

Noninvasive Cosmetic Treatments for the Aging Face

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There are six target areas in the cosmetic treatment of the aging face: 1) induction of new collagen formation, 2) creation of smoother skin, 3) creation of tighter skin, 4) improvement in skin tone, 5) improvement in hyperkinetic muscle tone, and 6) increased fullness. This article will review noninvasive methods that can be used to achieve these six goals, including laser resurfacing, topical therapies, a nonablative radio frequency device, botulinum toxin injections, and filler agents.

Collagen Formation

There are many ways to improve collagen in the skin; however, a noninvasive way to induce collagen formation is laser resurfacing, of which there are several types of ablative lasers in use. The variably pulsed Er:YAG lasers are the most commonly used. There is clear-cut histologic and clinical evidence of new collagen formation following treatment with Er:YAG lasers.¹ Treatment with the laser induces thermal damage, and 3 to 9 months following the laser treatment, epidermal hyperplasia, or a thickened epidermis, forms, as well as extensive new collagen in the upper papillary dermis. The results appear to be long lasting.

Skin Smoothing

For smoother skin, topical tretinoin (Retin-A Micro, OrthoNeutrogena Inc.) often is used.

The use of topical tretinoin to smooth aging skin is based on two 24-week multicenter trials in which topical tretinoin was compared to a vehicle. The age range of patients in the study was 30 to 50 years. The bulk of patients in the study were women. The subjects were evaluated by visual appearance and by using a skin replica analysis, which can analyze the change in fine lines, wrinkles, and roughness following the treatments. After 24 weeks of treatment with topical tretinoin, there was improvement in the majority (78%) of the subjects. Eighty-three percent of the subjects felt they were visually improved; however, these results were based on subjective evaluation. Following 48 weeks of treatment, 88 percent of investigators felt the subjects were improved following the use of topical tretinoin, while 94 percent of the subjects felt that they were improved.

Topical tretinoin used three times weekly is more effective than once weekly; however, treatment should start with once weekly applications, gradually increasing applications to three times weekly due to possible irritation.

Skin Tightening

A noninvasive method used to tighten skin is a new nonablative radio frequency device (ThermaCoolTC, Thermage, Inc.). This device is not a laser, and there is no specific chromophore, which



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Figure 1. Shown here are fine wrinkles before treatment with a 1450nm Diode laser.

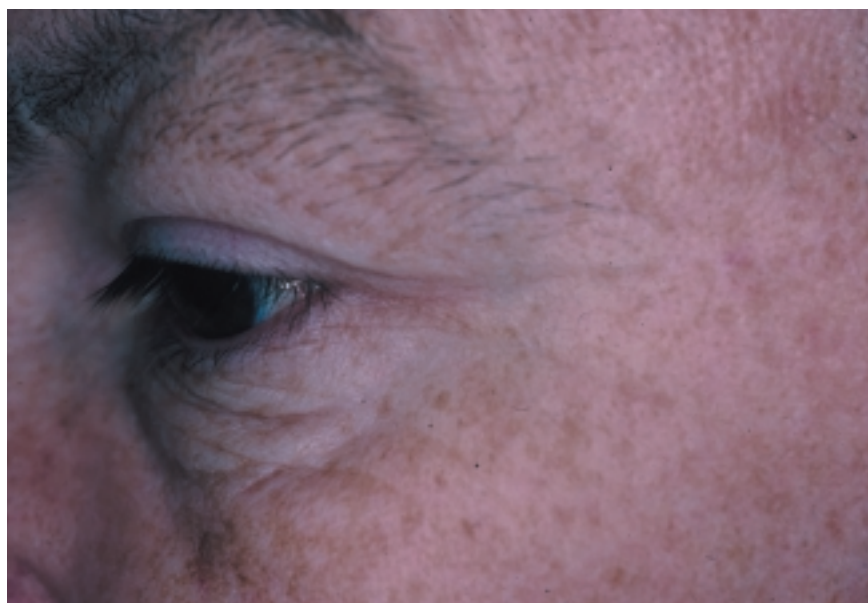


Figure 2. Treatment with 1450nm Diode laser lessened the depth of wrinkles.

means the device is colorblind and can be used on varying skin complexions. The effect of this technology is based on heat production or tissue resistance of electron movement, which is known as Ohm's Law. The device allows significant volumes of heating to be delivered while cooling the skin with a cryogen delivery system. Change of wavelength is not

needed to control the depth of tissue heating because this device uses radio frequency electrical energy. The device has a cryogen cooling system in the tip, which cools the epidermis while penetrating the dermis with heat.

Results using this device are more subtle than results seen with surgery. In the FDA trials, however,

researchers were able to measure the distance from the iris up to the eyebrow, which showed that eyebrows were lifted using this device.² Tightening may be seen after four months of treatment. This technique, again, does not compare as favorably to surgery; however, for the patient who does not want surgery, this technique is an option.

Skin Toning

Skin toning improves the texture of skin. Another term for skin toning is *photorejuvenation*, and there are two distinct treatment groups in this arena: near-infrared laser systems and vascular-specific laser systems. Near-infrared systems are myriad now, and they include longer-pulsed Nd:YAG lasers, 1320nm Nd: YAG laser, the 1450nm Diode Laser, and the Er:Glass Laser, which is used mostly in Europe. These systems are ideal for post-ablative resurfacing because they produce new collagen formation, though not as much as ablative lasers. Patients often have shine and sheen to their skin, and the potential for less fine wrinkles, after treatment with near-infrared lasers (Figures 1 and 2).

Vascular-specific laser systems include the 585 and 595nm lasers, pulsed dye lasers, and intense pulsed light sources. Vascular-specific systems can improve collagen formation, as is seen histologically, but usually not to the same degree as ablative lasers. After treatment with these devices, the epidermis thickens and there is a new Grenz zone in the papillary dermis. These vascular-specific systems utilize visible light, which makes them ideal for decreasing erythema in the skin.

Improvement of Hyperkinetic Muscle Tone

Botulinum toxin injections (Toxin A and Toxin B) are the only therapies available for improving hyperkinetic muscle tone. The most commonly used is Toxin A (BOTOX®, Allergan, Inc.) (Figures 3 and 4). Toxin B (MYOBLOC™, Elan Corp.) is used less frequently. Results may be seen more quickly with Toxin B, but the duration of results is usually longer with Toxin A. A greater degree of paralysis, particularly in the glabella area, may occasionally occur from Toxin B.

Increased Facial Fullness

Filler agents, such as collagen and hyaluronic acid, have been in use for many years. Collagen is FDA approved, while hyaluronic acid, though not FDA approved, is used extensively in Europe and Canada. The most recent addition to the filler agent arena is calcium hydroxylapatite, which produces longer lasting results in deeper nasal labial folds. The dermatologist, however, must be careful to avoid facial bones when using this product, as it can actually form bone. The cosmetic results from use of calcium hydroxylapatite can last for several years.

Conclusion

In conclusion, there are many noninvasive approaches to improve aging skin. Collagen formation can be increased with ablative laser. Skin tightening can be improved with the nonablative radio frequency devices. Skin smoothing can be accomplished with topical tretinoin. Skin toning can be improved with the near-infrared or the vascular-specific



Figure 3. Shown here are forehead wrinkles before botulinum toxin A injections.



Figure 4. Botulinum toxin A injections caused marked diminution of forehead wrinkles, shown here two months after injections.

systems. Decreased hyperkinetic muscle tone can occur following botulinum Toxin A or B injections. Finally, increased facial fullness can be achieved with a variety of filler agents that are now available or soon to be available.

References

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