

Upper Face Rejuvenation

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One hallmark of an aging face is the change that occurs in the upper face as soft tissue loss, photodamage, and dynamic rhytides combine to produce sagging, wrinkles, and surface changes. The advent of botulinum toxin type A allowed physicians to challenge dynamic rhytides and focus attention on possible treatments for the upper face. New fillers, lasers, suspension threads, intense pulsed light devices, and cosmeceuticals have ushered in a renaissance of facial rejuvenation. In this article, the use of botulinum toxin type A and fillers for facial rejuvenation is considered; additionally, the techniques for injecting botulinum toxin type A and fillers, as well as the facial areas that may be treated, are discussed.

BOTULINUM TOXIN TYPE A FOR FACIAL REJUVENATION

Botulinum toxin type A was approved for use in 2002 by the US Food and Drug Administration. The only approved cosmetic indication for botulinum toxin type A is glabellar rhytides. This limited indication constitutes a fraction of the number of injections of this agent, which now is widely accepted as the treatment of choice for many symptoms of aging of the upper, mid, and lower face. Botulinum toxin type A is used for brow lifting as well as for the treatment of forehead lines, crow's feet, lower eyelids, and nasolabial folds.

Because glabellar rhytides may connote a look of anger or displeasure in patients, treatment of the glabella is associated with increased self-image, as described by Finn et al.¹ Glabellar rhytides are caused by the actions of the corrugator supercilii, depressor supercilii, and procerus muscles. Injection of botulinum toxin type A may reduce or eliminate the contractions of these muscles, with a corresponding reduction in the dynamic component of the

wrinkles. Technically, injection into the glabellar area is easier to accomplish than in other facial areas. The average dose of botulinum toxin type A for treatment of the glabella is 20 to 25 U for most women and 25 to 35 U for most men.

Injection of botulinum toxin type A into the corrugator muscle is accomplished by visualizing or palpating the muscle as the patient frowns. As with all injections of botulinum toxin type A, knowledge of the anatomy is critical for proper injection. We usually use 5 injection sites when treating the glabella. Two sites enable treatment of each medial and lateral corrugator muscle and the depressor muscle; one central site allows treatment of the procerus muscle. Some patients with a powerful glabellar complex also recruit pull from the superior aspect of the orbicularis oculi muscle and thus may require injection approximately 1.5 cm above the orbital rim along the mid brow. It is imperative to avoid injections below this area and to point the needle tip downward because this protein may diffuse through the orbital septum and thus weaken the levator palpebrae superioris, which causes eyelid drooping. If eyelid ptosis does occur (it is exceedingly rare), we recommend using over-the-counter phenylephrine 3 times daily as an α -agonist to assist in Mueller muscle function rather than prescribing apraclonidine, which may unmask undiagnosed glaucoma.

For patients whose glabellar rhytides do not resolve despite immobility of the relevant muscles, fillers may be considered. Soft tissue augmentation agents should be injected slowly and in small doses. Necrosis has been reported with the use of Zyplast®; thus, the use of this

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agent in the glabella area is not recommended.² Other fillers, including Restylane®, also have been reported to cause necrosis in this area.³ Although Restylane is not absolutely contraindicated for injections into the glabella, care should be used when injecting this site. Hylaform®, Captique™, and CosmoDerm® also may be used for soft tissue augmentation of static glabellar rhytides. Additionally, these fillers are less dense and often are recommended to minimize the risk of necrosis.³ Injectors should remain in a superficial plane and inject medially into the glabella because necrosis may occur not only from intravascular placement but also from compression of the vessels in this watershed area. Physicians should recognize blanching, which may signify vascular occlusion, and respond immediately with application of warm gauze to encourage vascular flow and dilation. If vascular insult is suspected, topical nitroglycerine paste should be applied to the affected region and hyaluronidase injected according to a protocol published by Glaich et al.⁴

The use of botulinum toxin type A for brow lifting and shaping has been advanced by detailed descriptions by several authors, including Alastair and Jean Carruthers.⁵ The key to treating the brows is understanding the temporal fusion plane and the various forces that countervail vectors of pull on the brow. The lateral boundary of the frontalis muscle is at the junction of the temporal and frontal bones (the temporal fusion plane). Injection into the lateral third of this muscle will relax the frontalis and thus slightly lower the lateral brow at rest. Conversely, injection into the medial aspect of the frontalis muscle, sparing the lateral component, allows the lateral brow to elevate because of unopposed lateral frontalis baseline activity, even at rest. This effect may be enhanced by injecting a small dose (3–6 U) of botulinum toxin type A into the orbicularis oculi muscle where the muscle pulls the lateral brow inward and downward. This point may be located by asking the patient to close his or her eyes tightly. For patient satisfaction, it is beneficial to ensure that women retain the arched brow associated with a youthful, feminine appearance and that men have a more horizontal-appearing brow.

For brows that cannot be adequately shaped with botulinum toxin type A alone, fillers may be used for enhancing the brow lift. Injecting a small dose (approximately 0.2 mL) of Restylane, Hylaform, CosmoDerm, or CosmoPlast® directly below the lateral third of the brow may significantly affect the fill in of redundant skin in a sagging brow-lid complex. Before injecting soft tissue augmentation agents into the brow, careful preoperative evaluation is warranted. Patients with prominent brow ridges should be approached cautiously because these patients have a tendency to look worse if more than a

trivial amount of filler is injected in the brow area. When injecting these agents into this area, caution must be used to avoid overcorrection and the creation of a “Cromagnon” brow, which is not satisfactory to patients seeking to enhance their appearance.

The medial brow also may be injected with botulinum toxin type A to treat forehead wrinkles. Brow rhytides are caused primarily by the actions of the frontalis muscle, which may be composed of either 2 bellies or a more unified band of muscle. Patients with a bifurcated frontalis muscle do not need treatment in the medial aspect of the brow, whereas patients with a uniform frontalis muscle do need treatment medially. In most patients, the degree to which medial musculature is present may be appreciated on palpation. In many cases, patients with a bifurcated frontalis muscle have less prominent horizontal lines in the central forehead; occasionally, these lines are angled downward into a central “V.” Some patients with static rhytides in this area require gentle treatment with a soft tissue augmentation agent that is intended for superficial placement. Such agents include CosmoDerm (in the United States) and Restylane Touch (Fine Lines), Juvéderm®, or Hylaform Fine Line (in Europe and Canada).

Treatment of crow's feet with botulinum toxin type A also is an important aspect of upper face rejuvenation. The muscle involved in this injection is the orbicularis oculi. Treatment typically involves injecting approximately 10 to 15 U of botulinum toxin type A into each lateral ocular area. Injections are made into the superficial dermis (as if one were raising a wheal) to avoid inadvertent vessel trauma and thus decrease the risk of bruising. Typically, 3 to 5 injections are made on each side of the face, with care taken to remain at least 1 cm lateral to the lateral aspect of the orbital rim. There are several patterns of musculature in this area, ranging from superior or inferior predominance to a more even fan-shaped distribution of the crow's feet. In addition, many patients do not have the same pattern on each side of the face; wrinkles in the left crow's feet area typically are more prominent in patients who squint while driving. When treating this area, it also is important to recognize and discuss with patients that some wrinkles will not abate entirely with botulinum toxin type A treatment alone. Some creping of the skin inferiorly often will persist. Some patients may benefit from careful placement of fillers (eg, CosmoDerm I or II, depending on the thickness of the skin; CosmoDerm I is the preferred choice for patients with thin skin) to help synergistically soften these lines as well. Caution is warranted to avoid overzealously moving inferior crow's feet lines toward the malar eminence because of the risk of unwanted

toxin spreading to the zygomaticus muscle complex and causing an asymmetric smile. This means that patients often will retain some of the inferiormost portions of their periocular wrinkles, a condition that should be explained to patients prior to the procedure.

Softening the infraorbital musculature and increasing the aperture of the eye may result in a more youthful and lively appearance. This softening may be accomplished by injecting botulinum toxin type A into the lower eyelid, as described by Flynn et al.⁶ Additionally, this softening may be accomplished by injecting 2 to 4 U of toxin 3 mm below the ciliary margin in the middle pupillary line.⁶ It is important that the injector snap test the eyelid to ensure that the lower eyelid retains sufficient resiliency to tolerate this procedure. Careful patient selection is important with this technique. Again, these injections do not alleviate creping skin lines of the lower eyelid. The injections are intended to relax the hypertrophic orbicularis oculi muscle at the lower eyelid and potentially open the aperture of the eye, which is becoming increasingly popular among Asian patients. As with any injection into or around the eyelid, it is prudent to approach the eye laterally to avoid puncture of the globe by the needle if the patient inadvertently moves. It also is prudent to ensure that patients avoid distractions during the procedure—particularly those undergoing infraorbital injections.

Many patients who receive botulinum toxin type A injections in the upper face have prominent “bunny lines” at the proximal lateral nasal sidewall. These lines look incongruous compared with the relaxed, softened, and youthful forehead, glabella, and crow’s feet seen after botulinum toxin type A treatment. Upper face rejuvenation that stops suddenly on the bridge of the nose is avoided by treating the nasalis muscle with botulinum toxin type A. This injection is easily performed by administering 2 to 4 U on each side of the nasal bridge. Care should be taken to inject the nasal sidewall rather than the nasolabial junction to avoid diffusion, which will impair function of the lip elevators, including the levator labii superioris alaeque nasi muscle. Wrinkles on the nose that are inadequately treated with botulinum toxin type A may be filled with filler agents such as CosmoDerm.

FACIAL REJUVENATION WITH FILLERS

In some cases, rhytides may not be amenable to treatment with botulinum toxin type A. These patients should be treated with soft tissue augmentation. Since 1982, when Zyplast was approved, the number of available fillers has risen markedly. There are now hyaluronic acid fillers, collagens, volume enhancers (ie, Sculptra®), permanent fillers (ie, off-label silicone agents), semi-permanent fillers, and others. We believe that cosmetic

practitioners should choose a few fillers and become proficient in their use.

Less frequently, we use fillers in the forehead and crow’s feet areas of motivated patients to fill imprinted lines that do not resolve with botulinum toxin type A injection alone. In such instances, we use soft tissue fillers such as CosmoDerm, Restylane, Captique, and Hylaform to avoid lumps and bumps. Until the Fine Line versions of these hyaluronic acid agents are available in the United States, we advocate using a 32-gauge needle in the forehead and crow’s feet areas as well as for imprinted vertical lip lines—if not using CosmoDerm. Typically, these imprinted lines are treated with superficial injections using a linear threading or serial puncture technique.

Sculptra (poly-L-lactic acid) is a volume enhancer that has particular utility for rejuvenation of the mid and lower face. Currently, it is approved by the US Food and Drug Administration for human immunodeficiency virus–related facial lipoatrophy but not for general cosmetic use. Its method of action is different from that of other agents presently in use because this filler stimulates collagen production. Collagen fibers have the capacity to tighten the skin and reposition the mid face. Injections into the zygomatic arch may dramatically affect the mid face as well. These injections are made at a submuscular or possibly a periosteal level using a depot injection technique. For this indication, we recommend dilution with 5 mL of sterile water (reconstituted for at least 6–8 hours) before injection followed by 1 mL of lidocaine. Repeat injections spaced 4 to 6 weeks apart are usually advised. Sculptra is also useful for rejuvenating the temporal region in patients who have lost volume in this area. The dilution is the same as for zygomatic treatments, but the volume typically injected is approximately 0.5 to 1.0 mL on each side of the face.

Other agents used for zygomatic arch injections include Restylane, Hylaform Plus, and Radiesse™ in the United States, and Juvéderm and Restylane Perlane® in Europe and Canada. Studies with Radiesse are under way to determine its long-term value for this indication. Restylane Perlane has been used for this indication for many years and performs well in this area. Each of these materials may be injected into the area of the zygomatic arch in a pattern that radiates superolaterally toward the zygomatic arch, with marked improvement of mid face ptosis. An added benefit of this injection is that the nasolabial folds frequently diminish as the facial ptosis is corrected.

One cardinal sign of the aging face is the hollowing of the infraorbital ridge (the medial portion of which is known as the *tear trough*). Restoring a youthful appearance to this infraorbital hollow can produce a remarkable

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change in periocular aesthetics. Various materials are useful for injecting into the tear trough and surrounding areas. Soft collagens such as Zyderm® or CosmoDerm may be used here in addition to hyaluronic acid products such as Restylane. We recommend a lateral approach with small volumes of filler using a linear threading technique in a submuscular plane. Injection into this area usually results in swelling or bruising for as long as 10 to 14 days, so we encourage our patients to not only avoid strenuous activity but also to discontinue using potentially blood-thinning agents (eg, aspirin, nonsteroidal anti-inflammatory drugs, vitamins, herbal supplements) at least 1 week before treatment. This is the only site to which we apply ice before treatment to help minimize bruising and swelling. The ice changes the skin turgor on entry of the needle; however, the submuscular intended plane is unaffected in the desired placement of the product.

CONCLUSION

The upper face is uniquely amenable to cosmetic procedures. Botulinum toxin type A has ignited interest in this area, and newer fillers, lasers, and thread lifting techniques have enhanced the ability of cosmetic practitioners to “turn back the clock.” Selective use of botulinum toxin type A and fillers may substantially rejuvenate the upper face. Newer technologies and techniques are likely to continue this trend.

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