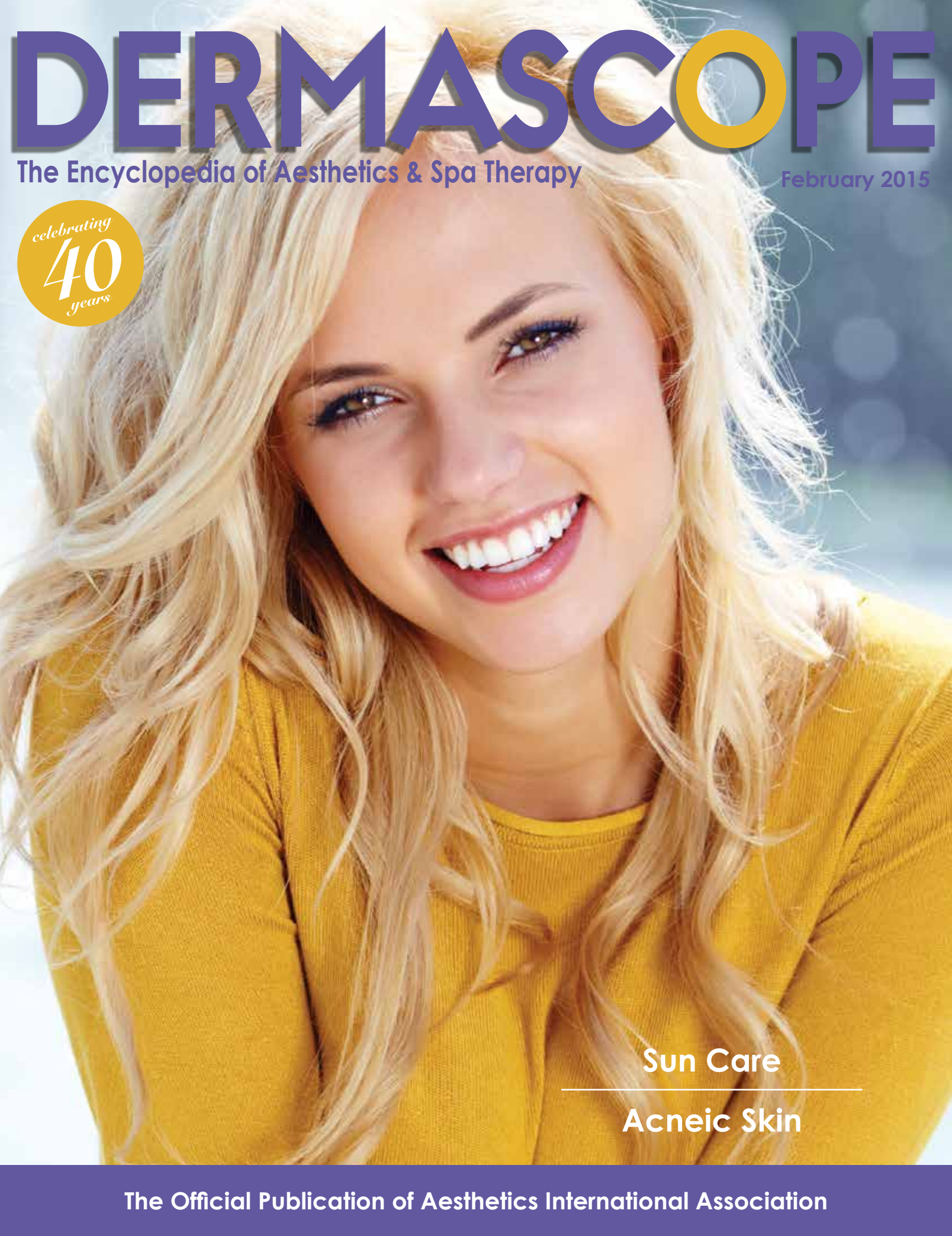


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Winter Skin Under the Sun

by Alison Adams-Woodford, L.E.

It all started in the 1920s when Coco Chanel fell asleep while outdoors on vacation in the French Riviera and woke up with an unintended sunburn. The style icon singlehandedly changed previous views that skin should be pale and pristine to one that viewed a tan as a fashion statement. There is a slow-moving paradigm shift back to a belief that tanning is dangerous, and campaigns from a variety of organizations and corporations are working to uphold the idea of one's own natural skin tone as beautiful. The ongoing effort to extoll the virtues of daily, year-round sun protection has gained traction, but not enough. Even those who protect their skin during the summer months often think that once the fall season rolls around, daily protection is no longer necessary. Gaining an understanding of the sun's strength during different seasons, how ultraviolet rays interact with skin, and how the climate in the winter can be the culprit in many other winter-related skin issues, helps clarify and emphasize the need for customized, year-round care, treatment, and protection.



Winter Sun Exposure

A common misconception is that protection from ultraviolet rays is needed more in the summer than in the winter. Although the strength of UVB rays diminishes slightly during winter months, UVA rays are a constant threat throughout the year. It is important to note that UVA rays have the ability to penetrate through glass, so even driving or sitting inside by a window delivers a dose of UVA rays. These longer ultraviolet rays also penetrate deeper into the skin, breaking down the extracellular matrix that supports the skin.

We are conditioned to think of applying sunscreen at the beach or on a boat, yet sand only reflects 15 percent of ultraviolet rays and water only 10 percent. Outdoor winter activities pose an even worse sun exposure threat, as snow can reflect up to 80 percent of the sun's rays. Skiing can be one of the most dangerous sports for the skin, as the activity requires times at high altitude where the exposure is intensified further.

The sun is the primary source of ultraviolet radiation. Ultraviolet rays are broken down into UVA, UVB, and UVC rays according to their wavelength:

- UVC – 200 to 280 nm
- UVB – 280 to 320 nm
- UVA – 320 to 400 nm

The majority of the negative sun-induced effects in the skin are attributed to UVB exposure; this is mostly due to the visible nature of their effects. Although the inflammation and redness accompany-

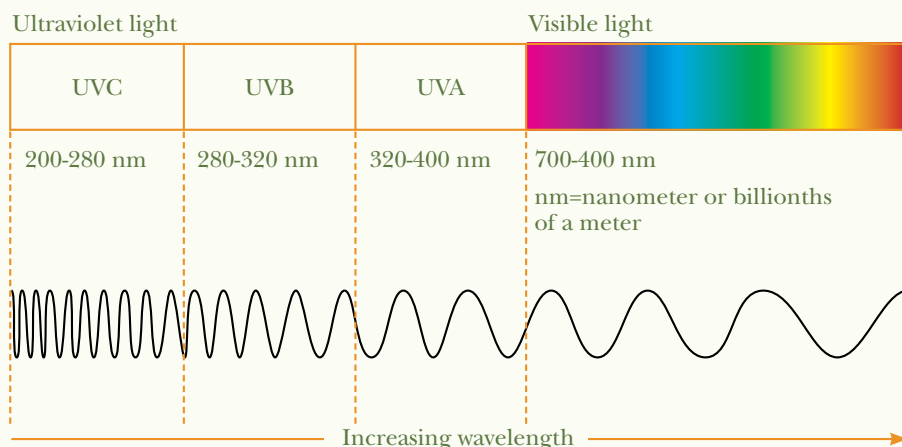
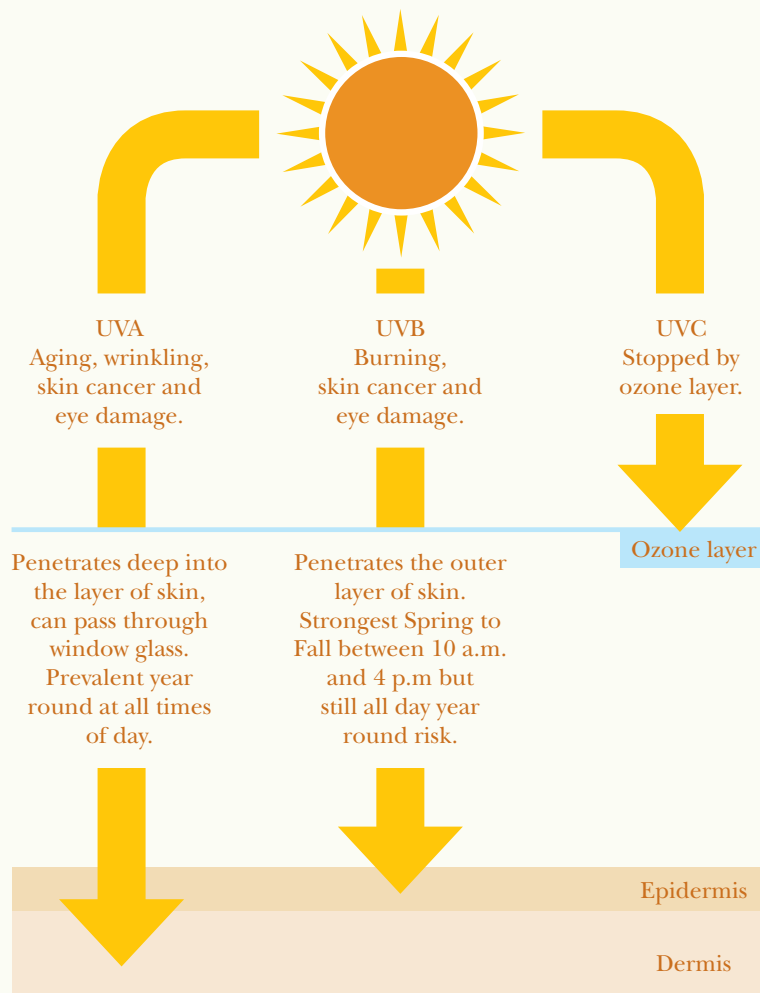
ing sunburns are the obvious and most visible negative effects, it is the damaging internal effects that are more worrisome.

Exposure to UVB radiation is responsible for a cascade of events inside the epidermal skin cells, including increased levels of the damaging free radical reactive oxygen species (ROS). Radicals are compounds with unpaired electrons. This lack

of electron balance creates highly-reactive atoms and molecules. There are many types of free radicals, yet reactive oxygen species have been widely studied because of their particularly damaging effects in the skin. Of the wide variety of environmental insults, ultraviolet radiation is a primary contributor to the overproduction of reactive oxygen species and oxidative stress in the skin. Reactive oxygen species include hydroxyl radicals, nitric oxide, peroxyxynitrite, superoxide anions, peroxide, triplet oxygen, and singlet oxygen.

Damaging the First Line of Defense

The outermost layer of the skin, the stratum corneum, is the skin's first line of defense against the environment. The stratum corneum contains mostly corneocytes (dead, flattened skin cells) with a structure often described as similar to



the brick and mortar of a wall. The corneocytes represent the bricks and contain the skin's natural moisturizing factor, a complex combination of lactic acid, urea, salts, and amino acids. The mortar is made up of groups of important lipids that congregate into layers, creating a natural water-binding barrier for the stratum corneum. The disruption or removal of either of these components leads to increased transepidermal water loss, resulting in dry, dehydrated skin.

Moisture is important for maintaining healthy skin. Appropriate water content in the stratum corneum allows the skin to be soft and flexible. Moisture also plays a critical role in desquamation, which is the intricate process by which our cells turn over and shed away from the stratum corneum. Without the appropriate moisture levels in the stratum corneum, desquamation is disrupted, leaving the corneocytes to build up on the surface, making the skin appear dull, dry, and flaky. Impeding the natural exfoliation of dead cells compounds the dysfunction of the already stressed, dehydrated skin by trapping debris and reducing the penetration of topically-applied products.

The First Step

Broad spectrum sunscreens are the single most important product



in any person's skin care regimen, regardless of the time of year. Daily use limits ultraviolet-induced skin damage and reduces the chances of cellular DNA mutations that can lead to the formation of tumors and skin cancers. Protecting the skin by applying a broad spectrum sunscreen (sun protection factor of at least 30) half an hour prior to exposure and reapplying every two hours, or after perspiring, is the best strategy.

Sunscreen products can have either chemical or physical ingredients, or a combination of both. It is critical that any recommended product protects against both UVA and UVB wavelengths. Unfortunately,

only four of the ingredients currently approved by the FDA provide true broad spectrum protection against UVA rays. For this reason, a broad spectrum sunscreen should include one of the following: zinc oxide, titanium dioxide, avobenzone, or ecamsule. A blend of multiple ingredients is typically necessary to provide ideal sunscreen protection. Purely physical protection typically yields a product that is thick and unpleasant for daily use. A combination of chemical and physical ingredients provides a cosmetically elegant option that will tend to increase client compliance with daily use. It has also been demonstrated that a combina-

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tion of zinc oxide and octinoxate provides superior broad spectrum protection more so than using zinc oxide alone.

Fighting Oxidative Stress

In addition to daily, year-round, broad spectrum ultraviolet protection, topical antioxidants are critical to healthy skin. Human skin has its own natural antioxidant defense system that is required to quench the free radicals created internally as a result of a variety of metabolic processes. Exposure to ultraviolet radiation increases the production of reactive oxygen species (ROS) and upsets the natural antioxidant/radical balance in the skin, causing damage to proteins, lipids, and DNA within the cells.

In addition to sunscreen usage and sun avoidance, an important strategy for avoiding this oxidative stress and damage is keeping the skin's radical and antioxidant levels in balance. Adding topical antioxidants to the client's daily care regimen is important all year, but especially during the winter months when skin is typically dehydrated and more vulnerable to oxidative stress.

UVB rays also reduce the body's internal antioxidant levels, making it even more susceptible to DNA

damage and mutation. Ultraviolet-induced DNA mutation is the number one cause of skin cancers. This inevitable chain reaction is the reason the use of sunscreen ingredients alone is not enough. Ideal sunscreen formulations should include antioxidants to help prevent the initial overproduction of reactive oxygen species. If a chosen sunscreen product does not contain antioxidants within their formulations, add a topical antioxidant serum to clients' skin care regimens. The following antioxidants have been proven to fight ultraviolet-induced ROS: green tea, resveratrol, genistein, ergothioneine, coffea arabica, cocoa, caffeine, mangosteen, and silymarin. Certainly the use of broad spectrum sun protection and antioxidants is important year-round, but it is a particularly helpful support to dry, dehydrated winter skin.

Staying Hydrated

In order to strengthen the skin and reduce damage caused by sun exposure, it must be well hydrated. Maintaining proper moisture levels within the skin is important all year, but critical in the winter when the humidity typically drops, heaters are running, and the skin is exposed to dramatic shifts in temperature. Also,

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many people are drinking less water. In order to keep winter skin strong and hydrated, water intake must increase and daily use of topical moisturizing ingredients should increase as well.

Ideal moisturizing products should contain both humectant and occlusive ingredients. Humectants are used to increase hydration of the stratum corneum by drawing water up from the dermis. Increasing topical hydration helps to improve the health and appearance of the skin. Some effective humectants include the following:

- **Hyaluronic Acid** – A naturally-occurring glycosaminoglycan used topically for its impressive moisture-attracting capabilities.
- **Sodium PCA** – A part of the skin's natural moisturizing factor.
- **Sorbitol** – Often used as a more cost-effective alternative to sodium PCA and hyaluronic acid; it is also an antioxidant.
- **Honey** – A humectant, antibacterial, and anti-inflammatory ingredient.
- **Glycerin** – One of the most effective humectants that can also penetrate through the cell's water channels (aquaporins).
- **Urea** – It is capable of entering and hydrating the skin cells by way of aquaporins.

In addition to containing effective humectant ingredients, a moisturizing formula must also contain occlusive ingredients to hold the newly-acquired moisture within the skin. They create an invisible barrier on the skin to maintain moisture levels and, if used alone in a formulation, occlusive agents retain existing




hydration, rather than significantly increasing moisture levels in the skin. Moisturizing products that use both humectants to draw water from the dermis to the epidermis and occlusive ingredients to retain it in the skin are optimal. Some useful occlusive agents include the following:

- **Petrolatum** – This is considered the most effective occlusive agent available, though it has fallen out of favor due to an unappealing, greasy finish on the skin.
- **Lanolin** – An effective occlusive agent derived from the sebaceous glands of sheep; its potential for causing dermatitis has reduced its use in skin care.
- **Silicones** – Dimethicone and cyclomethicone are polymers that provide occlusion with a light, powdery finish. They are particularly appealing for products designed for oily

or acneic skin as they are not greasy, do not clog pores, and are non-irritating.

- **Shea Butter** – It has a rich texture, making it most appropriate for drier skin types.
- **Niacinamide** – This increases the skin's natural barrier components. It increases production of epidermal free fatty acids, ceramides, and cholesterol in the barrier.
- **Plant Oil** – Provides mild occlusion; some are rich in essential fatty acids that reduce inflammation and occluding.

There are broad spectrum sun protection products available that also function as daily moisturizers. This is a great option for addressing hydration while also protecting winter skin from the sun. If a product is providing protection, hydration, and antioxidant support simultaneously,

while also being cosmetically elegant, there is a higher probability that a person will truly use it every morning, year-round. Education is the first step. Make sure clients understand the real threat that exists from sun exposure and inadequate moisture levels in the skin during winter months. Once they understand and are given the proper winter skin care regimen, they will be able to achieve healthy, beautiful skin regardless of the season. 



Alison Adams-Woodford, L.E., has been licensed and active in the aesthetics industry for almost 20 years. In her 15 years with PCA SKIN®, she has held the roles of director of education, director of product development, and now serves as senior editorial strategist. Adams-Woodford has spent much of her time at PCA SKIN working with physicians, licensed skin health professionals, and chemists, striving to provide the best in education and products to support skin health and improve people's lives.



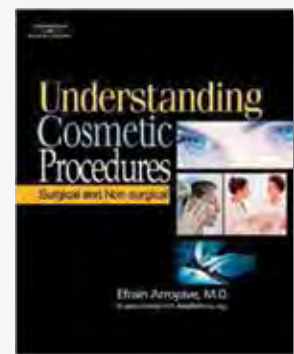
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