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The Importance of UV Protection

Here's what you need to know about sunscreen

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ermatologist Dr. Luigi Polla stresses that aging gracefully starts with applying a facial moisturizer that contains SPF—every single day. "Wear a moisturizer with SPF every day, and you will never look your age," he says. Teaching consumers about the importance of sun protection and the damage caused to the skin by ultraviolet (UV) rays is essential. You will not only help your customers age gracefully; you will be teaching them about the importance of preventing skin cancer.

WHY IT MATTERS

UV ray exposure induces free radicals, which leads to damaging the skin, and in particular, premature aging. When exposed to UV radiation, the skin undergoes alterations resulting in inflammation, photoaging and various skin disorders. Typical signs of photoaging include wrinkling, loss of elasticity, increased skin fragility and slower wound healing.

Specifically, UVB rays are absorbed by melanin and lead to skin concerns such as redness (sunburn), while also generating additional free radicals, including the very nefarious hydroxyl radical. An SPF 30 sunscreen can block up to 97 percent of UVB radiation, but its important to limit sun exposure between 10 a.m. and 4 p.m., and reapply every two hours.

UVA rays penetrate more deeply into the dermis, increasing the production of free radicals and contributing to long-term cellular damage. Both UVA and UVB induce the activation of enzymes that damage collagen and elastin, too, so broad-spectrum sunscreens are a must. Sunglasses can also prevent eye damage by providing up to 100-percent protection from both UVA and UVB rays.

In case this is not enough incentive to educate, sell and recommend products with SPF, keep this in mind: Sunscreen does not only prevent sun damage, it also helps repair existing damage—and keeps skin looking healthy. In a recent study, 32 women used a moisturizer

with SPF 30 (a chemical sunscreen blend) every day for a year; skin aging did not accelerate—and it actually improved the overall quality of the skin.

"Not only did their skin not age, but we actually saw significant improvement in a number of parameters of photoaging," says Michael Southall, research director and fellow of global skin biology and pharmacology at Johnson & Johnson Consumer, one of the authors of the study. As reported in MedEsthetics May/June 2017 issue, the most significant improvement was in skin texture and pigmentation, with a 40 to 52 percent improvement over one year; there was also an 18 to 34 percent reduction in fine lines. So recommend a moisturizer with SPF—not just for protection, but also for correction.

THE TYPES OF SUNSCREEN

Sunscreen can be classified into three main categories: physical blocks that reflect UV light (for example by using titanium dioxide molecules of a size of 200 to 400 micrometers), physical (mineral) filters that absorb UV light (such as titanium dioxide in nanoparticle size) and chemical filters that absorb UV light.

PHYSICAL BLOCKS

Physical blocks are compounds with a particle size of about 200 to 400 µm that act by reflecting solar radiation. The most commonly used blocks are titanium oxide, zinc oxide, iron oxide, mica and silica. While these ingredients are well tolerated by most skin types since they do not penetrate the skin and the adverse effects they generate are minimal, titanium and zinc oxides create an opaque appearance on the skin and typically leave it looking ashy, which some consumers don't like. Nonetheless, these tend to be the ingredients preferred by brands that position themselves as "natural" or "organic."

PHYSICAL FILTERS

The most common example of a physical (mineral) filter is titanium oxide, used in particle sizes ranging from 15 to 80 nanometers. These absorb both UVB and UVA rays. Due to

| TYPE OF SUNSCREENS | STRUCTURE | FUNCTION | ADVANTAGES | LIMITATIONS | EXAMPLES |
|---------------------|--|-------------------------------|---|--|------------------------------------|
| Physical blocks | Mineral molecule of 200 to 400 µm | Reflect solar radiation | Well tolerated Efficient in absorbing UVA and partially UVB | Opaque Leaves a white deposit on skin | Titanium dioxide Zinc oxide |
| Physical filters | Mineral molecule at the nano scale 15 to 80 nm | Absorb solar radiation | No white deposit Efficient on UVA and UVB | Difficult dispersion Dryness of skin Controversy of nanoparticles | Titanium dioxide Zinc oxide |
| Chemical filters | Chemical substance | Absorb one type of wavelength | Stable Each filter has its own absorption coefficient | Can cause allergic reactions Can cause photosensitivity Mix of different products may be required Can cause and cause are a cause and cause are a cause are a cause and cause are a cause and cause are a cause | Benzophenones PABA Mexoryl |

THE BUZZWORDS

You'll often see these buzzwords on the labels of sunscreen. Here's what you should know about these popular terms.

Broad spectrum: The FDA requires sunscreens that carry the label "broad spectrum" provide protection against both UVA and UVB radiation. For a sunscreen to be effective against erythema (redness and sunburn), it must contain filters, which absorb UVB radiation. UVA protection is also key, as UVA is responsible for photoaging and skin appearance of actinic keratosis, as well as some forms of skin cancer.

Waterproof or water resistant: The term "water resistant" describes a formulation that is not easily washed off by contact with water (this is usually achieved by the incorporation of silicone oils, dimethicones and/or cyclomethicones). The FDA does not recognize the term "waterproof."

Nanoparticles: Titanium dioxide and zinc oxide in nano size (i.e., that their particle size is of 100 nm or less) are often used as UV filters. When incorporated into sunscreens, these nanoparticles avoid the formation of white and shiny residue typically left on the skin that may be generated when the particles are larger in size. However, in recent years, there has been a public concern in regards to the ability of nanoparticles to penetrate into and through the skin and potentially cause harmful effects. The European Union requires that the use of nanoparticles in cosmetic products be explicitly declared on product packaging and listed as a part of the ingredients. In the list of ingredients, the substances will be followed by the word "nano" in brackets; for example, titanium dioxide [nano].

Environmental protection factor (EPF): EPF is not a term officially recognized by the FDA, however, some manufacturers use this term to describe the photo-protective effect of some antioxidant molecules such as green tea. In general, it should be noted that layering antioxidant products under any sunscreen product will enhance overall protection from free radicals, as the antioxidants will neutralize any that are not blocked or absorbed by the screen.

Organic sunscreen: Technically, referring to sunscreen as organic is an oxymoron. No product containing SPF protection can be 100-percent organic—so make sure you read the fine print on the bottles, and understand the percentages of organic ingredients used in a product so that you can explain the product accurately.

Higher is better: Numbers can be misleading. While an SPF of 30 blocks about 97 percent of the sun's damaging rays, SPF 50 will only block one additional percent (98 percent). As the numbers increase above 30, the additional increase in protection is penlinible.

Proper application: Consumers typically do not apply sunscreen at the concentration the FDA tests at, meaning that emphasizing how to apply this product is key. The correct amount of product to use is a teaspoon for the face and a shot glass for the body. Repeated application is also key, no matter how high the SPF (think every two hours when in direct sunlight or after swimming).

Sunscreen vs. a moisturizer with SPF: When speaking about sunscreens, it is important to differentiate between a customer's "normal life" and "vacation life." For everyday wear, assuming that most customers spend the majority of their days indoors, a day cream with an SPF of 20+ is good, and water resistance is not necessary. In my experience, the focus in this case is to remind your customers that some SPF protection is needed daily to help age gracefully. You can recommend a morning facial cream (or makeup) with an SPF incorporated so that no additional products are needed. For customers going on vacation, recommend products for both the face and body that are water resistant and have an SPF of 50+.

| INCI NAME | EXAMPLE OF COMMERCIAL NAME | ADVANTAGES | LIMITATIONS |
|--|----------------------------|--|---|
| Aminobenzoic acid | PABA | Excellent absorption coefficient Satisfactory stability | Maximum of absorption varies with the pH Doubtful tolerance Allergenic potential |
| Octyl methoxy cinnamate | Parsol MCX | High absorption coefficient | Imperfect photostability Sensitization problems |
| Homosalate | Filtrasol A | Very stable Well tolerated | Low absorption coefficient |
| Camphor benzalkonium methosulfate | Mexoryl SO | Stable to radiation Well tolerated | No UVA protection |
| Benzylidene camphor sulfonic acid | Mexoryl SL | Stable to radiation Well tolerated | No UVA protection |
| Polyacrylomethyl benzylidene camphor | Mexoryl SW | Stable to radiation Well tolerated | No UVA protection |
| Teraphtalylidene dicamphor sulfonic acid | Mexoryl SX | Stable to radiation Well tolerated UVA protection | |
| Octocrylene | Octocrylene | UVB protection Short-wave UVA Photostable Non-allergenic | Low absorption coefficient but is mainly used as a stabilizer |
| Benzophenone-3 or oxybenzone | Eusolex 4360 Uvinul M40 | UVB protection Short-wave UVA | Poor skin tolerance Allergenic Low absorption coefficient |

their small size, they do not leave a white deposit upon application—an advantage that is appealing to consumers. However, the use of "nanoparticles" is sometimes considered controversial, as there is limited long-term data about their absorption in the skin and beyond, and any related health effects.

CHEMICAL FILTERS

Chemical filters are molecules that absorb (rather than reflect) UV rays. Chemical filters are often found in the most elegant cream formulations, without resulting in any white residue or ashiness. However, chemical filters are sometimes controversial, as they are known to cause allergic contact dermatitis, irritative dermatitis and even photosensitivity. As always, the key is to understand that chemical filters are a large family of compounds, and that some are safer than others. The filters that most commonly cause bad skin reactions include: benzophenones (benzophenone-3 or oxybenzone), butylmethoxydibenzoylmethane,

methoxycinnamate, methylbenzylidenecamphre and aminobenzoic acid.

Below is an overview of the most common chemical filters you will see used by various brands. Most often, brands combine chemical filters in their formulations, given that many only work on either UVA or UVB. Three or four chemical filters are common within a single formulation.

The most important thing to remember overall, however, is that regardless of whether your customers prefer chemical sunscreens or physical sunblocks, whether they like sunscreen or moisturizers with SPF, UV protection will not only help to prevent skin cancer, it will prevent accelerated skin aging and repair existing skin damage. Dr. Luigi L. Polla, as usual, is right: "Wear a moisturizer with SPF every day, and you will never look your age."

Ada S. Polla is the president, CEO and co-creator of the skincare line Alchimie Forever of Switzerland, which launched in the U.S. in 2004.