Evaluation and Treatment Planning for the Aging Face Patient

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KEYWORDS

• Cosmetic evaluation • Cosmetic surgery • Facial plastic surgery • Aging face • Minimally invasive • Facial rejuvenation • Patient evaluation

KEY POINTS

- Although surgery is still a mainstay of facial rejuvenation, a multitude of nonsurgical minimally invasive techniques exist for facial rejuvenation.
- Careful patient selection and counseling on realistic expectations is a critical component of the evaluation and treatment planning of the aging face patient.
- As facial aging is multifactorial, a multimodal approach to care provides optimal results.

INTRODUCTION

Facial aging is a multifactorial process that occurs due to alterations in the skin, soft tissue, and bony skeleton. When considering treatments for the aging face, a multifaceted approach targeting each of these areas should be considered. Although surgical intervention is a key component to the holistic care of the aging face patient, there is an expanding group of patients seeking nonsurgical esthetic interventions for rejuvenation with a nearly 175% increase in minimally invasive procedures in the past 20 years.[1] A plethora of minimally invasive procedures, technologies and techniques exist either as primary interventions or as adjuncts to surgery. It behooves one to have a firm understanding of the aging process and awareness of the available treatment options in order to provide optimal rejuvenation. In this article, we will provide an overview of the aging process, discuss the evaluation of the patient seeking facial aesthetic surgery, and provide a brief overview of minimally invasive techniques available for use in treatment planning. A more in-depth discussion of these techniques will be discussed in other chapters in this issue.

THE CHARACTERISTICS OF THE AGING FACE

The Skin

Both intrinsic and extrinsic factors are determinants of aging of the skin causing textural irregularities, pigmentation changes, prominent vasculature, and loss of tone with sagging (**Fig. 1**).[2,3] Intrinsic (or chronologic) aging is due to the passage of time and affects individuals at variable rates. This is genetically determined and tends to be familial in nature. Although aging progresses in a similar fashion for all, one will see characteristic differences in apparent skin aging between ethnicities, with people of darker skin color exhibiting less signs of intrinsic aging.[4] Overall there is general thinning of the dermis with a loss of elasticity and various degrees of skin sagging secondary to dermal relaxation and involution of various skin "ligaments" and other support mechanisms. There is a decrease in collagen and elastin synthesis and an increase in collagen fragmentation, primarily due to extrinsic factors.[5,6]

The most profound variable causing extrinsic (environmental) skin aging is ultraviolet radiation from sunlight although there are other important extrinsic factors including tobacco use, diet,

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Fig. 1. Photoaged skin. Note the textural irregularities, dyspigmentation, static rhytids, and loss of tone with sagging.

exercise, pollution, and weather issues including wind and temperature extremes. As melanin is protective of ultraviolet exposure, people with darker skin types therefore exhibit fewer signs of photoaging.[4] Extrinsic skin changes include deleterious changes in skin pigmentation, texture, and skin moisture content. These combined changes in the skin begin to manifest as aged inelastic skin secondary to changes in elastin, glycosaminoglycans, and collagen integrity.[7]

The Facial Muscles

Involutional changes in muscle occur throughout the body and manifest themselves as a progressive loss of tone and muscle mass.[8] In the face, secondary to repetitive contraction of the aging muscle in an environment of diminished skin elasticity, soft tissue support mechanisms, and tissue volume loss, one observes hyperdynamic and dysfunctional muscle activity. Over time this creates changes in the soft tissues in different regions of the face. In the upper face, one sees the development of lines that progress from dynamic rhytids to deep permanent furrows. In the central and lower face, these dynamics create the downturned oral commissures with marionette lines and the deepening furrows at the nasolabial folds. The contraction of the orbicularis oris muscle that creates the sensuous puckered lips in the youthful face overwhelms the perioral skin and, along with volume loss, creates static radial perioral rhytids and a more tense and pursed appearance in the aged face. Mentalis hypercontraction can lead to the peau d'orange appearance in the chin (**Fig. 2**).[7,9]

Fig. 2. Peau d'orange appearance of the chin.

The Facial Soft Tissue Volume

The shape of the face is determined by the underlying skeletal structures and the facial subcutaneous volume. This facial subcutaneous volume to a small degree is composed of the facial muscles but includes to a larger extent the contribution of the facial subcutaneous fat in addition to the deeper fat compartments.[10,11] The superficial musculoaponeurotic system (SMAS) overlies and at some locations intertwines with the mimetic facial muscles and is contiguous with the platysma in the neck. The facial fat is generally regarded as lying in two different planes as superficial and deep in reference to this plane.[12] Both of these layers are further subdivided into smaller fat compartments. The deep fat compartments are closely associated with the underlying bone, are relatively immobile, have different types of adipocytes, and have been speculated to provide a gliding plane for muscle movement (**Fig. 3**A). The superficial fat compartments are felt to be more mobile and subject to gravitational forces (**Fig. 3**B).[10] These forces and changes in the facial retaining ligaments that undergo involution or attenuation due to other skeletal volume loss cause soft tissue descent.[13,14] Although ligamentous attachments do not resorb, due to changes in surrounding soft tissue and bony volume and alterations in subcutaneous fat compartments, ligamentous attachments will contribute to the appearance of furrows and grooves throughout the face such as the tear trough deformities, labiomental creases, nasolabial folds, etc (**Fig. 4**).[12] Facial volume replacement during facial rejuvenation is generally directed to the superficial layer although deeper injections are also used.[15,16]

The Facial Bones

With aging, individuals demonstrate a progressive skeletal regression and remodeling in many regions of the facial skeleton (**Fig. 5**).[17,18] In the upper face, the forehead flattens along with a decreasing bony volume of the orbital rim thus lowering the eyebrow position and increasing the size of the bony orbit. In the midface, there is a

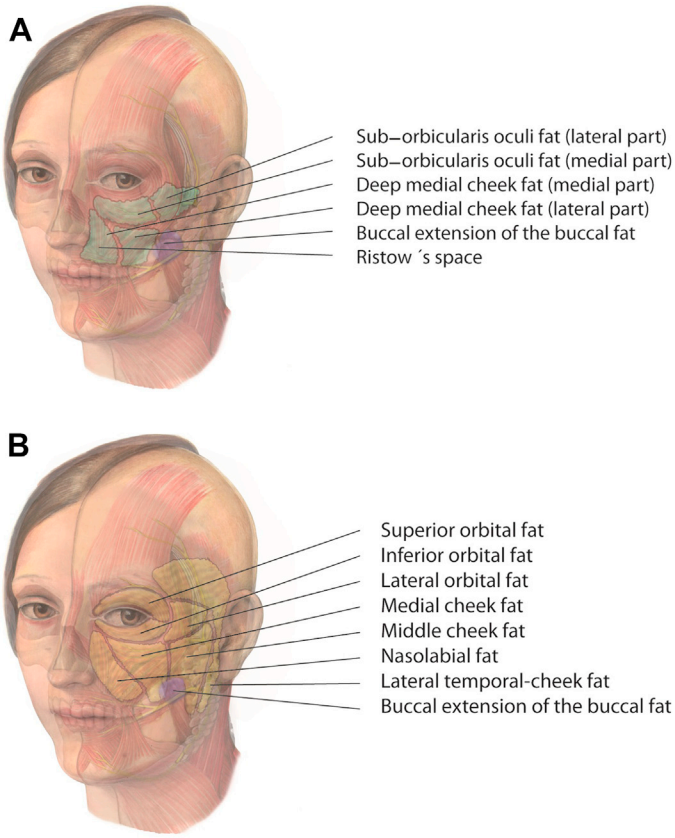

Fig. 3. (*A*) Deep and (*B*) superficial fat compartments of the face. (*From* Gierloff M, Stöhring C, Buder T, Gassling V, Açil Y, Wiltfang J. Aging changes of the midfacial fat compartments: a computed tomographic study. Plastic and reconstructive surgery 2012; 129:263-273.)

continual and age-related maxillary retrusion and dentoalveolar regression resulting in a flattening of the midface that contributes to the descent of the midfacial soft tissues. The mandible undergoes atrophy in several key areas including a loss of chin projection and wasting along the mandibular ramus, contributing to the loss of lower facial definition, soft tissue ptosis, and prominent grooves. As the facial skeleton is the scaffold for the facial soft tissues, consideration for treatment of the skeleton should be given during facial rejuvenation.[19,20]

Regional Changes in the Aging Face

The upper third of the face

In the upper third of the face, one observes a deepening of the superior orbital sulcus as the size and shape of the orbit expand.[21] There is a wasting and deprojection of the bony orbital rim. The eyebrow descends because of the loss of elasticity and lengthening of the forehead skin and a deflating of the periorbital fat along with the loss of the temporal fat pad. There is a secondary increase of dynamic forehead wrinkles and furrows as the frontalis muscle continuously contracts to keep the brow elevated allowing a stabilization of vision and the amount of light entering the eyes. Chronic contraction of the procerus and corrugators produce inferior descent of the medial brow and creation of static furrows and dynamic lines. Laterally, the brow becomes ptotic due to the repetitive action of the orbicularis. Laxity and skin excess occur in the eyelids and along with pseudoherniation of orbital fat pads, loss of elasticity, fatiguing of retaining ligaments, and volumetric changes including an expanding bony vault, results in the overall aged appearance of the upper face and periocular region (**Fig. 6**).[19,22,23]

The middle third of the face

The principal change that is observed in the aging midface is the apparent descent of the cheek soft tissues with loosening of retaining structures and ligaments. This results in a number of undesirable features including skeletonization of the inferior orbital rim and zygoma, pseudoherniation of fat in the lower eyelid, the appearance of the "tear trough" deformity, an apparent deepening of the nasolabial sulcus, laxity of the skin, orbicularis

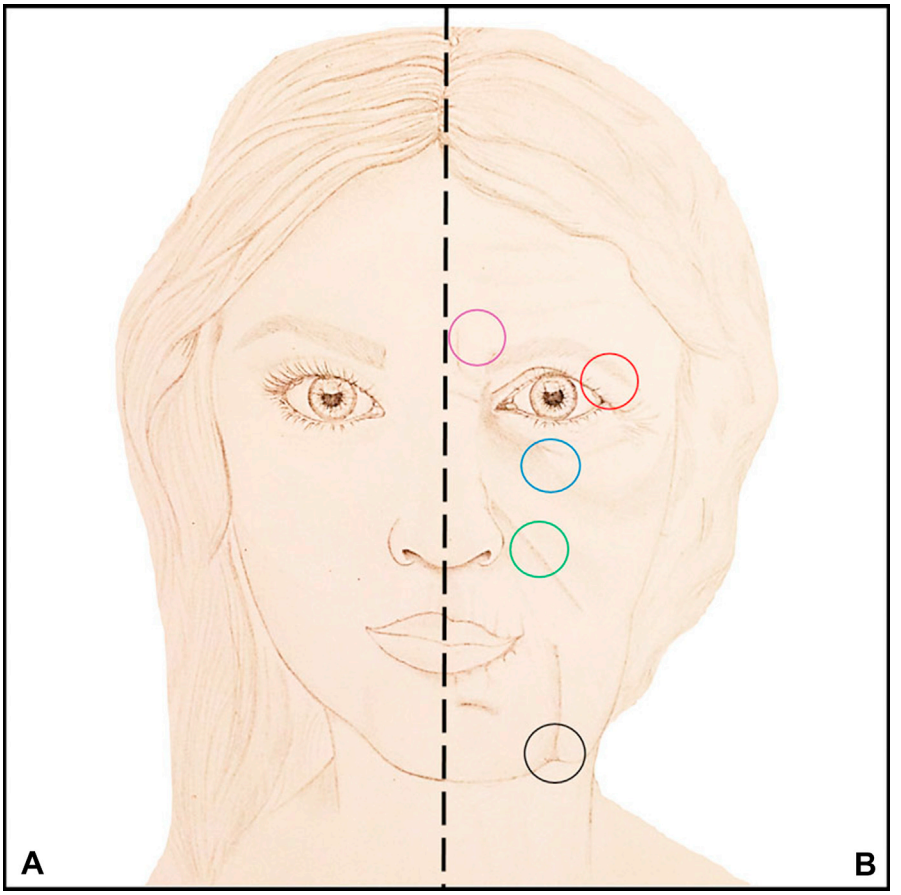

Fig. 4. A youthful (*A*) versus an aged (*B*) face. Circles represent some key areas of aging due to combined repetitive muscle action, skin changes, skeletal and soft tissue volume loss or descent, and positioning of the retaining ligaments. (*From* Cotofana S, Fratila AA, Schenck TL, Redka-Swoboda W, Zilinsky I, Pavicic T. The Anatomy of the Aging Face: A Review. Facial Plast Surg 2016; 32:253-260.)

hypertrophy, and a flattened central upper midface (see **Fig. 6**). The skin of the eyelids thins and loses its elasticity (dermatochalasis) and takes on a crepe-paper appearance with visible subdermal vessels and pigmentary changes. These changes are secondary to the regional skeletal changes, attenuation of the facial retaining ligaments, and actual fat atrophy.[15,16,24]

The lower central third of the face

The central lower face undergoes visible aging changes different than the rest of the face. This is secondary to the prominent changes in the bone and subcutaneous volume loss. There is resorption of bone at the mentum thus reducing mandibular projection. Additional mandibular atrophy is irregularly distributed along various locations of the mandibular margin depending on the underlying biomechanical forces. This is especially pronounced in the area of the anterior mandible immediately inferior to the mental foramina, resulting in an anatomic bony depression known as the anterior mandibular groove, just anterior to the attachments of the mandibular ligament.[9] With atrophy of the overlying fat compartments and the hypertrophy of the regional musculature one notes characteristic changes in the lower central face including the deepening of the melomental folds, the mental crease, and the labiomandibular creases. The resultant distortions result in anatomic characteristics that we identify as of jowling, the appearance of marionette lines, and a deepening pre-jowl sulcus (**Fig. 7**).

With bony and soft tissue volume loss and repetitive perioral muscular contraction, the lips take on an elongated appearance with static and dynamic rhytids, loss of definition, a flattened or deflated appearance with a poor dental show and oral commissure descent (see **Fig. 1**). In the chin, there is bone loss and soft tissue ptosis with progressive worsening of the skin contour with dimpling causing a peau d'orange

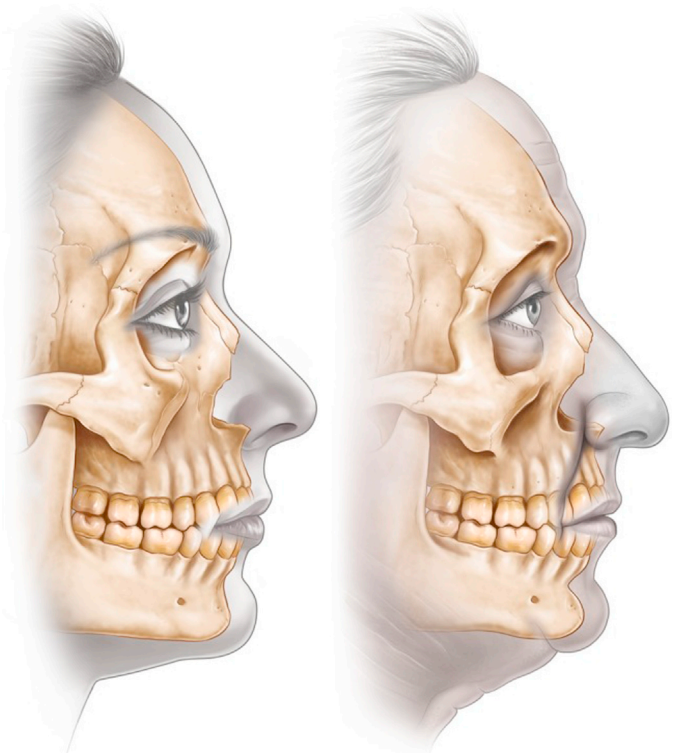

Fig. 5. Skeletal changes that occur with age. (*From* Mendelson B, Wong CH. Changes in the Facial Skeleton With Aging: Implications and Clinical Applications in Facial Rejuvenation. Aesthetic plastic surgery 2020; 44:1151-1158.)

appearance with progression to the "witch's chin" from further severe loss and descent of chin volume and support.

The neck

Underlying anatomy plays a critical role in the aged appearance of the neck as it sets the skeletal framework. Chin and hyoid position will alter the cervicomental angle. Ptosis of the submandibular glands will lead to fullness and less definition below the body of the mandible. Soft tissue ptosis in the lower face and neck along with atrophy of the mandible and fat deposition in the submental region creates a loss of the distinct borders between the lower face and neck with a poorly defined mandibular line (see **Fig. 7**). This is further exacerbated by the appearance of platysmal banding and medial hypertrophy along with excess sagging skin with static horizontal furrows. Loss of skin elasticity and photoaging will affect the overall appearance of face/neck transition and may require treatment to optimize rejuvenation.[25]

PATIENT EVALUATION

In the approach to the patient seeking facial rejuvenation, it is optimal that the practitioner has at their disposal a constellation of noninvasive, minimally invasive, and more invasive rejuvenation techniques and technologies that they are facile with. Decision-making and recommendations can then be best based on the patient's anatomic and psychological needs rather than on a limited repertoire of technical assets. Together, the history and exam will help the practitioner create a framework for individualized multimodal treatment planning of facial aging.

PATIENT SELECTION AND CANDIDACY FOR FACIAL REJUVENATION

The Motivations of the Patient Seeking Facial Rejuvenation

Psychological motivations

As in all aspects of cosmetic surgery, the surgeon should aim to have a firm understanding of each patient's motivations for undergoing a cosmetic intervention. It is important that these motivations be sound and healthy. One has to be particularly concerned about the patient who is undergoing the intervention as a reaction to or to please another person. For instance, if someone is in the current throes of a divorce, they may not be in the best psychological condition and undergo a procedure that is permanent and has at least a small chance of having a less than optimal recovery.

Fig. 6. Aged appearance of eyes with flattened, asymmetric brows, dermatochalasis, blepharoptosis, pseudoherniation of fat, and deep infraorbital hollows.

Social motivations

We are including this heading here because of the current trends of creating "selfies" and the "posting" of such images on social media. One should be careful to properly counsel the patient who has decided to undergo a surgical procedure because how they look in their selfies. On the most elemental level, the patient should be educated that many of the images seen a social media are distorted by various photo and computer factors and do not represent how they actually look.[26] Also emerging is the phenomenon of "zoom dysmorphia" as there has been an increased use of digital platforms with real-time camera use.[27] The outward facial expression may be distorted by computer or smart device angles, lighting, and distance and accentuate true or perceived flaws in the facial form.

Expectations of the patient

What is equally important is to be aware of the patient's understanding of the limitations of various minimally invasive procedures and to establish realistic expectations. If the patient expresses an expectation that they will obtain results similar to a surgical procedure from a minimally invasive treatment, a pause may be in order. The practitioner has to be wary and redirects the patient's expectations. It is extremely important that the patient's expectations are set within the realistic capabilities of the procedure. Screening for patients with unrealistic expectations or a dysfunctional body image, such as body dysmorphic disorder (BDD), which is a preoccupation on physical flaws that are not visible or minimally visible to others, should be considered. Studies have shown a BDD incidence of around 13% in patients presenting with cosmetic concerns. Despite some interventions being minimally invasive, they have the potential to lead to unhappy outcomes in this patient population.[28]

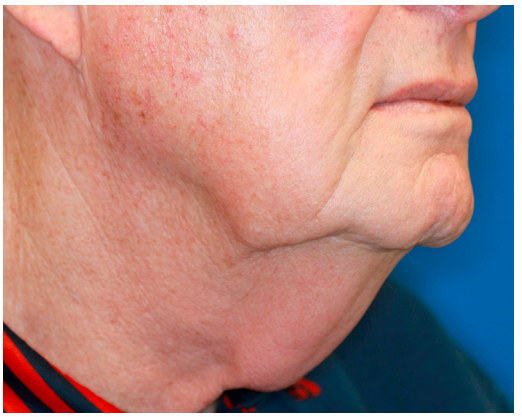

Fig. 7. Aged lower face and neck with loss of mandibular bone and definition, deep marionette lines, downturned oral commissures, prejowl sulcus, moderate jowling, loss of definition of lips, and skin and fat excess in the neck with platysmal banding.

Contraindications

Typical surgical contraindications may also apply to minimally invasive facial rejuvenation. Contraindications such as poor health, inflammatory or autoimmune disease, tobacco abuse, the use of anticoagulants, pregnancy, active illness, and others issues should be considered.

MULTIFACETED AND REGIONAL APPROACH TO FACIAL AGING

A discussion of the multifactorial nature of facial aging is critical for patients to understand the need for a multifaceted approach to optimal rejuvenation addressing their individual aging concerns.[29]

In some situations, the result of a minimally invasive procedure can be quite impressive. For example, the "perfect" lips produced with the use of a hyaluronic acid filler in the younger patient or the elimination of dynamic glabellar wrinkling with a neuromodulator. In many situations, however, the optimal treatment of a facial region will be to use several minimally invasive techniques to produce a balanced or harmonious result (see **Table 1** for a list of common minimally invasive treatments targeting the aging face and neck).

The Rejuvenation of Aged Facial Skin

The treatment of aged skin is aimed at improving texture, pigmentation, and elasticity. There have been many advancements over the last 30 years to rejuvenate the skin.

Medical grade skincare

The most basic fundamental maintenance and rejuvenation regimen directed at the facial skin

Table 1
Common minimally invasive treatments for rejuvenation of the face and neck

Modality	Examples	Desired Effect
Topicals	Retinoids Sunscreens Lightning agents Vitamin/Antioxidants Combination/Compound Therapy	Treatment of lines, texture, elasticity, tone. Increase collagen. Prevention of photoaging Depigmentation Decrease sallowing, improve photoaging and dyschromia Offers multimodal therapy for aging
Treatment of pigment and vascularity	Broadband light Intense pulsed light Pulsed dye laser ND:YAG	Improve hyperpigmentation, fine lines Treat hypervascularity
Chemodenervation	Botox, Dysport, Xeomin, Jeuveau	Smooth dynamic line Lip flip Chemical brow lift
Fillers	Hyaluronic acid Calcium hydroxylapatite Polylactic acid Polymethyl-methacrylate microspheres Platelet-rich plasma Allograft adipose matrix	Restore youthful volume Create symmetry Add lift Static rhytids/grooves Stimulate collagen, elastin, and extracellular matrix
Resurfacing	Ablative vs nonablative vs fractional lasers Dermabrasion Peels	Treatment of lines, texture, elasticity, tone Stimulate collagen synthesis Improve dyspigmentation
Lipolysis	Phosphatidylcholine Deoxycholic acid-injection Transcutaneous cryolipolysis Ultrasound, radiofrequency, or laser-assisted liposuction/ lipolysis	Adipose reduction (liposculpture)
Vascular lasers/light therapies	Intense pulsed light Pulsed dye laser Broadband light Nd:YAG	Decrease pigmentation Decrease erythema and prominent vessels
Nonsurgical skin tightening	Ultrasound technology Radiofrequency (monopolar, bipolar, unipolar)	Skin tightening Reduction of wrinkles Fat reduction
Muscle development	Electromagnetic stimulation and direct current	Improve muscle tone
Biostimulants	Biostimulants (eg, growth factor injections, exosomes, platelet-rich plasma poly-L-lactic acid, or calcium hydroxylapatite microspheres)	Increase collagen, elastic and extracellular matrix Reverse photoaging Stimulate volume
Percutaneous collagen induction therapy	Microneedling alone or with biostimulants or radiofrequency	Enhance collagen synthesis and reorientation Dermal thickening
Suture suspension	Thread lifting (polydiaxanone, polyglcolic acid, poly-lactic-polycaprolactone acid, polyproplylene)	Tissue resuspension and tightening Collagen production

should include at least a combination of tretinoin, antioxidants, and sunscreens. Tretinoin will reverse some of the skin photodamage.[30] It will increase the rate of epidermal cell turnover that will restore a more orderly cellular progression from the basal to the keratin layer. This results in an improvement in skin texture and pigmentation. The skin will appear smother and reflect light more efficiently producing a subtle luminescence to the skin. Tretinoin will stimulate collagen synthesis and over time will result in a more orderly array of collagen bundles in the skin.[31] This will result in flattening and improvement in fine rhytids. Elastin synthesis is also increased resulting in a more resilient skin.

The second fundamental is the use of skin antioxidants, such as Vitamin C and E-containing products. They will serve to eliminate free radicals in the skin. Free radicals serve as an intermediary in the process of sunlight-related skin damage. Antioxidants have shown benefits in treating photoaged skin and improving dyschromia.[32]

Although many treatments for photoaging exist, the ideal situation would be to prevent photoaging with avoidance and the appropriate use of sunscreen to reduce the deleterious extrinsic effects of UV radiation on the skin. Additionally, studies have shown that consistent sunscreen use may reverse some of the signs of photoaging.[33]

Other topicals, such as moisturizers or products containing hyaluronic acid and ceramides, may be beneficial for overall skin health.

RESURFACING OF THE SKIN

Skin resurfacing is typically directed at improving wrinkles, texture, and brown pigmentation issues by stimulating a secondary tissue healing response to injury-inducing epithelialization, collagen remodeling, and creation of new collagen and elastin.[6] In the spectrum of resurfacing, there are agents that produce minimal epidermal exfoliation to those that produce near-total ablation of epidermis and partial removal of the dermis. Resurfacing may be performed with chemical agents (peels), mechanical agents (dermabrasion and microdermabrasion), and a variety of energy and light-based therapies such as lasers and plasma devices. For brevity, we will largely refrain from a thorough discussion of the spectrum of agents available and instead touch on laser and energy devices.

The earlier full ablative CO_2 and erbium lasers created tighter and smoother skin but could hardly be considered minimally invasive and could easily result in a patient "healing' time of several weeks with increased risk of texture irregularities, fine scarring, and pigment concerns. Fractional laser technologies made it possible to create skin that was improved and retained a normal texture, pigmentation and architecture. Newer advances in laser technology using picosecond technologies and different wavelengths have produced results with limited rates of complications, impressive skin tightening and a better targeting of pigmentation and vascular defects with a limited downtime of hours to days (**Fig. 8**).[34,35]

Treatment of Skin Vascular and Pigmented Lesions

Although the ablation of the skin epithelium will many times improve hyperpigmented lesions of the facial skin, the treatment of vascular lesions and benign pigmented lesions of the skin are many times addressed differently than the management of rhytids in the skin. The 595 nm pulsed dye laser and the 1064 nm long-pulsed Nd:YAG has been used for the management of a variety of vascular lesions such as port-wine stains and telangiectasias. Hyperpigmented lesions are frequently managed with erbium and picosecond Nd:YAG lasers (see **Fig. 8**). Intense pulse light and other lasers are is also used (see **Table 1**).[36]

The Rejuvenation of Facial Volume and Contour

Skin tightening—energy devices

Skin tightening devices have become popular. Underlying technologies include ultrasound, helium plasma, and radiofrequency stimulation of the skin. The core mechanism of skin tightening in all of these devices is the heating of the dermis and subdermal structures to induce a secondary healing response. A reactionary collagen synthesis is induced with resultant contraction and skin tightening. This is done in a manner without ablation of the skin or a prolonged downtime. Skin tightening then occurs over weeks to months.

Percutaneous and transcutaneous devices are available. Some of these devices provide tightening as well as subcutaneous fat remodeling. Serial treatments are typically required to obtain improvement. Commonly used devices to achieve these goals incorporate ultrasound technology, plasma, and monopolar, bipolar, or unipolar radiofrequency (**Fig. 9**).[37–39] More recently, several noninvasive energy devices have been introduced to induce skin tightening of the face and neck without any penetration of the skin or subcutaneous tissues (**Fig. 10**). Preliminary reports and experience are optimistic. The long-term effects and longevity of these treatments are still unknown (**Figs. 11** and **12**).

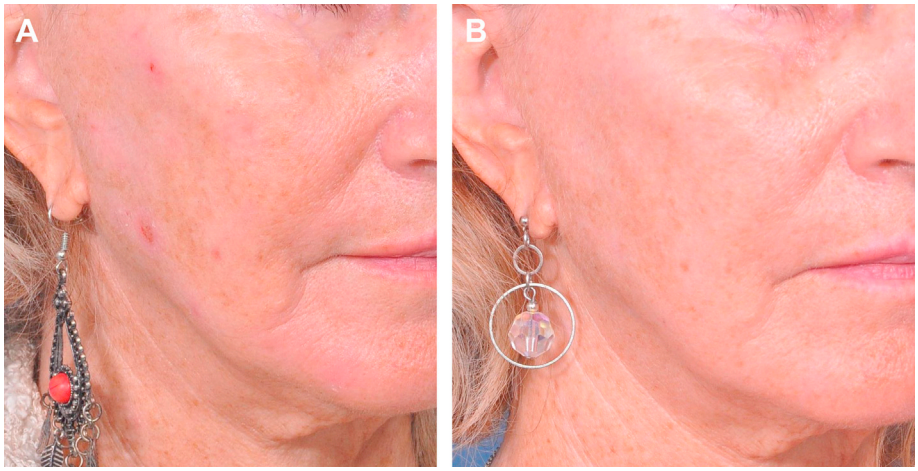

Fig. 8. Clinical images depicting improvement of facial lentigines and modest skin tightening with single treatment picosecond 1064/532 nm laser (PicoLazer, Rohrer Aesthetics). Treatment resulted in approximately 24 hours of "redness" downtime. (*A*) Pretreatment, (*B*) Post-Treatment.

Suture suspension

Although treatments are available for skin tightening, resurfacing, fat reduction, or volume rejuvenation, ptotic soft tissue may still be a problem.[40] To combat this, soft tissue suture suspension was developed as a minimally invasive technique. Multiple types of suture are now available, with both nonabsorbable and absorbable threads on the market. The ideal patient is younger without advanced signs of aging. For optimal rejuvenation, thread lifting may be combined with other minimally invasive therapies.[41]

Treatment of dynamic rhytids

The neuromodulators occupy a unique position in the esthetic ecosystem of facial rejuvenation. Their sole mechanism of action is to weaken or *modulate* muscle contraction. When used in strategic areas, with many areas being off-label, the neuromodulators can be used esthetically to lessen glabellar frown lines, decrease forehead motion, soften periorbital rhytids, passively elevate the brows, and improve the oral commissure position. Their high efficiency and low complication rate make the neuromodulators extremely popular and safe to use.

Restoring facial volume and treatment of static lines/furrows

Among the most significant changes in the aging face is the loss and malposition of facial volume. Although replacement of volume with alloplastic implants or autologous fat transfer is still commonly performed, the most significant change has been through the introduction of injectable fillers. The use of off-the-shelf fillers and biostimulatory agents is now among the most commonly performed esthetic procedures.

The injectable filler availability has grown immensely since the introduction of Restylane in 2003 as the first hyaluronic acid filler.[42] The hyaluronic acid fillers currently garner the largest proportion of the market and use as they have an excellent safety profile, are easy to use, and are reversible. As a sole treatment, filler is ideal in younger patients or to treat deep grooves (**Fig. 13**) or enhance lips. Autogenous fat transfer has become more popular, may be performed under local, and may be combined with tightening procedures (see **Fig. 11**).[24,43–46]

Biostimulants, stem cells, and exosomes

In recent decades, an interest has developed in biostimulants and stem cells for the induction of collagen and elastin production and extracellular matrix to combat photoaging (see **Table 1**).[47,48] These may be used as adjuncts with other minimally invasive therapies or as volume replacement.

Lipolysis

Some areas retain fat that is resistant to weight loss and may show increased deposition with age. To combat this, multiple nonsurgical techniques have been developed, including deoxycholic acid injection, transcutaneous cryolipolysis, and ultrasound-assisted lipolysis.[49]

TREATMENT PLANNING

Treatment planning should be an interactive process between patient and practitioner. Patients now present having done more "research" that

Fig. 9. Transcutaneous radiofrequency microneedling devices. (*A*) Morpheous 8 (Inmode, Inc.), (*B*) Pixel8 (Rohrer Aesthetics), (*C*) percutaneous radiofrequency device (FaceTite handpiece, Inmode, Inc.), and (*D*) clinical image of FaceTite being used for local lipolysis and skin tightening of neck.

may not be correct or ideal for their situation. It is therefore paramount that the clinician attempts to guide the patient to develop an individualized treatment plan.

In the passages that follow, we will briefly discuss the regional rejuvenation of one's face from the perspective that we are specifically *not* going to recommend surgery but instead use the spectrum of interventions in the minimally invasive range. Keep in mind that there are many variations on this theme and what is offered here is a series of interventions that has worked in our practices. As it is in many cases, even when the full spectrum of interventions is being entertained, it is helpful to ascertain the face in terms of regions and address what might be done from region to region. These treatments will be discussed in more detail in other articles on this issue.

Fig. 10. Clinical images of the patient undergoing noninvasive lower facial skin tightening with one of the two Evoke devices (Inmode, Inc.).

A FACIAL REGIONAL APPROACH TO THE USE OF NONINVASIVE AND MINIMALLY INVASIVE THERAPIES

The Upper Face

Patients frequently seek consultation for rejuvenation of the upper face related to aging issues such as forehead wrinkles, brow ptosis, dermatochalasis, glabella furrows, and periorbital rhytids. Other issues that can be identified at the time of consultation include temporal fat wasting, hollowing of the superior orbital sulcus, skeletonization of the superior orbital rims, skin laxity, lentigines, rhytids, and poor texture.[22]

Among the most popular and effective vehicles for rejuvenation of the upper face are neuromodulators for dynamic lines. Although Botox (Allergan Aesthetics) still commands a market dominance,

Fig. 11. Clinical images of the patient who underwent transcutaneous and percutaneous radiofrequency treatment of face and neck and fat transfer. (*A*) Preoperative and (*B*) postoperative.

other alternatives are available and are arguably just as effective. In the upper facial region, the selective weakening of the brow depressors will facilitate frontalis muscle elevation actions thus resulting in an elevation of the eyebrows and providing a chemical brow lift. Treating the forehead, periocular region, and glabella can diminish dynamic forehead wrinkles and furrows. Patient

Fig. 12. Clinical images of patients who underwent transcutaneous and percutaneous radiofrequency treatment of lower eyelid fat pseudoherniation and simultaneous with single treatment picosecond 1064/532 nm laser treatment of regional face and neck skin. (*A*) Preprocedure and (*B*) postprocedure.

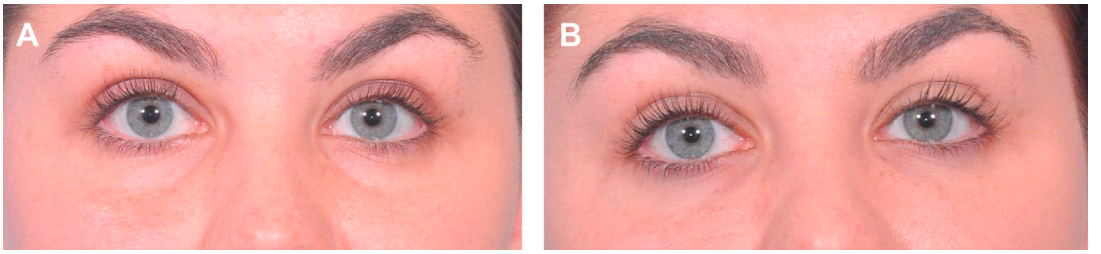

Fig. 13. Clinical images of patients who underwent correction of tear trough deformity with the injection of a total of 1 cc of Kysse (Galderma, Inc.). (*A*) Preprocedure and (*B*) postprocedure.

selection and strategic use of the neuromodulators are important in this location as if overdone they can cause a secondary brow or lid ptosis.

Fillers, autogenous fat, and biostimulants may be used to minimize the appearance of deep furrows in the glabella, forehead, and periorbital region and can be used to add volume to skeletonized brows and orbital rims and minimize temporal hollowing.

Photoaged skin may be treated with any of the resurfacing techniques, prominent vessels may be minimized with the use of vascular-directed lasers, and tightening may be obtained by ultrasound or radiofrequency techniques (see **Figs. 11** and **12**).

The Midface

The descent of the midface soft tissues results in the skeletonization of the infraorbital rim and development of a tear trough deformity, deepening of the nasolabial groove, and flattening of the upper midface. The ptosis of the upper central midface results in the biconvexity deformity (see **Fig. 6**).

The use of injectable volume agents including fillers, biostimulating products, and fat transfer all have excellent track records for the rejuvenation of the midface. Adding volume to the deep at the malar eminence and upper midface, filling in the nasojugal groove and tear-trough, and softening of the nasolabial fold (see **Fig. 13**).

Minimally invasive skin tightening, suture suspension, and treatment of photoaged skin may be treated with a combination of skincare products, thread lifting, radiofrequency, microneedling, resurfacing, and use of vascular lasers (see **Figs. 11** and **12**).

The Lower Face and Lips

Although neuromodulation at the upper vermilion border or in the depressor anguli oris muscles may be beneficial to improve radial perioral lines, provide a "lip flip" or turn up low oral commissures, this is not the primary modality in this region. Instead, a combination of fillers to minimize the appearance of grooves and contour the chin and mandibular, resurfacing to treat textural irregularities and induce collage production, and tightening devices to provide definition are the mainstay (see **Fig. 11**).

Neck

Minimally invasive treatments to rejuvenate the neck are aimed at minimizing excess fat with liposculpting, treating surface irregularities with resurfacing, minimizing dynamic rhytids with chemodenervation, and tightening of skin and soft tissue. The lower face and mandible are typically treated in conjunction to re-establish the mandibular line and provide a more youthful, defined transition.

SUMMARY

Although minimally invasive techniques have revolutionized facial rejuvenation when used or alone or, more commonly, in combination, there are limitations to what can be achieved through these techniques and patients must be counseled about realistic expectations. The vast majority of these modalities available are valid and effective. The clinician's job is to choose among this constellation of interventions that best suit the patient's individual desires and needs anatomically and psychologically.

CLINICS CARE POINTS

- A multimodal approach to facial aging will provide optimal rejuvenation results.
- Treatments plans should be individualized based on patient goals and aging characteristics and may include skin care regimens, minimally invasive therapies, and surgical interventions.
- Proper patient evaluation and counseling are critical components of a holistic approach to facial rejuvenation.

DISCLOSURE

The authors have nothing to disclose.

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