

ACELIFT: A Minimally Invasive Alternative to a Facelift

Deborah S. Sarnoff MD FAAD FACP^{a,b} and Robert H. Gotkin MD FACS^{b,c}

^aDepartment of Dermatology, NYU School of Medicine, New York, NY

^bCosmetique Dermatology, Laser & Plastic Surgery, LLP, New York, NY

^cDivision of Plastic Surgery, Department of Surgery, North Shore/Long Island Jewish Lenox Hill Hospital and Manhattan Eye, Ear & Throat Hospital, New York, NY

ABSTRACT

Background: Cervicofacial aging is often characterized by a combination of skin and subcutaneous tissue laxity, midfacial deflation, an accumulation of excess submental fat, an obtuse cervicomenal angle, jowls, and rhytides of the face and neck. Traditional treatment, and the “gold standard” against which other treatments are compared, is a facelift.

Objective: To demonstrate that a combination technique called ACELIFT – an acronym for the Augmentation of Collagen and Elastin using Lasers, Injectable neurotoxins, Fillers, and Topicals – in selected patients, is a viable, safe, and effective alternative to a facelift.

Methods: Ten healthy women, ages 50 to 62 (mean age = 58), with cervical and facial stigmata of aging were enrolled in a prospective study conducted in the authors’ private practice. Patients underwent a two-step procedure; the first step was laser lipolysis of the submental and anterior cervical areas with a pulsed 1440nm Nd:YAG laser with a side-firing fiber (PrecisionTx, Cynosure, Westford, MA). Three months later, the patients were treated in a single session that combined injectable neurotoxin, fillers, and fractional (Fx) CO₂ laser resurfacing delivered in a novel “hammock” distribution. After two weeks, following complete re-epithelialization, the patients were started on a topical regimen that included daily use of sunscreen and antioxidants and nightly use of retinoids and peptides. This regimen was continued for a period of six months when all patients returned for final evaluation.

Results: Nine months following the initiation of treatment, all patients were evaluated by the following: Global Aesthetic Improvement Scale, cervicomenal angle scale, physician, and subject evaluation. Clinical improvement was evident, and often marked, for all subjects. Both physician and subject satisfaction scores were high, indicating overall satisfaction with the procedure and the outcomes. Side-effects were mild and transient; there were no incidents of adverse scarring, thermal injuries, permanent nerve injury, or dyschromia, hematomas, seromas, or infection. Subjects were likely to recommend the procedure to a friend.

Conclusions: In properly selected patients, the ACELIFT proved to be a safe and effective, minimally invasive alternative to a facelift. There was little downtime and high patient satisfaction.

J Drugs Dermatol. 2014;13(9):1038-1046.

INTRODUCTION

Cervicofacial aging is a pervasive cosmetic problem in our society. Typical components of facial aging include laxity and descent of the facial skin and underlying soft tissues, midfacial volume loss, anterior cervical skin laxity, an accumulation of excess fat in the submental area resulting in an obtuse cervicomenal angle, jowls, and a loss of jawline definition, cutaneous photodamage, and rhytides of the face and neck. While this entire constellation of findings does not exist in all individuals, procedural plans must be flexible enough to address all that do occur.

Women over 50 years of age complain about looking old, looking tired, “seeing my mother in the mirror,” and feeling badly about the appearance of their necks.¹ As the face and neck age, one of the changes commonly seen is a blunting of the cervicomenal angle – the angle formed by the more horizontal submental area and the more vertical portion of the neck. The “ideal” cervicomenal angle is 105°. ² As aging progresses, the cervicomenal angle becomes more obtuse.

Since more women are living longer, and societal pressures to look more youthful abound, there is a need to address facial aging in this population. But many women do not want invasive surgery. Some have a fear of the surgery itself – untoward cosmetic results, visible scars, looking “fake” or unnatural, no longer looking like themselves – or the complications that may arise afterwards – hematoma, seroma, or facial nerve damage. Others have a fear of anesthesia and anesthetic-related complications and even death. Still others are wary of the downtime associated with a facelift – time lost from work, social functions, and activities of daily living.

What is a facelift and what does it address? Rhytidectomy, rhytidoplasty, meloplasty, facelift, neck lift – all are common names for a surgical procedure that addresses cervicofacial aging by re-positioning subcutaneous soft tissues and elevating and re-draping sagging, ptotic skin of the face and neck. There are incisions beginning in the temporal scalp and extending along the preauricular crease, around the earlobe, up the back of the

ear, and out into the occipital scalp. There may also be a submental incision and transverse sideburn hairline incisions to prevent elevation of the sideburn hairline. But the word "rhytidectomy" may be a misnomer because it does not excise rhytides and is not necessarily an all-encompassing procedure for facial rejuvenation. In fact, the term "facelift" also may be a misnomer because it does not address the upper portion of the face (forehead and brow). Yet it is still the "gold standard" against which all other facial rejuvenation procedures must be compared.

The first facelifts were performed in the earliest part of the 20th century in Europe.³ These "skin only" lifts, shrouded in secrecy, remained essentially unchanged until the 1970s. In 1974, Tord Skoog described subfascial dissection⁴ and in 1976, Mitz and Peyronie described an anatomic layer called the Superficial Musculoaponeurotic System (SMAS).⁵ The SMAS is a distinct fascial layer that is continuous with the temporoparietal fascia and galea above and the platysma in the neck. Elevation and repositioning of the SMAS is still the most commonly employed method of performing a facelift today.

Although facelifts can accomplish anatomic changes that no other procedure can achieve, it remains a procedure that is not for everyone. It is an invasive procedure usually performed under general anesthesia or intravenous sedation. There is a risk for hematoma, facial nerve damage, and skin flap necrosis with slough. It is not a viable alternative for smokers or those on anti-coagulants. There will be some visible scarring and prolonged dysesthesias, but complications such as "pixie ear," blunting of the tragus, "Joker" lines,⁶ a "wind tunnel" look, hypertrophic scars, keloids, or alopecia can occur. A facelift also has a number of limitations. It does not address photodamage, solar elastosis, dyschromia, solar lentigines, or the quality of the skin itself. It does not promote new collagen and elastin formation and it does not address the forehead, perioral, or periorbital areas. Furthermore, as an individual ages following a facelift, new iatrogenic deformities may arise – hollowing of the orbits, a malar crescent due to ptosis of the orbicularis oculi, and an "Austrian curtain" or ruching-like deformity described by Hamra as the lateral sweep⁷ (Figure 1). Various "mini-facelifts" and "short scar" facelifts often come up short and may not be a good alternative to a full facelift ("Lifestyle Lift," S-lift, MACS lift, midface lift, etc.). All have in common less downtime and less scarring, but none really address the periorbital or perioral areas and none address photodamage, solar elastosis, or the quality of the facial or neck skin.

We would like to introduce a minimally invasive alternative to a facelift: ACELIFT – an acronym for the Augmentation of Collagen and Elastin using lasers, injectable neurotoxins, fillers, and topicals. An ACELIFT restores a more aesthetic cervicofacial angle and achieves skin tightening in the neck. An ACELIFT promotes the formation of new collagen and elastin; addresses

FIGURE 1. The "Austrian curtain" or ruching-like deformity described by Hamra as the "lateral sweep."



the quality of the skin; addresses dyschromia, solar lentigines, and photodamage; addresses solar elastosis and can offer pan-facial rejuvenation. An ACELIFT does not require intravenous sedation or general anesthesia. Furthermore, in a situation in which a patient has already had a facelift and desires additional facial rejuvenation, an ACELIFT can be utilized in lieu of a secondary facelift. This is a versatile and flexible procedure and can be used in a variety of situations.

METHODS

Treatment Protocol

Ten healthy women, ages 50 to 62 (mean age = 58), Fitzpatrick skin types I - III, with cervical and facial stigmata of aging, were enrolled in a prospective study conducted in the authors' private practice. Thorough medical and surgical histories were obtained and reviewed. Standard inclusion and exclusion criteria were used; additional exclusion criteria specific to this study included: BMI > 30, use of injectable neurotoxins or fillers within the previous 12 months, use of anti-coagulants, use of oral retinoids within the previous 12 months, and use of topical retinoids or steroids within the previous 3 months. All patients signed an informed consent document. Photographs were taken at baseline and at three and nine months post-operatively.

Step 1: Laser lipolysis of the neck

Preoperative diazepam and peri-operative first generation cephalosporins were given by mouth. Patients were marked in the sitting position, then placed supine on the operating table, prepped with a chlorhexidine gluconate solution, and draped in a sterile fashion. The submental and anterior cervical area was divided into four trapezoidal zones extending from the jawline to the level of the thyroid cartilage and medial to the SCM muscles (Figure 2). Using a #11 blade, one transverse midline incision in the submental crease and incisions at the junction of each earlobe with the facial skin were used for access. Local anesthesia, using approximately 200-250cc of tumescent solution (125mg lidocaine, 0.25mg epinephrine, and 3cc of 8.4% NaHCO₃ in 250cc normal saline), was delivered with a 1.5mm diameter blunt-tipped infiltration cannula on a 20cc syringe. No intravenous sedation or general anesthesia was employed. The

FIGURE 2. The typical distribution of laser lipolysis and laser-induced skin tightening performed with the 1440nm PrecisionTx™.



PrecisionTx™ laser system (Cynosure, Inc., Westford, MA), a pulsed 1440nm Nd:YAG laser, and a helium-neon aiming beam delivered through an 800 micron “side-firing” optical fiber and carried through a 1.5mm diameter cannula, was used for treatment. A temperature sensor, located at the tip of the cannula, provided internal temperature feedback throughout the course of the procedure (ThermaGuide™, Cynosure, Inc., Westford, MA). The laser was set at 10W and 25Hz; pulse energy = 0.4J. Approximately 800-1000 joules were directed downward towards the adipose tissue and then another 800-1000 joules was directed upward towards the deep dermis. One of the goals of the procedure was to evenly and consistently heat the sub-dermal tissue to 47°C. Following laser treatment, no mechanical aspiration was used; the lysate (liquefied remnants of laser lipolysis) was removed via massage and manual rolling on the skin. Each incision was closed with a single 5-0 fast-absorbing plain catgut suture. Patients were instructed to wear an elasticized garment for three days and at night for an additional two weeks.

Step 2: Fractional CO₂ laser resurfacing of the face and neck combined with injectables

Three months later, the patients were treated in a single session that combined injectable neurotoxin (BTX-A), fillers, and FxCO₂ laser resurfacing in a novel “hammock” distribution (Figure 3). If there was extensive dyschromia, segmental (eg, perioral), or pan-facial solar elastosis, the FxCO₂ resurfacing was extended, in lower energy settings, beyond the hammock distribution. A 10-day course of ciprofloxacin and valacyclovir was given for the FxCO₂ laser procedure. One hour prior to the procedure, a topical mixture of lidocaine/prilocaine/phenylephrine (Custom Scripts Pharmacy, Tampa, FL) was applied to the face and neck of each patient; after 60 minutes, the anesthetic was removed and the face was prepped for implantation of the injectables. Injectable filling agents were placed first; six to eight syringes of fillers⁸ were chosen based upon the assessed needs of each patient. Each filling agent contained lidocaine. Midfacial augmentation and restoration of midfacial volume and contour was accomplished with supra-periosteal zygomaticomaxillary implantation of calcium hydroxylapatite

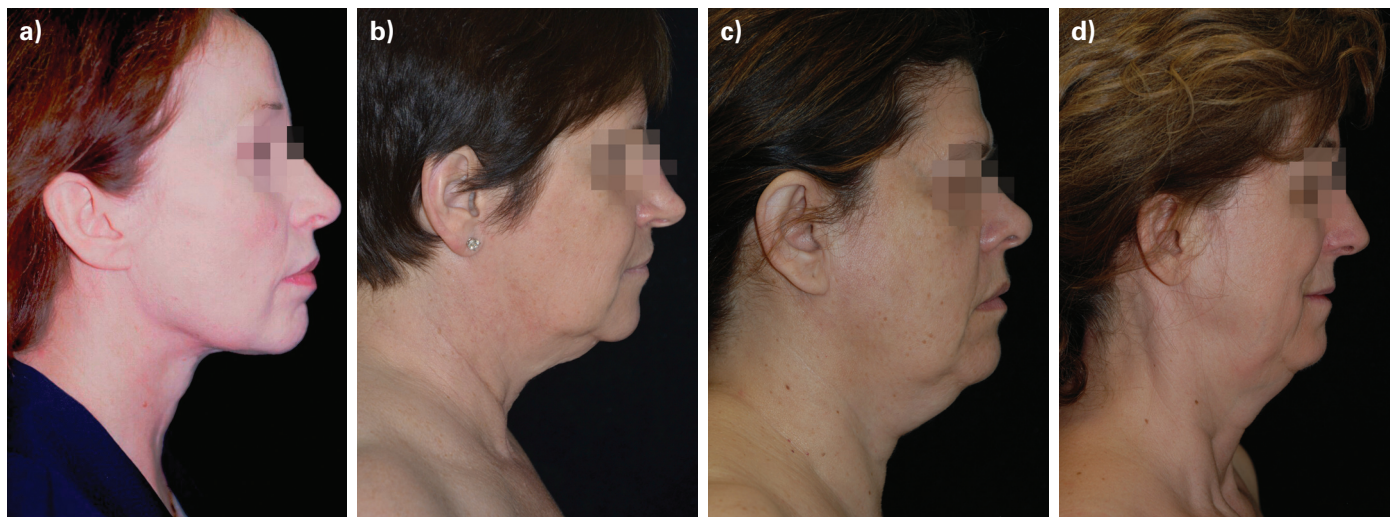
FIGURE 3. The “hammock” distribution of fractional CO₂ laser resurfacing that is the hallmark of the ACELIFT.



(CaHA; Radiesse®, Merz Aesthetics, Inc., Greensboro, NC). The CaHA was placed to “lift” the midface, soften the nasolabial creases, and highlight the malar eminence and the body and arch of the zygoma; sub-malar implantation was performed as needed. If the chin was weak and lacked adequate anterior projection, supra-periosteal depot injections of CaHA were also used to augment the mentum.

Other areas were treated with CaHA, hyaluronic acid (HA; Juvéderm®, Allergan, Inc., Irvine, CA) or both – in a layered fashion with CaHA deep and HA more superficial – according to each patient’s perceived requirements and surgeon judgment. If temporal atrophy or wasting was noted, depot injections of HA or CaHA were used. Linear strands of CaHA or HA were administered along the horizontal ramus of the mandible, the angle, and along the ascending ramus of the mandible to create a more sculpted jawline, a more definitive delineation between the neck and face, and to soften any geniomandibular crease/marionette line/pre-jowl sulcus that was present. If prominent horizontal neck creases were present, a softer, lower G’ HA that has not been associated with a Tyndall effect (Belotero Balance®, Merz Aesthetics, Inc., Greensboro, NC) was given superficially in these creases.

Following the filler treatment, the face and neck were re-prepped and draped in a sterile fashion with wet towels. All appropriate laser safety precautions were taken. FxCO₂ laser resurfacing of the face and neck was performed with either of two devices (Cynosure SmartSkin™; Cynosure, Westford, MA or DEKA SmartXide DOT; DEKA, Calenzano, Italy). One to two passes with settings ranging from 20-30W, 200-400 micron pitch, 1600-1800msec dwell time was performed in a “hammock” distribution including the submental area, along the ascending ramus of the mandible, and in the preauricular area. In some cases, the remainder of the face, including the perioral area and periorbital area/eyelids, and the crêpey skin of the anterior cervical area, were also resurfaced; treatment settings for these areas (dwell time, pitch, and power) were individualized

FIGURE 4. Subjects representative of the four grades of the CMAS (a-d).

according to clinical assessment, but were invariably at lower energy than that used in the hammock so as to not detract from the selective tightening seen with the hammock distribution.

After the laser resurfacing was completed, botulinum toxin A (BTX-A; BOTOX[®] Cosmetic, Allergan, Inc., Irvine, CA or Xeomin[®], Merz Aesthetics, Inc., Greensboro, NC) was administered in the platysma, procerus, corrugators, frontalis, orbicularis oculi, orbicularis oris, depressor anguli oris, and the mentalis – all based upon the individual needs of each patient. The range of BTX-A dosage was 40 - 80u. The laser resurfaced areas were treated with white petrolatum in an open fashion until complete re-epithelialization occurred (one to two weeks).

All patients then were started on a topical regimen that included daily use of a broad spectrum sunscreen with SPF 50. In addition, the daytime regimen included topical non-cross-linked HAs and anti-oxidants (vitamins A, C, E, coenzyme Q-10, grapeseed extract, zinc, ferulic acid, and green tea) to prevent free-radical damage. At night, retinoids and peptides were applied to stimulate fibroblasts to produce collagen, elastin, and other dermal matrix components.

Nine months after the initiation of treatment, all patients were evaluated for the degree and quality of improvement by a physician not involved in the treatment; the physician employed the cervicomenital angle scale (CMAS) and the Global Aesthetic Improvement Scale (GAIS). A questionnaire was given to all patients for subjective evaluation according to the GAIS and a tabulation of complications and adverse events (AEs) was performed.

RESULTS

Clinical outcomes of the ACELIFT procedure were judged by comparison of standardized preoperative and post-operative

TABLE 1.

Cervicomenital Angle Scale^{9,13} (After Knize⁹, see Figure 4)

| | |
|---------|-----------------------------------|
| Grade 1 | Normal angle: at or close to 105° |
| Grade 2 | Mildly oblique |
| Grade 3 | Moderately oblique |
| Grade 4 | Severely oblique |

photographs by a physician not involved in the treatment; each patient was rated according to the CMAS (Table 1; Figures 4 and 5) and the GAIS (Table 2; Figure 6). The patients were given questionnaires for subjective evaluation (Figure 7).

Analysis of the CMAS revealed that all patients improved at least one grade and one patient improved two grades after completion of the entire ACELIFT procedure (Figure 5). Similar analysis of the GAIS revealed improvement in all patients; there were none that were felt to have “no change” or were “worse.” The physicians determined that four out of ten were “exceptionally improved” while the patients themselves felt that six out of ten were “exceptionally improved” (Figures 6 and 7).

A critical evaluation of results and a tabulation of adverse events revealed that there were no hematomas, seromas, or infections after any of the components of the ACELIFT. Two patients had temporary marginal mandibular neurapraxia following the laser lipolysis of the neck; both completely resolved over a period of two to three months. There were no permanent nerve or other adverse thermal injuries related to either of the lasers used in ACELIFT. One patient (Fitzpatrick type III) had transient post-inflammatory hyperpigmentation (PIH); she was treated with a modified Kligman formula (topical hydroquinone, steroid, and retinoid) and the PIH completely resolved prior to the final evaluation. Post-treatment hypopigmentation was not observed.

FIGURE 5. CMAS for all 10 patients at baseline and 9 months post-operatively.

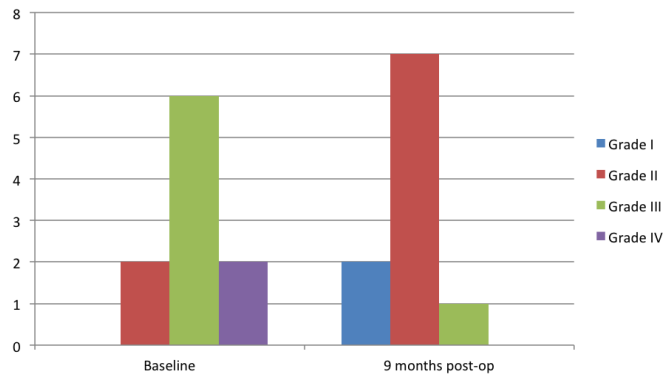


FIGURE 6. GAIS as rated by physician evaluators.

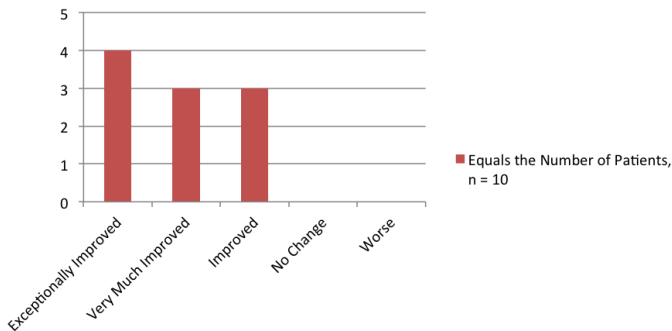


TABLE 2.

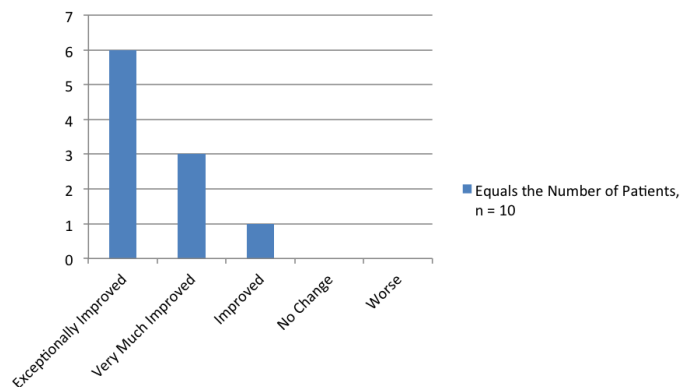
Global Aesthetic Improvement Scale

| Degree | Description |
|--------|---|
| 1 | Exceptionally improved: optimal cosmetic result in the subject |
| 2 | Very much improved: marked improvement in appearance from the pre-treatment condition, but not completely optimal for this subject |
| 3 | Improved: obvious improvement in appearance from the pre-treatment condition, but re-treatment is indicated |
| 4 | No change: the appearance is essentially unchanged from the pre-treatment condition |
| 5 | Worse: the appearance is worse than the pre-treatment condition |

DISCUSSION

ACELIFT – the Augmentation of Collagen and Elastin using Lasers, Injectable neurotoxins, Fillers, and Topicals – in selected patients, has proven to be a viable, safe, and effective alternative to a facelift. Women today are living longer; in many cases, well into their 90s. The average facelift lasts about seven to ten years and it is simply not logical to have a facelift every decade beginning at age 50. This likely would result in too many unnatural side effects, aesthetic deformi-

FIGURE 7. GAIS as rated by patients.



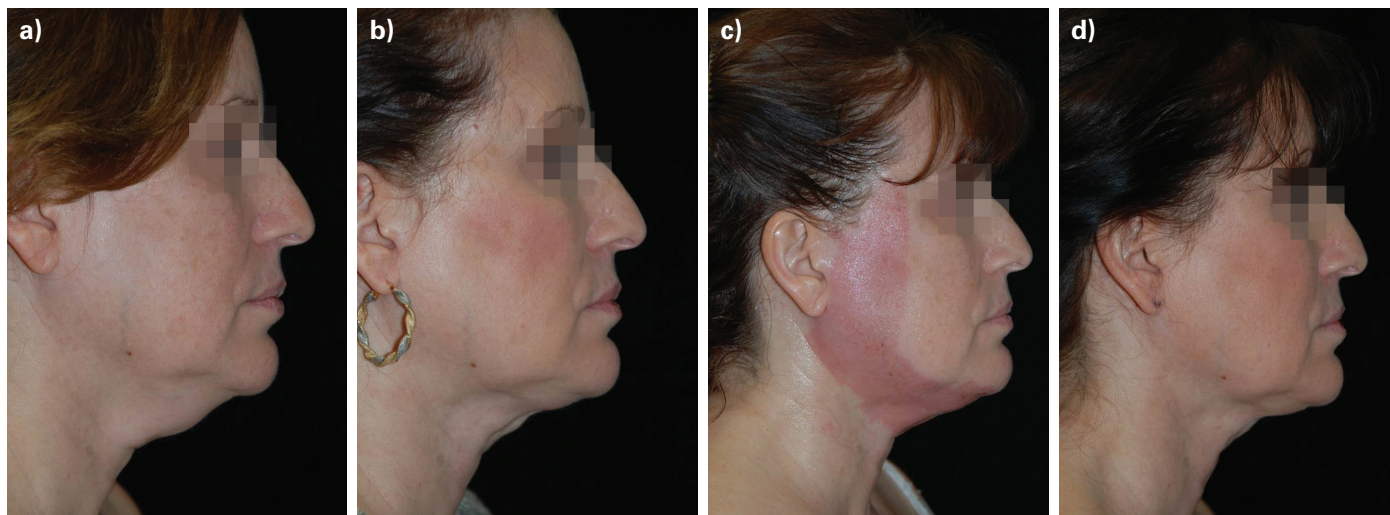
ties, or distortions in the appearance of the face. We propose that the ACELIFT procedure be performed in lieu of a facelift, especially in younger patients, and the facelift be postponed until the cervicofacial laxity and malposition is to the degree that nothing but open surgical intervention will provide the appropriate aesthetic solution.

ACELIFT is a minimally invasive procedure, which can be performed safely under topical or local anesthesia; intravenous sedation or general anesthesia is not required. In addition, the procedure can be performed in patients with medical problems or those taking medications that would otherwise preclude a facelift. Aside from the #11 blade “stab” incisions, there are no other incisions or surgical scars following the procedure. ACE-LIFT promotes collagen and elastin formation and addresses the quality of the skin with a minimal amount of downtime. It provides cervical rejuvenation and can be modified to deliver pan-facial rejuvenation as well. Moreover, the components of the ACELIFT work synergistically to create an overall cosmetic result that is better than any of the individual components alone. This synergy between the ACELIFT components is one of the hallmarks of the procedure.

In previous studies, the 1440nm wavelength has proven to be unique – maximally absorbed by both fat and water and having the ability to form a transient “steam” bubble at the distal tip of the beveled fiber; this bubble creates an air-glass interface that facilitates partial deflection of the laser beam. About half the energy is emitted straight ahead along the long axis of the fiber and the other half emitted at about a 90 degree angle. In the neck, the latter can be directed either down into the fat or up towards the dermis. The advance is significant compared to conventional liposuction because the thermal effects on the hypodermis lead to neocollagenesis, skin thickening, and increased elastin.¹⁰⁻¹²

It is well known that one of the histologic effects of pulsed CO₂ lasers on the skin is the formation of new collagen.¹³⁻¹⁵ Stuzin

FIGURE 8. 58-year-old woman before ACELIFT **a)**, three months after laser lipolysis of the neck **b)**, after the FxCO₂ in the hammock distribution **c)**, and six months after FxCO₂, BTX-A and fillers (nine months after baseline) **d)**.



et al also noted a similar proliferation of elastic fibers.¹⁵ Other studies, likewise, have shown an increase in collagen, elastin, or an increase in elasticity – the former measured histologically and the latter measured clinically. Tanaka demonstrated a histologic increase in both collagen and elastin in infrared-irradiated human skin.¹⁶ Fractional CO₂ resurfacing, in addition to promoting neocollagenesis, also yields skin tightening and improvement in tissue elasticity; both have been measured in vivo using a skin elasticity meter (Cutometer®).¹⁷ Treatment with a fractional CO₂ laser allows the skin to recover some of the biomechanical properties of younger skin.

Fractional ablative technology is associated with quicker healing, less downtime, and fewer complications than traditional, fully ablative CO₂ laser skin resurfacing. The fractional quality of the treatment reduces intra-operative discomfort, post-operative pain, and allows treatment to be performed in areas not confined to traditional cosmetic units. FxCO₂ laser skin resurfacing can be performed safely both on the face and the neck as well as elsewhere on the body. FxCO₂ laser skin resurfacing has not been associated with delayed hypopigmentation and, due to its fractional nature, there is better blending of treated and non-treated areas. This allows us to safely treat the “hammock” distribution on the face and neck.

In 2003 and 2006, Ruiz-Esparza^{18,19} described his concept of applying heat in “key areas,” or “anchoring points,” for rejuvenation of the face and neck. Although he was using nonablative radiofrequency, the concept of applying heat in vectors from areas of less moveable skin – the anchoring points – to areas of more moveable skin, yielded improved tightening compared to treatment over a wider area of the face. By selectively treating anchoring points located along the preauricular area, the skin of the cheeks was tightened. The unique hammock

distribution of the FxCO₂ laser resurfacing in ACELIFT mimics the directional vectors of SMAS-platysma and skin re-draping in a facelift. It creates a new matrix of collagen – a microscopic dermal scar – that provides a scaffold for skin tightening in a very selective, “U”-shaped, distribution.

The components of the ACELIFT, ie, lasers, injectable neurotoxin, fillers, and topicals, have been shown to have synergistic effects. As demonstrated clinically (Figures 8-10), there is additional skin tightening noted following FxCO₂ laser resurfacing compared to that seen after laser lipolysis alone. Both procedures have been shown to promote neocollagenesis^{10,12,13} (Figures 11-12). When injectable neurotoxin is used in conjunction with CO₂ laser resurfacing, there is further synergy. It has been shown that putting underlying musculature at rest during the healing phase of laser skin resurfacing facilitates a more uniform broad band of collagen in the dermis and leads to better overall eradication of rhytides and longevity of correction.²¹⁻²³

Dermal fillers have also been shown to help build new collagen. Evidence has shown that a stimulatory filler such as CaHA causes neocollagenesis. Even when the filler is metabolized, there is still histologic evidence that there is an increase in collagen in the area.²⁴ Interestingly, even temporary fillers such as HAs, have been shown to promote neocollagenesis.²⁵ Injection of cross-linked HA stimulates collagen synthesis. Although it is not yet known, this stimulatory effect may be induced by mechanical stretching of the dermis causing activation of dermal fibroblasts.

There is even further synergy between BTX-A and fillers. It has been demonstrated that the combined use of BTX-A and fillers appears to increase the longevity of tissue dwell time of the filling agent.²⁶ To understand how all of the individual

FIGURE 9. 59-year-old woman before **a)** and **c)** and nine months after ACELIFT **b)** and **d)**.**FIGURE 10.** 62-year-old woman before ACELIFT **a)**, three months after laser lipolysis of the neck **b)**, after FxCO₂ **c)**, and six months after FxCO₂, BTX-A and fillers (nine months after baseline) **d)**.

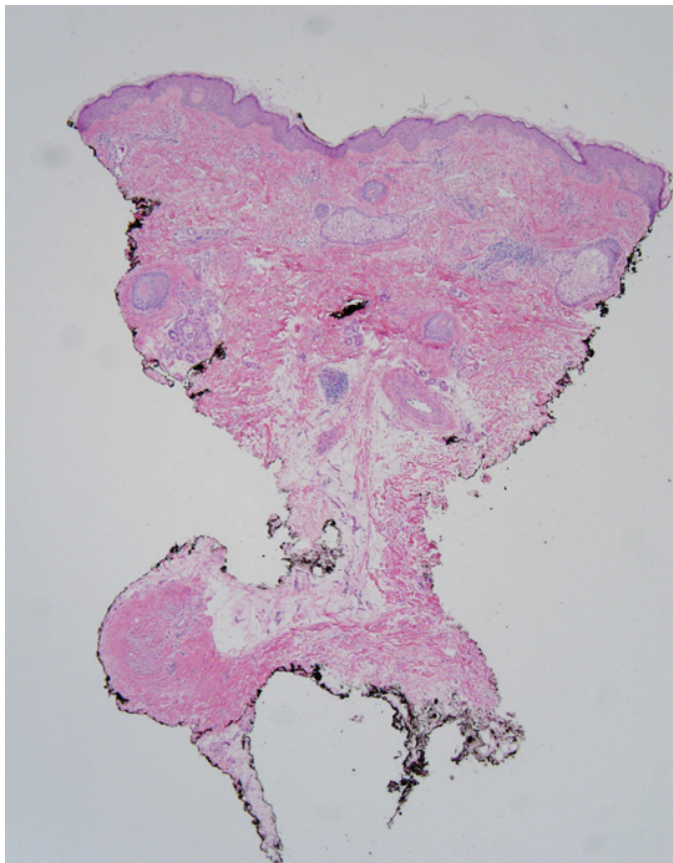
components of ACELIFT work in synergy requires a thorough knowledge of facial anatomy, the aging process, and an appreciation of the three-dimensional nature of that process and the possible alternatives for rejuvenation: not only injectables to relax muscles, reshape contour and restore volume, but the judicious use of both internal and external heat to further the goals of rejuvenation.

Lastly, it has been shown that certain topical ingredients in cosmeceuticals promote collagen formation, hydrate the skin and, therefore, further enhance the synergy of the other ACELIFT components. Use of topical vitamin C results in neocollagenesis with increased production of both collagen types I and III.²⁷ In addition, the combination of the antioxidant vitamins A, C, and E, when delivered in appropriate formulations, is effective in the treatment of photoaging and has

anti-inflammatory properties that are additive compared to any of the individual components alone.²⁸ Topical hyaluronic acid, like injectable HA, is hydrophilic; topical preparations lead to significant improvement in skin hydration and elasticity.²⁹ Hence, the “LIFT,” ie, the Lasers, Injectable neurotoxin, Fillers, and Topicals, all contribute to the Augmentation of Collagen and Elastin in the ACELIFT procedure.

The ACELIFT procedure does come with some caveats. While in some cases, an ACELIFT will produce a result superior to a facelift, especially in those patients that are severely photodamaged and volume depleted, for optimal rejuvenation, repeat treatments with neuromodulating agents and fillers will be needed. In this study, no additional injectables were administered during the entire six-month follow-up period. In fact, at the six month evaluation following the injectables

FIGURE 11. Submental neocollagenesis 3 months following laser lipolysis of the neck with the 1440nm PrecisionTx (H & E x 20).



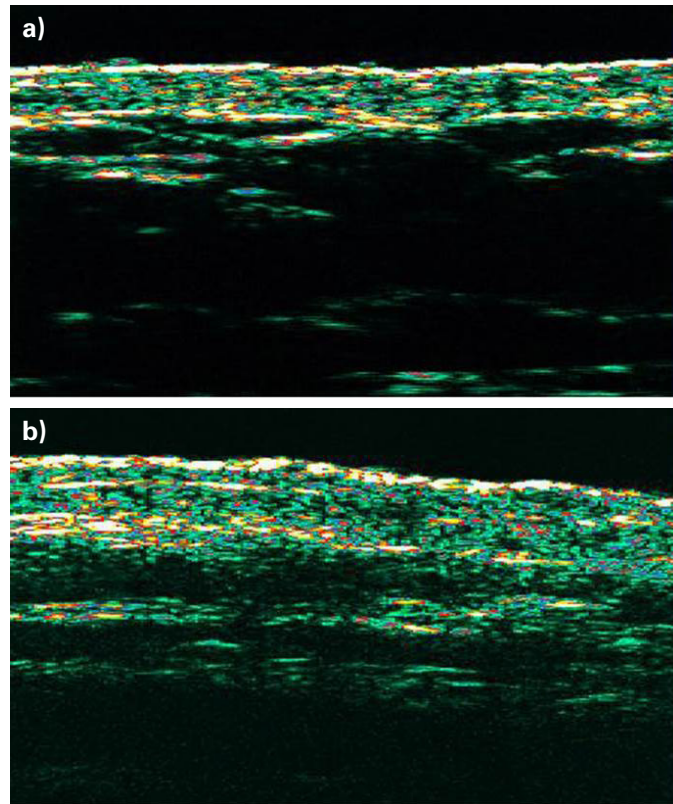
and CO₂ resurfacing (nine months after baseline), one would expect that the effects of the neurotoxin would have worn off. Yet the photographs demonstrate improved neck contour, even in those women with platysma bands preoperatively.

There are several limitations of our study: the small sample size and relatively short follow-up period; enrollment of only Fitzpatrick skin types I-III; and enrollment of only women between the ages of 50 and 62. Further studies should be done on a larger sample size, including men and individuals with ethnic skin. More importantly, in order to appropriately position ACELIFT to a broader range of patients, younger patients should also be included. We would predict that individuals in their 40s would fare even better with ACELIFT because they have more native skin elasticity, healthier collagen, a lower incidence of and less severe platysma bands, and less midfacial volume deflation than their counterparts in their 50s and 60s. Consequently, it is our belief that the ACELIFT can be used to delay the first facelift until the 50s or 60s.

CONCLUSION

In our opinion, the ACELIFT will not spell the end of facelift procedures. A facelift is still the procedure of choice in an individual

FIGURE 12. Ultrasound measurement of dermal thickness at baseline **a)** and 3 months following laser lipolysis of the neck **b)** with the 1440nm PrecisionTx. Dermal thickness = 1.81mm at baseline and 2.93 at 3 months; a 64% increase in dermal thickness.



with severe stigmata of cervicofacial aging – severe anterior cervical laxity, marked platysma banding, significant midfacial ptosis, substantial jowls, and loss of jawline definition. In selected patients, however, ACELIFT does provide a very viable, minimally invasive, safe, and effective alternative to a facelift.

DISCLOSURES

The concepts promoted in this paper are entirely those of the authors. No funding was provided for this study. The authors have been consultants or investigators for Cynosure, DEKA, and Merz.

REFERENCES

1. Ephron, N. *I feel bad about my neck and other thoughts on being a woman*. New York: Alfred A. Knopf, Inc., 2006.
2. Ellenbogen R, Karlin JV. Visual criteria for success in restoring the youthful neck. *Plast Reconstr Surg*. 1980; 66:826-837.
3. Rogers BO. The development of aesthetic plastic surgery: a history. *Aesth Plast Surg*. 1976; 1:3-24.
4. Skoog T. *Plastic Surgery – New Methods and Refinements*. Philadelphia, W.B. Saunders, 1974.
5. Mitz V, Peyronie M. The superficial musculoaponeurotic system (SMAS) in the parotid and cheek area. *Plast Reconstr Surg*. 1976; 58:80-88.
6. Lambros V, Stuzin JM. The cross-cheek depression: surgical cause and effect in the development of the “Joker line” and its treatment. *Plast Reconstr Surg*. 2008; 122:1643-1551.
7. Hamra ST. Frequent facelift sequelae: hollow eyes and the lateral sweep: cause and repair. *Plast Reconstr Surg*. 1998; 102:1658-1666.

8. Taub AF, Sarnoff DS, Gold M, Jacob, C. Effect of multisyringe hyaluronic acid facial rejuvenation on perceived age. *Dermatol Surg.* 2010; 36:322-328.
9. Knize DM. Limited incision submental lipectomy and platysmaplasty. *Plast Reconstr Surg.* 1998; 101:473-781.
10. DiBernardo BE. Treatment of cellulite using a 1440nm pulsed laser with one year follow-up. *Aesthet Surg J.* 2011; 31:328-341.
11. Sarnoff DS. Evaluation of the safety and efficacy of a novel 1440nm Nd:YAG laser for neck contouring and skin tightening without liposuction. *J Drugs Dermatol.* 2013; 12:1382-1388.
12. Sarnoff DS. *Ultrasonic and histologic findings using a 1440nm Nd:YAG laser for neck contouring and skin tightening.* Oral presentation at the annual conference of the American Society for Laser Medicine and Surgery. Phoenix, AZ. April 5, 2014.
13. Gotkin RH, Sarnoff DS, Cannarozzo G, Sadick NS, Alexiades-Armenakas M. Ablative skin resurfacing with a novel microablative CO₂ laser. *J Drugs Dermatol.* 2009; 8:138-144.
14. Alexiades-Armenakas M, Sarnoff D, Gotkin R, Sadick N. Multi-center clinical study and review of fractional ablative CO₂ laser resurfacing for the treatment of rhytides, photoaging, scars and striae. *J Drugs Dermatol.* 2011; 10:352-362.
15. Stuzin JM, Baker TJ, Baker TM, Kligman AM. Histologic effects of the high-energy pulsed CO₂ laser on photoaged facial skin. *Plast Reconstr Surg.* 1997; 99:2036-2050 (Discussion: 2051-2055).
16. Tanaka Y, Matsuo K, Yuzuriha S. Long-term evaluation of collagen and elastin following infrared (1100 to 1800nm) irradiation. *J Drugs Dermatol.* 2009; 8:708-712.
17. Naouri M, Atlan M, Perrodeau E, Georgesco G, Khallouf R, et al. Skin tightening induced by fractional CO₂ laser treatment: quantified assessment of variations in mechanical properties of the skin. *J Cosmetic Dermatol.* 2012; 11:201-206.
18. Ruiz-Esparza J. Nonablative radiofrequency for facial and neck rejuvenation. a faster, safer, and less painful procedure based on concentrating the heat in key areas: the thermalift concept. *J Cosmetic Dermatol.* 2006; 5:68-75.
19. Ruiz-Esparza J, Gomez JB. The medical face lift: a non-invasive, nonsurgical approach to tissue tightening in facial skin using nonablative radiofrequency. *Dermatol Surg.* 2003; 29:325-332.
20. Avrum MM, Tope WD, Yu T, Szachowicz E, Nelson, JS. Hypertrophic scarring of the neck following ablative fractional carbon dioxide laser resurfacing. *Lasers Surg Med.* 2009; 41:185-188.
21. Carruthers J, Carruthers A, Zelichowska A. The power of combined therapies: Botox and ablative facial laser resurfacing. *Am J Cos Surg.* 2000; 17:129-131.
22. West TB, Alster TS. Effect of botulinum toxin type A on movement-associated rhytides following CO₂ laser resurfacing. *Dermatol Surg.* 1999; 25:259-261.
23. Zimble MS, Holds JB, Kokoska MS, et al. Effect of botulinum toxin pretreatment on laser resurfacing results: a prospective, randomized, blinded trial. *Arch Facial Plast Surg.* 2001; 3:165-169.
24. Marmur ES, Phelps R, Goldberg DJ. Clinical, histologic and electron microscopic findings after injection of a calcium hydroxylapatite filler. *J Cosmet Laser Ther.* 2004; 6:223-226.
25. Wang F, Garza LA, Kang S, Varani J, Orringer JS, et al. In vivo stimulation of de novo collagen production caused by cross-linked hyaluronic acid dermal filler injections in photodamaged human skin. *Arch Dermatol.* 2007; 143:155-163.
26. Coleman KR, Carruthers JDA. Combination therapy with BOTOX and fillers: the new rejuvenation paradigm. *Dermatol Ther.* 2006; 19:177-188.
27. Heber GK, Markovic B, Hayes A. An immunohistological study of anhydrous topical ascorbic acid on ex vivo human skin. *J Cosmet Dermatol.* 2006; 5:150-156.
28. Burgess, C. Topical vitamins. *J Drugs Dermatol.* 2008; 7(Suppl.): S2-S6.
29. Pavicic T, Gauglitz GG, Lersch P, Schwach-Abdellaoui K, Malle B, et al. Efficacy of cream-based formulations of hyaluronic acid of different molecular weights in anti-wrinkle treatment. *J Drugs Dermatol.* 2011; 10:990-1000.

AUTHOR CORRESPONDENCE

Deborah S. Sarnoff MD FAAD FACP

E-mail:..... sarnoffandgotkin@aol.com