

Site-Specific Product Formulation, Part 3: Body and Intertrigenous Skin



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The formulation and understanding of skin care products is predicated upon consideration of the anatomy and physiology, unique dermatoses, as well as the hygiene and skin care needs of a particular area. Part 1 of this series discussed skin care product considerations for the face, eyelids, and lips. Part 2 examined these issues as they relate to the hands, feet, cuticles, and nails. The final part of the series will focus on the body, neck, and axillae. I suppose it is possible to put acne cream on the legs and apply body lotion to axillary skin, but these products were not designed for application to such areas. Site-specific formulation is an important part of skin care product development, formulation, and testing. This article is intended to shed light on skin care products formulated for the body and intertrigenous skin.

Body Considerations

The body encompasses the largest area of skin including the back, chest, arms, and legs. The skin on the body does not heal as well as facial skin, making surgical manipulation more problematic. In fact, the farther the skin is from the face, the poorer the surgical result. This creates challenges for the surgical dermatologist, as well as unique skin care needs for the area.

Anatomy and Physiology

The skin on the upper back is the thickest skin on the body because of the need to sustain the pulling and twisting movements of the arms. This thick skin does not heal well, often resulting in unsightly scars. The poorest healing body sites are the upper chest, upper arms, and upper back, where hypertrophic scars and keloids form

with increased frequency. These areas also have a limited number of sebaceous glands, making careful cleanser selection and the use of moisturizers important. The base of the shoulder blade on the back is one of the itchiest spots on the entire body. Although it is not quite clear why this is the case, neurologic damage is a possibility, which presents a treatment challenge.

The arms and legs possess skin that is designed for movement accompanied by hair growth. Sebaceous glands are more numerous in these areas than in the back and chest; however, the arms and legs are frequent sites of dry skin in aging adults.

Dermatologic Disease

The most common skin disease of the body is eczema. Why is this the case? The reason can be simply stated as over bathing. Bathing the body has become a ritual; many people feel the need to bathe daily and some twice a day. Some people bathe to relax prior to retiring for the night, while others bathe to wake up. Athletically inclined individuals bathe after each exercise session. Aging adults who are otherwise inactive may bathe frequently, as they find the warm water soothing for aching muscles and joints. This excessive amount of contact with cleanser and water eventually removes not only the sebum but also the intercellular lipids, causing dry skin. Subsequently, the skin cracks, exposing tender dermal nerve endings, and itching ensues. Scratching further damages the skin barrier and more itching and scratching occurs. Finally, the skin barrier is in complete disarray and eczema presents. This sequence of events is known as *the itch-scratch cycle*. Successfully controlling eczema depends on stopping the itching, repairing the barrier, and restoring the skin to health.

Hygiene Needs

Body hygiene is a careful balance between removing enough bacteria to prevent disease and body odor while leaving the skin barrier undamaged. This is indeed a challenge. It would be nice to somehow develop a cleanser

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COSMETIC CONSULTATION

that could distinguish between sebum and intercellular lipids, removing the former while leaving the latter untouched. This should be the goal of all therapeutic body cleansers.

Skin Care Needs

Excessive bathing has made moisturization the major skin care concern of the body. Body moisturizers should create an optimal environment for healing and quell itching, leaving the skin smooth and soft. The moisturizer must function in hair-bearing areas and leave behind a breathable film that does not prevent sweat from evaporating from the body surface. One of the newest products designed to prevent over cleansing of the skin is an in-shower body lotion known as a *moisturinse*. A *moisturinse* is formulated like a body wash except that it contains a large amount of moisturizer and a small amount of cleanser. The cleanser is washed down the drain leaving behind silicone, other lightweight oils, and petrolatum on the skin.

Neck Considerations

The neck is an area of highly mobile skin that provides a transition between the thin skin of the neck and the thicker skin of the upper chest and back. It contains fully mature hairs in men and thin vellus hairs in women. The neck is an important area from a cosmetic standpoint since it is affected by shaving in men, fragrance application in women, and photodamage in both sexes.

Anatomy and Physiology

The skin on the neck covers important underlying structures such as the blood and nerve supply to the head. The neck also contains the cervical spine and numerous muscles that control the mobility of the head. It is for this reason that the neck is a cosmetically challenging area; it does not heal well from cosmetic surgical or traumatic injuries because of this continuous movement. The neck is also subject to photodamage, since many people forget to cover or apply sunscreen to this area. Most hats do not provide adequate neck protection; thus, the skin on the neck tends to show signs of aging more quickly than other body sites.

Dermatologic Disease

Poikiloderma is one of the most common effects of photoaging on the neck, resulting in lost dermal collagen, visible sebaceous glands, damaged elastin, mottled pigmentation, and telangiectasia. It is interesting to note that the skin beneath the chin is sun protected. For this

reason, the photodamaged areas of the neck form a shape that is similar in appearance to a butterfly (ie, the photodamage is more pronounced on the sides of the neck than under the chin).

The neck is also a common area for women to apply fragrance. For this reason, the neck is a common site of fragrance allergy, which can manifest as allergic or irritant contact dermatitis. Patch testing to the actual suspected fragrance or the patch test tray fragrance mix is the best confirmatory test. Irritant contact dermatitis, which presents as red itchy skin, can occur from the drying volatile vehicle in perfume.

Hygiene Needs

The hygiene needs of the neck are similar to those of the rest of the body. The neck does not contain many sebaceous glands; thus, cleansing should be thorough but not so extensive that it causes dryness. Probably the most unique hygiene need for the neck is in men who shave the hair in this area. In men, the neck is a transition area for hair growth between the beard and chest hair. For this reason, the hair exits the skin in many different directions, which can cause inflammation of the hair follicular ostia, more commonly known as *razor burn*. Severe razor burn accompanied by ingrown hairs in black men is known as *pseudofolliculitis barbae*. In this condition, the curved hair shafts reenter the skin causing inflammation and infection. Pseudofolliculitis barbae is difficult to treat. The best option for a man with this condition is to grow a beard because the long hairs cannot become ingrown. The next best choice is to shave frequently, keeping the hairs so short that the shafts cannot reenter the skin.

Skin Care Needs

The major skin care needs of the neck are good moisturization accompanied by sun protection. The neck receives almost as much sun as the face and is a common site for precancerous and cancerous growths.

Axillary Considerations

The underarms have not been included in the general body discussion because they represent a unique intertriginous body site. Intertriginous sites on the body include the axillae, the skin beneath the female breasts, and the skin between the upper inner thighs. In persons who are obese, other intertriginous sites may be present beneath the chin and abdomen and behind the knees, etc. Intertriginous sites are characterized by moisture retention, skin movement, and warmth. This

environment is ideal for the growth of fungus, yeast, and bacteria; thus, intertriginous areas are frequent sites of dermatologic disease.

Anatomy and Physiology

The axilla is a particularly interesting intertriginous site because it combines the aforementioned factors with hair and abundant sweat glands. The axillae contain 2 types of sweat glands: eccrine and apocrine. Up to this point, the discussion of sweat glands has referred to eccrine sweat glands that produce a clear odorless sweat designed to cool the body and prevent overheating. Apocrine sweat glands do not participate in thermoregulation, but rather produce a yellowish scented sweat. It is the scented apocrine sweat that interacts with special perfumes to produce a unique smell. Apocrine sweat provides a perfect growth medium for odor-producing bacteria. Further growth of these bacteria, in combination with fungus and yeast, can result in axillary infections.

Dermatologic Disease

Infection is clearly the most common dermatologic condition occurring in the axilla. An infection in this area may be caused by fungus, yeast, or bacteria. *Intertrigo* is the most common dermatologic axillary condition. It is caused by the growth of yeast and possibly fungus in the warm moist environment of the axilla that has skin barrier damage due to excessive hydration with eccrine sweat. *Intertrigo* presents as red inflamed skin that may itch or burn. Eliminating the sweat via the use of antiperspirants can prevent recurrence.

Axillary bacterial infections usually are caused by *Staphylococcus* or *Streptococcus* organisms. These are the most common pathogens found in the environment and on the body. The apocrine sweat in the axilla provides an excellent medium for bacterial growth. *Impetigo* is a bacterial infection of the axillary skin, and *folliculitis* is an infection of the skin surrounding the hair follicle. Again, eliminating the sweat is key to prevention.

Hygiene Needs

It is no surprise that the key hygiene need for the axilla is the elimination of eccrine and apocrine sweat. While sweating is a normal part of human physiology, excessive sweating, known as *hyperhidrosis*, can occur in the

axillae, as well as the hands and feet. Controlling sweat can prevent body odor, skin barrier damage, infection, and embarrassing wetness. This is the realm of antiperspirants, but oral medications and chemodeneuration through botulinum toxin type A also are used. Antiperspirants containing aluminum salts are the most effective and provide better wetness control when applied before bedtime, as well as in the morning. The aluminum salt must actually create a plug within the eccrine duct to stop perspiration in the axilla. It takes time for this plug to form, and the aluminum salt can function more efficiently when the body is at rest and not sweating.

Skin Care Needs

The skin care needs of the axilla are mainly irritation reduction from the aluminum salts used in antiperspirants and hair removal. Unfortunately, most topical antiperspirants cause irritation in the sensitive skin of this area, which can result in irritant contact dermatitis, especially if the skin barrier has already been damaged from excessive hydration. Thus, the best way to maintain the health of the axilla is to use an effective, nonirritating antiperspirant.

The axillary skin barrier may be further irritated from hair removal techniques, especially in women. Because it is concave in nature, the axilla is a challenging area to shave with a razor. Using a well-designed razor and shaving cream to soften and reduce friction are key. Depilatories typically are too irritating for hair removal in this area. However, hair removal is important to control odor, since the hair provides a large surface area for bacterial growth. Removal of the hair limits the amount of bacteria that can exist in the axilla.

Summary

This entire series has covered the most significant areas of the body for skin care product formulation. It has discussed the axillae, body, cuticles, eyelids, face, lips, feet, hands, nails, and neck. These are the major areas for which skin care products are formulated. Understanding the anatomy and physiology as well as the unique hygiene and skin care needs of an area enables proper product development and selection. This allows the dermatologist to integrate skin care as part of the overall treatment plan. ■