

Gloving and Skin Wellness

Resolving the Paradox

By Deborah Davis

Medical gloves are the most frequently donned item of protective apparel. They are by nature occlusive since the materials from which they are manufactured prevent the penetration of body fluids and other hazardous substances.

Paradoxically, studies have shown that the occlusive quality that makes gloves such an effective barrier takes a toll on skin wellness. Because glove materials do not permit the evaporation of skin moisture, they can alter the stratum corneum, resulting in a reduction of protective barrier properties. Additionally, water under occlusion can disrupt the skin's barrier lipids and also damage the stratum corneum similar to the mechanism of surfactants.

Hand dermatitis: A significant healthcare issue

Irritation or contact dermatitis is a non-allergic reaction. Though clinicians frequently describe their reactions as allergic in nature, irritations are not an immunological response but simply an irritant response to any number of substances or factors. Irritations may be acute or chronic.

Typical characteristics of Acute vs. Chronic Dermal Irritation

	Acute Dermal Reactions	Chronic Dermal Reactions
Onset	Rapid	Lengthy
Severity	Severe	Range from mild/localized to severe
Duration	Short	Long
Typical symptoms	Redness, itching, possibly burning	Cracks, fissures, hard bumps, sores

In addition to the occlusive nature of gloves, there are several other causes of irritation/contact dermatitis among clinicians.

- ▶ Frequent occupational exposure to various soaps, detergents, disinfectants and other caustic chemicals known to cause changes to the skin
- ▶ Seasonal low humidity
- ▶ Glove powder, especially among exam glove wearers
- ▶ Donning and removal of gloves, especially if not properly sized, which can cause friction across the dorsum of the hand (knuckles) and develop into a reddened irritant reaction

A more delicate issue to address is the aging nursing population. The majority of practicing nurses today are more than 40 years old and the average age of an operating room nurse is 48.7 years old. This population is at greater risk for dry skin; however, even among 20- to 30-year-olds, it has been recently recognized that dermal reactions are on the increase.

The impact of hand dermatitis on clinical practice and employee safety

The recently published Centers for Disease Control document *Guideline for Hand Hygiene in the Healthcare Setting* addresses issues that can result in higher incidence of nosocomial infections among patients. One issue directly mentioned is skin dermatitis and its role in the spread of nosocomial infections. The guidelines note that a key reason clinicians do not adhere to recommended hygiene guidelines is skin irritation and specifically recommend that healthcare workers select products that contain emollients in order to reduce the potential for contact irritant dermatitis.

In addition to possibly transferring infection to patients, employees with compromised skin are at an increased risk of occupational exposure to a potentially infectious organism such as hepatitis B, C or even HIV. The broken skin provides a more direct route for an organism to enter the individual's blood stream. They are also at increased risk for exposure to contact organisms such as *staphylococcus aureus* and *e.coli*. Dermatic hands may also result in lost productivity and lower job satisfaction and morale.

By undertaking a consistent, effective hand-care regimen, healthcare professionals will maintain the integrity of their skin as their first line of defense against the spread of bloodborne pathogens and other potentially infectious microorganisms. Primary protection of uncompromised skin is the optimal

strategy for prevention of occupational contact dermatitis. However, despite persistent promotion of hand hygiene protocols over many years, a significant number of facilities and clinicians do not follow best practices for maintaining healthy skin while preventing cross-contamination between healthcare workers and their patients.

Products that promote and maintain healthy skin will result in increased compliance and frequency of hand washing and hand hygiene among healthcare providers. The CDC guidelines specifically state employers should “provide personnel with efficacious hand hygiene products that have low irritancy potential, particularly when these products are used multiple times per shift.”

Hand-care product usage: Getting below the surface

Moisturizing with an appropriate, healthcare-compatible product can help prevent dehydration, damage to barrier properties, desquamation (i.e., excessive skin cell shedding) and loss of skin lipids, as well as restore the water-holding capacity of the keratin layer. Several controlled trials have demonstrated that regular use of hand lotions or creams helps prevent and treat irritant contact dermatitis. There is even biological evidence to support the idea that the use of emollients on skin of healthcare professionals may be protective against cross-infection. However, numerous articles note that failure to use supplemental hand lotions or creams is one of the factors contributing to dermatitis associated with frequent hand-washing activity.



Photo courtesy of Cardinal

Wetting the skin relieves dryness only temporarily. For skincare products to be effective there must be restoration of the skin barrier. Once the skin has been damaged and the stratum corneum barrier function impaired, barrier repair can only occur if the loss of moisture is inhibited. This requires protectants for the skin, in addition to skin restoration and healing.

While it is common practice for clinicians to use over-the-counter hand lotions and moisturizers in the clinical environment, from an infection prevention standpoint this is unacceptable. These products may harbor and grow infectious microorganisms and are not approved for use in the healthcare setting. Most of these products are highly fragranced, are not compatible with other hand hygiene products and can be the source of either an acute or chronic irritation.

The CDC guidelines provide even more evidence that addressing skin dermatitis is a critical healthcare issue. In light of these new guidelines, clinicians are particularly infection control professionals æ have a renewed interest in products that:

- Promote and maintain healthy skin
- Reduce trans-epidermal water loss
- Increase skin hydration (moisturization)
- Have low irritancy potential
- Improve overall skin tolerance

The potential added cost of these products can be easily justified by the increased adherence to hand-washing protocols and the impact on clinician and patient health and well-being.

Skincare product ingredients: What works, what doesn't

A number of skincare ingredients have been widely used in the cosmetic and skincare industry for many years. When considering the efficacy of these products, the healthcare professional should look for *quantitative measures* detailing the results these additives provide. Test data should be available that specifically demonstrates the benefit of the product in actual or simulated clinical use conditions.

Aloe

Since aloe was included in the first United States Pharmacopoeia in 1820, many investigators have studied its efficacy in a wide range of clinical applications. Various clinical studies have shown that aloe has a role in the treatment of radiation dermatitis, superficial skin abrasions, corneal ulcerations, frostbite, burns and leg ulcers. However, topical Aloe is not always a healing and soothing agent and has been reported to cause both contact irritation and allergy. It has been shown that Aloe Vera gel is only a fair humectant.

Additionally, quite a bit of information on aloe's properties is derived from anecdotes or poorly designed studies. Often, researchers have worked with crude, impure extracts of aloe plants that do not necessarily belong to a single species.

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The chemical composition of aloe differs depending upon the species used, and the time of year the plants are harvested.

The result of this non-uniformity of collection or extraction process is a wide difference between the contents, consistency, and appearance of one manufacturer's aloe compared with another's. In many products the level of aloe can be very low and the aloe designation serves as more of a marketing tactic than a meaningful skin treatment.

Examples of consumer products containing aloe are Suave® Skin Therapy with Aloe Vera and St. Ives® Advanced Therapy Lotion with Aloe. The Aloe Corporation also produces many products in various dosage forms that contain efficacious amounts of aloe.

Glycerin

Glycerin is one of the best natural moisturizers in living systems and has been used in skincare products for preventing and treating skin dryness because it moisturizes and plasticizes the stratum corneum. It is used in a diverse range of living organisms to maintain the correct osmotic pressure within living cells.

Glycerin (also called glycerine and glycerol) is a key component found in many skin products and has been used as an effective moisturizer and humectant in cosmetic products for many years. More recent studies have shown that the moisturizing benefits of glycerin include attraction of moisture, maintenance of liquid crystallinity of intracellular lipids, and normalization of desquamation (skin shedding).

Some examples of skincare products that contain efficacious amounts of glycerin are the following: Proctor & Gamble's Oil of Olay® cream, Helene Curtis' Suave® lotion, Ponds® Moisturizing Lotion, Neutrogena® Norwegian Formula, Vaseline® Intensive Care, Curel® lotion, Dermalogica's Skin Hydrating Booster and many, many others.

Citric Acid

Citric acid is found on the label of many skincare, bath and shampoo products. It is mainly included as a pH adjuster, a chelating agent or a fragrance ingredient. The pH adjustment keeps the product *skin friendly*, maintaining the appropriate balance of acidity and alkalinity. Those skincare products that contain extracts of fruits will have citric acid in them along with the more powerful AHAs glycolic and lactic acid.

Sorbitol

Sorbitol is found in a number of oral care and skincare products. In the skincare products it is used as a moisturizer. Examples of products containing sorbitol are Tom's of Maine® Skincare Products, Pfizer's Lubriderm® skin creams, Neutrogena® Skin Cleansing Face Bar for Men and Eucerin® Original Moisturizing Lotion.

Gluconolactone

Gluconolactone is an ingredient known to minimize skin flakiness and is often used for therapy of photodamaged skin. It is an alphahydroxyacid (AHA) that has less irritating properties than other AHAs often used in skin treatments, such as lactic and glycolic acid.


NeoStrata, the father company of the AHA products, has a line of products with gluconolactone in them. Pfizer's Lubriderm® Skin Renewal and Exuviance® Essential Multi-Defense Day Cream are two others.

Chitosan

Chitosan (or chitin) is a carbohydrate that has the power to bind to skin and hair and act as a film alone, or bind water and other molecules to be delivered to the skin or hair. It is used a great deal in dressings for wound healing. Chitosan inhibits inflammation processes and promotes regeneration of injured tissues. When chitosan is introduced into the composition of skincare products, the skin's ability to retain moisture increases. Janssen of Australia has a complete line of skincare products containing chitosan and Neutrogena has a Men's Razor Defense product on the market.

Panthenol

Vitamins are not superficial ingredients with just a moisturizing effect, but genuine therapeutic agents. Over



Medical gloves are the most frequently donned item of protective apparel.

Photo courtesy of Cardinal

the years, a substantial amount of data has shown that a number of vitamins can affect the skin when used topically. The effects on the skin are many and varied, but all of them depend on the absorption of the vitamins into the epidermis or upper dermis.

Studies in recent years have provided strong evidence that certain vitamins, when applied topically, can play an important and beneficial role in the aged skin, particularly Panthenol/Provitamin B-5. Products containing Panthenol include Morganics Skin Toner, Pfizer's Lubriderm® Skin Renewal, BH California Shampoo and Conditioner Rinse and Murad® Moisture Rich Cleanser and Environment Shield Protective Hand Cream.

Using gloves and skin protectants effectively

For any skincare product to be effective, emphasis must be placed on its regular, frequent and correct application. While optimal frequency of application remains to be established and probably depends on the condition of the individual's skin and the number and types of decontamination performed, we do know that adequate coverage of the hands with emollient is essential to ensure full protection. Trials have demonstrated that application often is poor, and that most people do not adequately protect their hands.

Not all lotions are compatible with all antiseptic types or with all types of gloves. Hydrocarbon-based products such as those with mineral oil, petrolatum, or lanolin should not be used when wearing latex medical gloves. Water-based options such as Amino+Derm® lotion are preferred when using latex gloves.

Another important means of reducing the risk of irritant contact dermatitis is to ensure that gloves are available in a choice of materials in all clinical areas, as some individuals may be sensitive to a chemical used in the manufacture of a particular type of glove or to the protein allergen in natural rubber latex. Most skin reactions are irritations, and most irritations can be managed by improved hand care and appropriate gloving practices.

Protection without compromise for both patients and clinicians

Choosing skincare products on the basis of cost is a false economy, since the costs associated with even a few healthcare associated infections of average severity can equal the entire annual budget for hand-hygiene products used in in-patient areas. Just one severe surgical site infection, lower respiratory infection or bloodstream infection can easily exceed the entire budget for antiseptic agents. Simply purchasing more effective or more acceptable hand hygiene products can have a positive impact on the prevention of HAIs and the associated costs. However, availability of appropriate hand hygiene products addresses only half the issue. Clinician compliance with recommended skincare protocols is also key, and is a common weak link in many skin wellness programs.

One important recent development is the introduction of products that deliver moisturizing agents in new ways. For example, medical gloves coated with skincare ingredients are becoming available and represent a completely different type of glove than has been seen on the market before. These types of gloves can have a significant impact on skin health. However, it's important to review the formulation and efficacy of the ingredients selected and the test data demonstrating these benefits before selecting a glove for your facility.

Improving the skin health of clinicians can have an enormous positive impact on healthcare. It's up to infection control professionals and staff to address the clinical implications of everyday tasks such as protecting hands, and put the products and programs in place that can improve outcomes. † (See Table on page 38)

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Ingredient Actions and Benefits	Glycerol	Glucono-lactone	Sorbitol	Citric Acid	Chitosan	Panthenol/ Pro Vitamin B-5
Add moisture to the skin	X	X	X		X	X
Form a protective barrier (film)					X	X
Inhibit inflammation (reduce irritation and redness)		X			X	X
Promote wound healing					X	X
Inhibit growth of skin bacteria				X	X	X
Decrease appearance of fine lines/wrinkles		X				X
Improve skin integrity (barrier function)		X				X
Reduce roughness (increase smoothness of skin)	X	X	X			X
Improve skin texture		X	X			X
Improve skin appearance	X	X			X	X
Increase elasticity		X				X
Improve the integrity of the barrier		X				X
Condition/nourish the skin	X		X	X	X	
Strengthens skin tone						
Maintain appropriate pH				X		

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Deborah Davis, MS, MBA, is Technical Director, Gloves, for Cardinal Health's Medical Products and Services business. Her primary responsibilities include driving clinical research initiatives, coordinating various aspects of product development among the marketing, regulatory, manufacturing and research and development organizations and overseeing the publication and presentation of technical information for clinician customers and sales personnel. Ms. Davis is a doctoral student at the University of Wisconsin-Milwaukee. She may be contacted at deborah.davis@cardinal.com

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