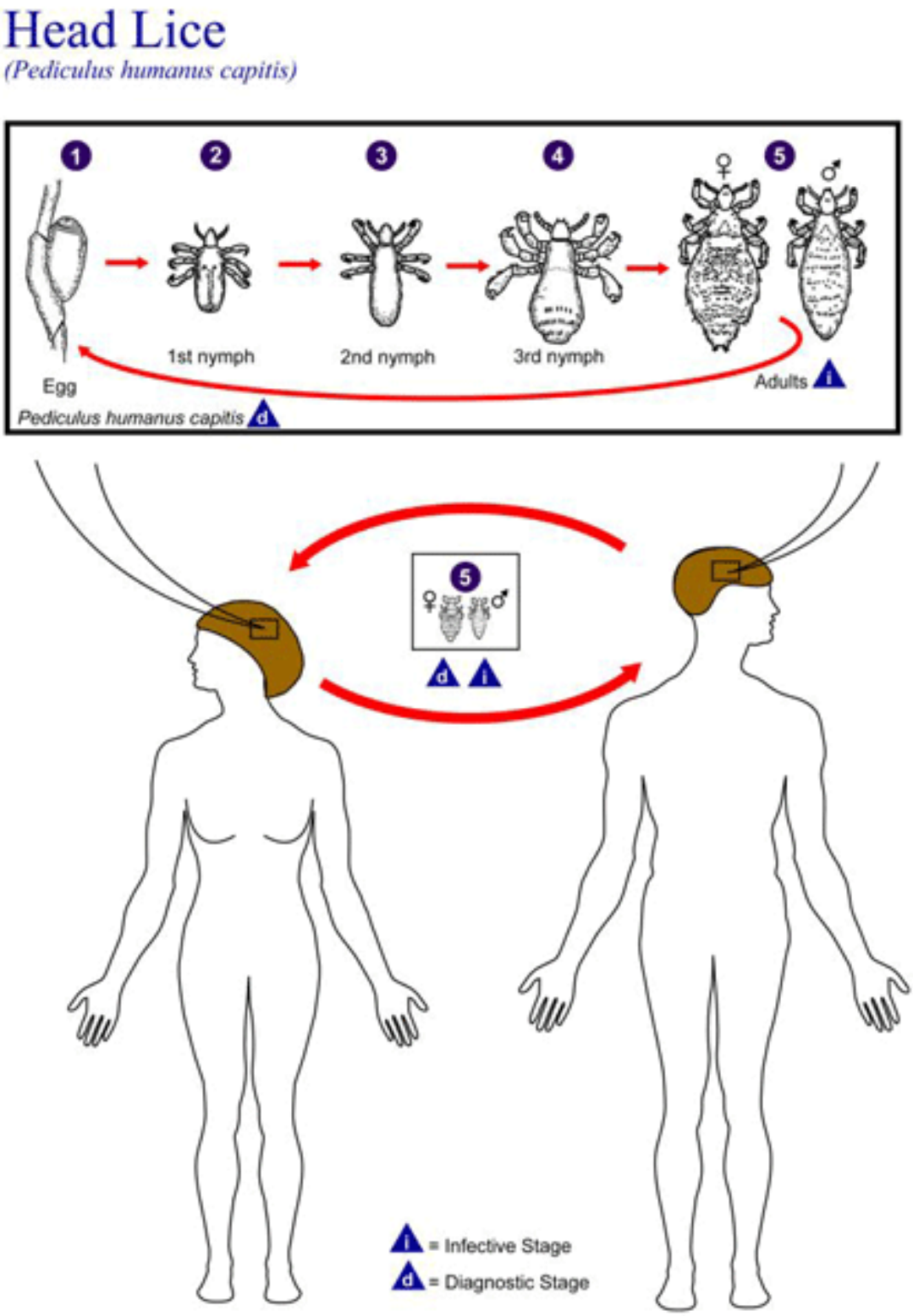

Figure 4: Illustration of life cycle of head lice

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Regardless of the language in which the content is displayed, numerals are displayed according to the original English-language numerical separator standard. For example 4 digit numbers shall not include a comma nor a decimal point; numbers of 5 or more digits shall include commas; and numbers stated to be less than 1 shall be depicted using decimal points. See Figure 1 below for an explanatory table.

BMJ accepts no responsibility for misinterpretation of numbers which comply with this stated numerical separator standard.

This approach is in line with the guidance of the International Bureau of Weights and Measures Service.

Figure 1 – BMJ Best Practice Numeral Style

5-digit numerals: 10,000

4-digit numerals: 1000

numerals < 1: 0.25

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