

Coupling Advanced Injection Techniques for Cosmetic Enhancement

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The dermatologic industry is at a major crossroads when it comes to cosmetic practices, as there has been a massive infiltration of unregulated providers administering cosmetic treatments without the physical supervision of or direction from board-certified physicians. With botulinum toxin type A and injectable fillers now being commonly accepted by patients as first-line therapy instead of many surgical options, dermatology practices must expand their customization of treatments and training in areas beyond the 3 most basic injection sites—forehead, crow's-feet, and glabella—to be successful.

Since 1982, clinical indications for botulinum toxin have been expanded. It was not until 1987 that cosmetic use of botulinum emerged as a result of the study of Carruthers and Carruthers,¹ who noted a softening of glabellar lines in patients whose blepharospasm and strabismus were treated with the toxin.

Over the past decade, many injectable fillers that both improve wrinkles and enhance volume without the need for skin testing prior to treatment have come to market. Restylane has dominated the hyaluronic acid filler market in the United States since being introduced, and another hyaluronic acid filler, Juvéderm, was recently released and is increasing in market share. Other commonly used fillers well known among providers and patients include calcium hydroxylapatite, poly-L-lactic acid, and purified human-based collagen.

It is now becoming very common to combine both botulinum toxin type A and injectable fillers in similar treatment

areas of the face, an approach that we have termed *coupling*. There are 2 main reasons for coupling. First, the combined use of botulinum toxin type A and fillers appears to increase the longevity of the tissue dwell time of the filling agent.¹ Second, encasing the filler with botulinum toxin type A greatly impacts the overall results, or the finished look, for the patient. Patients expect this finished look after treatment by a cosmetic dermatologist. Undoubtedly, patients whose expectations are met are more likely to be satisfied, to refer other patients, and to return for further treatment.

COUPLING THERAPIES

Understanding facial aging begins with a thorough appreciation of facial morphology over time. In 2000, Donofrio² evaluated the fat distribution of the aging face through 3-dimensional topography, demonstrating distinctive phenotypic presentations of the face throughout life. It is now generally accepted that to restore youthfulness, volume must be addressed. One need only look at children to observe the convexity of their temples, cheeks, and lateral brows. Addressing just a wrinkle without treating structural loss in the aging face is a superficial and suboptimal approach.

In addition, the most forward-thinking practices today focus on relaxing the pull of muscles in a negative direction while restoring volume. In this way, a more youthful look can be created in patients without making them appear overly “done.” Wrinkles are prevented from

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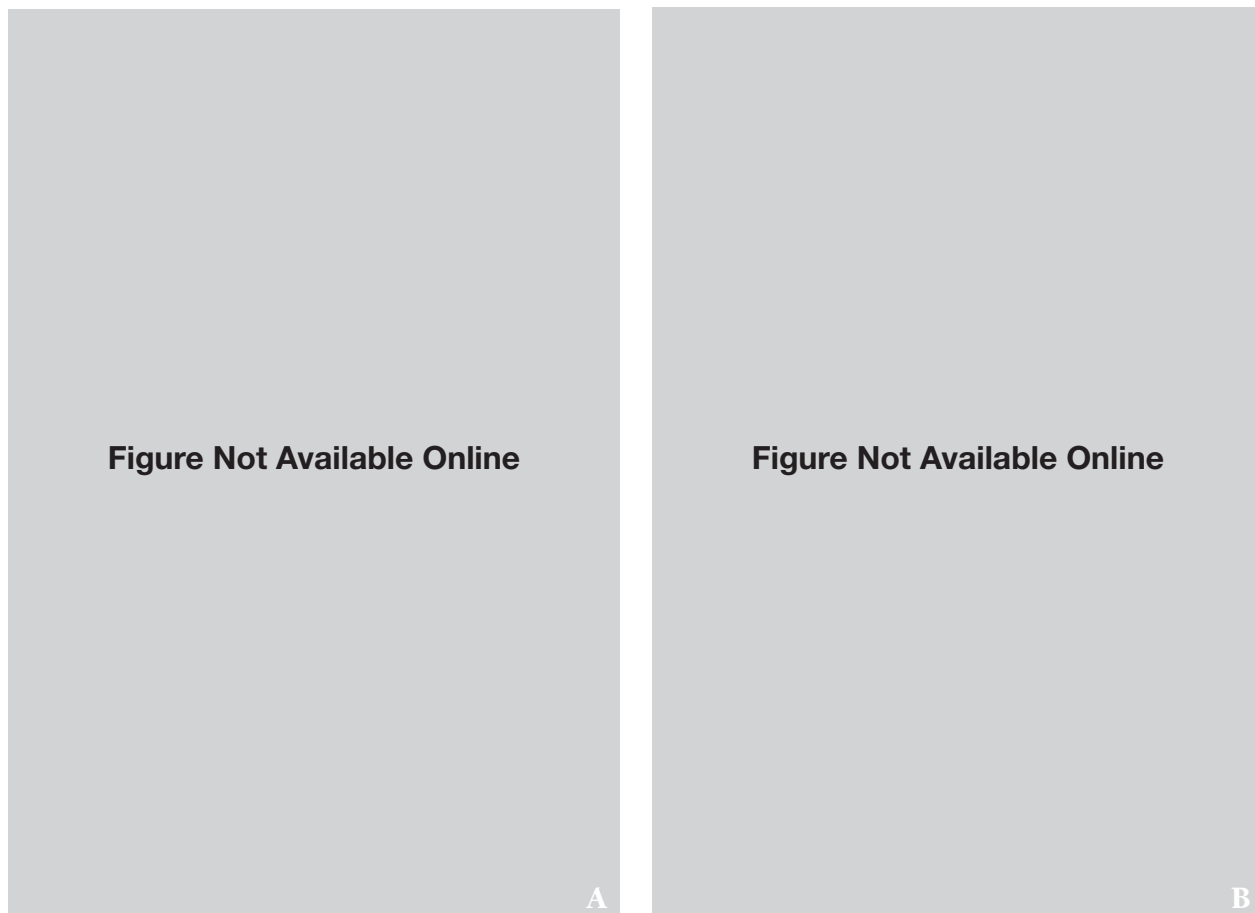


Figure 1. Patient before (A) and after (B) treatment of tear trough deformity and malar fat pad descent with a combination of botulinum toxin type A and injectable filler.

forming, and patients are given a relaxed, satisfied appearance.³ A skilled injector will often couple therapies to optimize outcomes; the combination of agents becomes the injector's insignia. There is nothing routine about these injection methods, and, in truth, the skill sets of the most attentive injectors may not be inimitable.

Despite the difficulty in reproducing injection methods, there are basic, generally accepted guidelines that can be followed to achieve more easily reproducible results. These guidelines are the building blocks for a more refined perspective. Following are some traditional approaches to treating common cosmetic areas and a few coupling approaches that we hope help refine your treatment strategy.

BROW-LIFT

Traditional Approaches

Traditional approaches are primarily surgical options. Many different surgical techniques have been employed to raise the brow: endoscopic, coronal, trichophytic, transblepharoplasty, mid-forehead crease, temporal, and direct brow-lifts. Unfortunately, surgical brow-lifts elevate

the tail of the brow but fail to restore the anterior projection of the lateral brow commonly lost through atrophy of the lateral brow fat pad. The young face has substantial fullness around the superior orbital rims, whereas the aging face loses its anterior projection, with a resultant displacement of the skin inferiorly.⁴ Autologous fat augmentation has been the mainstay for correcting this volume loss in the past. However, these traditional surgical approaches carry increased risks of hematoma, fat necrosis, infections, vascular occlusion (including blindness and cerebral vascular accident), and the formation of cysts.⁵

Alternative Approach

Botulinum toxin type A and fillers complement each other well to achieve a cosmetically pleasing lateral brow-lift while also restoring anterior projection to the lateral brow fat pad. Fillers are more convenient and less time consuming to inject than the repeat treatment sessions needed with fat transplantation.

Botulinum Toxin Type A—In 1999, Huilgol et al⁶ reported raising the eyebrows with botulinum toxin type A. In

2006, Glaich et al⁷ described an approach for achieving a consistent botulinum toxin type A brow-lift while minimizing the opposite effect of brow ptosis. In this approach, the patient is asked to raise the brows to determine the muscular insertion point at the bony temporal fusion line of the forehead. The patient is then asked to squint; this helps to determine the point of maximum contraction of the superolateral fibers of the orbicularis oculi muscle. Four to 5 units of botulinum toxin type A are injected into these fibers, making sure to stay lateral to the temporal fusion line. When addressing the brows and retention of the filler, this zone is surrounded with concurrent botulinum toxin type A treatments of the crow's-feet and glabellar complex. One should minimize or refrain from treating the frontalis muscle when attempting to achieve a brow-lift, as this will weaken the brow elevators. Although 20 to 40 U of botulinum toxin type A injected into the glabella alone can also lead to lateral eyebrow elevation of 1 to 3 mm as a result of increased muscle tone in the lateral and superior muscle fibers of the frontalis, the best results are achieved when injecting botulinum toxin type A to the region surrounding the lateral brows.⁸

Injectable Fillers—Hyaluronic acid products do well to augment the brow region. Calcium hydroxylapatite is also gaining acceptance for use in this area. The needle is inserted in a superoinferior direction, entering at the level of the brow, and injected inferiorly in the subdermal plane toward the hairless inferior brow zone. Generally, only the lateral half of the brow is filled. The volume injected should be creatively tapered to reproduce the normal contour of the lateral brow fat pad: less product used medially and more product used laterally. The lateral brow fullness should be nearly contiguous with the temporal region, with no distinct step-off.⁹ The amount of filler used is case dependent, but most patients require approximately 0.5 cc per side. Studies to determine the ideal brow position have shown the preferred brow height to be at or just beneath the orbital rim medially, with the highest point of the brow, or apex, being located lateral to a vertical line made through the lateral limbus.¹⁰

What to Watch For—Be conservative when attempting to give elderly patients or those with ptotic lateral brows a botulinum toxin type A brow-lift.⁶ Injection at the level of the lateral canthus may weaken the lateral fibers of the frontalis muscle and depress the lateral brow.

When injecting fillers, know the underlying anatomy to avoid penetrating the orbital septum, the supraorbital vessels, or both, which can result in retrobulbar hematomas or emboli. Document any eyebrow asymmetry before injecting, and watch for irregularities from the uneven placement of product after injecting. Overcorrection will impart an unnatural “Cro-Magnon” appearance to the

brows. Also, in patients with deep-set eyes, overfilling and overraising the brows can accentuate the supraorbital rims, resulting in an emaciated look.⁹ Patients with excessive brow ptosis and dermatochalasis may initially be treated best with surgical brow and lid corrections. Premature treatment with fillers in these cases could create a “slumping mass” that hangs.

TEAR TROUGH DEFORMITY

Traditional Approaches

Most practitioners accept the tear trough to be the hollowed groove overlying the inferomedial orbital rim and occasionally extending across the central mid cheek in a transverse direction. Tear trough deformities are thought to be secondary to malar fat pad descent, hypoplasia of the zygoma, and a relaxing of the Lockwood ligament. Traditional approaches for treatment include alloplastic surgical implants¹¹ and autologous fat replacement techniques, including lipostructure,¹² fat autograft muscle injection technique,¹³ fat rebalancing,¹⁴ and surgical fat repositioning.¹⁵ Mesotherapy has also been suggested.

Alternative Approach

Treating the tear trough deformity through a combination of botulinum toxin type A and injectable filler is especially rewarding to the patient and injector alike, particularly when also addressing the malar fat pad descent (Figure 1).

Botulinum Toxin Type A—Botulinum toxin type A is injected into the nasalis muscle and crow's-feet to border the filler and preserve its longevity, resulting in a longer-lasting, relaxed, and approachable look. It is important that the injector be familiar with the multiple variations of the nasalis complex to adequately and more precisely treat the nasalis muscle.¹⁶ Mastery of injection technique in the nasalis complex distinguishes an experienced injector from a less experienced one. Two units of botulinum toxin type A are often placed subdermally 3 mm inferior to the lid margin to improve lower-eyelid wrinkles. Flynn et al¹⁷ demonstrated that lower-eyelid wrinkles show greater improvement when crow's-feet are also treated. Ultimately, the goal is a smooth appearance. Multiple treatment sites facilitate this appearance.

Injectable Fillers—Most practitioners inject the filler product directly onto the orbital rim, although meticulous intradermal injections have also been described. Tapering the injection volume with less product centrally and more laterally allows for a smoother, more natural look. Placing injections in 0.1- to 0.2-cc aliquots in 3 to 5 injection sites is usually sufficient. The filler can then be nicely molded afterward. Control of the plunger and the feel of needle depth are critical to performing this treatment well. Too superficial an injection will leave

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obviously visible nodules, whereas mid-level injections could predispose to intramuscular placement and result in long-lasting edema that takes months to resolve. The treatment effect is much more dramatic when any adjacent submalar-midface soft tissue deficiency is addressed. Not only does this create a smoother tear trough, but it also provides for a rounder, fuller, and more youthful contour of the cheek (Figure 1). It is recommended to approach from an inferior to superior direction 0.5 cm above the nasolabial folds, injecting toward the tear trough in a fanning technique. One can then crosshatch in an opposite direction if needed. Volumes of 0.5 to 1.0 cc are generally enough to create a more contiguous, fresher look between the treatment areas.

What to Watch For—For treatment of lower-eyelid wrinkles, botulinum toxin type A should not be used in quantities greater than 2 U per lower lid, nor should it be injected too deeply, in order to minimize the risk of affecting the extraocular muscles.¹⁸ Higher doses lead to unattractive results and adverse effects, including eyelid edema, incomplete sphincter function, and keratoconjunctivitis sicca. Goldman¹⁹ reported a case of festooning to the infraocular area after injection with botulinum toxin type A in a patient with a posttranstarsal lower-lid blepharoplasty.

Regarding fillers, hyaluronic acid products placed too superficially will be visible as blue nodules in the skin (Tyndall effect). A papillary dermal injection technique may yield very favorable results, although it is very operator dependent and is associated with a much higher risk of complications than other injection techniques. Similarly, if not evenly tapered during the injection, too much product deep in the tear trough may result in unsightly cylindrical masses or linear ropes, particularly visible when the patient smiles. Also, know the bony landmarks (inferior orbital rim) to avoid undue placement, which may predispose to piercing of the orbit or the orbital septum.

NASAL RECONTOURING

Traditional Approaches

Surgical rhinoplasties were the second most commonly performed plastic surgical procedure in the United States in 2006, with more than 307,000 cases reported, second only to breast augmentation.²⁰ Other traditional options for nasal correction include dermal grafts and augmentation through alloplastic implants.¹¹

Another Approach

Many patients are dissatisfied with the appearance of their noses but are reluctant to resort to surgery. For these patients, injectable fillers can be used to enhance the appearance of the nose, whether to improve nasal contour defects or redesign the general shape. Botulinum toxin

type A is used to surround and preserve the longevity of the placed filler. Figures 2 and 3 show results of nasal root augmentation and nasal tip augmentation, respectively.

Botulinum Toxin Type A—Recontouring occurs largely at either the nasal root or the nasal tip. In the event of nasal root augmentation, botulinum toxin type A is coupled with the filler to treat the nasalis muscle (“bunny lines”) and the glabellar complex. Although the nose is not typically thought of as a moving structure, there are many surrounding muscles that can potentially aggravate a placed filler while increasing its rate of absorption: orbicularis oculi, nasalis, levator labii superioris alaeque nasi, depressor septi, and zygomaticus major and minor. Tamura et al¹⁶ describe variations in nasal wrinkles and suggest different injection points for these muscles. They also demonstrate that 60% of patients undertreated had persistent nasal rhytides.

Meticulous familiarity with the surrounding muscular anatomy allows for more precise placement of botulinum toxin type A to ensure the complete treatment of this area.¹⁶ Doses of botulinum toxin type A used in the mid and lower face are generally lower than those used in the upper face, but knowing optimal placement locations is essential.²¹

On the other hand, for correcting nasal tip defects, botulinum toxin type A injections into the nasalis and depressor septi alone are usually sufficient to help preserve the filler without treating the glabellar complex.

Injectable Fillers—When treating a shallow nasal root, use a crosshatching technique as the foundation for volumizing this area. Often, full correction can be achieved through mid-dermal injections only. Hyaluronic acid fillers are popular, although calcium hydroxylapatite is becoming more widely used. Deeper nasal defects will likely need subdermal augmentation as well (Figure 2B). However, hyaluronic acid fillers used in this location tend to dissipate rather quickly in the subcutaneous plane, so other filler options that are longer lasting should be entertained. To address the nasal tip, in particular the alar cartilage ridges, hyaluronic acid fillers work impressively well (Figure 3). Dimples in these zones can be fully corrected to become a smooth convex nasal tip by injecting into the mid-dermal plane. Corrections of these normal variations will often elicit emotional displays of disbelief and satisfaction from patients who have waited years to make their noses “better.”

What to Watch For—Be cautious about injecting botulinum toxin type A too posteriorly along the nasal sidewall, as unnecessary denervation of the levator labii superioris alaeque nasi will produce ipsilateral upper-lip ptosis.

When injecting fillers, it is important to keep in mind that not all defects are correctable. Using an artist’s eye to “see” the final result before starting to inject is essential

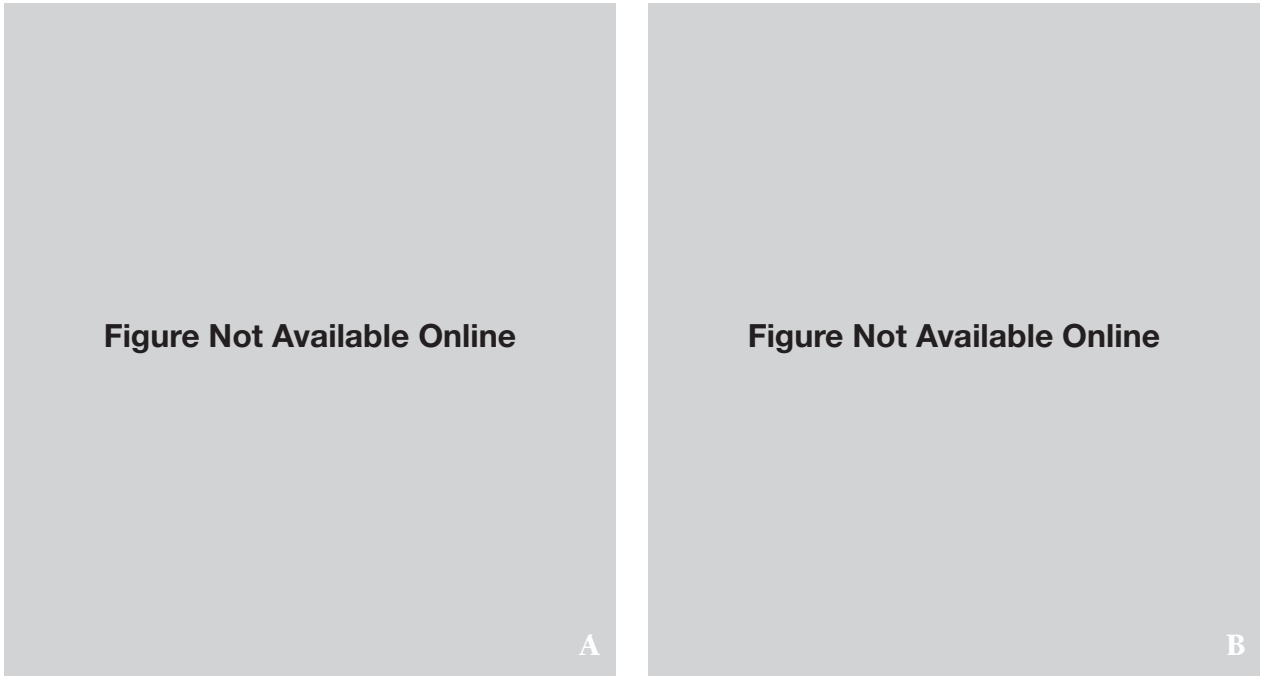


Figure 2. Patient before (A) and after (B) nasal root augmentation with botulinum toxin type A and injectable filler.

to prevent unwanted effects. For example, augmenting a nasal root concavity in a patient with a very high dorsal hump can create an abnormal appearance by displacing the nose too superiorly into the glabellar complex. When filling the nose, it is also important to be aware of important surrounding vessels (eg, the angular arteries and veins). Also, one may find that too much product

placed subdermally will migrate or become absorbed rather quickly.

EXPANDING TREATMENT AREAS

In addition to coupling therapies, dermatology practices must commit to training and expanding therapies beyond the basic injection sites. Other anatomic areas to

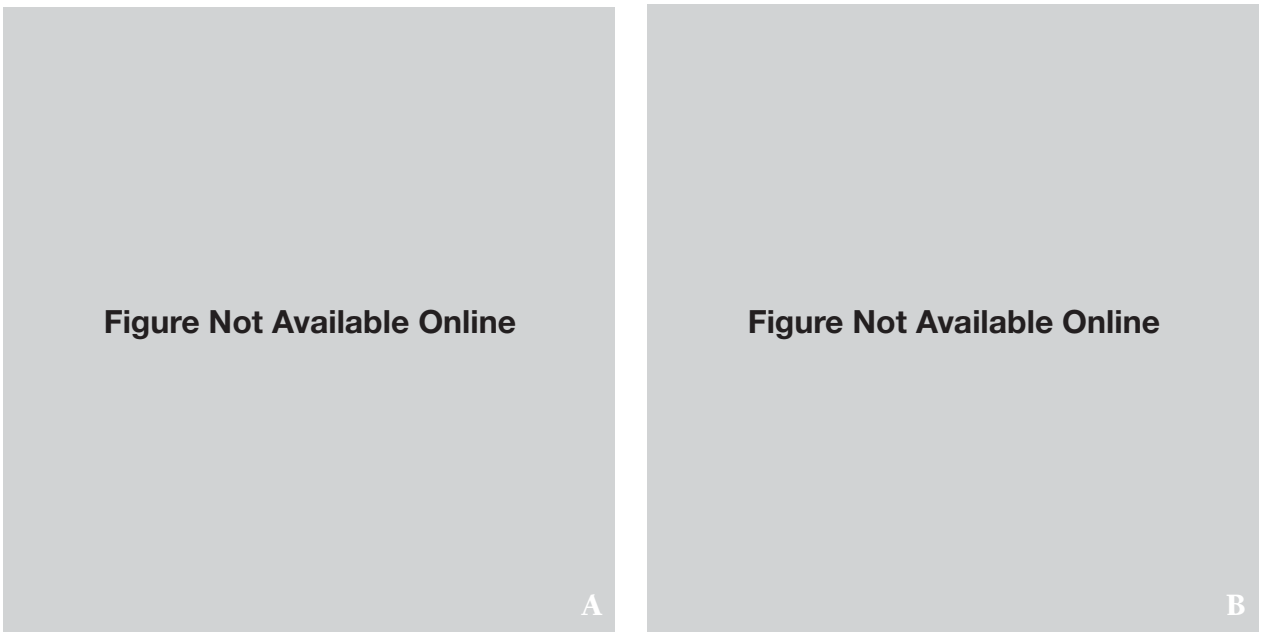


Figure 3. Patient before (A) and after (B) nasal tip augmentation with botulinum toxin type A and injectable filler.

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consider for treatment when coupling injectable fillers with botulinum toxin type A²¹⁻²⁵ are: oral commissure filling²⁶ (botulinum toxin type A into the depressor anguli oris muscle); perioral rhytides²⁷ (botulinum toxin type A into the orbicularis oris muscle); lip enhancement (botulinum toxin type A into the orbicularis oris, depressor anguli oris muscles, or both); chin augmentation²⁸ (botulinum toxin type A into the mentalis, platysma, depressor anguli oris muscles, or all); central cheek augmentation (malar fat pad descent) (botulinum toxin type A into the nasalis and lateral orbicularis oculi muscles); prejowl sulcus expansion (botulinum toxin type A into the mentalis, platysma, depressor anguli oris muscles, or all); and horizontal neck lines (botulinum toxin type A into the platysma).

SUMMARY

Administering only one therapeutic modality to different areas of the face will not produce the results that patients are expecting. The most effective way for a dermatology practice to increase the longevity of its therapies and enhance the overall results is to couple botulinum toxin type A and appropriately selected injectable fillers. Through advanced study and training of techniques, treating areas beyond the forehead, crow's-feet, and glabella with this coupling methodology will increase patient satisfaction, which is directly related to retention, referrals, and a more profitable and personally rewarding practice.

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