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Facial skin care products and cosmetics

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Abstract Facial skin care products and cosmetics can both aid or incite facial dermatoses. Properly selected skin care can create an environment for barrier repair aiding in the re-establishment of a healing biofilm and diminution of facial redness; however, skin care products that aggressively remove intercellular lipids or cause irritation must be eliminated before the red face will resolve. Cosmetics are an additive variable either aiding or challenging facial skin health.

Adverse reactions to facial skin care products and cosmetics

The incidence of reactions to facial skin care products and cosmetics is amazingly small considering the tremendous variety and number of ingredients consumers apply to facial skin on a daily basis. Individuals who preferentially experience problems usually have an underlying facial skin disease such as rosacea, atopic dermatitis, other dermatides, seborrheic dermatitis, inflammatory acne, etc. All of these diseases damage the skin barrier predisposing the facial skin to increased penetration of cleaners, moisturizers, and colored cosmetics beyond the stratum corneum. Because these ingredients are designed to remain on the skin surface and not contact the viable epidermis, problems can arise when unintended penetration occurs. Skin care products and cosmetics are designed for use on healthy skin, not diseased skin; yet, this is an important topic for investigation, because dermatologists preferentially encounter patients with skin disease and must provide treatment while recommending skin care products and cosmetics that promote the restoration of skin health.

Reactions to skin care products and cosmetics are generally contact dermatitis and can be subclassified as irritant contact dermatitis, allergic contact dermatitis, contact urticaria, phototoxic contact dermatitis, and photoallergic contact dermatitis.

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Irritant contact dermatitis

Most facial problems that arise with skin care products and cosmetics are of the irritant contact dermatitis type manifesting as erythematous, burning, pruritic skin that may develop microvesiculation and later desquamation. The dermatitis is characterized by stratum corneum damage without immunologic phenomena. The irritancy may be due to the presence of chemical factors with excessively high or low pH, or by volatile vehicles that dissolve protective sebum.[1] Physical factors including the rubbing necessary to apply cosmetics or abrasive particles within cosmetics may cause irritancy. Most importantly, a damaged stratum corneum may not be able to provide a protective barrier, so that any cosmetic applied to the damaged skin will cause irritation. This is the case in patients with atopic dermatitis, xerotic eczema, or rosacea. These patients frequently will describe numerous products that produce "allergic" symptoms. In actuality, there is no immunologic basis to the dermatitis, but an irritancy heightened by a damaged stratum corneum. Any cosmetic applied to dermatitis skin may produce irritation; therefore, patients should not wear cosmetics or use personal care items until the dermatitis has resolved.

It can be very difficult to diagnose the exact cause of irritant contact dermatitis in the patient who uses many different skin care products and cosmetics. One treatment approach is to eliminate all products and ask the patient to use the prescribed medication, which is usually a mild topical corticosteroid such as hydrocortisone valerate twice daily, a nonfoaming cleanser, and bland moisturizer. Resolution will

typically occur in 2 weeks and the patient may then consider returning to their normal routine hoping that a restored skin barrier will allow the use of their self-selected skin care products and cosmetics.

Occasionally, the problem recurs when the patient returns to their normal habits and practices. The dermatologist must then carefully evaluate the patient's skin care routine. All cleansers, moisturizers, cosmetics, fragrances, and any other products applied to the face must be brought to the office for examination. Any products with irritating potential should be eliminated in hopes that one of them is the cause. Identifying cause and effect can sometimes be challenging.

Allergic contact dermatitis

The second most common type of contact dermatitis is allergic contact dermatitis, which can be difficult to differentiate clinically from irritant contact dermatitis, but the distinction is important for good patient care. Both conditions may present as erythematous plaques; however, acute allergic contact dermatitis may exhibit more vesiculation. In some cases, late-stage allergic and irritant contact dermatitis cannot be differentiated clinically or histologically. Allergic contact dermatitis is an immunologic phenomenon requiring antigen-presenting and antigen-processing cells without regard to the condition of the protective stratum corneum. An intact stratum corneum, therefore, cannot prevent development of allergic contact dermatitis in sensitized individuals. The only course is avoidance of the allergen.[2] The cosmetically related substances that are presently found on commercial standard patch test trays are listed in Table 1.[3] Imidazolindinyl urea and quaternium-15 are preservatives used in many products. Lanolin alcohol is used in some moisturizers. P-phenylenediamine is found in permanent hair dyes.

Many other substances can cause allergic contact dermatitis. These substances have been identified by the North American Contact Dermatitis group and are listed in order of decreasing frequency in Table 2.

Contact urticaria

Contact urticaria is a rarer reaction to cosmetics and skin care products that may be an immunologic or nonimmunologic reaction. It is characterized by the development of a wheal-and-flare response to a topically applied chemical. The spectrum of clinical presentation ranges from itching and burning to generalized urticaria to anaphylaxis. Nonimmunologic contact urticaria is induced by direct contactant release of histamine and thus passive transfer is not possible. It is more commonly encountered than immunologic contact urticaria where immunologic mechanisms are involved in histamine release, thus the phenomenon can only be elicited in sensitized individuals and passive transfer is possible; however, there are some chemicals that produce contact urticaria due to uncertain mechanisms. Table 3 lists the nonimmunologic and immunologic causes of contact urticaria to substances encountered in cosmetics.[4] Testing for contact urticaria should be carried out under carefully controlled conditions with nearby resuscitation facilities because anaphylaxis due to topically applied chemicals has occurred in sensitized individuals.

Table 1

Imidazolidinyl urea
Quaternium-15
Lanolin alcohol
P-phenylenediamine

Phototoxic and photoallergic dermatitis

Phototoxic and photoallergic dermatitis are limited to areas exposed to light. Phototoxic reactions are based on nonimmunologic mechanisms and usually appear as sunburn that may be followed by hyperpigmentation and desquamation. The molecules that produce phototoxicity are generally of low molecular weight and possess highly resonant structures that readily absorb mainly ultraviolet A radiation.[5] Photoallergic dermatitis, on the other hand, is less common, immunologically mediated, generally requires repeat exposure and can be passively transferred. It is characterized by erythema, edema and vesiculation. Photoallergens are generally low molecular weight lipid-soluble substances that possess highly resonant structures absorbing energy over a wide range of wavelengths, but again predominantly ultraviolet A.[6] The light energy photochemically converts the photosensitizer into its active form.[7] Less ultraviolet radiation energy is required to elicit a photoallergic reaction compared to a phototoxic reaction.[8] Differentiating between the two may be difficult, however, especially if a severe phototoxic reaction results in vesiculation. Substance found in cosmetics that may cause photo-

Table 2

Sources of allergic contact dermatitis in skin care products and cosmetics
Fragrances
Preservatives
P-phenylenediamine (permanent hair dyes)
Lanolin (moisturizers)
Glyceryl thioglycolate (permanent wave solutions)
Propylene glycol (moisturizers)
Toluenesulfonamide/formaldehyde resin (nail polishes)
Sunscreens