



## Synopsis

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# Abstracts of Pertinent Medical Aesthetic Research

A scan of the journals uncovered articles on adding a laser to your practice, a review of mesotherapy and some basic research on reactive oxygen species (ROS).

### **Thinking About Adding a Laser to Your Practice? Renting Vs. Owning**

*Cosmet Dermatol* 2006, 19;6:400-402

Authors Catherine Maley, MBA, Wm. Philip Werschler, MD, and Kari Larson, MBA analyze some of the major issues physicians need to consider before purchasing a laser. They suggest that for some, renting lasers may be a better option because it allows your practice to keep up with the latest technology with less capital outlay, comes with its own certified technician, and lessens liability risks, maintenance time and concerns about keeping the equipment busy.

For others, though, these advantages might be outweighed by the diminished income the practice will derive from the laser and by the lack of control the physician will have over the equipment and the technician. Profit is a primary benefit of owning a laser. While lasers come with a high initial cost, they can quickly pay for themselves if used consistently and continue to generate income for years. Purchasing a laser usually includes training for you and your staff.

The goals of your practice are the best guide for whether to rent or purchase. If you aren't committed to expanding your practice to include cosmetic laser services, renting may be an option. If you want to make these services available to your patients and will need to rent equipment for more than two or three days a month, it makes better economic sense to purchase.

### **The Science of Mesotherapy: Chemical Anarchy,**

*J Aesth Surg* 2006, 26:95-98

Mesotherapy has been proposed as a noninvasive alternative to lipoplasty. It is a controversial therapy

used for cellulite, weight reduction, skin rejuvenation, and as a tool for body sculpting. Mesotherapy involves injecting medications, reagents and plant extracts into the layers of fat and connective tissue under the skin.

There are no published scientific studies to support mesotherapy or to indicate whether the effects are temporary or permanent.

Author Spencer A. Brown, PhD, Dallas, Texas, states that several scientific claims have been made about the metabolic changes affected by mesotherapy in the dermal region and individual cells, and its effects on systemic systems. The injected reagents decrease adipose tissue because they are toxic, which causes permanent removal of fat tissue. In some mesotherapy subjects, cellular necrosis has been documented. The author commented that there are no published scientific studies to support the treatment or indicate whether the effects are temporary or permanent.

According to the author, most mesotherapy clinics appear to use a product called Lipostabil—which has two primary ingredients: phosphatidylcholine (PC) and deoxycholic acid. Phosphatidylcholine can exist in three different chemical forms and at low molar concentrations. PC forms lipid bilayers, a chemical organization similar to cell membranes. At higher concentrations, micelles form that have organic soluble-containing cores. This is important because released triglycerides from disrupted fat cells cannot be transported by a PC bilayer or PC vesicle; therefore, a PC micelle is capable of solubilizing and transporting triglycerides and free fatty acids. In the context of mesotherapy, intercellular cholesteryl esters can mobilize to form free cholesterol, which is then diffused through plasma membranes and carried by HDL. In this process, triglycerides may be hydrolyzed to glycerol and free fatty acids along with cholesteryl esters. These free fatty acids diffuse through the membrane. Thus, a metabolic pathway that requires PC-rich particles does exist for reduction of adipocyte fat levels and does not involve necrosis.

Deoxycholic acid is the second major component in Lipostabil. High concentrations of deoxycholic acid are known to have toxic effects on skin and pulmonary systems. From a chemist's viewpoint deoxycholate can exist in two forms: as a monomer or as a micelle. If deoxycholate is injected with PC, mixed micelles or micelles containing both components should be present. In the extracellular environment four distinct phases are possible, with low concentrations of cholesterol. These phases can have formations of micelles, vesicles and crystals. The crystal formations can damage cells.

The author concluded that a form of chemical anarchy exists today. No clinical data have been published that includes standardized reagents, treatment protocols, dose/injections, technique/injection, interval times, and positive and negative controls. Clinical trials cannot be performed without specific concentrations of each component.

Scientific and clinical research can advance the science of mesotherapy. With scientific O<sub>2</sub> validation, mesotherapy may become a unique tool for cosmetic procedures.

### **Reactive Oxygen Species (ROS)— Pathogens or Sources of Vital Energy?**

*J Altern Complement Med* 2006, 12;2:111-118

All molecules contain an even number of electrons in their valence shells, and electrons tend

to be paired. The most comfortable state for two electrons is with opposing spins (the clockwise or counter-clockwise rotation of an electron). If an electron loses a partner, the molecule becomes unbalanced, hence unstable, and turns into a free radical. A free radical can be defined as a particle with an odd number of electrons. To turn back into a stable molecule, this free radical needs to pick up an electron from its surroundings or donate its extra electron to another molecule.

The author feels there are a number of problems with the free radical theory of aging.

The oxygen molecule is an exception. This molecule has an even number of electrons, but two of them are naturally unpaired. This constitution is called a triplet state. Both oxygen atoms that constitute O<sub>2</sub> have two unpaired electrons each. As such, to balance its electrons, O<sub>2</sub> needs to acquire a total of four electrons.

The author goes on to discuss how an O<sub>2</sub> molecule cannot spontaneously start to oxidize surrounding molecules because the laws of quantum physics do not enable direct interaction between molecules in singlet and triplet states. However, there are several ways to activate oxygen. One of them is to excite O<sub>2</sub>, turning it into a singlet, which can easily react with other molecules. Another is one-electron oxygen reduction.

The current attitude regarding ROS as dangerous pathogens stems from a 50-year-old “free radical theory of aging” suggested by Dr. Denham Harman. The theory is based on the observation that irradiation produces water splitting and ionization, and free radicals emerging in rather high quantities cause irreversible damage in organic molecules. In the presence of dissolved O<sub>2</sub>, this damage is much more pronounced because oxygen under these conditions provides for the fast multiplication of free radicals.

The author feels there are a number of problems with the free radical theory of aging. First, transgenic mice with hyperexpression of SOD (one marker of oxidative stress) suffer from a syndrome that is similar to the human Down's syndrome. Second, ROS are purposefully produced by living organisms

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