Technology Approaches to the Medical Spa: Art Plus Science Equal Rejuvenation

Mitchel P. Goldman, MD

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• Medical spa • Cellulite • Rejuvenation • Hair

Medical spas are the fasting growing segment of the 15-billion dollar spa industry. Although medical spas have been in existence since ancient times to treat a wide variety of ailments such as gout, arthritis, and diabetes, our modern concept of the medical spa combines relaxation with medical rejuvenative procedures. In Europe, the first attempts at medical rejuvenation occurred with nutritional supplements, colonic cleansing, and intravenous therapy with a variety of hormones and animal-based extracts. The location of medical spas near thermal springs has been important, and even Napoleon had a spa build at La Roche Posey to treat the topical wounds of his war veterans.

The use of oral and topical waters and supplements also occurred in the "New World." This article focuses on the more recent technologic advancements in rejuvenation.

MODERN HISTORY OF MEDICAL SPA TECHNOLOGY

This author believes that the modern explosive evolution in medical spas coincided with the development of intense pulse light (IPL) and laser treatments for hair removal. This coincided with the recognition that epilation of hair from areas treated with the IPL was not a side effect of the IPL (as reported to the FDA in our initial studies on the treatment of vascular lesions with the IPL) but was a new treatment for excessive or unwanted body and facial hair. The company that first developed the IPL under the name Photoderm VL (Energy Systems Corporation, Ltd., now Lumenis, Inc., Santa Clara, CA) recognized that hair loss after IPL treatment was a new business. They modified the Photoderm to have a large spot size and more powerful fluence and called the new machine the "Epilyte."[1] Clinics devoted to hair removal, such as Vanishing Point, were started, and physicians added the Epilyte to their practices. The Epilyte became so successful that in 1998 our practice dedicated an adjoining office space to the medical suites to house the Epilyte and added facials, massage, and hydrating treatments and called the new business The Spa at Dermatology Associates. Within a few months, the "Spa" became profitable, primarily due to the success of IPL hair removal. Laser companies took note, and the 810-nm diode Lightshear (Palomar/Coherent/Lumenis) and the long-pulsed 755-nm Alexandrite lasers (Candela and Cynosure) were developed.

In the late 1990s, physicians who had been using the IPL for hair removal and to treat leg veins and other vascular lesions noticed that solar lentigos lightened or resolved when coexisting vascular lesions were treated, and the skin took on a smoother appearance and feel.[2] Dr. Patrick Bitter Sr. and Dr. Patrick Bitter Jr. termed this effect "photofacial," (now known as "photorejuvenation"), and the medical spa had a second large clientele. The development of minimally or noninvasive lasers that could also produce rejuvenation of photodamaged skin were developed and continue to be improved upon. More recent skin-tightening radiofrequency (RF) or infrared devises were developed to treat fine lines, wrinkles, and skin elasticity. Most recently, women have been

La Jolla Spa MD, 7630 Fay Avenue, La Jolla, CA 92037, USA
E-mail address: mgoldman@spa-md.com

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educated as to the undesirable appearance of the natural female characteristic of cellulite, prompting the development of yet another treatment modality.

In summary, the technological advances were in the treatment of unwanted hair, photodamaged skin, and cellulite. One could also make a case for the treatment of tattoos and fatty deposits, but a discussion of every possible treatment is beyond the scope of this article. This article focuses on the three most important and common medical spa treatments.

Spa Nursing Personnel: Who Should Deliver Medical/Technologic Care?

Equipment available to vaporize hair, reduce signs of photodamage, improve the appearance of cellulite, and tighten skin has become easier to use over the last few years. This ease of use has resulted in the ability of nonphysicians to serve as technicians, which permits widespread use. Because nonphysicians receive less training than physicians, they charge less for their services on an hourly basis. The use of nonphysicians to operate rejuvenating equipment translates to a lower charge per procedure or a higher profit margin for the owner of the equipment. Many rejuvenating procedures use laser, IPL, and (RF) technology, and these procedures are not fool-proof and can cause adverse effects. Because United States law delegates the responsibility of public safety to State governments, rules and regulations governing the use of these machines are not uniform or are non-existent. Despite this variability of State regulation, common ethics dictates that one should strive to provide safe and effective procedures. The dangers of inappropriate delegation of medical procedures are listed in **Box 1**. Common problems seen from nonsupervised medical procedures are listed in **Box 2**.

Some states, such as Georgia, do not require training or testing of competency of physician supervision in using lasers, RF, or IPL devices.

Box 1
Dangers of nonphysician practice of medicine

- Impaired patient safety
- Adverse events from treatment
- Failure to treat adverse events from treatment
- Unnecessary or inappropriate treatment
- Excessive treatment
- Subordination of patient well-being to financial productivity secondary to financial incentive

Box 2
Commonly reported problems from nonphysician practice of medicine

- Cutaneous burns
- Post-treatment hyperpigmentation
- Scarring
- Post-treatment hypopigmentation
- Delayed healing from infections
- Corneal and retinal injury due to inadequate eye protection

Other states, such as Florida, require that the physician who supervises a nurse on sight be a dermatologist or plastic surgeon. The problem is that the American Society for Dermatologic Surgery estimates a 25% increase in complications from using these procedures by nonphysicians over the last 5 years. Therefore, the American Academy of Dermatology and the American Society for Dermatologic Surgery in 2004 approved a position statement that required a supervising physician to be present and immediately available to respond to problems associated with nonmedical administration of IPL, RF, or laser treatments. The American Society of Laser Medicine and Surgery in 1999 took a similar stance and added that the supervising physician must be trained and certified to administer the treatments s/he is supervising and be within 5 minutes of the nonphysician. The American College of Surgeons takes a more restricted position in their 2007 regulations, stating that individuals who perform these procedures be licensed physicians with the same certification that governs all surgical procedures. Ultimately, the delegation of patient care depends on the ethical standards of the medical director. As physicians, we took an oath not to make the most money possible but to deliver the best care we can and do no harm.

Hair Removal Lasers

The first laser assisted hair removal device was marketed in 1996. Such hair removal devices include ruby, alexandrite, diode, and neodymium: yttrium aluminum garnet (Nd:YAG) lasers and IPL sources.

MECHANISMS OF HAIR FOLLICLE DESTRUCTION

There are three means by which light can destroy hair follicles: thermal (due to local heating), mechanical (due to shockwaves or violent cavitation), and photochemical (due to the generation of toxic mediators like singlet oxygen or free radicals). For