

# Dermatologic Surgery Into the Next Millennium, IV

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*The use of lasers for facial resurfacing and tattoo removal is discussed with special emphasis on patient safety and avoidance of complications. In addition, hair transplantation and development of new techniques over the past 3 decades are detailed. Long-term planning of hair transplant sessions is of foremost importance for the patient to achieve the most natural-looking hairline.*

In the previous issue (*Cutis*. 2001;68:193-195), we discussed new developments in face-lift procedures and blepharoplasties. In this article, we focus on using lasers for skin resurfacing and tattoo removal, as well as for hair transplantation.

## Laser Resurfacing

Since the development of the principle of photothermolysis, the use of lasers in the cosmetic surgery office has increased dramatically and their applications have expanded rapidly. Technical developments are producing new laser devices with different chromophore spectra and thus different indications for use. The pulsed CO<sub>2</sub> laser and erbium:YAG (Er:YAG) laser are available for facial resurfacing. The Er:YAG laser is indicated for mild-to-moderate rhytides and does not induce a long-lasting posttreatment erythema compared with the CO<sub>2</sub> laser.<sup>1</sup>

The CO<sub>2</sub> laser is still our mainstay for facial resurfacing. The treatment results for moderate-to-deep rhytides are excellent. In addition, the side effect profile for Er:YAG and CO<sub>2</sub> lasers is similar. Potential side effects such as postinflammatory hyperpigmentation, infections (bacterial, viral, yeast), and scarring are rare and can be addressed appropriately during

close postoperative patient follow-up. In addition, the laser resurfacing procedure easily can be combined with other cosmetic interventions such as microfat injection, blepharoplasty, and mini-face-lift. At our practice, we use the CO<sub>2</sub> laser for both scar revision and acne scar treatment. In some cases, CO<sub>2</sub> laser resurfacing precluded the need for blepharoplasty because of its contraction effect.<sup>2</sup>

## Tattoo Removal

Tattoo removal is performed with a variety of lasers that are chosen according to the color of the tattoo. The treatment duration, however, is not predictable. Thus, patients should understand that tattoo removal will take more than one session. Our treatment rate varies between 4 and 8 sessions. The major advantages of tattoo removal with lasers include a low risk of scarring and no blood loss.<sup>3</sup> The pulsed-dye laser is used for the treatment of red tattoos, port-wine stains, telangiectasis, striae distensae, verrucae, and hypertrophic scars.<sup>4</sup> These laser procedures are well tolerated by the patient. Although treatment with the pulsed-dye laser is associated with initial bruising, our experience has shown that it is more efficient than other laser systems used for similar indications.

The rapid progression of laser system techniques has led to their use for new indications including treatment of leg veins and hair removal. Laser beams can attack a specific chromophore and precisely limit the depth of tissue injury and tissue damage. It is foreseeable that these laser systems will be packaged in devices that are more handy than those currently available. There are already available laser systems with the properties of 2 lasers in one, as well as different laser systems in the same hardware.

## Hair Transplantation

The technique of hair transplantation has undergone significant advancements since the first

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patients were treated in the late 1970s. Initially, the transplantation was performed using 4-mm punch plugs. The result was a granular or "pluggy" look. The desire to achieve a more natural look resulted in the replacement of the punch graft technique with minigrafts and micrografts, which now are the standard transplant grafts.<sup>5,6</sup>

Hair transplant surgery now involves excising multiple donor stripes from the occipital area and cutting them into minigrafts and micrografts. Our office procedure calls for the use of sharp microdilators to create recipient sites into which the transplants are carefully placed one by one. This is a tedious and time-consuming procedure.<sup>7-9</sup> In our experience, however, the cosmetic results are excellent and the hairline created appears natural.

The tumescent anesthesia technique is a patient friendly procedure that has a decreased pain sensation and decreased risk of blood loss. Although there is a trend toward mega hair transplant sessions, we prefer to limit our transplant sessions to 600 grafts at a time. We have found sessions of this length to be more accommodating for the patient, as well as our nursing staff. Also, these additional hair transplant sessions add volume and density to the patient's hair.

We envision the procedure of hair transplantation becoming automated or semiautomatic. Computers with laser knives could cut the grafts after scanning each micrograft or minigraft. With the help of a device similar to the computerized pattern generator being used in the laser field, microdilators and hair grafts could be placed equidistant automatically. Although this development might not be encountered in the near future because of the fragility of the micrografts and the required perfection in handling technique, it is not science fiction. What's more, the medical treatment approach for hair loss through gene therapy is already on the way. Ahmad et al<sup>10</sup> recently discovered the first human hair-loss gene.

In summary, cosmetic dermatologic surgery covers a variety of procedures for rejuvenation and body shaping. Our experience has shown these procedures to have a high safety profile. We see a tendency toward less-invasive procedures that do not require a prolonged downtime for the patient. The trend away

from in-patient operations to the out-patient setting will continue. In addition, a combination of multiple procedures and techniques will optimize the expected results.<sup>11-13</sup> New technologies and newly acquired knowledge about basic science issues such as fat metabolism signaling and wound healing will help us to attain our goal of overall patient safety, well-being, and satisfaction.

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