

Topical Therapies: Shampoos and Rinses

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Topical therapy is used in the management of many dermatologic diseases. Although topical therapy is most often used as an adjunctive therapy, it can also be used as a sole treatment or as palliative therapy while awaiting definitive diagnosis.

Quick definitions

- Shampoos are vehicles that are left on for at least 10 minutes, then rinsed off.
- Rinses (dips) are vehicles that are applied to the animal, and left on (not rinsed off).

General principles for using shampoos and rinses

1. Remember the philosophy: "Above all do no harm". Choose the product with the least risk for side effects. Use the safest, simplest, mildest topical therapy that will effectively achieve the therapeutic objective. Key points to remember:
 - a. Anything applied topically, particularly to already inflamed skin, has the potential to cause irritation or contact dermatitis.
 - b. The more products you use, the more chance there is for incompatibility reactions or drug interactions.
 - c. Some topical products can be absorbed systemically (either percutaneously or through oral ingestion from grooming behavior). This systemic absorption may result in side effects, toxicities or drug interactions.
 - d. If a topical therapy worsens a patient's condition, then discontinue the use of that product immediately. Recommend owner rinse the patient in luke-warm water, in case any of the product remains on the skin. Re-examine the patient and determine the reason for the adverse reaction, such as irritation, drug reaction/sensitivity, drug interaction, disease progression, or incorrect original diagnosis.
2. Owner compliance determines the success of topical therapy. It is of no benefit to the patient if the client will not use the product or uses it improperly. Many factors can influence owner compliance.
 - a. Proper instructions: provide clear, detailed, written instructions as to how to apply the product, length of skin contact time and whether or not it is meant to be rinsed off.
 - b. Temperament of the pet: some cats and dogs can be very difficult to bathe, especially if the affected area is painful. Example: feet and ears.
 - c. Cost of therapy: consider the size of the area to be treated or the size of the patient; larger dogs or thicker hair coats will be more expensive to treat.
 - d. Owner's own physical and time constraints: are the recommendations regarding the use and frequency of topical therapy realistic, practical and feasible?
 - e. Cosmetic acceptance of the product: some products may smell unpleasant or discolor the coat, making their use less appealing to owners.
 - f. Vigorous washing against the lay ('grain') of the hair is discouraged:
 - g. It is too easy to induce a folliculitis.
 - h. Do not use out of date products: this is especially important if bottles have been left open for long periods of time, which could allow bacteria to grow in the product.
3. Agents are the active ingredients in the product. They have the following activities: antibacterial, antifungal, antiparasitic, antiseborrheic (keratolytic or keratoplastic), moisturizing, antipruritic/anti-inflammatory, sunscreens or deterrents.
4. Vehicles are the delivery system for the application of the active ingredient. The vehicle can have therapeutic, cosmetic or irritant effects on the skin.

Shampoos are vehicles: One of the most commonly used vehicles for topical therapy. Removes scales, crusts, debris, organisms, old medications. Requires minimum contact time of 10 minutes and then needs to be thoroughly rinsed off. Utilize veterinary products that are formulated for canine skin; their pH is more basic than human skin. Choose shampoo with appropriate agent or active ingredient for desired therapeutic objective, such as antimicrobial, antiseborrheic, or antiparasitic. Newer products possess sustained-release microvesicle technology:

- a. Novasomes® (ELANCO) Microvesicles have an outer lipid membrane and contain water. The lipid membrane binds to hair and skin and gives a long-term (7-10 days) moisturizing effect as the microvesicles break down. The active medication is not incorporated and will still be rinsed away.

- b. Spherulites® (Virbac) Composed of multiple layers of surfactants within the microvesicle and contain chitosanide which helps form a film coating over the skin and hair. The shampoo ingredient contained within the spherulites® is slowly released over an 8 day period. Many agents may be encapsulated within the same spherulite®, such as moisturizing agents, essential oils, water and fat soluble vitamins

Rinses (dips) – also vehicles.

These products are most often applied to the entire body and provide good coverage. Can deliver parasiticides, antipruritic agents or moisturizers. They are concentrated solutions or powders mixed with water that are poured, sponged or sprayed onto the animal. They are not typically absorbed well and provide mainly a surface effect. They are NOT rinsed off; thus use the term “dip” since the term “rinse” implies it will be washed off. This may be confusing for owners.

Agents used in topical therapy

Agents are the active ingredients inside the vehicle. Many agents have multiple therapeutic effects. However it is important to remember that agents have potential side effects as well. Classes of agents used in shampoos or rinses are antibacterial, antifungal, antiparasitic, antiseborrheic, moisturizing, and antipruritic.

1. Antibacterial Agents (e.g. benzoyl peroxide, chlorhexidene, ethyl lactate, triclosan, sulfur/salicylic acid, propylene glycol, tris-EDTA)
 - a. Benzoyl peroxide: Oxidizes bacterial organisms leading to its antibacterial activity. May have some residual activity (2 days). Also has degreasing and keratolytic properties and is considered a follicular flushing agent. May be synergistic with sulfur. Can cause excessive drying and possible irritation of the skin. Warn owners that it may bleach fabric and hair. Available as 5% gel and 2.5% or 3% shampoo. Follow expiration dates, since it may breakdown with time or when exposed to heat. Helpful adjunctive therapy in patients with superficial or deep pyoderma, folliculitis, or as part of the topical therapy for demodicosis. Examples: Oxydex®, Sulfoxydex® [DVM-Bayer], Pyoben® [VIRBAC]
 - b. Chlorhexidene: Its antibacterial activity is due to its activity on the bacterial cell membrane and inhibition of intra-cellular ATP. Also has antifungal properties at >3%. It is not inhibited or inactivated by organic debris (crusts, scales, exudate) and has some residual activity (2 days). Available as shampoo preparations, surgical scrub, solution with varying concentrations and others. Concentrations less than 4.5% are typically non-irritating. Examples: Triz-CHLOR4™ [Dechra], Malaseb™, Chlorhexiderm® [DVM-Bayer], Hexidene®, Resi-chlor® [VIRBAC], Nolvasan® [Ft. Dodge]
 - c. Miconazole: although an anti-fungal azole, also has anti-bacterial properties. Example: Malaseb™[DVM-Bayer]
 - d. Ethyl lactate: Broken down within the skin to lactic acid and ethanol, which both have antibacterial properties. Lactic acid results in lowering of the pH of the skin, which leads to inhibition of bacterial lipases. Ethanol can solubilize lipid material. Typically well tolerated, although infrequently irritation and erythema have been reported, and has a nice fragrance. Coined the “elegant shampoo”. Example: Etiderm® [VIRBAC]
 - e. Triclosan: Antibacterial activity in vitro by destroying plasma membrane integrity resulting in cell death. Often used in combination with sulfur or salicylic acid. Example: Sebalyt® [DVM-Bayer]
 - f. Sulfur/Salicylic acid: Salicylic acid is bacteriostatic, keratolytic, keratoplastic and mildly antipruritic. Sulfur is antimicrobial, antiparasitic, and antipruritic. Can be drying, malodorous and may tarnish jewelry. Need to warn owners. Typically used in combination with other topical agents for it’s antiseborrheic activity. Example: Sebalyt® [DVM-Bayer], Sebolux®[VIRBAC]
 - g. Propylene glycol: Antibacterial, antifungal with humectant properties; is an agent and a vehicle
2. Antifungal Agents: Used most commonly in combination with systemic therapy for either dermatophytes or Malassezia. Important to obtain definitive diagnosis as not all agents have activity against both. Chlorhexidene has antifungal properties in addition to their antibacterial properties. Many of the following antifungals’ activity is due to their ability to interfere with ergosterol synthesis, an essential component of the fungal cell wall.

Antifungal Agent (Trade name)	Activity
Miconazole (Malaseb™)	Dermatophytes & <i>Malassezia</i>
Chlorhexidene (Chlorhexiderm®, Triz-CHLOR4™)	Dermatophytes & <i>Malassezia</i>
Lime Sulfur (LimePlus Dip™ Dechra)	Dermatophytes & ectoparasites (safe in any age animal; malodorous; may stain white hair yellow)

3. Antiparasitic Agents: Able to kill adults, larvae or ova via direct contact with parasite or ingestion of product by parasite. Most common vehicles are spot-on products, sprays, dips, shampoos and powders. Many of the newer products are safer and resistance is less of a concern. Some products are not safe for use in neonates or cats due to risk of toxicity.

- a. 'Natural' products: Sulfur (lime sulfur 1-5%), safe for use in young animals and most veterinary species. Effective against mites (Sarcoptes, Cheyletiella, Notoedres, lice, chiggers; not effective against Demodex [except D gatoi] or fleas).
 - b. Botanical compounds: obtained from plant sources or synthetic derivatives of botanical compounds. "Natural" products can be just as toxic as formulated insecticides
 - i. Pyrethrins: volatile oil of chrysanthemum, releases acetylcholine, low toxicity. Effective against fleas, lice, flies.
 - ii. Pyrethroids: synthetic compounds, TOXIC to cats!!!!
 - c. Amitraz (Mitaban® [Zoetis]): Monoamine oxidase inhibitor. Effective against demodex, sarcoptes, cheyletiella, otodectes, notoedres. NO efficacy against fleas.
4. Antiseborrheic Agents: these agents are meant to normalize the effects of a disturbed epidermal turnover time that is resulting in excessive scaling and crusting on the skin and possibly an oily or greasy nature to the coat. They accomplish this by being keratolytic (by damaging keratinocytes as well as decreasing cohesion between keratinocytes desquamation is promoted and excess scale is removed). Keratoplastic properties of many of these agents helps to normalize keratinization by decreasing DNA synthesis resulting in a lowering of the mitotic rate of the epidermal basal cells. Most common vehicle for all of these agents is a shampoo, however there are sprays and spot-on treatments on the market. Many of these products will also contain many other agents. There are numerous trade names on the market, so it is important to read the labels and choose a product with the active agent and activity that is desired.
- a. Tar: keratolytic, keratoplastic and degreasing; also has antipruritic properties. Malodorous. Can cause skin irritation and photosensitization. Should never be used on cats. Indicated for "greasy" dermatoses but rarely used anymore.
 - b. Sulfur/Salicylic acid: keratolytic and keratoplastic
 - c. Benzoyl peroxide: keratolytic and degreasing; also antibacterial and follicular flushing. Can be quite drying. It is important to remember that with the exception of a few genodermatoses (ichthyosis, cocker spaniel seborrhea) most excessive scaling has an underlying infectious, allergic or endocrine causation.
5. Moisturizing Agents: used to soften or moisturize the skin. Two groups: emollient oils and humectants. Emollient oils are highly dispersible oils mixed with surface active agents that decrease transepidermal water loss. Work best when applied immediately after a bath. Examples are safflower, sesame, lanolin or hydrocarbons. HyLyt EFA Bath oil® [DVM-Bayer] is a commercial emollient oil product. Humectants attract water from deeper tissues to the skin's surface. These are non-oily products that bond to the stratum corneum to promote moisture retention. Examples are: urea, lactic acid, propylene glycol, glycerin, carboxylic acid.
6. Antipruritic Agents: Rarely successful as a sole therapy but can be useful adjunctive therapies for the pruritic patient. Antipruritic agents may act in a number of ways: by decreasing or removing the pruritic threshold (moisturizing dry skin or removing scale/crust), substituting another sensation (cooling or tingling), anesthetizing peripheral nerves, or via the application of specific biochemical agents.
- a. Corticosteroids: function by suppressing inflammation consequently it can mask disease. Can have systemic side effects particularly in small breed dogs as iatrogenic hyperadrenocorticism (Cushing's disease) is possible through percutaneous absorption. Chronic application can result in skin atrophy, scaling, alopecia and secondary pyoderma (local immunosuppression). Available in shampoo, leave on rinse, creams, ointments, lotions. Many trade names on the market; examples: Resi-cort® [VIRBAC], Relief HC®[DVM=Bayer]
 - b. Colloidal Oatmeal: must be in colloidal form. Exact mechanism of action is not known, but has been proposed that it inhibits prostaglandin synthesis. Its anti-pruritic effects maybe concentration dependent. Trade names: Epi-soothe®, Relief®, Resi-soothe®
 - c. Anesthetics: Relatively short duration of effect, but safe and can be applied frequently. Anesthetic agents used topically are lidocaine and pramoxine. Trade names: Relief®, Dermacool®, Dermal-soothe®
 - d. Anti-histamines: Very weak antipruritic effects when applied topically. Antihistamine creams in people appear effective. Topical shampoo and leave on rinse are available in veterinary medicine. Trade names: Resi-Hist®, Histacalm®
 - e. Tar: primarily used as antiseborrheic agent; not used much anymore.
 - f. Sulfur: primarily used as antiseborrheic agent; usually combined with salicylic acid, tar or benzoyl peroxide.
 - g. Aloe vera: salicylic acid and magnesium lactate are the two active ingredients that have anti-pruritic effects. Salicylic acid inhibits cyclooxygenase therefore in inhibiting prostaglandin production. The magnesium lactate inhibits the conversion of histidine to histamine in mast cells. Also reported to have healing properties. Most reports are anecdotal at best.