

Lecture IV – Topical Treatment¹

Topical treatment of skin disease is an important part of treating chronic skin problems. Often clients will experiment with over the counter shampoos, conditioners, and vitamin combinations even before consulting with the veterinarian. Medical team members and clients must have an understanding of the disease process, the physical symptoms and the goals of topical treatment before the correct topical agents can be selected. Improper choice or use of topical medication, or unrealistic client expectation can make the skin condition more severe and frustrating.

For example, Bull Dog Karloff (See Figure 4.1), a 3 year old white and tan male neutered 52 pound English Bull Dog, comes into your hospital with a chief complaint of severe itching (pruritus), odor and redness to the skin (erythema) for 6 weeks. He has been to 3 other veterinarians for the same problem. Currently the patient is on oral antihistamines and skin vitamins, and is being bathed 2x/month in human shampoo.



Figure 4.1: Boris

When approaching a chronic skin disease workup, the medical team has to consider if the patient is on the correct medication or topical treatment for their condition, is the current topical treatment actually making the patient worse, and most importantly is the client properly educated on the goals and protocols of the topical and systemic treatment. Many clients many not comply with the full treatment protocol if they do not understand the importance of each component.

After the veterinarian examines and completes the diagnostic process, Boris is diagnosed with Allergies (Atopy) and a secondary bacterial and yeast infection. The

¹ Chapter courtesy of Coyner, Kim and Rosenfeld, Andrew. [Principles of Topical Therapy](#), Derm College, Virbac on line 2006. www.virbacuniversity.com/

veterinarian prescribes systemic medications for the patient. As the veterinarian leaves the room to begin to write up the chart, the client asks “What topical treatments are best for my pet with these problems?” How should a medical team member respond?

There are many indications for recommending topical treatment for the patient. These include products for cleansing normal skin, moisturizing dry skin, treating bacterial, and fungal dermatologic infections and finally to reduce pruritus or itching. It is important to identify the correct skin condition, so a proper choice in topical treatment can be made. Indications for topical treatments can be:

- Cleansing
- Moisturizing
- Antibacterial
- Antifungal
- Antiseborrheic
- Anti-itch

There are multiple product types available for the treatment of dermatologic conditions. Each product has its own strengths and limitations dependent on the patient’s condition, the owner’s ability to medicate and other treatment regimes. Many topical treatment courses are used in association with systemic medication. Clients should understand what the benefits are for using each type of topical treatment. Further, clients should understand that topical therapy is often only one step in treating ongoing skin disease.

Cleansing Shampoos:

The goal to cleansing shampoos should be to routinely clean the coat of debris and dirt. Normal healthy pets should probably be bathed no more frequently than every 10-14 days with a mild shampoo and conditioner. Conditioners help restore the natural oils to the hair coat that can be washed out by the shampoo.

The indications for moisturizing shampoos and conditioners are for patients with dry, mildly flaky skin. Using a conditioner is also recommended after using benzoyl peroxide and tar products. Leave on conditioners can produce longer lasting effects. Moisturizing ingredients include: fatty acids, lipids, urea, glycerin, colloidal oatmeal, chitosanide, propylene glycol, sodium lactate and lactic acid.

Clinical signs of a dry hair coat (See Figure 4.2) are visible flakes or dandruff. If allergy or infection is present, pruritus, a strong skin odor and increased shedding and hair loss may also be seen.



Figure 4.2: In this picture, the patient is suffering from a dry hair coat, and the use of a moisturizing shampoo and conditioner combination can help decrease flaking and irritation.

Colloidal shampoos can be used weekly to help maintain normal moisture and oils within the skin coat. Leave on conditioners can help maintain a healthy hair coat for 7 days after application. The shampoo and conditioner can be used every 7-10 days or as needed.

Antibacterial Shampoos & Conditioners:

Antibacterial shampoos and conditioners using anti-septic medications can be very effective in topically treating bacterial dermatitis. In very mild bacterial infections, shampoos and conditioners may be sufficient on their own. In more serious infections, these medications can be used in conjunction with oral antibiotics to speed resolution of disease.

This patient with a bacterial pyoderma (See Figure 4.3) is noted by pustules and crusts, scratching (pruritus), and redness (erythema). This patient should be placed on a topical anti-bacterial shampoo and conditioner as well as oral antibiotics. Some types of antibacterial products are:



Figure 4.3: Evidence of bacterial infection as noted by crusts, redness and pruritus)

- Chlorhexidine shampoos and conditioners (0.5-4%) are not inactivated by organic debris and has good residual activity for up to 2 days after treatment. At higher concentrations (2-4%) these products are also effective against yeast.
- Povidone – iodine products are good for bacterial infections. However, the shampoo can be inactivated by increased amounts of organic debris in the hair coat. Further, the product can occasionally produce a contact dermatitis in some patients. The medication usually has a residual effect of only 4-6 hours after administration. Because of these limitations, Chlorhexidine containing products are usually superior. Iodine based shampoos should be administered no more than 1-2 times / week.
- Benzoyl peroxide shampoos are excellent at degreasing an oily hair coat and removing scales/crusts as well as treating bacterial skin infections. Benzoyl peroxide shampoos can cause irritation and drying and should be followed by a conditioner in most cases.
- Other products containing Triclosan can be helpful in treating bacterial skin infections. Another product, Ethyl lactate can be used as a anti-septic as well as to reduce dry scaling/seborrhea. This product is mild and does not cause drying.

Antifungal Products:

As already discussed, secondary yeast skin infections (*Malassezia* spp) can be associated with primary disease such as Atopy, food allergy, bacterial infection, hormonal disease and other causes. Ringworm or dermatophytosis is a fungal skin infection which may benefit from topical therapy, although topical therapy alone is rarely effective to cure ringworm and may increase owner exposure to this zoonotic disease. When fungal infection is diagnosed, antifungal therapy can include topical and systemic treatments. Patients suffering from yeast skin infections can have signs of (See Figure 4.4):

- Hair loss
- Lichenification (Thickening of the skin)
- Pruritus
- Oily scaling
- Odor
- Erythema



Figure 4.4: Image of chronic fungal dermatitis showing alopecia, lichenification, oily skin and malodor.

Another important point to discuss with clients is that some fungal infections, such as dermatophytes, can be zoonotic (infectious) to humans. Dermatophytosis or ring worm infection is infectious to clients through contact with the fungal spore through cuts and breaks in the skin. Clients must be informed that when treating the patient with a possible fungal infection, that they should wear protective clothing (i.e. gloves) and wash their hands with a strong antiseptic soap after handling their pet. Further, the patient's chart should be documented that the client has been informed about the concerns and risks of zoonotic disease. Examples of anti-fungal products are:

- Chlorhexidine 2 - 4 % topical solution and shampoo is effective against yeast infections. It is less effective in the treatment of ringworm. It has residual activity for up to 2 days.
- Miconazole products and ketoconazole are strong anti-fungal topical medications for the treatment of yeast and ringworm infections.
- Povidone – iodine: As described earlier, Povidone-iodine, can have good antibacterial and antifungal activity. However, this topical treatment has a short residual activity, and can cause irritation and contact dermatitis.
- Selenium sulfide (Selsun Blue™) can be used for greasy skin caused by a yeast infection. The over the counter product can be irritating and should not be used in cats due to their delicate skin.

- Lyme Sulfur Dip is a very effective treatment of ring worm both treating the fungal disease and decreasing pruritus. It is not degreasing. It also has a very potent odor and can stain clothing and furniture.

Antiseborrheic shampoos

Seborrhea is characterized by a defect in keratinization (skin formation) with increased scaling +/- excessive greasiness of the skin and coat and often secondary inflammation. There are two types of seborrhea –oily (seborrhea oleosa (See Figure 4.5)) and dry (seborrhea sicca (See Figure 4.6)). In most animals, seborrhea is not a disease but a symptom of many possible diseases. Common diseases that cause seborrhea are allergies, infection, parasites, nutritional imbalances or hormonal disease. Topical antiseborrheic products can be keratolytic (help remove scales), and/or keratoplastic (help normalize keratinization and decrease scale and skin oil production).

Treating Seborrhea oleosa



Figure 4.5: Clinical signs of Seborrhea oleosa are:

- Oily Hair Coat
- Scaling
- +/- Pruritus
- +/- Hair loss
- +/- Erythema

Benzoyl peroxide shampoo is a degreasing shampoo that removes crusts (keratolytic), aids in follicular flushing and has antibacterial effects. The shampoo can be drying and irritating so a conditioner is recommended after bathing. Other options for treating oily seborrhea are tar shampoos. These are excellent for degreasing the hair coat and decreasing overall scaling (keratolytic and keratoplastic). However they can be irritating to the skin and do not have antimicrobial activity. These shampoos should not be used in cats because they are too irritating. Further these shampoos are used as a last resort due to their excessive drying effect on the coat. Another option is Selenium sulfide (Selsun Blue) which also decreases scaling and degreases the coat (keratolytic and keratoplastic). However as discussed previously, this

product can be irritating to the skin so a conditioner is recommended. Also this product should not be used on felines.

Treating Seborrhea oleosa



Figure 4.6: Clinical signs of seborrhea sicca are Dry / Flaky Hair Coat, +/- Hair loss , +/- Erythema, and +/- Pruritus

Sulfur/Salicylic Acid shampoo is very effective at treating dry forms of Seborrhea. The shampoo decreases scaling (keratolytic and keratoplastic) with mild antibacterial action. The shampoo is non-drying and aids in decreasing pruritus. 10 % ethyl lactate shampoo also causes decreased scaling and also has good antibacterial action. The shampoo is non-drying and so is a good choice for dry seborrhea associated with pyoderma.

Anti-Pruritic Shampoos / Conditioners

The goal of anti-itch shampoos and conditions are to help treat the symptoms of pruritus. As with seborrhea, pruritus is a symptom of a primary disease. Disease conditions that can cause pruritus are allergies, skin parasites, infections, and other causes. Often treatment will involve systemic medication, shampoos and special conditioners to help treat the disease and its symptoms. Clinical signs of pruritus include generalized or localized itchiness, +/- hair loss, red inflamed skin, rash, odor and discomfort. Examples of treatment options for pruritic patients are:

- Colloidal oatmeal Shampoos, are soothing cleansing treatments to help reduce erythema and skin irritation. Leave on conditioners can be used to help produce longer durations of effect.

- Antihistamine shampoos contain topical antihistamines, such as Diphenhydramine. These topical medicated treatments help to reduce the skin's response to topical allergens. These shampoos can be used with leave on conditioners to help increase duration of effect. One concern however is that topical diphenhydramine has been report to cause contact sensitivity and irritation in some cases.
- Topical anesthetics help reduce pruritus without the potential adverse effects of topical steroids. Pramoxine leave on conditioner is often used in conjunction with an oatmeal shampoo. Compared to other topical anesthetics such as benzocaine and lidocaine, pramoxine has low sensitization and irritation potential and has no systemic side effects. Lidocaine is also a topical anesthetic, marketed as a spray but has a greater potential for contact sensitivity and a shorter duration of action compared to Pramoxine.
- The use of topical steroids offers a reliably effective treatment to decrease pruritus. However even topical steroids needs to be used selectively since these medications can worsen bacterial infection, and can cause systemic or local side effects with long term use.
 - 1% Hydrocortisone products the mildest topical steroid available.
 - These products come in shampoos, sprays and lotions. Initially, topical steroids are applied 1-2 times daily to effect, then the frequency of application is tapered down to no more often than 2-3 times weekly to avoid local and systemic side effects.
 - 0.015% Triamcinolone Acetonide spray is a water/denatured alcohol base spray that is absorbed quickly after application and is very effective at reducing signs of pruritus, comparable to oral steroid therapy. Mild systemic side effects occasionally noted are: Sneezing, slight decreases in white blood cell count and rarely increased thirst (polydipsia) and increased urination (polyuria).
- Allermyl shampoo and spray are cleansing, hydrating and antipruritic. Allermyl is non-steroid-based and contains linoleic acid which helps maintain the epidermal barrier. The spray also contains monosaccharide and Vitamin E which help to decrease skin inflammation and l-rhamnose to help decrease allergen penetration. Recommended frequency of use: 2-3 times weekly for 2 weeks, then as needed.

GLYCOTECHNOLOGY²

Several approaches have been taken by manufacturers in an attempt to either extend the residual action of topical products, or somehow make them useful as longer-term maintenance treatments. Such approaches have included:

- Physical reformulation of ingredients into alternate vehicles, such as “leave-on” conditioners or spray-on formulations that are not rinsed off.
- Reformulation of ingredients into novel, “slow-release” delivery systems such as liposomes or “Spherulites”
- Addition of novel ingredients which are intended to interfere with initial colonization of the skin with organisms, such as “glycotechnology.”

Glycotechnology is a concept developed and recently incorporated. The idea is that by addition of simple sugars or other carbohydrate molecules to a topical preparation, the sugars will “block” adhesion of microbes to epidermal surfaces, thus potentially decreasing the chances for colonization and infection. This concept is intriguing and very promising, but there is not yet direct clinical evidence of the degree of benefit that “glycotechnology” provides.

Bacteria and yeast have lectins (sugar-binding receptors) on their cell surfaces. One function of the microbial lectins is that they allow the organism to attach to surface glycoproteins on epidermal cells. Glycotechnology proposes to topically apply exogenous sugars (mannose, galactose, rhamnose, alkylpolyglucoside) that are able to bind to the microbial lectins, and thus block their attachment to the skin.

Laboratory studies have demonstrated that in vitro adherence of microbes to epidermal cells can be reduced by 40-50% by adding these sugars to cultures of *Pseudomonas*, *Staphylococcus*, or *Malassezia*. It has not been yet demonstrated that this effect translates to reduction in occurrence of skin infections clinically. In laboratory studies, addition of these sugars to cultures of epidermal cells can inhibit cytokine release. This *suggests* that they may have some anti-inflammatory action. Potential benefits and uses:

- Chronic ear infections. Following resolution of a severe or longstanding ear problem, many patients require long-term maintenance therapy to make the ear canal less prone to re-infection. Glycotechnology is one possible approach.
- Atopic dermatitis. Because major therapeutic goals are control of inflammation and of recurrent infection, glycotechnology-based products may help with both.

² Courtesy of Doiug Deboer, DVM, 2008, University of Wisconsin.

- If these products are shown to live up to their potential, fewer infection relapses should contribute to minimizing antibiotic use in the future.

PHYTOSPHINGOSINE³

Phytosphingosine is a biosynthetic molecule that is similar to the sphingosine compounds that form part of the intercellular matrix of epidermal cells. It has been shown to have several properties that may benefit chronic skin conditions. This may augment barrier function and produce antimicrobial action for both staphylococci and yeast. Further, anti-inflammatory actions have been demonstrated in vitro. This product comes in shampoos and spray on formulations (“substitute for shampooing”). Based on these properties, these types products have been most often recommended in the following situations:

- **Atopic dermatitis:** serve to enhance barrier function, reduce recurrent infections, and may have an anti-inflammatory action
- **Recurrent staphylococcal pyoderma**
- **Malassezia dermatitis**
- **Primary seborrheic diseases (seborrheic Cockers!)**
- **Granulomatous sebaceous adenitis.**

³ Courtesy of Doiug Deboer, DVM, 2008, University of Wisconsin.

Condition	Topical Product	Indications/mechanism of action/Frequency of Use	Contraindications / Side Effects	Other recommended topical products
Normal to mildly Dry Hair Coat	Mild cleansing and Moisturizing shampoo/conditioner	Recommended for weekly use.	...	--
Bacterial Skin Infections	Chlorhexidine 0.5-4.0%	Works well in organic debris, up to 48hr residual activity Effective for Yeast Infections at higher concentrations	...	...
	Povidone - Iodine	Works well for bacterial and fungal infections	Inactivated by organic debris, only 4-6hr duration of residual activity Can Cause Contact Dermatitis	...

	Benzoyl Peroxide	Excellent for degreasing and removing scales Used for Oily Hair Coat	Can be irritating and drying to the hair coat	Follow with conditioner
	Triclosan	A good disinfectant added to some antiseborrheic shampoos	...	...
	Ethyl lactate	A mild non-drying antibacterial and antiseborrheic agent	...	...
Fungal Infections⁴	Chlorhexidine 2.0-4.0%	Effective for Yeast Infections at higher concentrations	These preparations are less effective at treating dermatophytes	...
	Miconazole / Ketoconazole	Used for yeast and ringworm infections	...	...

⁴ Owners must be cautioned that some Fungal Infections (I.e. Ringworm) is zoonotic.

	Povidone - Iodine	Works well for bacterial and fungal infections	Inactivated by organic debris Can Cause Contact Dermatitis	...
	Selenium sulfide (Selsun Blue™)	Used for yeast infections with greasy skin changes	Can be irritating Not to be used on cats.	Follow with conditioner
	Lime Sulfur	Best topical treatment available for ringworm, both treating the fungal disease and decreasing pruritus	Not Degreasing Topical treatment has a very potent odor, stains	...
Antiseborrheic Shampoo – Oily Skin	Benzoyl Peroxide	A degreasing shampoo that removes crusts, aids in follicular flushing and has antibacterial effects	Can be irritating and drying to the hair coat	A conditioner is recommended to help prevent hair coat drying.

Tar-free shampoo	Tar-free shampoo to help degrease and remove scales/crusts without drying the skin	...	...
Tar Shampoo	A degreasing / descaling shampoo	Little to no anti-bacterial effect Can be irritating Do not use in cats Used as a last resort	A conditioner is recommended to help prevent hair coat drying.
Selenium sulfide (Selsen Blue™)	Used for yeast infections with greasy skin changes	Can be irritating Not to be used on cats.	A conditioner is recommended to help prevent hair coat drying.

Antiseborrheic Shampoo – Dry Skin	Sulfur / Salicylic Acid Shampoo	This topical treatment helps decreasing dry scaling with mild antibacterial action. The shampoo is non-drying and does help in decreasing pruritus	...	...
	Colloidal Shampoos and Conditioners	Recommended for weekly use.	...	Topical steroidal / antihistamine leave on conditioner.
Anti-Pruritic Treatments	Antihistamine Shampoos	Used to help to reduce physical signs of Atopy Use of leave on conditioners can help increase duration of effect.	Diphenhydramine can be contact sensitizer	Topical steroidal / antihistamine leave on conditioner.

<p>ADD LIDOCAINE Pramoxine Conditioner (ResiProx)</p>	<p>Pramoxine is a topical anesthetic with good residual activity; combined with oatmeal</p>	<p>Lidocaine can be contact sensitizer, has short duration of activity</p>	<p>Use after oatmeal or Antihistamine Shampoos</p>
<p>1% Hydrocortisone Spray</p>	<p>Mildest topical steroid spray. Product comes in spray, shampoos and lotions.</p>	<p>Steroid sprays can rarely cause worsening of bacterial infection or local and systemic side effects with long term use.</p>	<p>...</p>
<p>0.015 % Triamcinolone Acetonide Spray (Genesis)</p>	<p>Water/denatured alcohol base spray that is absorbed quickly after application. Very effective at reducing signs of pruritus.</p>	<p>Sneezing Slight decrease in White Blood Cell population Polyuria /Polydipsia (Rare)</p>	<p>...</p>

Allermyl

**Cleansing/hydrating/antipruritic
shampoo and spray**

**Non-steroid-based Linoleic acid
which helps maintain epidermal
barrier**

...

...

**Also contains Monosaccharides
/ Vitamin E which have anti-
inflammatory effects**