All-in-One Skin and Hair Care Products

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A current trend in skin care that has risen out of consumer belt tightening following the recession is the all-in-one skin care product. These are skin care products designed to have multiple functions. For example, the makeup remover that also cleanses and moisturizes the skin. The sunscreen that moisturizes and reduces the appearance of facial wrinkles. The cleanser that also minimizes the appearance of pores. The shampoo that conditions and strengthens hair shafts. The nail polish that builds stronger nails. Why have these complex claims become popular? Perhaps the consumer feels that money spent on one product with multiple functions is well spent. Since it is hard to come up with new product terminology given the restrictions on cosmetic claims, perhaps marketing feels that a product with multiple uses is new and more appealing.

Whatever the reason for these new all-encompassing skin care products, dermatologists need to carefully examine this trend to determine if these products are appropriate for patients with various skin conditions. For example, should a patient with atopic dermatitis use a cleanser that moisturizes for better results, since the drying effects of soap can exacerbate the condition? Should a patient with androgenic alopecia use a cleansing, conditioning, and strengthening hair shampoo to minimize further loss from breakage? Finally, should a mature patient use a moisturizer that modulates the skin barrier to reduce the appearance of wrinkles? This article examines each of these scenarios to better understand the pluses and minuses of all-in-one products.

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Should a Patient With Atopic Dermatitis Use a Cleanser That Moisturizes For Better Results, Since the Drying Effects of Soap Can Exacerbate the Condition?

Skin cleansing is the most basic hygiene need that can exacerbate disease in patients with atopic dermatitis. There are a wide variety of cleansers in the marketplace that fall into several discrete categories based on the sebum and dirt removal needs of the patient. There are true soaps, which are alkaline products at a pH of about 9, that are excellent at removing sebum, but may cause dryness in the skin. There are also synthetic detergents, such as sodium cocoyl isethionate, the main surfactant in bar cleansers designed for sensitive skin; however, these products can only cleanse, since they are solid 1-phase formulations. Basically, bar cleansers are designed to remove sebum and environmental dirt from the skin surface, which they do quite well, but the surfactant must rinse completely from the skin surface or irritation will result.

Bar cleansers still represent the most basic form of skin cleansing, but are slowly being replaced by liquid cleansers, emulsions known as body washes. A body wash refers to a 2-phase liquid with a hydrophobic phase and a hydrophilic phase that are held together by an emulsifier. The surfactant cleanser is in the hydrophilic phase and binds to the dirt, which is washed down the drain. Vegetable oils, humectants, dimethicone, and petrolatum are in the hydrophobic phase, which bind to the skin surface decreasing transepidermal water loss (TEWL) and providing an environment optimal for barrier repair. This is the mechanism of action for all-in-one products that claim to both cleanse and moisturize. These products are of use in patients with atopic dermatitis who either wish to bathe more frequently or those with severe disease.

The key question is: how does the cleanser know whether to cleanse away sebum or deposit the moisturizer? This is accomplished by varying the water concentration between the 2 skin care events, one being cleansing and the other being moisturizing. During the first phase of washing, the body wash is placed on a puff to increase the amount of air and water in the emulsion,

followed by rubbing it over the body. At this time, the concentration of water is very low, the concentration of body wash is very high, and cleansing occurs. During the rinse phase, the water concentration is very high and the body wash concentration is very low. It is during the rinse phase when the moisturizing ingredients are deposited on the skin surface.

The next question is: how does the body wash know how much of the moisturizing ingredients to leave behind? It is possible to construct the emulsion such that the moisturizer amount is very carefully controlled. Large moisturizing ingredient droplets within the emulsion, containing petrolatum, soybean oil, and dimethicone, create a high depositing body wash. During the rinse phase, these droplets are left behind on the skin surface. A product for normal skin might be a medium depositing product with smaller droplets leaving behind a lesser amount of moisturizing ingredients. The dry skin body washes are most appropriate for patients with atopic dermatitis because of the larger amount of leave-behind skin protectant ingredients.

It is possible to measure the efficacy of body wash products by examining TEWL measurements in patients with atopic dermatitis. Transepidermal water loss measurements are made with an evaporimeter, which consists of 2 humidity meters placed at a known distance from the skin surface. The distance between the humidity meters is also known, as well as how much water vapor is going into the probe, allowing the calculation of water loss from the skin surface in terms of grams of water loss per meter squared per hour. This water vapor loss is an indirect measurement of the degree of barrier damage, which directly correlates with the skin injury caused by cleansing. Patients with atopic dermatitis have an increased TEWL based on their disease and defective barrier function. Some dermatologists, especially those in Europe, are beginning to use TEWL measurements as a method of meeting quality of care requirements for treatment of their patients with atopic dermatitis.

Liquid cleansers that both cleanse and moisturize are a consideration in these patients. Use of such a product may allow more frequent bathing or possibly prolong remission intervals. In this case, moisturizing cleansers are a reality and an important all-in-one product.

Should a Patient With Androgenic Alopecia Use a Cleansing, Conditioning, and Strengthening Shampoo to Minimize Further Loss From Breakage?

Shampoos that contain conditioners work in the same way as the body washes previously discussed. As a matter of fact, the whole idea of a moisturizing cleanser came from the hair care industry concept of a conditioning shampoo. A conditioning shampoo cleanses during the wash phase when concentration of water is low, and conditions during the rinse phase when the concentration of water is high. Thus, breaking the emulsion with water and air contact allows conditioning to occur during the rinse phase and the cleansing to occur during the application phase of the shampoo.

Conditioning shampoos do not clean as well as a regular shampoo and do not condition as well as a plain conditioner, but they are of use for patients with androgenic alopecia. These patients tend to have fine, thin hair that appears fuller with frequent shampooing to remove sebum. Frequent shampooing can dry the hair making it appear frizzy and dull. Conditioning shampoos are a good choice in this population to prevent over drying the hair.

The next question is: how do conditioning shampoos improve hair strength? Hair strength is related to the protein and water content of the hair. Protein and disulfide bonds are the structural elements of the hair, but the elastic properties of the hair are due to water bonds. Hair is pulled, combed, brushed, snarled, clipped, and banded. Each of these activities requires flexible deformation of the hair to resist breakage. If the hair is devoid of water, breakage will occur with less force. Conditioning shampoo improves hair strength through several mechanisms. First, an oily coating is placed over the hair to reduce water loss. Second, the oily coating reduces friction, which decreases hair breakage from combing, brushing, and snarling. Third, many conditioning shampoos contain protein, which can diffuse into the hair shaft in areas where the cuticle is missing. The protein only remains in the hair shaft temporarily, until the next shampooing, but its presence increases strength of the hair shaft.

Thus, protein-containing conditioning shampoos that clean, condition, and strengthen are a reality. In the patient with androgenic alopecia, they should be used in combination with an instant conditioner, applied and rinsed in the shower, followed by a leave-in conditioner, which is not rinsed. The conditioning shampoo is a start, but additional conditioning products are also recommended.

Should a Mature Patient Use a Moisturizer That Modulates the Skin Barrier to Reduce the Appearance of Wrinkles?

The last all-in-one product concept to evaluate is the wrinkle-reducing moisturizer. One of the more important new concepts in skin moisturization is modulation of the water channels within the skin. The water channels,

known as aquaporins are present in all living cells to control osmotic balance. Aquaporins were discovered in the kidneys many years ago, as aquaporin 1 is the abnormality that leads to diabetes insipidus. Aquaporin 3, however, is found in the skin. Aquaporins are formed from 6 transmembrane α helixes in a right-handed bundle. This channel allows the transport of substances, including urea and glycerol, in addition to water. It is interesting that a mouse model, deficient in aquaporin 3, demonstrates decreased stratum corneum hydration and impaired barrier function very similar to those seen in human atopic dermatitis.

Glycerin, a humectant that attracts water, is also transported in aquaporin 3 channels. It has been recognized for many years that glycerin possesses a skin reservoir effect. That means that a morning glycerin application can still be measured 2 or 3 days later, provided that it has been applied every day for two weeks or longer. It was previously thought that glycerin somehow intercalated itself between intracellular lipids and modulated skin water content. But it appears that glycerin may be transported through aquaporin 3 channels by a substance known as phospholipase D, which results in the production of phosphatidylglycerol. Phosphatidylglycerol is a lipid that signals enzymes of cell differentiation. Meaning that glycerin when placed on the skin surface, functions not only as a humectant, but also as a modifier of cell differentiation. The fact that older cells are not as well differentiated as younger cells means that glycerin might have a more profound effect on aging of the skin than previously thought.

The ability of substances to increase the water content of the skin can be measured scientifically through a technique known as corneometry. Corneometry is performed with something know as a pin probe. The probe contains pins that transmit electricity to the skin and sense electrical conduction. However, in order to be conducted, electricity needs a conductor. What is the conductor in the skin? Water. So more water in the skin will conduct more electricity, the corneometry reading will be higher, and the skin is better hydrated. If, on the other hand, the skin is dehydrated with less water, less electricity will be conducted, and the corneometry reading will be lower indicating less well moisturized skin. It is through this indirect measurement of the electrical conductivity of water that skin hydration is assessed.

Since water transport into cells and cell differentiation are linked, it is quite possible that moisturizing ingredients, such as the commonly used humectant glycerin, may improve skin functioning and reduce the appearance of lines of dehydration in addition to enhancing moisturization.

Summary

All-in-one products for skin and hair care may have merit. Not only is it possible that purchasing one product instead of 2 may save money, but combination products may offer attributes useful in some dermatologic conditions. This article has examined the use of moisturizing body washes in patients with atopic dermatitis, conditioning shampoos in patients with androgenic alopecia, and antiaging moisturizers in persons with photoaging. Newer formulations, better ingredients, and more insight into skin functioning are contributing to this advanced technology. ■