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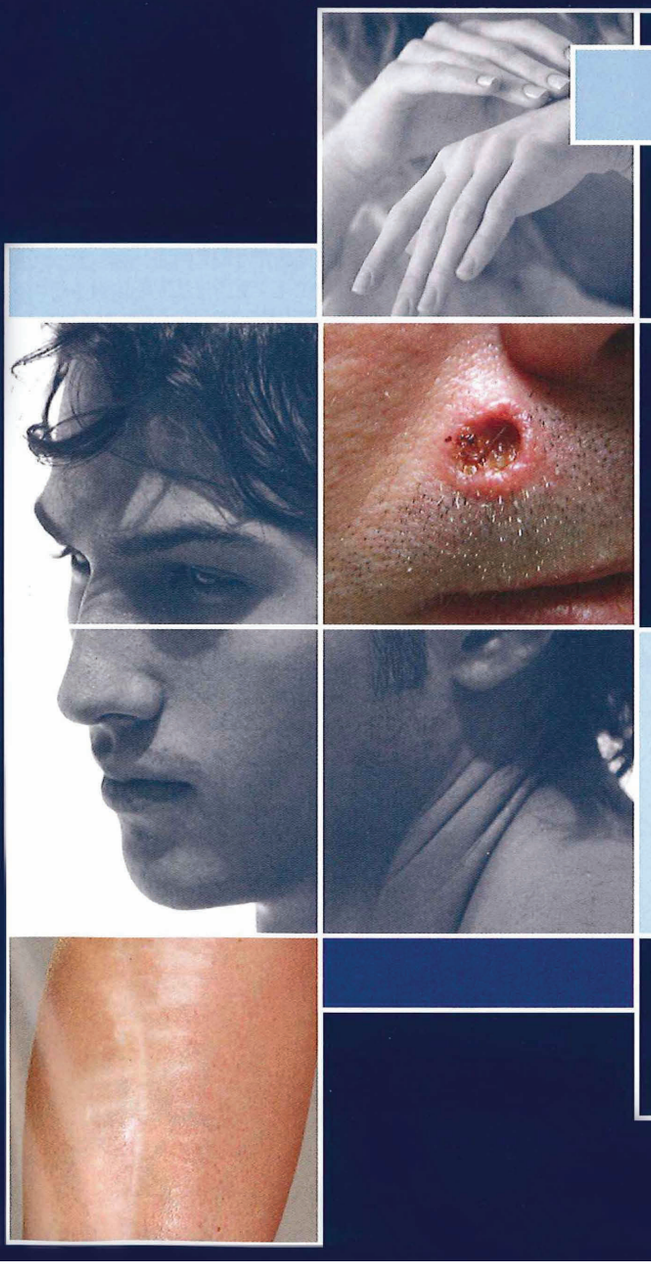

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Mineral Makeup and Its Role With Acne and Rosacea

Jane Iredale, MA; Jennifer Linder, MD

Rosacea and acne have been the cause of physical and emotional distress for patients worldwide. Part of the distress has originated from the inability to find products that provide coverage without exacerbating the conditions. This includes understanding the role of certain ingredients with their attendant negative and positive effects. Fifteen years of experience has shown that mineral makeup can play a large part in helping to repair patients' self-esteem as well as playing a meaningful role in skin improvement.

IDENTIFYING AUTHENTIC MINERAL MAKEUP

Patients with acne and rosacea frequently seek options to cover what they consider to be visually frustrating conditions. Regrettably, they often make choices that are not effective and potentially detrimental to their situation. To serve these patients better, physicians should educate themselves and their staffs about camouflaging options. Mineral makeup can be a satisfactory solution as it is a healthy, skin-friendly alternative to traditional makeup. Mineral makeup not only provides superior coverage and is easy to use, but it is also UV protective, noncomedogenic, and anti-inflammatory. It is beneficial for physicians to increase their understanding of authentic mineral makeup because, as with skin care, patients expect physicians to be the experts when it comes to anything that affects the health and appearance of the skin.

Ms. Iredale is Founder and Chief Executive Officer, Iredale Mineral Cosmetics, Ltd, Great Barrington, Massachusetts. Dr. Linder is a board certified dermatologist and fellowship-trained Mohs surgeon in private practice, Scottsdale, Arizona, and Clinical Instructor, University of California, San Francisco.

Ms. Iredale is Founder and Chief Executive Officer of Iredale Mineral Cosmetics, Ltd. Dr. Linder is a consultant, speaker, and honorarium recipient for sanofi-aventis US LLC, and a consultant, speaker, and honorarium recipient for Allergan Facial Aesthetics. Dr. Linder is also Chief Scientific Officer for PCA SKIN, in which she has an equity stake.

Correspondence: Jane Iredale (jane@janeiredale.com).

For physicians to assess mineral makeup and its benefits for their patients with rosacea and acne, it is necessary to explore the chemical composition of authentic mineral powder. Many makeup brands are now marketing products they call mineral makeup, but they do not utilize authentic minerals in their formulations. The incorrect use of the word *mineral* as a marketing term confuses patients and can lead to the use of products that can potentially worsen their condition due to problematic ingredients.

The original definition of mineral makeup is a makeup that eliminates talc, potential skin irritants, and comedogenic ingredients, all of which are critical for patients to avoid if they have acne and rosacea. Authentic mineral powders are primarily comprised of combinations of titanium dioxide (TiO_2), zinc oxide (ZnO), iron oxides, mica, bismuth oxychloride (BiOCl), or boron nitride (BN). In authentic mineral powders, the minerals will appear at the top of the ingredients list because ingredients must be listed in descending order by volume. In traditional makeup, minerals are usually listed on the label under the phrase *may also contain*, indicating that they may or may not exist in the formula and that their percentage is likely to be minimal.

Unfortunately, the most common ingredient in traditional makeup is talc, comprising 70% to 90% of the formula. Although talc, also known as soapstone, is a mineral (magnesium silicate hydroxide), the definition of an authentic mineral makeup is one that contains no talc. The dilution of actual mineral pigments in talc diminishes their benefits, deadens the look of skin, and increases the requirement for reapplication. Coverage with a heavily

talc-based makeup is at best unsatisfactory and camouflage is almost impossible.

An authentic mineral formula containing a high percentage of minerals provides numerous benefits to patients with acne and rosacea including sun protection, lack of comedogenic ingredients, anti-inflammatory action, and versatile coverage. This concentrated pigment also gives the mineral powder adherence that rarely transfers or necessitates reapplication, which makes them useful for busy patients.

COMMON MISCONCEPTIONS

To comfortably answer patients' questions, it helps to have a basic understanding of several of the common misconceptions about the minerals that are in mineral powders.

Minerals used in mineral powders are inorganic, defined as without carbon molecules. Because carbon compounds are the basis for all living organisms, inorganic compounds are considered to be of nonliving or mineral origin rather than biologic origin. Their inert nature eliminates the risk for bacterial contamination. This is in contrast to organic, defined as that which contains carbon and therefore requires preservatives to prevent decay and contamination.

No minerals formulated in cosmetic powders are used directly from the earth and some are entirely manufactured. Most minerals go through extensive refining processes and should be classified as inorganic compounds (eg, TiO_2 and ZnO). A brittle metal that is used extensively in mineral makeup, BiOCl is found as the mineral bismuth in the earth's crust and in certain types of ores. This mineral requires considerable refinement and purification before it can be used topically.

Iron oxides used for cosmetics are wholly synthesized to avoid the heavy metal contamination found in nature.

Authentic minerals have no relationship to mineral oil, which is a liquid petrolatum, a by-product of petroleum.

As there is no scientific definition of the term *natural* as it relates to cosmetics and cosmeceuticals, the common question asked by patients whether mineral makeup is natural cannot be truly answered.

WHICH MINERALS ARE USED AND WHY

The primary minerals used in mineral makeup are beneficial to patients with acne and rosacea because many are photoprotective, water resistant, noncomedogenic,[1] innately antibacterial, anti-inflammatory, and camouflaging. Mineral makeup is often favored over other makeup foundations by patients with erythema following chemical peels and laser resurfacing, erythema caused by acne, rosacea, melasma, and postinflammatory hyperpigmentation.[1] Several key mineral ingredients are combined together to maximize the benefits and effectiveness of mineral makeup.

Titanium Dioxide

Found in the minerals rutile (beach sand), anatase, and brookite (relatively rare), TiO_2 is a naturally occurring oxide of titanium. It is seldom used raw because of its photocatalytic propensity. To make it effective and beneficial, TiO2 is surface treated to eliminate oxidation and to increase its ability to refract UV rays. Dimethicone is commonly used for this purpose, due to its ability to increase the light-scattering properties of TiO_2. Approved as an active physical sunscreen ingredient, TiO_2 is anti-inflammatory and provides coverage.

Zinc Oxide

Manufactured from the mineral zincite, ZnO is a pure white mineral known for its anti-inflammatory and antimicrobial properties and is approved as an active physical sunscreen ingredient.

Mica

Mica is naturally occurring; however, natural mica has not been used in cosmetics since 1960. Currently, all mica used in cosmetics is manufactured. Mica can be used in larger particle sizes to provide shimmer, or in small particle sizes to render it matte and absorbent to the benefit of patients with oily skin. It is also often used as a colorant. Although it is rare, some sensitivity to mica can occur.

Bismuth Oxychloride

Originating as the mineral bismuth, BiOCl is processed to produce an iridescent white or nearly white metal powder. Its sheen has led it to being called synthetic pearl. It adds color, coverage, and adhesion to the finished product. Of all the ingredients in mineral makeup, this is the one that is often blamed for irritation, usually described as itching and burning. Although BiOCl is commonly used in traditional makeup, it is present in mineral makeup in larger quantities.

Boron Nitride

Manufactured as a white, silky powder, BN provides smoothness, coverage, slip, and sheen. It is also known as the "soft focus" mineral because of its light-refractive qualities.

Iron Oxides

Iron oxides, commonly known as rust, are primarily used as colorants. All iron oxides used in cosmetics are required to be synthesized under strict laboratory processes. Iron ore cannot be used directly from nature due to its heavy metal content.

PROBLEMATIC INGREDIENTS

Mineral makeup was developed to benefit the conditions that typically occur or worsen as a result of wearing traditional makeup. Some types of acne, inflammation, contact dermatitis, and allergies can be exacerbated or caused by ingredients commonly found in traditional makeup.[2] Some ingredients that have been identified as problematic are emulsifiers, drug and cosmetic (D&C) dyes, fragrance, synthetic preservatives, binders, and some mineral oils.

Emulsifiers

Emulsifiers potentially aggravate acne due to follicular irritation. It is reasonable to assume they are acneic because they emulsify the sebum and proteins residing within and around the follicles.[3] Detergents are also known instigators of irritant contact dermatitis reactions.[3]

D&C Dyes

Colorants approved for drugs and cosmetics, known as D&C dyes, were once derived from coal tar and are now from petroleum. They are often comedogenic,[4] particularly the red dyes, which are commonly used in blush and result in breakouts in the cheek area. Every batch of synthetic dye is tested by the US Food and Drug Administration (FDA) for heavy metals and must be certified for use. The FDA recognizes the ubiquitous nature of heavy metals and allows some parts per million, including lead at 20 ppm. This came to the public's attention in 2007 when the Environmental Working Group did a study on red lipsticks manufactured by different companies and found lead in 61% of the lipsticks tested.[5] Always controversial, there have been claims that some D&C dyes are carcinogenic.

Fragrance

Fragrance can be an irritant, an allergen, and a photosensitizer. Ninety-five percent of chemicals used in fragrances are synthetic compounds derived from petroleum. The European Union has led the way in safety issues connected with fragrance, which appear on the label as *parfum* in the European Union or *fragrance* in the United States.[6] A typical fragrance can contain up to 100 ingredients, which are exempt from product labeling laws. A group of commonly used ingredients, phthalates (plasticizers), has been linked to reproductive damage.[7]

Synthetic Preservatives

Synthetic preservatives are a controversial topic, with some companies choosing to avoid them altogether. Contact dermatitis can be seen in reactive individuals exposed to synthetic preservatives. It is generally accepted that the formaldehyde group of preservatives is likely to cause the most sensitivities.[8]

Binders

Binders, substances that hold powders together, can be comedogenic, such as octyl palmitate, or can be beneficial to the skin, such as dimethicone. This silicone is noncomedogenic, nonacnegenic, nonirritating, and nonallergenic.[3] Silicones also hold moisture in the epidermis similar to the lipid bilayer, which is important to rosacea sufferers because dry skin and barrier dysfunction are common. Not addressing the barrier dysfunction that leads to increased sensitivity, dryness and dehydration will typically worsen the symptoms of rosacea.[9]

Mineral Oil

Mineral oil is comedogenic. It is important to note that some oils rich in omega-3 and omega-6 essential fatty acids have demonstrated benefits for acne patients,[10] in contrast to mineral oil.

By eliminating the problematic ingredients identified, the result is a makeup that produces fewer negative effects in the skin. However, well-formulated mineral makeup can go further and claim actual measurable dermal benefits.

BENEFITS

Mineral makeup provides UVA/UVB broad spectrum coverage, ease of use, and camouflage coverage. It is also noncomedogenic, nonacnegenic, nonirritating, hypoallergenic, anti-inflammatory, and useful for all Fitzpatrick skin types.

UV Protection

It is well established that sun protection is of critical importance to skin's health. UV exposure and its resultant inflammation is credited with at least 80% of the signs of aging and is a well-known trigger for rosacea. It is also true that many of the products that help treat acne make the skin more sensitive to the sun, thereby increasing the risk for damage and postinflammatory hyperpigmentation.[11] Mineral makeup is a useful tool for dermatologists to dispense to their patients with acne and rosacea because it makes sun protection easy and effective, while also minimizing the appearance of lesions and excessive redness.

In addition, TiO_2 and ZnO are inorganic sunscreens and the only 2 physical sunscreens listed in the FDA's sun protection monograph. The appropriate grade and percentage will give broad spectrum protection (UVB and UVA). They also perform well in water resistancy tests and can reach the level of being very water resistant. However, it would be a misconception to believe that all mineral makeup provides UV protection. The level of protection is dependent on the percentage and type of active ingredients used as well as the application and amount of

coverage. For example, raw TiO_2 is not an active ingredient but is classed as a pigment. It is also photocatalytic, which is the phenomenon by which a relatively small amount of light-absorbing material, the photocatalyst, changes the rate of chemical reaction without itself being consumed. As a result, raw TiO_2 can cause damage to the surrounding skin cells when exposed to UV rays. The photocatalytic action is usually avoided by coating the particles with either fatty acids, alkyl silanes, alumina, or silica, such as dimethicone or cyclomethicone. This additional ingredient must be listed on the product label. Mineral foundations can be rated as high as SPF 20 with a UVA protection of medium. Of course, it is important to look for the sun protection level on the product label to ensure adequate UV coverage.

Ease of Use

An authentic mineral powder functions as a foundation, concealer, powder, and sunscreen. Because it is concentrated pigment, it gives maximum coverage using the minimum amount of product. It is the way minerals interact with light that creates the illusion of perfection rather than traditional coverage, which is dependent on the amount of product applied.

Minerals interact with light in multiple ways. They allow light to pass through the particles so it bounces off the skin, reflecting back some of its hue, literally taking on the color of the skin. Minerals reflect, refract, and diffuse light, creating a soft focus effect which minimizes imperfections. They give a luminous appearance to the skin and impart a healthy, youthful glow.

This interaction with light makes matching color to the skin easier in comparison to traditional makeup. In fact, minerals blend so well with the skin that demarcation lines are rarely obvious. For coverage of the redness caused by rosacea and acne, a yellow-based mineral powder eliminates the need for other types of camouflage.

Mineral makeup comprises a variety of particle sizes. When applied to clean, moisturized skin, these particles cling together and create a surface tension that overcomes gravity and holds the minerals tightly to the skin. The result is that they resist running, creasing, and smearing and can only be removed with a cleanser. As a consequence, there is far less transference with mineral makeup compared to traditional makeup. This resistance to transference adds a dimension of comfort for patients with acne or rosacea as they go about their daily lives without the continual concern of reapplication of their camouflage.

If minerals are applied properly, they should feel weightless. Some wearers report that for the first time in many years they can feel the air on their skin. If minerals feel or look heavy, it is probably an issue with application technique and not the minerals themselves. Patients can apply minerals easily and quickly if the right tools are used. Brushes with hand-tied natural hair are usually the tool of choice, giving the best application and blending properties. Sponges can be used for heavier camouflage work.

Mineral powders come in 2 forms, loose and pressed. Slightly different application techniques apply to each. They both require the skin to be clean and prepared with a layer of moisturizer. The moisturizer should be allowed to absorb before applying the minerals.

Loose mineral powders can be packaged in 2 ways. One is in a jar with a sifter that requires a separate brush, or a brush that dispenses powder. The other packaging option is a cylinder that dispenses mineral powder through a brush. To minimize scattering and to allow access to smaller areas such as the eyes and nose, the correct tool for loose mineral powder in a jar is a chisel powder brush. Patients should be taught proper application techniques to ensure maximum coverage and the best cosmetic outcome. The brush is dipped lightly into the minerals, any excess is tapped off, and the lid of the container or dish is used to work the powder into the brush so it is evenly distributed. The minerals should cling to the bristles all the way around the brush and not just on the ends. One brushload is then applied to each quadrant of the face. The minerals should be applied in thin layers, finishing with downward strokes. If too much is applied, a sponge with a nap (a flocked sponge) can be employed to remove any excess. If additional coverage is needed in specific areas, a sponge can be used to spot treat as necessary.

An alternative application technique for loose minerals is a brush that dispenses powder. It should be primed by running the brush over the knuckles or a tissue in order to visualize when the powder begins to disperse and to judge the proper amount of product needed. Circular motions are preferred when using this type of brush, beginning on the area of the face that needs the most coverage.

Pressed mineral powders have the advantage of being easier to apply than loose minerals. Similar application techniques as those for loose powder are used; however, a flat-ended, natural hair brush works best with pressed powders. These pressed formulations often contain skin-enhancing ingredients, such as antioxidants, although the pressing agent may or may not be beneficial. For example, as noted previously, octyl palmitate is comedogenic whereas dimethicone is not. For patients with acne and rosacea, it is critical they receive physician guidance on ingredients to avoid. This education supports their treatment plan and reduces the likelihood of worsening their condition.

Camouflaging Skin Imperfections

The importance of camouflage cannot be underestimated for patients suffering with acne and rosacea due to the immeasurable effect the diseases can have on patients' quality of life and self-image.[2] These patients will find a way to cover the visible signs of their conditions whether it is recommended by a doctor or not. Without informed choices, the camouflage they choose could be detrimental. It is important for dermatologists to recommend products to their patients that will allow them to minimize the appearance of their condition during treatment. These informed recommendations will help patients avoid selecting a camouflaging product that may exacerbate the very condition they are working to hide. Mineral powders have been used to positive effect by dermatologists and plastic surgeons for 15 years to camouflage imperfections of all types. Some dermatologists have stated that mineral makeup is a revolutionary addition to the cosmetic camouflage market and that they offer an inexpensive alternative for patients.[13]

Mineral makeup is different from traditional camouflage in other important ways, such as the time it takes to achieve satisfactory coverage and its subsequent removal. Traditional camouflage products are notoriously time consuming to apply. Depending on the severity of the lesions or flushing, a patient with acne or rosacea could spend up to an hour attempting to achieve coverage that does not draw attention to itself. Many camouflage products require special cleansers that can be irritants in themselves, such as solvents containing propylene glycol, surfactants containing sodium lauryl sulfate, and alkaline soaps. In contrast, mineral makeup is quickly applied and needs no special cleanser for removal.

In addition to application, color matching is critical to optimizing coverage of acne and rosacea. Green has traditionally been used to cover redness on the theory that green and red are complementary colors and, therefore, cancel each other out. This technique works well on an artist's canvas but not on human skin. Unfortunately, the result of green applied over red is a grey, ghostlike pallor, or green, both of which have to be concealed. A better choice is a yellow-toned mineral base to cover redness effectively and effortlessly.

In natural light, a patient's complexion should be matched to the powder on the jawline. If the matching color has a yellow undertone, that same powder is all that is typically needed to neutralize the erythema. If, however, the matching complexion shade has a pink tone and if the erythema is not pronounced, then the matched color can be applied to a small section of the face to see if it gives the required coverage. If it does not cover sufficiently, a yellow base of the same value as the complexion shade can be applied before finishing with a layer of the pink-toned complexion shade.

If more coverage is needed, a flocked sponge can be used to pick up additional powder. After working the powder into the sponge to ensure even distribution, the additional minerals can be applied with a roll-press motion. A facial spritz can be utilized to set the minerals on the skin. Proper selection of mineral makeup and application technique are critical for patients of all Fitzpatrick skin types to achieve the healthy, visually appealing results that they desire.

ADDITIONAL BENEFITS

For the patient with rosacea and acne, a makeup that claims it is noncomedogenic, nonacnegenic, nonirritating, hypoallergenic, and anti-inflammatory must seem like the Holy Grail. However, these claims may or may not be substantiated from brand to brand. There are legitimate laboratory tests that can be conducted for comedogencity and irritancy and they should be performed by responsible manufacturers. Acnegenicity is harder to determine and is a separate issue from comedogenicity. According to Draelos,[3] it is of great importance when selecting products for patients with acne and rosacea. Draelos[3] contends that cosmetics that are acnegenic in one patient are not necessarily acnegenic in another. The formation of acne caused by cosmetics is rapid, usually developing within 48 to 72 hours after product application. Unfortunately, there are no accepted industrywide protocols to follow for acnegenicity testing. As a result, many manufacturers rely on testimonials from consumers and responses from dermatologists.[3]

An additional advantage of minerals is that they allow the skin to breathe and function normally. They lay on the skin like overlapping fish scales, helping to lessen transepidermal water loss and provide a filter against airborne pollutants. This is particularly advantageous to sensitive, barrier-impaired, rosacea-prone skin.

SUMMARY

Once the marketing hype is eliminated, mineral makeup stands up to its reputation as a genuinely innovative niche product in the cosmetic world. Authentic mineral powders perform differently than traditional makeup from the way they look and act on the skin to the benefits they offer. Because of its many attributes, mineral makeup is the fastest growing segment of the cosmetic industry. Its appeal goes far beyond the requirement for an everyday makeup that benefits the skin. It is especially useful to those suffering from skin conditions such as acne and rosacea. Minerals have now become an integral part of the tools offered by physicians and skin care specialists

whose aim is to offer patients a product that not only hides visible imperfections but also enhances the look and health of the skin.

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