

DERMATOLOGY CLINIC
What's Your Diagnosis?



A 'Louse-y' Scalp Itch

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CASE: A 14-year-old female presents for evaluation of an itchy scalp. She has no history of dandruff, but she tends to get a dry scalp in the winter. She washes her hair at least 3 times a week and sometimes wears hair care products, like gel and hairspray. She was away at summer camp last month, where she played sports, shared hats and headphones, and snapped group selfies with friends on her cell phone. On exam,



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she has 2-3mm whitish, linear pieces stuck to her hair, about 1 cm (< ½ inch) from the scalp. There are no crawling bugs noted in the hair. She has some scratch marks behind her ears, but no redness of the scalp or swollen occipital lymph nodes.

What's Your Diagnosis?

- (A) HAIR CASTS
- (B) SEBORRHEIC DERMATITIS
- (C) PIEDRA
- (D) HEAD LICE

ANSWER: (D) HEAD LICE

Head lice is a common scalp infestation in children. Each year, between 6-12 million cases are diagnosed among children aged 3-12 years. Adult lice are wingless parasites that crawl very quickly, but cannot jump or fly. Hence, lice is caught by close head-to-head contact, which allows the adult lice to crawl from one head to another. Lice can theoretically crawl onto fomites, such as hairbrushes, hats, pillowcases, sofas and mats, from which they can be transferred to new heads or re-infest previous hosts, however, this is not the main source of spread. Since younger children are more likely to play and lie closer together, lice is more commonly seen in younger children. However, shared helmets, headphones and head-to-head cell-phone selfie photos among adolescents and teens may be increasing the incidence of head lice in this older population (aka 'social media lice').

The lifecycle of the female louse is about 3-4 weeks. The adult louse lays up to 10 eggs per day and cements them to the host hair shaft, within 0.5cm from the scalp. These eggs (aka nits) incubate near the warm scalp for 7-9 days before hatching (up to 12 days, if cold climate). The nymph takes 8-12 days to develop into an adult. After 1.5 days as an adult, it is able to lay its own eggs. If left untreated, this cycle will continue every 3 weeks.

Many children are asymptomatic, which is why lice is so easily spread through kindergarten and elementary schools. It can take weeks after initial infestation for symptoms to develop, because it can take that long to develop a hypersensitivity reaction to the louse saliva as it feeds. The most common complaint is itch, and kids may scratch their necks and scalps to the point of bleeding and waking at night. They can complain of a crawling sensation on their heads. They can have enlarged occipital lymph nodes. They may present with pink eye.

When examining the scalp and hair, section the hair into small pieces and look for active lice and nits, especially within ½ inch (viable lice and nits will probably be within ¼ inch) of the scalp, and in the post-auricular and occipital areas. Adult lice look like 2-3mm grey-tan sesame seeds with 6 legs that crawl quickly through the hair. Nits (eggs) can be white, yellow, beige or brown when they are alive, but are clear/white and easier to spot once the nymph hatches and leaves the shell. Nits are 1-2mm and are 'cemented' onto the hair shaft, making them extremely difficult to remove. Nits that are discovered beyond ½-1 inch from the scalp (¼ inch, per the CDC) are unlikely to ever hatch into a live louse. Head lice is seen more commonly in females than in males, and in Caucasians more than African Americans. The former is likely because girls play with their heads more closely together than boys do, the latter is because lice may have a harder time grabbing onto hairs of different thickness and shapes.

Head lice do not spread disease, but they can cause scalp itch and irritation. Severe scratching can lead to secondary bacterial skin infections. Catching lice does not mean that your hair or home is dirty; lice are looking for human blood on which to feed in order to survive. This is why lice and live nits are found very close to the scalp, and why lice and nits cannot survive for long on fomites (one study suggests up to 55 hours, but they probably dry up before then). Because many schools have a no lice/ no nits policy, and because of the social stigma of being diagnosed with lice, there are many treatment options available. Most treatments will kill live lice, but the nits will remain, unless physically removed. Lice are often present for weeks before they are detected, and the majority of children with nits do not develop an active infestation. The finding of nits without live lice does not confirm active infestation; conversion to active infestation is

somewhat more probable if ≥ 5 nits are found within $\frac{1}{4}$ inch of the scalp (32% vs 7% controls). Of note, the CDC, the American Academy of Pediatrics (AAP) and the National Association of School Nurses (NASN) advocate that 'no-nit' policies in schools should be discontinued.

TREATMENT:

Pyrethrins are the classic treatment for head lice, and are approved for ages 2 years and older. Available over-the-counter (Brands: Rid, Triple X, Pronto, Licide), these shampoo formulations are meant to be lathered into dry hair/scalp and left on for 10 minutes before rinsing the hair over the sink or tub. Keep your child dressed when rinsing the shampoo, to minimize skin contact with the product. Do not wash hair again for 2 days, so that any residual medication can kill remaining lice/nymphs that continue to hatch. Permethrin 1% lotion (Brand: Nix) is a synthetic pyrethrin that may be less allergenic and is approved for ages 2 months and older. Pyrethrins kill active lice, but do not kill unhatched nits, so it is important to re-treat the hair 7-10 days later. Re-treatment needs to occur after all of the eggs have hatched, but before new ones can be laid. Re-check the hair in 8-12 hours after each shampoo application to look for active adult lice. If there are no dead lice at that time and all of the lice are as active as before treatment, consider an alternative ingredient for re-treatment. The shampoo should come with a fine-toothed comb, meant for physically combing out the hair in small sections, to remove adult lice and nits from the individual hair strands (aka nit-picking). It is important to comb the hair every day for at least 2 weeks, to be sure that all of the lice and nits are removed. If new live lice or nits are found after completing the second round of treatment, then the child may have been re-infected (by family, friends or fomites), or the lice is resistant (aka super-lice). In fact, pyrethrin-resistant lice has been found in at least 29 US states, including California. For these cases, or in areas of known resistant species, consider the following prescription treatment options. All of them can be temporarily irritating to the scalp, skin and eyes. Limit skin contact and rinse skin and eyes well, as needed.

- Benzyl Alcohol 5% lotion (Brand: Ulesfia) – This medication is indicated for ages 6 months and older, is safe in pregnancy and breastfeeding. It only kills live adult lice (by asphyxiation), so re-treatment is necessary in 7-10 days. The lotion is applied to dry hair and rinsed out after 10 minutes. You must comb the hair to remove lice and nits after treatment, and then daily until clear. Resistance is not common.
- Ivermectin 0.5% lotion (Brand: Sklice) – This treatment is also indicated for ages 6 months and older. It is great because it can kill both adult lice and newly hatched nits/nymphs, so it usually requires only one treatment and does not require combing the hair. It is applied to dry hair and rinsed out after 10 minutes. It is expensive.
- Malathion 0.5% lotion (Brand: Ovide) – This organophosphate is approved for ages 6 years and older. It kills both adult lice, as well as nits. It is applied to dry hair and left on for 8-12 hours, before rinsing. It is extremely flammable, so do not apply it anywhere near a cigarette, stove, campfire or electrical tool. One application should suffice, but may be repeated if live lice are still present 7-10 days after the initial treatment. There is significant resistance to malathion in the UK, but not the US.
- Spinosad 0.9% topical suspension (Brand: Natroba) – Derived from soil bacteria, this treatment kills both live lice and unhatched nits, so it should require only 1 application and no nit-picking. It is applied to dry hair and rinsed out after 10 minutes. However, be sure to re-examine the hair in 7 days. If there are adult lice or new nits, repeat treatment or consider another ingredient. It is safe in children aged 6 months and older. It is expensive.

- Lindane 1% shampoo – This old-school organochloride treatment is FDA-approved as a last measure, for resistant cases, as it can be neurotoxic if not applied properly. Adverse effects include seizures. It is no longer recommended by the AAP for use in children, and should be avoided by pregnant or breastfeeding women, infants, children, elderly, persons with known seizure disorders, HIV, open wounds or persons under 110 lbs.

Treating your Home:

- It is important to check household members, caregivers and close contacts, to be sure that re-infestation does not occur. Inspect the hair daily for at least 10 days. Only treat persons who have clinical evidence of live nits or adult lice or persons who share a bed with an actively infested person.
- Remove the hair and then soak all hairbrushes and combs in hot water (≥ 130 °F) for 5-10 minutes.
- Wash all hats, pillowcases, sheets, blankets, towels and clothing that the infected child has been in contact with in the previous 2 days in hot water and dry them in a hot dryer (≥ 130 °F) for at least 5-10 minutes.
- For items, like pillows, comforters and stuffed toys, that may not tolerate a hot wash cycle, toss them into a hot dryer for 20-30 minutes (5 minutes at ≥ 130 °F is sufficient, per the CDC) or dry clean them.
- For true unwashables (helmets, headphones, hair accessories, hats), seal them in a plastic bag and either place them in the freezer overnight or leave them aside for 2 weeks, the time it takes for adult lice and newly hatched nymphs to grow and die.
- Vacuum carpets, furniture and floors to remove any nit/lice-bearing hairs that may have been shed. It is normal to shed up to 100 hairs a day. Consider vacuuming daily until the hair is clear of live lice and nits, however, adult lice cannot survive more than 2 days without a feed, and live nits will die within 1 week.

DIFFERENTIAL DIAGNOSIS:

HAIR CASTS These are 2-5mm white, tubular, sheath-like keratin rings that surround the hair shaft. They can be insignificant, shed skin from the lining of the hair follicle, or associated with a dry/irritated scalp, dandruff or psoriasis. They slide off easily and do not require treatment. They look similar to dried on hair styling product, which is also easily removed from the hair shafts with washing or brushing.



Hair Casts: (Copyright: Tsippora Shainhouse 2016)

SEBORRHEIC DERMATITIS This is essentially dandruff, a scalp condition that presents as greasy, non-adherent scalp scale, with or without scalp itch. It is actually an irritation reaction to yeast that naturally lives in scalp oils. In people who don't wash hair frequently and/or who are particularly sensitive to this yeast, flaky scalp scale can develop. It can be managed with dandruff shampoos, which kill fungus.



Seborrheic Dermatitis:(Copyright: Tsippora Shainhouse 2016)

PIEDRA White and black piedra are fungal infections that live on the hair shafts, particularly in tropical climates. They appear as either small white/beige or brown/black concretions on the skin. White piedra tends to be soft and easily removed from the hair shafts; it is caused by *Trichosporon sp.* and is more commonly found on face, axillary and genital hairs. Black piedra is firm and firmly fixed to the hair shafts; it is caused by *Piedra hortae*, and is more commonly found on scalp and facial hairs. Fungal elements can be seen on a KOH (potassium hydroxide) prep, to differentiate it from nits or hair casts. It is most easily treated by shaving the hairs.



Black Piedra: (VisualDx 2011 1)

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