

The Oxygen CHRONICLES

By Lisa Randazzo

No other skincare ingredient requires quite the leap of faith demanded by oxygen. Vitamin A, for example, conjures images of hearty orange tubers such as carrots and yams, while vitamin E evokes a handful of almonds or a murky, aromatic ramekin of olive oil awaiting freshly baked bread. Oxygen, however, remains as elusive as, well...*air*. How exactly, then, does one package it and put a price on it?

Leading experts in the esthetics industry have been arguing oxygen's value in skin care for more than a decade and are farther apart in their views than ever. Without taking sides, we hope to air some of the issues and help day spa owners watching the phenomenon better understand the principles involved.

While oxygen has been used in the medical industry for decades as a carefully regulated, therapeutic agent for respiratory illnesses or to help heal burn victims when pressed into the skin via a hyperbaric chamber, the value of supplemental oxygen beyond these purpos-

ability to oxygenate our skin—basically a function of the capillaries—declines with age, and because oxygen is vital to cellular metabolism, adding it topically can breathe new life into sluggish skin. While some experts point to the risks of excessive oxidative damage from the additional free radicals that would naturally accompany a boost of oxygen, others maintain that our skin is prepared to confront such an onslaught with naturally occurring antioxidants such as SOD, an enzyme that breaks down free radicals into water; still others put forth that delivering the oxygen along with *supplemental antioxidants* evens out the equation. As all sides continue to battle it out, the more immediate issue is whether or not oxygen can actually *be delivered* to the active levels of the skin. What's to keep it from bouncing off the stratum corneum and evaporating into the atmosphere?



Courtesy George Four Seasons Salon Spa

Oxygen treatments can benefit all skin types, including those with conditions such as acne and rosacea.

es remains a subject of debate. While many—including the Food & Drug Administration—argue that inhaling anything more than the 21% oxygen that naturally occurs in our atmosphere is unnecessary for healthy people, anecdotal evidence suggests otherwise. (See sidebar on page 122.)

Delivering supplemental oxygen to the skin, on the other hand, carries with it specific implications for esthetics, and continues a long-held tradition in the skincare industry of adopting a healing modality for use in cosmetics for the purpose of revitalizing healthy but aging skin.

Mission Impossible?

Spraying oxygen onto the skin as an adjunct to professional skincare treatments became popular in the middle of the last decade, and the trend has gained even greater momentum in the past few years. The premise? Our body's

“The skin has what’s called an acid mantle to prevent outside insult; in order to get oxygen past the acid mantle, we have to remove the mantle temporarily,” says Jeffrey Lapin, president, Echo2Plus, Van Nuys, California. “I say temporarily because as soon as any of the body’s defense mechanisms is compromised, the body begins to rebuild it. So, we have a small window of time when the skin is semi-permeable, during which we deliver oxygen along with antioxidant vitamins, amino acids and trace minerals to the dermal-epidermal junction of the skin. Oxygen is necessary for the creation of all cells in the body, and by placing pure oxygen molecules into the layers of the skin where collagen and elastin are produced, we can help build the basic framework that gives skin its strength and suppleness, in addition to speeding cellular turnover in general.” One way to

Our body's ability to oxygenate our skin declines with age.

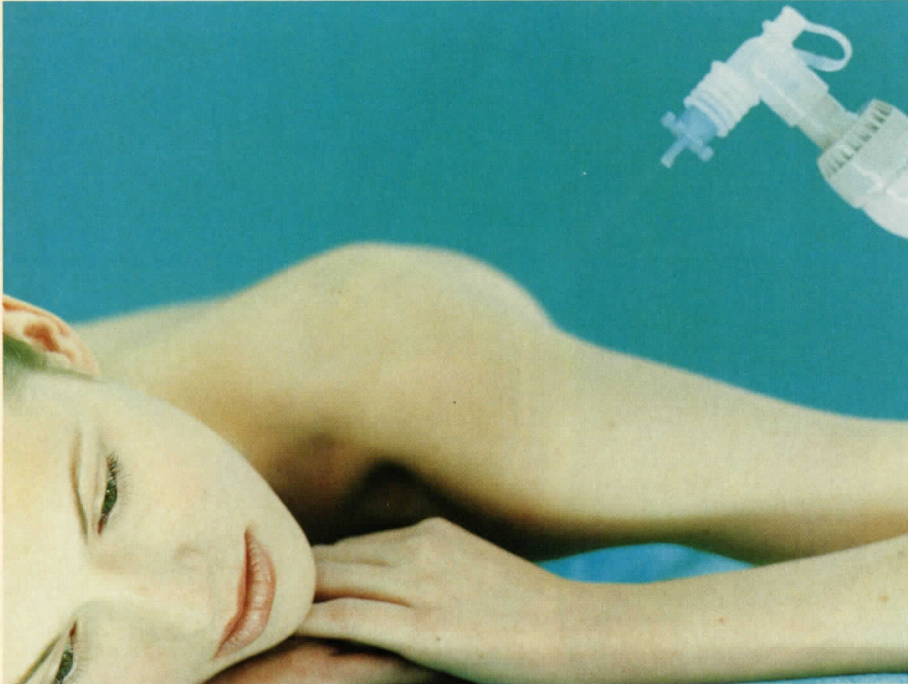
remove the acid mantle, says Lapin, is with a very alkaline solution—in excess of eight on the pH scale. Other methods include ablative procedures such as microdermabrasion, laser treatments and chemical peels.

in skincare products is not in its final, gaseous form, but rather in a more stable, derivative state that changes into its active form upon contact with the skin. The oxygen derivative most often used is hydrogen peroxide.

“When the emulsion hits the skin, an enzyme called catalase, which naturally occurs in the skin, breaks it down into a gas, and the oxygen is pushed into the skin,” says LuAnn Schann, office manager, Karin Herzog, Rohnert Park, California. “Normally, the oxygen would evaporate into the air, but Paul Herzog, MD, developed a formulation that creates a barrier to push the oxygen into the skin and deliver other ingredients, such as vitamin A, for instance.”

The emulsion is key to delivery in that it helps create a *hyperbaric* situation; hyperbaric referring to pressure greater than *one atmosphere*, which itself refers to the 21% oxygen atmosphere that we live in. Ted Kalli, AURA Research, San Diego, explains this mechanism of action in “The Oxygen Controversy,” published in the March 1995 issue of *Advanced Dermatologic News*:

“When hydrogen peroxide comes in contact with the skin, it always breaks down into water and oxygen due to the presence of the enzyme, catalase. Instead of oxygen being released on the surface of the skin and escaping to the atmosphere, as with aqueous hydrogen peroxide, the oxygen penetrates the skin. This is due to the oil phase of the emulsion, which creates a barrier to the oxygen. The skin becomes the path of least resistance. When hydrogen peroxide changes from a liquid to a gas (which is instantaneous), it increases in volume 22.4 times. This instantaneous increase in volume is what causes the pressure and why the oxygen penetrates the skin. Simply put, the



Oxygen can benefit skin on any part of the body.

“I’ve come across research in biomedical literature that says that after microdermabrasion, blowing oxygen over the skin does indeed facilitate healing and proliferation of the skin cells,” says Harry R. Elden, PhD, president, Elden Associates Esthetic Skin Care, Coral Gables, Florida, and a consultant to Aesthetic Skin Biophysics in Miami. “So, it seems that in the absence of the stratum corneum, there is some activity and benefit of applying oxygen topically.”

Air in a Jar?

While formulating oxygen into an emulsion creates, on the one hand, a more tangible delivery vehicle, the concept itself somehow seems gossamer when compared to picking up an oxygen tank, aiming and shooting. It helps to understand that the oxygen

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Oxygen products are helpful for acne and rosacea.

TO BREATHE or Not To Breathe?

At Beyond Day Spa in Hackensack, New Jersey, located within the Hackensack University Medical Center, spa clients sit in recliners in a peaceful, private room to inhale oxygen that's piped into the wall from behind a picture frame.

"We sell oxygen therapy as a relaxing add-on service before spa treatments," says Marijane Hubbell, spa director. "Clients usually buy anywhere from 5 to 20 minutes; we bring them an elixir to sip on while they recline and inhale the oxygen through a cannula, which is the rubber tubing that attaches to the oxygen tank that's hidden behind the picture on the wall." Hubbell says the pre-service O₂ therapy relaxes the client, encourages mental clarity, nourishes the skin and balances the body.

Experts agree that inhaling supplemental oxygen is harmless for a healthy person, and most proprietors are careful not to make any medical claims. Nonetheless, the Federal Food, Drug and Cosmetic Act declares any type of oxygen used by people for breathing and administered by another person to be a prescription drug. So how come everyone is breathing so freely? Even though it's a violation of federal regulations, the FDA permits individual state boards of licensing to enforce the rules. If you're considering adding inhaled oxygen to your spa service menu, check with your state board before buying any expensive machinery. If you get the go-ahead, be sure to learn how to properly store and maintain all equipment to avoid dangerous combustion or the inadvertent spread of pathogens.

emulsion is a topically applied, hyperbaric treatment.

"Oxygen is a gas only during this instantaneous reaction. As soon as it penetrates the stratum corneum, it is dissolved in the extracellular water and in the capillary plasma. Molecular oxygen (gas) can only exist in the lungs. As the oxygen penetrates the skin, it acts as a vehicle and takes the water and other ingredients with it."

Alternate transportation and destination. While hydrogen peroxide is the most common oxygen derivative used in skincare formulations,

many insist the compound isn't completely safe, citing its reputation for being harsh and volatile. Says Rebecca Gadberry, president, YG Labs, Huntington Beach, California: "Hydrogen peroxide is a highly reactive chemical that's used most often as a bleaching agent for everything from cloth and paper to hair and skin."

Schann matter-of-factly challenges the anti-hydrogen peroxide sentiment: "People say that hydrogen peroxide is harmful to skin. But why then is it present in our toothpaste, when our gums and mucosa are far more sensitive than our skin—and the FDA allows that?"

The safe way to deliver oxygen to the dermal-epidermal junction is with an in-spa, professional service, says Lapin, who adds that most of the oxygen products on the market for home use work solely on the epidermis, where they can be quite helpful for situations such as acne and rosacea, and offer an ideal daily regimen between professional treatments. Of course, even though the oxygen is not traveling as far, it still needs to be kept stable. The answer, says Lapin, is to use a delivery system called *perfluorodecalin* which is a derivative of perfluorocarbons, also known as PFCs; PFCs are used as carriers in blood products, and are able to carry up to 50% of their weight in oxygen. "Perfluorodecalin is made by Baxter Pharmaceuticals," says Lapin. "It keeps the oxygen stable in a semi-inert form, then releases it upon contact with the skin."

Indirect Route

While experts debate the how, where and why of oxygen as a skincare ingredient,



Taking in oxygen no longer seems like an involuntary act.

there are those who say you don't need oxygen itself in the formula to deliver its benefits to the skin.

"If you enhance the microcirculation and the respiration of the skin, you are, indirectly, enhancing the oxygenation of the skin," says Jon Packer, corporate vice-president, Centerchem, Stamford, Connecticut. "I think that

anything you can use that stimulates cell turnover is essentially stimulating the use of oxygen. Basically, if you do a good job of enhancing cell metabolism, then you are enhancing the production of the living stuff skin needs; you are stimulating energy."

Others agree. Marion Bauchede, national trainer for Sothys, Miami, says this is the very principal behind the company's oxygenating philosophy.

"Here at Sothys, it's more about bringing energy to the skin; this energy is brought to the skin by oxygen. There's a reaction in the [cellular] mitochondria between the oxygen and the micronutrients (that we get through diet) that creates the energy, which is called ATP. So, the oxygen is working indirectly. That's why I say we're not actually 'putting oxygen' into the product," she says. "We use a new generation liposome, called Spherulite, that encapsulates a patented cellular energy complex which helps boost the reaction between the micronutrients and the oxygen to produce more energy, reduce free radicals, and increase skin cell metabolism. So, the objective is to bring more energy to skin cells by making them consume more oxygen more efficiently."

Regardless of what they taught us in grade school biology, taking in oxygen no longer seems like an involuntary act. As more oxygen products and services blow into the skincare market, you may need to take a deep breath to sort out the countless claims and techno-jargon accompanying them. Your best defense is to brush up on the latest science in skin care. ♦

Lisa Randazzo is *DAYS*PA's special projects editor.

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