Therapeutic Class Overview
Scabicides and Pediculicides

Therapeutic Class

- **Overview/Summary:** The agents indicated for the management of scabies and head lice are listed in Table 1. The skin and mucous membrane scabicides and pediculicides are approved to treat pediculosis and scabies.[1-10] Pediculosis is a transmissible infection, which is caused by three different kinds of lice depending on the location: head (*Pediculus humanus capitis*), body (*Pediculus humanus corporis*) and pubic region (*Phthirus pubis*). Pediculosis is often asymptomatic; however, itching may occur due to hypersensitivity to lice saliva.[11] Scabies is also a transmissible skin infection caused by the mite *Sarcoptes scabiei.* Mites burrow into the skin and lay eggs, which when hatched, will crawl to the skin's surface and begin to make new burrows. The most common clinical manifestation of scabies is itching, which is due to a hypersensitivity reaction to the mite or mite excrement.[12] When treating scabies and lice, the goal of therapy is to eradicate the parasite. Benzyl alcohol inhibits lice from closing their respiratory spiracles, which causes the lice to asphyxiate.[3] Crotamiton has scabicidal and antipruritic actions; however, the exact mechanism of action is unknown.[4] Lindane is a central nervous system stimulant, which causes convulsions and death of the arthropod.[1,2] Malathion is an organophosphate agent, which inhibits cholinesterase activity.[5] Permethrin disrupts the sodium channel current, which leads to delayed repolarization and paralysis of the arthropod.[1,2] Spinosad causes neuronal excitation, which leads to paralysis and death.[6] The suspension also contains an unspecified amount of benzyl alcohol. Retreatment with benzyl alcohol and permethrin is required after seven to 10 days to eradicate the infestation. The newest agent in the class ivermectin, is pediculicidal but not ovicidal and it is approved as a single application product only.[7] Lindane, malathion, permethrin, spinosad, and piperonyl butoxide and pyrethrins products are available generically, while permethrin, and piperonyl butoxide and pyrethrins products are also available over-the-counter.

Table 1. Current Medications Available in the Therapeutic Class[1-10]

Generic (Trade Name)	Food and Drug Administration Approved Indications	Dosage Form/Strength	Generic Availability
Single-Entity Agents			
Benzyl alcohol (Ulesfia®)	Treatment of head lice	Lotion: 5% (227 g/bottle)	-
Crotamiton (Eurax®)	Treatment of scabies	Cream: 10% (2 oz/ tube) Lotion: 10% (2 oz/bottle, 16 oz/bottle)	-
Ivermectin (Sklice®)	Treatment of head lice	Lotion: 0.5% (4 oz/tube)	-
Lindane*	Treatment of head and pubic lice	Shampoo: 1% (2 oz/bottle)	✔
Malathion (Ovide®*)	Treatment of head lice	Lotion: 0.5% (2 oz/ bottle)	✔
Permethrin*† (Acticin®, Nix Complete Lice System®*†, Nix Crème Rinse®*†)	Treatment of head lice and scabies	Cream: 5% (2 oz/tube) Liquid: 1% (2 oz/bottle) Lotion: 1% (2 oz/bottle, 4	✔

Generic (Trade Name)	Food and Drug Administration Approved Indications	Dosage Form/Strength	Generic Availability
		oz/bottle)	
Spinosad (Natroba®*)	Treatment of head lice	Topical Suspension: 0.9% (4 oz/bottle)	✔
Combination Products			
Piperonyl butoxide and pyrethrins*† (Licide Complete Lice Treatment Kit®*†, Pronto®*†, RID®*†)	Treatment of head, body and pubic lice	Gel: 4/0.33% (each kit) Shampoo: 4/0.33% (each kit) Solution: 4/0.33% (each kit)	✔

*Generic available in one dosage or strength.
†Over-the-counter product is available in at least one dosage form or strength.

Evidence-based Medicine

- In two, randomized, active-controlled trials in patients with an active head lice infestation, a greater proportion of patients were lice-free 14 days following treatment with spinosad alone compared to patients who received permethrin plus nit combing (P<0.001 for both trials).[13]
- The combined results of two identical, vehicle-controlled trials (N=765) in patients six months and older with head lice showed that significantly more patients treated with ivermectin lotion were lice-free on day two (94.9 vs 31.3%), day eight (85.2 vs 20.8%) and remained lice-free through day 15 (73.8 vs 17.6%; P<0.001 for each day) compared to the vehicle group.[14]
- In two studies comparing benzyl alcohol to its vehicle, the absolute difference in treatment success rate in study one was 71.4% in favor of benzyl alcohol (95% confidence interval [CI], 61.8 to 85.7) and 48.8% (95% CI, 31.1 to 62.0) in study two, again in favor of benzyl alcohol. Benzyl alcohol was associated with a lower risk of treatment failure in both studies (P<0.001 for both).[15]
- For the treatment of lice, permethrin has demonstrated a higher rate of treatment success compared to lindane, following a single application.[16-19] Compared to the combination of pyrethrins and piperonyl butoxide, permethrin was more efficacious several days following treatment; however, one study found the agents to be equally effective at 14 days following treatment (P>0.01).[20,21] In multiple studies, malathion has been reported to be pediculicidal and ovicidal when compared to permethrin.[22,23]
- In studies comparing various topical agents for the treatment of scabies, a higher cure rate has been demonstrated with permethrin compared to crotamiton and lindane.[24-29] In the largest study completed (N=467), Schultz et al reported that there was a trend towards a higher cure rate with permethrin treatment compared to lindane; however, the difference was not statistically significant.[25]

Key Points within the Medication Class

- According to Current Clinical Guidelines:
  - Permethrin and pyrethrin products are recommended for treatment of scabies and lice, despite increasing resistance in the United States. These agents are available over-the-counter without a prescription.[29,30]
  - Malathion 0.5% can be used in people who are ≥24 months of age when resistance to permethrin or pyrethrins is documented or when treatment with these products fails despite their correct use. Due to the high alcohol concentration of the product it is highly flammable.[29,30]
  - Permethrin is the most studied pediculicide and is the least toxic to humans. Permethrin is less allergenic than pyrethrins and does not cause allergic reactions in individuals with plant allergies.[30]
  - Lindane has low ovicidal activity (30 to 50% of eggs are not killed), and resistance has been reported worldwide for many years. For these reasons, it should be used cautiously. The Food

and Drug Administration (FDA) has warned that incorrect use of lindane can be neurotoxic and its use should be restricted to patients for whom prior treatments have failed or in those patients who cannot tolerate safer medications. [29,30]
    - Lindane should not be used to treat premature infants, persons with the human immunodeficiency virus, seizure disorders, women who are pregnant or breast-feeding, persons who have very irritated skin or sores where the lindane will be applied, infants, children, the elderly, and persons who weigh <110 pounds. [29,30]
    - Permethrin is the drug of choice for the treatment of scabies. Two (or more) applications may be necessary to eliminate all mites, particularly when treating crusted (Norwegian) scabies.
    - Crotamiton is approved for the treatment of scabies in adults but is frequently associated with treatment failure.[31]
    - Lindane is not recommended as a first-line therapy for the treatment of scabies due to its potential for toxicity with frequent or incorrect use. Lindane should be restricted to patients who have failed recommended therapies or who cannot tolerate recommended treatments.[31]
- Other Key Facts:
    - Several first-line therapies are available generically in at least one strength or formulation.[1]
    - According to the manufacturer, spinosad is the first FDA-approved head lice treatment that does not require nit combing following treatment.[33]
    - Ivermectin is approved for use as a single application only and is not indicated for retreatment.[7]
    - Reasons for treatment failure with the topical scabicide and pediculicide products include misdiagnosis, noncompliance, failure to follow instructions correctly, not enough pediculicide applied, reinfestation, and resistance. If resistance is suspected, retreatment should be with a different chemical entity than initially used.[34]

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