Cosmetic Injection Techniques

A Text and Video Guide to Neurotoxins and Fillers

Second Edition

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Online at MedOne Videos

Thieme

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Second Edition

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127 illustrations

Thieme
New York • Stuttgart • Delhi • Rio de Janeiro

Executive Editor: Stephan Konnry
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Library of Congress Cataloging-in-Publication Data
Names: Kontis, Theda C., author. | Lacombe, Victor G., author.
Title: Cosmetic injection techniques : a text and video guide to neurotoxins and fillers / Theda C. Kontis, Victor G. Lacombe ; Sarah E. Faris, medical illustrator ; foreword by Jean D. Carruthers.
Description: Second edition. | New York : Thieme, [2019] | Includes bibliographical references and index.
Identifiers: LCCN 2018051037| ISBN 9781626234574 (hardback : alk. paper) | ISBN 9781626234581 (e-book)
Subjects: | MESH: Cosmetic Techniques | Face–surgery | Injections, Subcutaneous–methods | Neurotoxins–therapeutic use | Dermal Fillers–therapeutic use | Face–anatomy & histology
Classification: LCC RD119.5.F33 | NLM WE 705 | DDC 617.5/20592–dc23
LC record available at https://lccn.loc.gov/2018051037

Thieme Publishers New York
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+49 [0]711 8931 421, customerservice@thieme.de

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A-12, Second Floor, Sector-2, Noida-201301
Uttar Pradesh, India
+91 120 45 566 00, customerservice@thieme.in

Thieme Publishers Rio de Janeiro, Thieme Publicações Ltda.
Edifício Rodolpho de Paoli, 25º andar
Av. Nilo Peçanha, 50 – Sala 2508,
Rio de Janeiro 20020-906 Brasil
+55 21 3172 2297/+55 21 3172-1896
www.thiemerevinter.com.br

Cover design: Thieme Publishing Group
Typesetting by DiTech Process Solutions

Printed in India by Replika Press Pvt. Ltd. 5 4 3 2 1

ISBN 978-1-62623-457-4

Also available as an e-book:
eISBN 978-1-62623-458-1

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I dedicate this second edition to David and Alexandra, for their love and support; to Mom, my greatest fan; and to the memory of my father, my angel.

– TCK

I dedicate, with love, this second edition to my wife, Alice, and to my children, Victoria and Max: you all mean the world to me.

– VGL

We jointly dedicate this book to our patients, whose trust and feedback allow us to improve and refine our injection techniques.

– TCK and VGL

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▶ *denotes a chapter with video content on MedOne*

Foreword

Dr. Theda C. Kontis and Dr. Victor G. Lacombe have now published their combined experiences in this second edition of their practical handbook, *Cosmetic Injection Techniques*. The first edition was not only a bestseller but also had such quality videos that they were the most accessed videos in all of Thieme's library. The authors have again done a superb job in making facial tissue "transparent" for everyone interested in this increasingly important subject area. New subjects covered include the injectable consultation, choosing the right filler, neurotoxin and filler treatment for the décolleté, filler to the mandibular angle and jawline, the de Maio technique for midface volumization, neurotoxins for sweaty scalps and foreheads, fillers for fine lines, and gender-specific indications/injections. With the new use of sodiumdeoxycholate there is a further section on submental fat injections.

Cosmetic surgeons have the privilege of using transcutaneous treatments to restore patients' faces to their natural best. This book with its videos is a labor of love written by highly respected authors who discuss variations in techniques from the East and the West Coasts of the United States. I recommend it to all readers who choose to review their treatment plans from start to finish and who value learning from experts who teach with passion as well as knowledge.

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Preface

I hear and I forget.
I see and I remember.
I do and I understand.
– attributed to Confucius (551–479 BCE)

We are pleased to present this revised second edition of *Cosmetic Injection Techniques: A Text and Video Guide to Neurotoxins and Fillers*. This new edition includes new fillers and new techniques as well as information on fat-dissolving injections. The accompanying videos have also been updated. Our readers found the first edition to be a handy quick-reference guide as well as a guide to new injection techniques. Patients in the office have enjoyed looking through this text so they may better understand the injections they are about to receive, and injectors have found the diagrams to be useful for patient education.

The number of non-surgical facial enhancements has continued to skyrocket since our first edition was published. As a consequence of patient demand, many physicians, nurses, and physician assistants have begun to treat such patients. This book, with its accompanying videos, is meant to be a guide and quick reference for the many professionals and paraprofessionals who have become facial injectors. It is not, however, a training manual for the naive injector. We highly discourage the novice injector from using this book as a primer on injections. In our opinion, nothing can replace training that is offered by courses and by one-on-one preceptorships.

This book is designed to augment the knowledge of a beginner injector and to train the experienced injector in how to perform "finesse" injections. The face can be shaped and minor irregularities and asymmetries improved by performing the techniques we describe. In addition, we hope to help the injector "look through" the skin to the underlying anatomy. This will help with both the targets of injection and the important structures to avoid. The authors are aware that there is more than one way to treat a given anatomic region. It was our aim, by having authors from two very different locales (the East and the West Coasts of the United States) and different practices, to describe the "best" injection technique by comparing our techniques of injection. In cases where the authors' techniques differ markedly, both techniques are presented.

The products described herein are all U.S. Food and Drug Administration (FDA)-approved fillers and neurotoxins; however, most of the techniques described are considered "off-label" uses of the products. The doses of products described serve as a general guide for injection. While the utmost care was taken to assure the accuracy of the dosages listed, we urge injectors to use their best judgment or experience in the unlikely event that a misprint suggests an inappropriate dose. The comments we make about specific products are often our opinion derived from clinical observation. Others may have different observations clinically, and we respect these variations in clinical practices and results.

We realize that this book will be utilized by injectors with differing skill levels. In an attempt to promote safety in the use of these products, we have devised a rating scale for each technique. Each injection technique is evaluated in terms of difficulty for the trainer, risks involved in performing the injection, and patient satisfaction with the results. Appendix A lists the chapters by degree of difficulty, as a cross reference for injectors who would like to safely advance to more challenging injection techniques. The rating system is summarized as follows:

Degree of difficulty for the injector:
- ● Easy
- ●● Intermediate
- ●●● Advanced
- ●●●● Expert (only expert injectors should attempt these injections)

Patient satisfaction with the procedure:
- ● Variable results, results may be subtle
- ●● Good results, patients usually pleased
- ●●● High patient satisfaction, predictable results

Risks of complications:
- ● Low
- ●● Medium
- ●●● High

The products described in this book include Botox, Dysport, Xeomin, Restylane, Restylane Lyft, Restylane Silk, Restylane Refyne, Restylane Defyne, Juvéderm Volbella, Juvéderm Vollure, Belotero, Radiesse,

Sculptra, and Bellafill. These products are the most commonly used fillers and neurotoxins at the time this manual is being written. New products are continually being developed and may be available by the time of publication. However, because we have no experience with these new products, they are necessarily not described in this second edition. Experienced injectors, however, will be able to extrapolate the techniques and dosing strategies described in this book to newer products, if they so desire.

Disclosures: Theda C. Kontis is a speaker/trainer for Allergan and for Galderma. Victor G. Lacombe is a speaker/trainer for Allergan and for Galderma and served as a principal investigator for Juvéderm Voluma.

Disclaimer: The material presented is a compilation of the clinical experiences of the authors. Off-label uses of FDA-approved products are described. A qualified health care professional should be consulted before using any therapeutic procedure discussed. Readers should verify all information and data before treating patients or employing any therapies described in this publication.

Acknowledgments

The authors believed that a simplified, well-illustrated, and thorough guide to injectables was needed in the medical literature. The editors at Thieme Publishers, in particular Timothy Hiscock, trusted our vision, and in the first edition we produced one of the best-selling books and most accessed videos in Thieme's collection. We were delighted when asked to produce this second edition.

We appreciate the editorial support and assistance from J. Owen Zurhellen and Sue Hodgson at Thieme, who kept the project moving forward. The quality of this book has much to do with the fine artwork of our medical illustrator, Sarah E. Faris, who graciously agreed to continue the work in this edition. Her attention to detail and artistic skill made this textbook one that is not only thorough but easy to read and understand.

Finally, and most importantly, we thank our patients who have agreed to have their procedures filmed so that medical professionals can learn safe and effective injection techniques.

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Section I

Introduction to Injectables

I

1
The Consultation

Initial Evaluation

A combination of factors can lead a patient to visit a provider for injectable treatment or evaluation. Often it is a result of the patient looking or feeling tired, or being told that they give that impression to others. Sometimes it is the drive for youthful appearance or for simply a different look (whether that is fewer wrinkles, fuller lips, or higher cheek bones). The motivation for change may be preparation for an event that is fast approaching, like a wedding or reunion, or a longer-term goal, such as maintaining a competitive edge in the job market. All of these factors must be determined in the first discussions prior to developing the plan. The time frame for treatment and recovery, longevity of results, and patient expectations must be part of the planning.

Anatomic Considerations

The injector must have a thorough and comprehensive understanding of facial bone structure, muscle location and function, skin structure and thicknesses, as well as the location of nerve and vascular supplies to the face and neck. Greater familiarity will lead to increased comfort, sophistication, and talent with both diagnosing and treating the changes seen in facial aging. Most aging changes are a result of facial fat loss and redistribution away from key areas of the face, which leads to sagging, undesirable folds, and skeletonization. Loss of fat in the forehead and temples leads to dropping brows and hollowing of the temples. Loss of fat on the cheeks and around the eyes causes dark circles under the eyes and drooping of the malar skin, creating deeper nasolabial folds as well as hollowing, melolabial folding, and jowling. Buccal fat loss contributes to a gaunt look in the lower cheek and can create the effect of a "pouch" lateral to the mouth (which is really just a prominent modiolus due to hollowing anteriorly and posteriorly). Intrinsic changes of the skin due to solar exposure and collagen and elastin loss can accentuate these changes. Recognizing, understanding, and explaining to patients the global effects of these anatomic changes will greatly facilitate the consultation.

Consultation Techniques

A mirror placed on a desk in front of the patient (or a hand-held mirror) is used so that the patient's facial features can be analyzed, both at rest and in animation. It is important to ask patients about what bothers them the most when they look into the mirror. Sometimes the practitioner's trained eye targets an area that turns out not to bother the patient at all. Patients are happiest when we listen to and address *their* concerns first. After we discuss how we can (or cannot) improve

what bothers them, then we can help them develop a plan for total facial rejuvenation, if they so desire.

Pointing out facial asymmetries or irregularities should be done as part of the pre-injection teaching. Patients may not see their asymmetries pre-injection but will note them post-injection. Photographic documentation is essential to document the pre-injection appearance. Three-dimensional photography is another helpful tool that can be used as an objective means to demonstrate areas of concavity and asymmetry as well as skin changes.

Once the need for treatment is established, a summary of the tools available, including neurotoxins for relaxing, fillers for volume restoration, skin boosting, and line filling, is in order. Patients may have heard of the different brand names but are often ignorant of where they go, how they work, and how long the results will last. One should develop clear, concise talking points on the products used, which include safety and recovery profiles. Next, the injector should recommend the quantity of product necessary for a complete correction and a conservative estimate as to when that would need to be re-treated. This should also be provided in written estimate form to avoid any later confusion. An example would be 50 units of Botox to treat the glabella, forehead, and crow's feet, and six syringes of hyaluronic acid (HA) filler to treat under eyes, upper cheek bones, melolabial folds, lip lines, and jawline. The patient should understand that the injections can be done either all at once or in stages, as the patient's budget allows. This would complete the consultation and leave the patient well educated and not feeling like they were pressured.

Some patients will want to be injected at their initial consultation, and others will just want to develop a plan by gaining information and having their questions answered. The initial consultation can be overwhelming for a patient new to injectables. It is important to proceed slowly at first. If a patient is not a candidate for neurotoxins or fillers, be honest about it.

Precautions

The injector must listen to patients and take cues from their body language about how comfortable they are with the concept of injectables and how willing they are to proceed. Some patients are very timid and self-conscious about discussing aesthetic issues. In those cases, it is best not to overwhelm them with too many things that they did not initially seek advice about lest they be scared away. Other patients may be open to a clinician's advice as to what is available and will want to learn all that is possible. Listen carefully to patients and address their primary aesthetic concerns first.

Body dysmorphic disorder (BDD) is a syndrome that all injectors should understand. Know that BDD patients often desire our expertise: these patients have abnormal body perceptions, and small abnormalities are magnified in their mind. It is difficult, if not impossible, to please such patients, so proceed with caution. In practice, it is more likely to regret injecting someone than to regret *not* injecting them!

Additional Reading

[1] Coleman SR, Grover R. The anatomy of the aging face: volume loss and changes in 3-dimensional topography. Aesthet Surg J. 2006; 26 1S:S4–S9

[2] Crerand CE, Menard W, Phillips KA. Surgical and minimally invasive cosmetic procedures among persons with body dysmorphic disorder. Ann Plast Surg. 2010; 65(1):11–16

[3] Matarasso A, Nikfarjam J, Abramowitz L. Incorporating Minimally Invasive Procedures into an Aesthetic Surgery Practice. Clin Plast Surg. 2016; 43(3):449–457

2
The Physicians Aesthetic Coalition for Injectable Safety

The increased popularity of injectable procedures has been accompanied by an unfortunate increase in the performance of these procedures by unqualified personnel. It is the authors' concern that the use of this book by untrained individuals could produce disastrous results. The Physicians Aesthetic Coalition (PAC) was created to provide information on qualified injectors, on materials approved by the U.S. Food and Drug Administration (FDA), and on injectable training that can be obtained by qualified professionals. We direct patients and injectors to http://www.physiciansaestheticcoalition.org for appropriate information about the safe use of injectable materials.

The PAC is represented by over 5,000 board-certified members of the American Society for Aesthetic Plastic Surgery (ASAPS), the American Society for Dermatologic Surgery (ASDS), the American Academy of Facial Plastic and Reconstructive Surgery (AAFPRS), and the American Society of Ophthalmic Plastic and Reconstructive Surgery (ASOPRS). We encourage professionals to utilize the PAC website for up-to-date information about injectables and injectable safety, laws, and ethical guidelines pertaining to the purchase of injectables, research and statistics, and courses available for training in the use of injectables.

Section II

Introduction to Neurotoxins

II

3
Neurotoxins Overview

Action

Peripheral neuromuscular blocking agents.

Mechanism of Action

Botulinum toxins irreversibly bind to the presynaptic terminal of the neuromuscular junction and prevent release of acetylcholine, thereby preventing muscle contraction.

Botulinum Toxin A (BoNTA) Formulations

Botox: OnabotulinumtoxinA (BoNTA-ONA)

- 100 BU (Botox units) per vial (also contains 0.5 mg human serum albumin, 0.9 mg sodium chloride)
- Vacuum dried
- Store in freezer until reconstituted; refrigerate after reconstitution

Dysport: AbobotulinumtoxinA (BoNTA-ABO)

- 300 DU (Dysport units) per vial (also contains 0.125 mg human serum albumin, 2.5 mg lactose)
- Lyophylized
- Store in freezer until reconstituted; refrigerate after reconstitution

Xeomin: IncobotulinumtoxinA (BoNTA-INC)

- 100 XU (Xeomin units) per vial (also contains 1.0 mg human albumin, 4.7 mg sucrose)
- Lyophylized
- Store at room temperature; refrigerate after reconstitution

Neuronox

- Approved in 2004 by the South Korean Ministry of Food and Drug Safety (MFDS), manufactured by Medy-Tox Inc. (Seoul, Korea)
- Not U.S. FDA-approved in the United States
- 50, 100, and 200 U vials available (100 U contains 0.5 mg human serum albumin and 0.9 mg sodium chloride)
- Lyophilized
- Conversion ratio appears to be 1:1 with Botox
- Store in freezer until reconstituted; refrigerate after reconstitution

PurTox

- Pending FDA approval
- Similar to Xeomin without complexing proteins

Table 3.1 Comparison of Botulinum Toxin A Formulations.

Product	Year of FDA Approval	Generic Name I	Composition	Manufacturer	Similar Product Trade Names	Dosing Ratio Compared with Botox
Botox	2002	OnabotulinumtoxinA	900 kD	Allergan Inc., Irvine, CA	Botox cosmetic, Vistabel, Vistabex	NA
Dysport	2009	AbobotulinumtoxinA	500–900 kD	Medicis Aesthetics Inc., Scottsdale, AZ	Reloxin, Azzalure	2.5–3:1
Xeomin	2011	IncobotulinumtoxinA	150 kD No complexing proteins	Merz Aesthetics Inc., Franksville, WI	Xeomeen, Bocouture	1–1.5:1
Neuronox	N/A	N/A	940 kD	Medy-Tox Inc., Seoul, Korea	Meditoxin, Cunox, Siax, and Botulift	1:1
PurTox	Pending	N/A	150 kD No complexing proteins	Mentor Corp., Santa Barbara, CA		1–1.5:1
CBTXA	N/A	N/A	900 kD	Lanzhou Biologics, Lanzhou, China	Prosigne, Lantox	?

Abbreviations: kD, kilodalton; N/A, not applicable.

CBTXA

- Not FDA-approved in the United States
- The only botulinum toxin A registered with the Chinese government
- Lyophilized
- Contains 5 mg bovine serum albumin, 25 mg dextran, 25 mg sucrose per 100 units
- Conversion ratio to Botox unknown
- Store in freezer, refrigerate after reconstituted

Botulinum Toxin B (BoNTB) Formulation

Myobloc: BoNTB (rimabotulinumtoxinB)

- Solstice Neurosciences Inc., Malvern, PA
- Trade names: MyoBloc, NeuroBloc
- Minimal use cosmetically due to painful injection and limited duration
- FDA-approved only for cervical dystonia in adult

Additional Reading

[1] Flynn TC. Advances in the use of botulinum neurotoxins in facial esthetics. J Cosmet Dermatol. 2012; 11(1):42–50
[2] Nettar K, Maas C. Neuromodulators: available agents, physiology, and anatomy. Facial Plast Surg. 2011; 27 (6):517–522
[3] Moers-Carpi M, Dirschka T, Feller-Heppt G, et al. A randomised, double-blind comparison of 20 units of onabotulinumtoxinA with 30 units of incobotulinumtoxinA for glabellar lines. J Cosmet Laser Ther. 2012; 14(6):296–303
[4] Walker TJ, Dayan SH. Comparison and overview of currently available neurotoxins. J Clin Aesthet Dermatol. 2014; 7 (2):31–39

4
Neurotoxin Preparation

Package inserts for the neurotransmitters state that they should be reconstituted with nonpreserved saline (0.9% sodium chloride). However, clinical practice has determined that using preserved saline (containing benzyl alcohol) results in much less patient discomfort.

Botox, Botox Cosmetic—100 BU (Botox units) may be reconstituted with

- 1 mL preserved saline, which produces a solution of 10 BU per 0.1 mL
- 2 mL preserved saline, which produces a solution of 5 BU per 0.1 mL
- 2.5 mL preserved saline, which produces a solution of 4 BU per 0.1 mL
- 4 mL preserved saline, which produces a solution of 2.5 BU per 0.1 mL

Xeomin—100 XU (Xeomin units) may be reconstituted and used similarly to Botox, above.

Dysport—300 DU (Dysport units) may be reconstituted with

- 2.5 mL preserved saline, which produces a solution of 12 DU per 0.1 mL
- 1.5 mL preserved saline, which produces a solution of 20 DU per 0.1 mL
- 1.0 mL preserved saline, which produces a solution of 30 DU per 0.1 mL

General conversion ratios

- 1 BU = 1.0 to 1.5 XU
- 1 BU = 2.5 to 3.0 DU

Additional Reading

[1] Bass Kaplan J. The dilution confusion: easy dosing for botulinum toxins. Plast Surg Nurs. 2016; 36(1):24–27

[2] Moers-Carpi M, Tan K, Fulford-Smith A. A multicentre, randomized, double-blind study to evaluate the efficacy of OnabotulinumtoxinA (20 units) in the treatment of glabellar lines when compared to IncobotulinumtoxinA (30 units). European Masters in Aesthetic and Anti-aging Medicine, September 30–October 1, 2011, Paris

5
Instrumentation for Neurotoxin Injections

After reconstitution, botulinum toxin A (BoNTA) can be injected using a 1-mL syringe with a 30-gauge needle. Product can be withdrawn from the vial with a 20-gauge needle, and a 30-gauge or smaller needle can then be used for injection. A “No Waste” syringe with or without a Luer lock (Acuderm Inc., Fort Lauderdale, Florida, or Exelint International, Los Angeles, California) is also available that pushes the last drop of product through the needle hub. Alternatively, non-drip insulin syringes (BD Ultra-Fine Needle, Becton Dickinson, Franklin Lakes, New Jersey) may be used. These syringes are available in 0.3 and 0.5 mL and have an attached 31-gauge, 8-mm needle.

When using these non-drip insulin syringes, the needle is pre-attached. The BoNTA must be reconstituted and the vial stopper removed. Neurotoxin is drawn up into each syringe and the syringes labeled with the product name, lot number, and expiration date. The syringes are stored in the refrigerator. Because the needles are so fine and fragile, care must be taken not to hit the vial with the needle tip while aspirating the product. In addition, the utmost care is required during re-capping of the needle (prior to patient use) to prevent damage or blunting of the fine needle tip.

Fig. 5.1 Dripless 0.5 mL (left) and 0.3 mL (right) BD insulin syringes may be used for BoNTA injections. These syringes have a pre-attached 31-gauge needle.

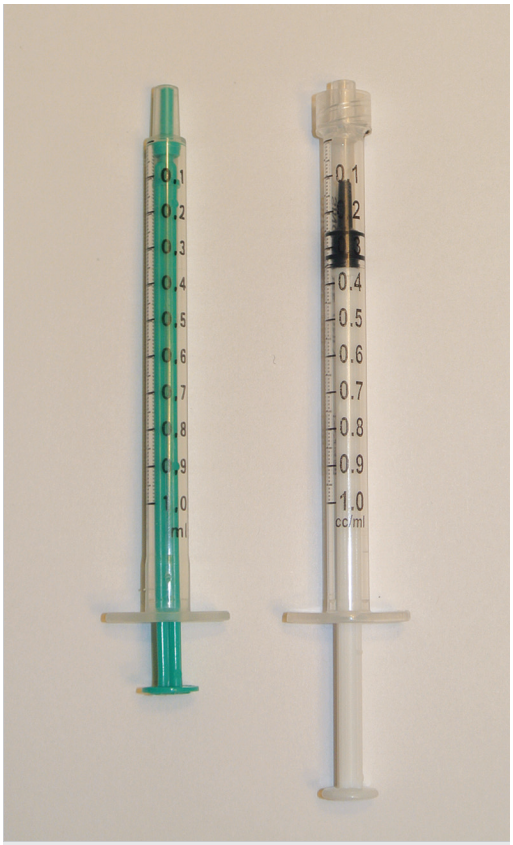


Fig. 5.2 "No Waste" syringe pushes plunger into needle hub: (left) Acuderm; (right) Exelint.

Section III

Neurotoxin Injection Techniques

III

6
Neurotoxin Injection for Glabellar Frown Lines

Difficulty: ●
Patient Satisfaction: ●●●
Risk: ●●

Indications

Neurotoxins are commonly used to treat the vertical lines between the brows. This is the only area currently FDA-approved for all BoNTA neurotoxins (Botox, Dysport, Xeomin).

Anatomic Considerations

The vertical lines of the glabella are produced by contraction of the paired corrugator supercilii muscles, and the horizontal lines are caused by contraction of the centrally located procerus muscle. The corrugators originate on the supraorbital ridge of the frontal bone and insert on the skin above the middle third of the eyebrow. The procerus muscle originates on the nasal bone and inserts onto the skin of the glabella or mid-forehead.

Although this anatomy seems straightforward, there are subtle anatomic variations that can be visualized during facial animation. We have noted two distinct patterns of corrugator positioning: either straight along the brow, or more vertically oriented in a **V**-shape. For this reason, the injector should not rely on only one technique in this area. The injector should "look through" the skin to imagine the location of the muscles and their contribution to the wrinkles produced during movement.

Injection Technique

Topical anesthesia may be used; however, this injection usually can be tolerated without anesthesia. Prior to injecting the patient, have the patient frown the brow. Attempt to look through the skin to determine the size, strength, and location of the procerus and corrugator muscles. Because the corrugator muscles insert laterally into the skin, the injector can visualize the dimpling of the skin to determine the lateral extent of the muscles.

Usual doses in this region are 20 to 30 BU (Botox units) or 50 to 80 DU (Dysport units), but injector experience with these treatments has shown that some patients can do well with as little as 10 units, and others (often men) may need substantially more.

Injections must be placed 1 cm above the superior orbital rim to reduce the risk of upper eyelid ptosis. Injections are placed in the muscle belly. Try not to

"bump" the periosteum, as this occasionally can be associated with post-injection headache.

Precautions

Injection in this area can result in an upper lid ptosis, which can be seen up to 2 weeks after injection and may last 2 to 4 weeks post-injection.

Post-Injection Instructions

There are no clinical data to suggest that giving patients post-treatment instructions decreases ptosis or improves results. However, some physicians ask their patients not to bend over, push on the injection sites, or lie down for 4 hours. They also recommend the patient not exercise that day and not actively move the injected muscles for 90 minutes.

Alternate Post-Injection Instructions

No exercise immediately after injection, as this may accentuate bruising.

Risks

Diffusion of product into the eyelid may affect the levator palpebrae superioris muscle and result in a transient ptosis.

Pearls of Injection

- Ask the patient to frown as you assess the size and shape of the muscle. ailor the treatment to the anatomy. It is important to extend the injections far enough laterally to treat the entire extent of the corrugator muscles.
- Filler injections may be necessary for deep rhytids in this region.
- Consistent retreatment of the glabella may result in the patient "unlearning" to move the brow, and thus not only improve the rhytids but also extend the time required between injections.
- Placing the thumb along the orbital rim during injection may reduce the likelihood of diffusion toward the levator palpebrae superioris muscle.

Fig. 6.1 Clinical photographs of the differing anatomy of corrugator muscles. (**a**) More horizontal muscles. (**b**) More vertical **V**-like muscles. The injector should learn to "look through" the skin to determine the anatomy.

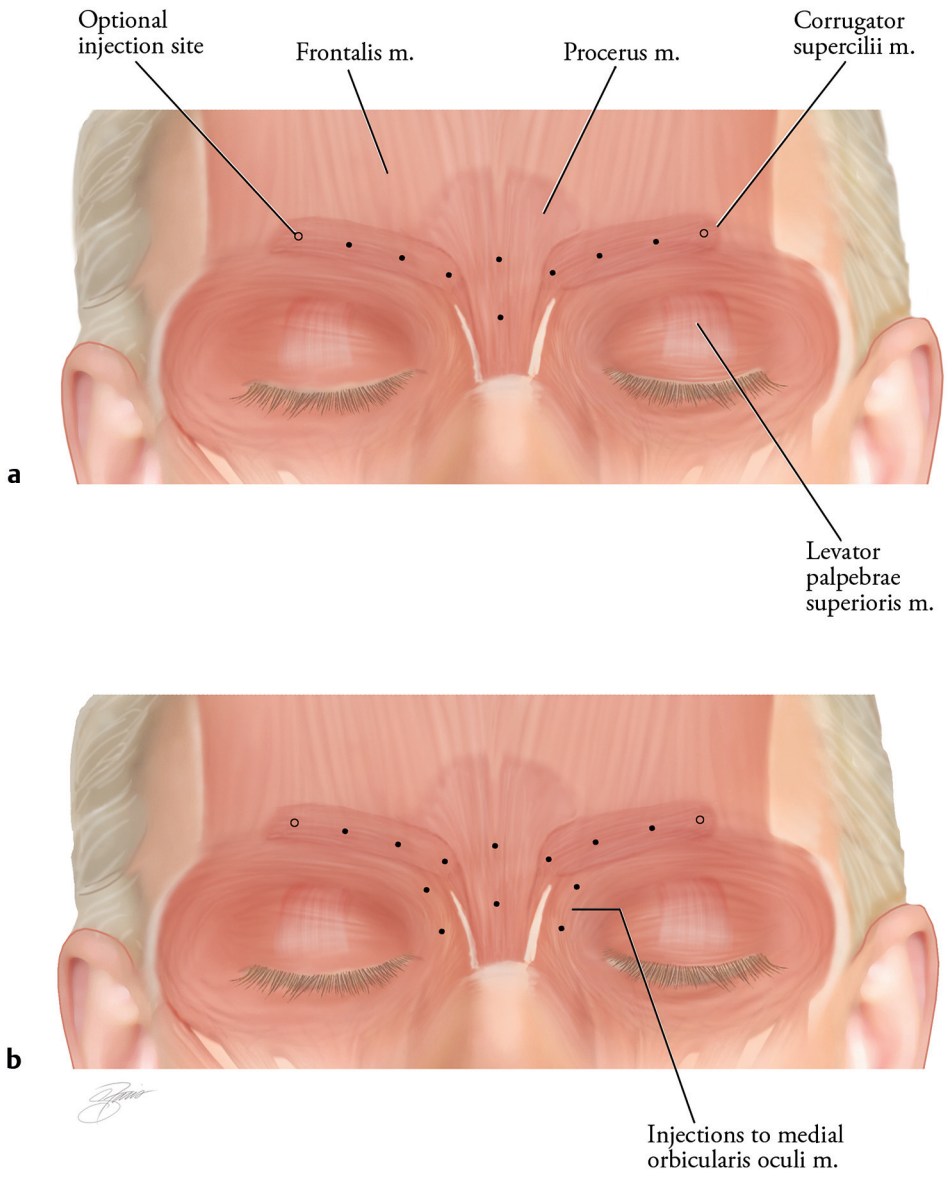


Fig. 6.2 (**a,b**) Suggested patterns of injection for more horizontal corrugator supercilii muscles. Depending on the length of the muscle, the injections may need to be placed farther out laterally. (*Open circles* denote optional injection sites.)

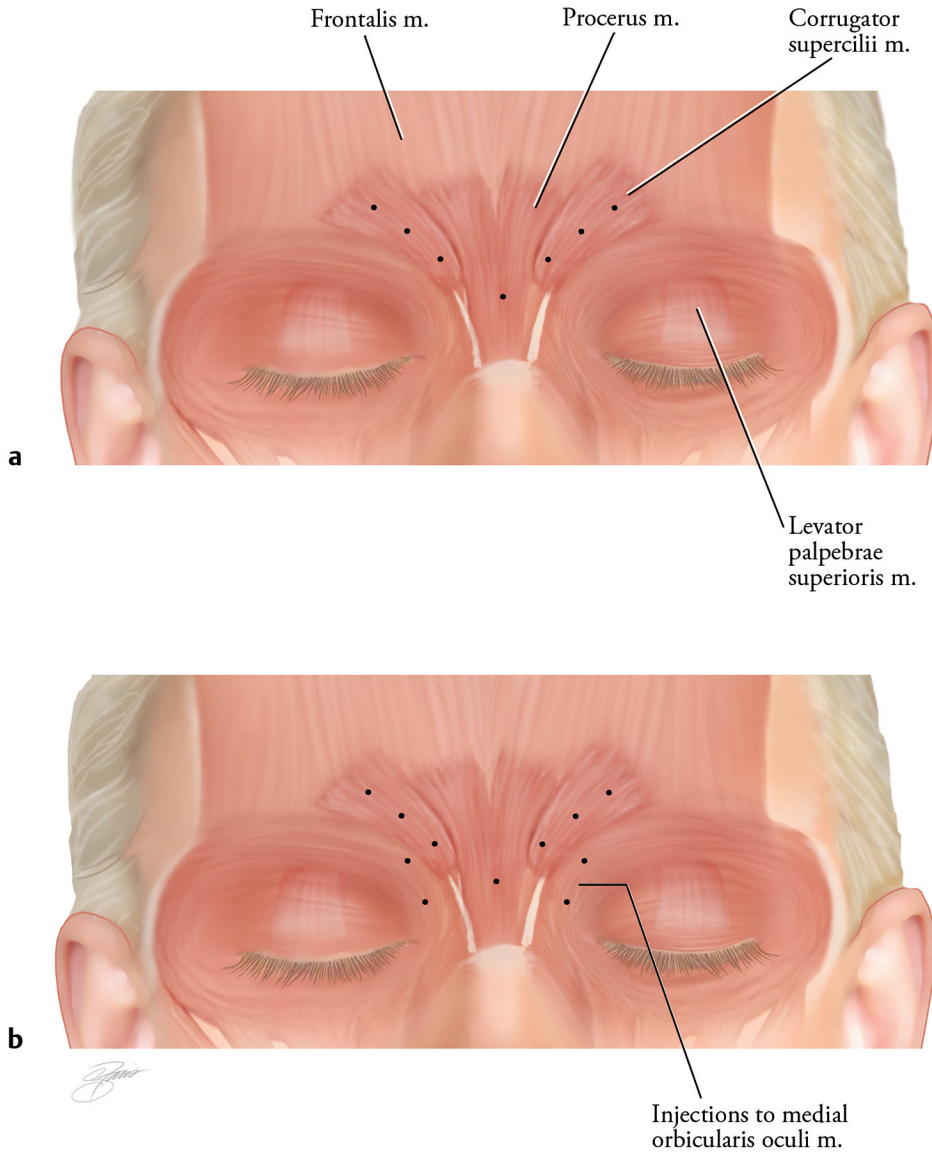


Fig. 6.3 (**a**,**b**) Suggested patterns of injection for the **V**-like corrugator supercilii muscles.

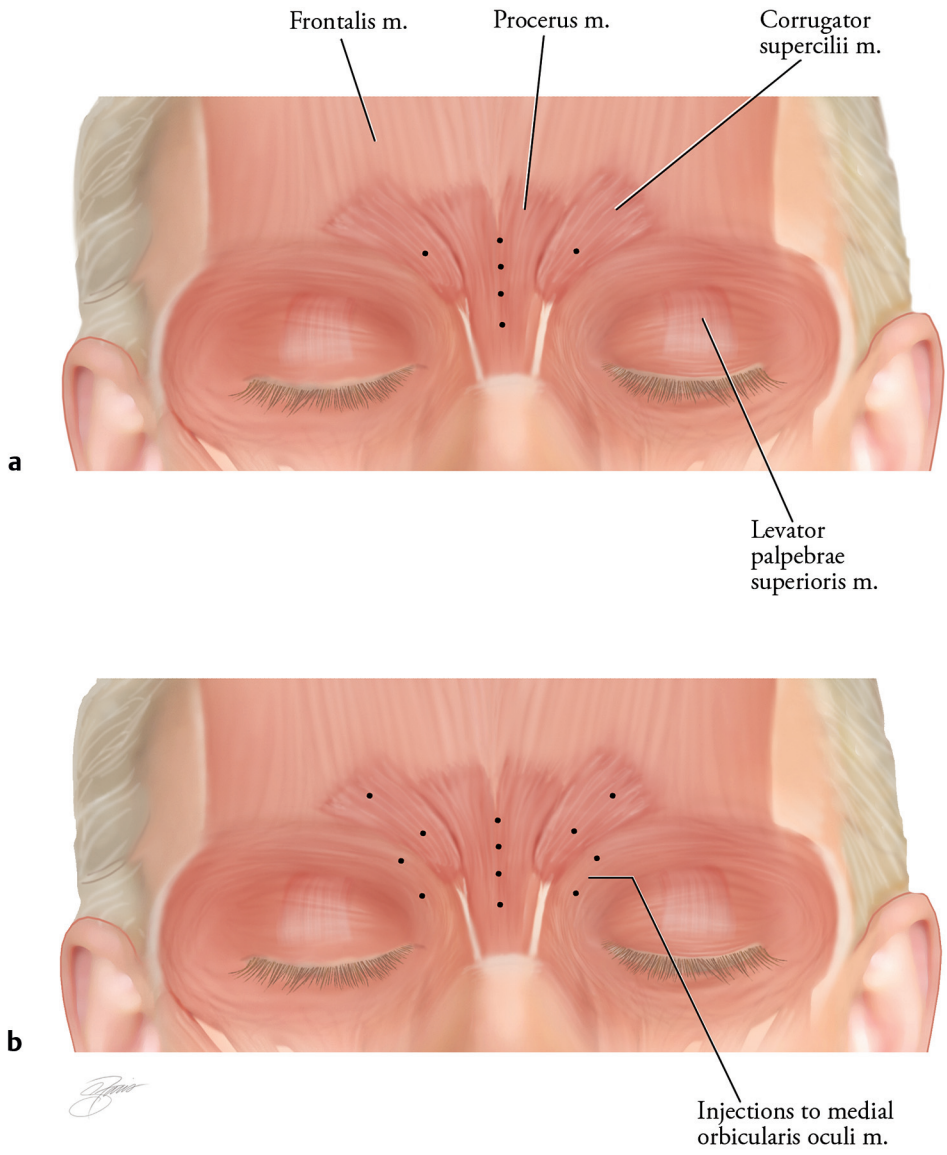


Fig. 6.4 (**a**,**b**) Suggested injection sites for predominantly horizontal glabellar rhytids with more contribution from the procerus muscle and less contribution from the corrugator supercilii muscles.

Additional Reading

[1] Bassichis BA, Thomas JR. The use of Botox to treat glabellar rhytids. Facial Plast Surg Clin North Am. 2003; 11(4):453–456

[2] Carruthers J, Fagien S, Matarasso SL, Botox Consensus Group. Consensus recommendations on the use of botulinum toxin type A in facial aesthetics. Plast Reconstr Surg. 2004; 114(6) Suppl:1S–22S

[3] Monheit G. Neurotoxins: current concepts in cosmetic use on the face and neck-upper face (glabella, forehead, and crow's feet). Plast Reconstr Surg. 2015; 136(5) Suppl:72S–75S

[4] Moy R, Maas C, Monheit G, Huber MB, Reloxin Investigational Group. Long-term safety and efficacy of a new botulinum toxin type A in treating glabellar lines. Arch Facial Plast Surg. 2009; 11(2):77–83

7
Neurotoxin Injection for Forehead Wrinkles

Difficulty: ●●
Patient Satisfaction: ●●●
Risk: ●●

Indications

Transverse wrinkles of the forehead.

Anatomic Considerations

Contraction of the paired frontalis muscles raises the eyebrows and upper eyelid skin, which produces transverse creases in the forehead. These muscles originate on the galea aponeurotica of the cranium and insert into the skin of the eyebrows. The frontalis muscles are often described as paired muscles that do not meet centrally. Clinically, however, the central position of the forehead is not devoid of wrinkles. Therefore, treatment of the forehead should include injections in the central aspect of the forehead.

The upper face must be assessed both in animation and at rest prior to injection. In women, the brow should lie at or just above the superior orbital rim. In men, it should lie at the bony rim.

Injection Technique

Have the patient raise and lower the brow and assess the extent of muscle movement. The frontalis muscles are located superficially, so the injections should be placed in the superficial subcutaneous tissue. Treat the entire forehead from medial to lateral. As with all BoNTA injections, male patients may require a higher dose. The typical dose ranges from 10 to 20 BU or 30 to 60 DU.

Precautions

The forehead is often described as the most difficult area to inject well. Although treatment of the forehead seems intuitively simple, common errors include overtreatment or poor injection planning. The most important rule of injection is to assess the position of the brows at rest, prior to injection of neurotoxin. Two important conditions of this region must be predetermined: the presence of brow ptosis, and increased resting tone of the muscles, which can mask brow ptosis.

In some patients, horizontal forehead creases are the result of compensation for brow ptosis. These patients often request neurotoxins to improve their deep forehead rhytids. It is important to remember that the frontalis muscles are the only muscles that elevate the brows. If the brow is ptotic, then do not inject the frontalis muscles, as this will worsen the brow ptosis. If injection must be performed on a patient with brow ptosis, plan the injections high in the forehead

so that the patient retains some brow elevation movement, or consider undertreating this entire area.

In addition, the frontalis muscles can sometimes show a resting tonic contraction that must be relaxed to determine the resting position of the brow. This may even require the injector to "smooth out" the forehead manually to encourage relaxation of the muscles. Having these patients close their eyes can help relax the frontalis muscles. Once the frontalis muscles are at rest, assess the brow position to determine if the frontalis contraction was masking brow ptosis.

Poor technique in this area can produce an odd-shaped brow. Do not limit the injections to the central brow. Do not assume that the injections cannot extend laterally. If only the center of the brow is treated, the brow will drop medially and elevate laterally, which produces an odd-appearing slanted look, sometimes referred to as the "Mr. Spock," or "Mephisto (devilish) sign." A lateral browlift can be obtained by using this technique, but proceed with caution in this area to avoid an overly slanted medial brow.

Post-Injection Instructions

Instruct the patient not to exercise immediately after treatment. Bruising may decrease the effect of the BoNTA by preventing diffusion to the neuromuscular junction.

Risks

Ptosis of the upper eyelid and unmasking brow ptosis are the major risks of this procedure. Minor risks include inappropriate injection planning, which may result in unnatural-appearing brows or persistent rhytids.

Pearls of Injection

- More than with any other area, it is imperative to observe the patient contracting and relaxing the frontalis muscles while the injector plans the injection sites.
- If the rhytids extend up to the hairline, then ensure the injections extend to this area, or it will result in a smooth forehead with a ridge of wrinkles superiorly.
- Also be sure to assess the lateral brows: occasionally these rhytids are undertreated, and deep crescent-shaped creases will be seen just above the lateral brow.
- In patients who have a preexisting unilateral myogenic upper lid ptosis, a compensatory unilateral forehead resting contraction may be seen. If so, injection of the forehead may actually worsen the ptosis. Assess these areas carefully prior to injecting the patient.
- One dose of BoNTA (20–25 BU or 50–70 DU) can occasionally be used to treat both the glabella and the forehead in selected patients.

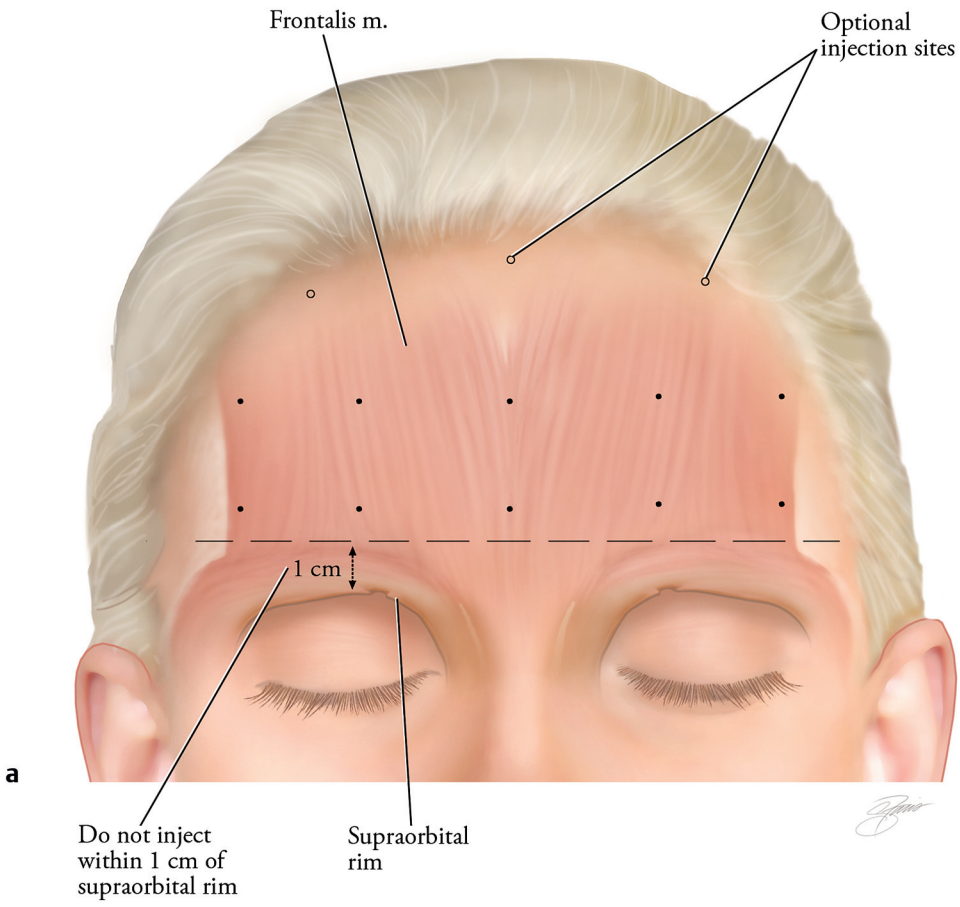


Fig. 7.1 (**a,b**) Frontalis muscle injection sites may extend up to the hairline in some individuals. Maintain a distance of 1 cm or more above the superior orbital rim. Alternate injection patterns are shown. Tailor the injection pattern to the shape and action of the muscle.

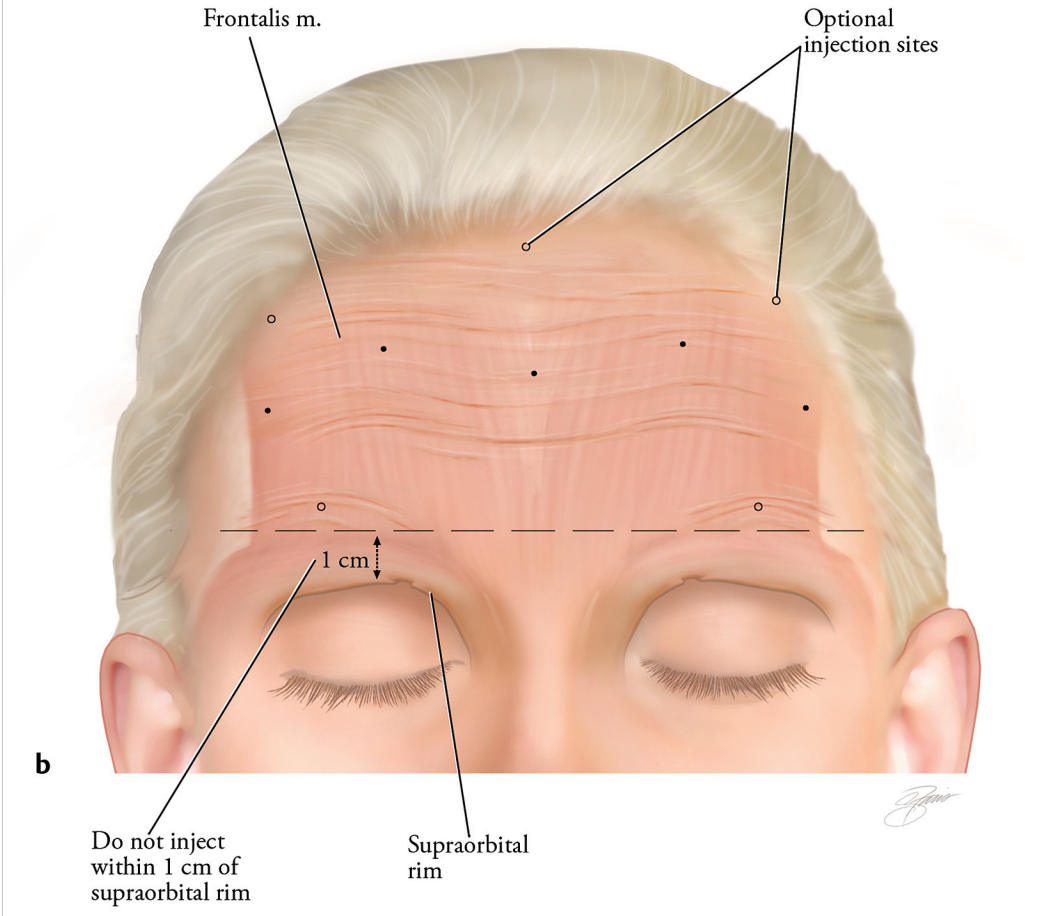


Fig. 7.1 (*continued*)

Fig. 7.2 "Mr. Spock" brow produced by central injection of the forehead.

Fig. 7.3 In some patients, care must be taken to treat the crescent-shaped rhytids superolateral to the brow.

Additional Reading

[1] Carruthers J, Fagien S, Matarasso SL, Botox Consensus Group. Consensus recommendations on the use of botulinum toxin type A in facial aesthetics. Plast Reconstr Surg. 2004; 114(6) Suppl:1S–22S

[2] Michaels BM, Csank GA, Ryb GE, Eko FN, Rubin A. Prospective randomized comparison of onabotulinumtoxinA (Botox) and abobotulinumtoxinA (Dysport) in the treatment of forehead, glabellar, and periorbital wrinkles. Aesthet Surg J. 2012; 32 (1):96–102

[3] Susmita A, Kolli NN, Meka S, et al. An evaluation of use of botulinum toxin type A in the management of dynamic forehead wrinkles - a clinical study. J Clin Diagn Res. 2016; 10(10):ZC127–ZC131

8
Neurotoxin Injection for Smile Lines and Crow's Feet

Difficulty: ●
Patient satisfaction: ●●
Risk: ●

Indications

Smile lines and crow's feet are two of the most commonly sought-after areas for treatment with BoNTA. To soften or eliminate wrinkles around the lateral and inferior orbit, injection of the orbicularis oculi muscles can prevent movement-related creasing of the overlying skin associated with expression and baseline muscle tension. Neurotoxin injection will not improve static wrinkles or deep creases due to photoaging.

Anatomic Considerations

The orbicularis oculi muscle surrounds the eye and is separated into three divisions: pretarsal, preseptal, and orbital. The orbital portion extends laterally and is intimately adherent to the overlying skin. Contraction of this muscle results in lines extending radially from the lateral canthus. As the overlying skin thins and ages, crow's feet become visible in the skin from repeated muscle contractions.

Injection Technique

Topical anesthesia may be used and ice may be applied, though neither is necessary in most cases. Three to four injections of BoNTA are placed radially in the area of the crow's feet. A total of 8 to 20 BU or 20 to 60 DU may be placed in each side. Care should be taken to inject 1 cm lateral to the bony orbital rim, especially above the canthal angle, as upper lid lag can occur. It is helpful to place a finger of the noninjecting hand at the lateral orbital rim as a guide.

The muscle is superficial, so the needle does not need to be placed deep into the subcutaneous tissue. Because of the wide zone of effect for BoNTA, a superficial dermal injection will minimize bruising without compromising clinical results.

Precautions

The periocular area often has many superficial and deep venous structures that may or may not be visible through the surface of the skin. Trying to avoid them will keep the toxin from being washed away and also prevent bruising.

Post-Injection Instructions

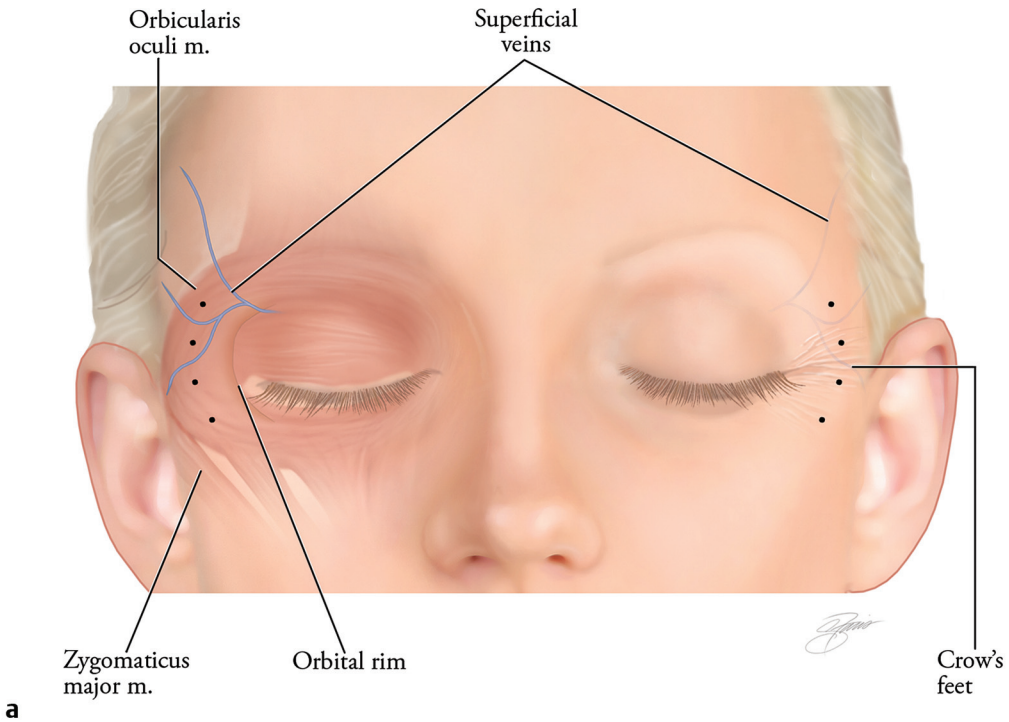
This is a highly vascular area, so bruising is possible. If a vessel is injured, hold firm pressure for a minute or two to minimize bruising. Ice packs used after injection may also minimize bruising, if necessary.

Risks

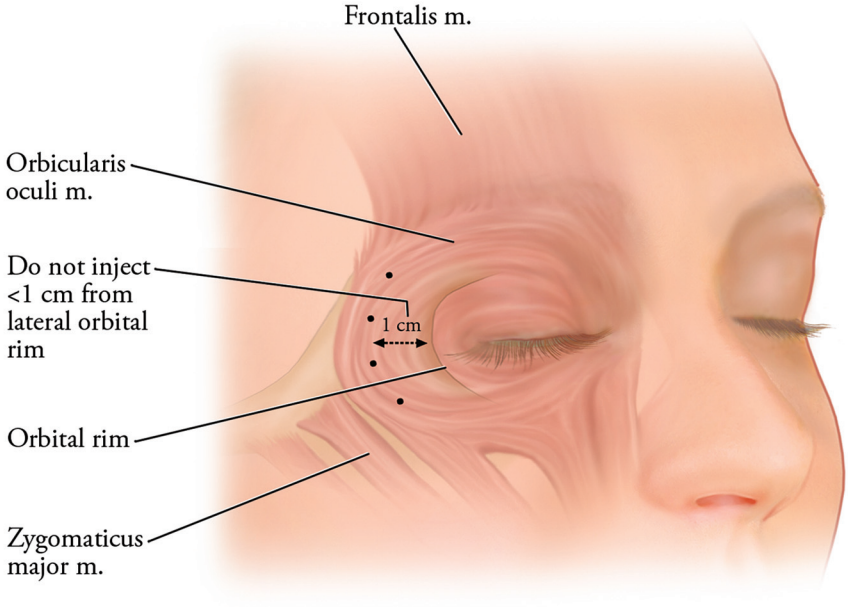
Extending the injections too far inferiorly and too deep under the orbicularis can affect the zygomaticus major muscle and result in an upper lip droop or asymmetric smile. Patients should be made aware that injections cannot be extended too inferiorly in this area. Some patients will note an accentuation of lines in this region once the lateral lines have been treated.

Pearls of Injection

- It is acceptable to have some movement with full expressive action of the muscle.
- Because of the wider zone of effect, some practitioners prefer BoNTA-ABO (Dysport) in this area.



a



b

Fig. 8.1 (**a,b**) Injections to treat the crow's feet are traditionally placed subcutaneously into the orbicularis muscle in a radial fashion 1 cm outside the lateral orbital rim. Avoid injection into the superficial veins seen in that region.

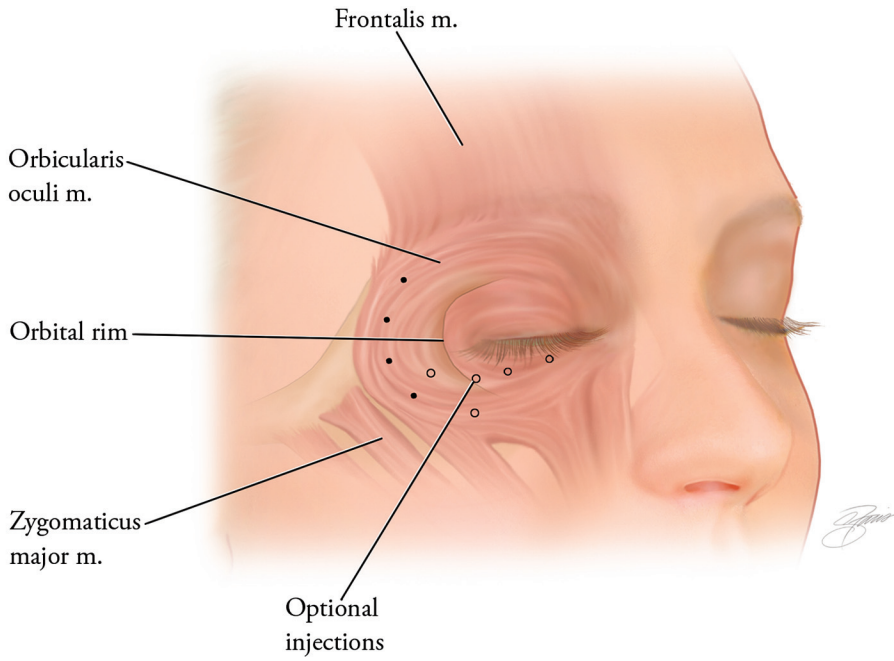


Fig. 8.2 For patients with wrinkles under the eyes, optional sites are shown, but care must be taken to avoid diffusion of BoNTA into the zygomaticus muscles.

Additional Reading

[1] Carruthers A, Bruce S, de Coninck A, et al. Efficacy and safety of onabotulinumtoxinA for the treatment of crow's feet lines: a multicenter, randomized, controlled trial. Dermatol Surg. 2014; 40(11):1181–1190

[2] Carruthers J, Fagien S, Matarasso SL, Botox Consensus Group. Consensus recommendations on the use of botulinum toxin type A in facial aesthetics. Plast Reconstr Surg. 2004; 114(6) Suppl:1S–22S

[3] Kim DW, Cundiff J, Toriumi DM. Botulinum toxin A for the treatment of lateral periorbital rhytids. Facial Plast Surg Clin North Am. 2003; 11(4):445–451

9
Neurotoxin Injection for Lateral Brow Lift

Difficulty: ●●
Patient Satisfaction: ●
Risk: ●

Indications

Hyperactivity of the lateral aspect of the orbicularis oculi muscle can result in ptosis of the lateral aspect of the brow. Vertically and obliquely oriented fibers of muscle, when activated or with baseline resting muscle tension, pull down on the position of the tail of the brow and oppose the lifting action of the frontalis muscle.

Anatomic Considerations

The orbicularis oculi muscle is a strong brow depressor. In most patients, the superolateral orbicularis oculi is positioned at or just inferior to the level of the lateral eyebrow hairs.

Injection Technique

The best effect occurs when the noninjecting hand is used to elevate the brow and injections are kept approximately 1 cm above the orbital rim. Topical anesthesia may be used but is not necessary in most cases.

BoNTA is injected into the muscle in two to three spots along the lateral brow, each with 2 to 3 BU for a total of 4 to 6 BU per side.

Precautions

Bruising is a risk in this area. The periocular area has many superficial venous structures that may or may not be visible through the surface of the skin. Bruising can be minimized by injecting into the superficial subcutaneous tissue.

Post-Injection Instructions

Hold firm pressure if bleeding occurs. Bruising is possible and more likely in this area than in many others.

Risks

There are few risks so long as the BoNTA does not affect the levator palpebrae superioris muscle.

Pearls of Injection

- Not all patients will be able to achieve significant brow elevation.
- Because brow elevation results from the upward pull of the brow by the frontalis muscle, simultaneous injection of the lateral aspect of the frontalis and the lateral orbicularis muscles will negate the upward lift of the brow in this region.

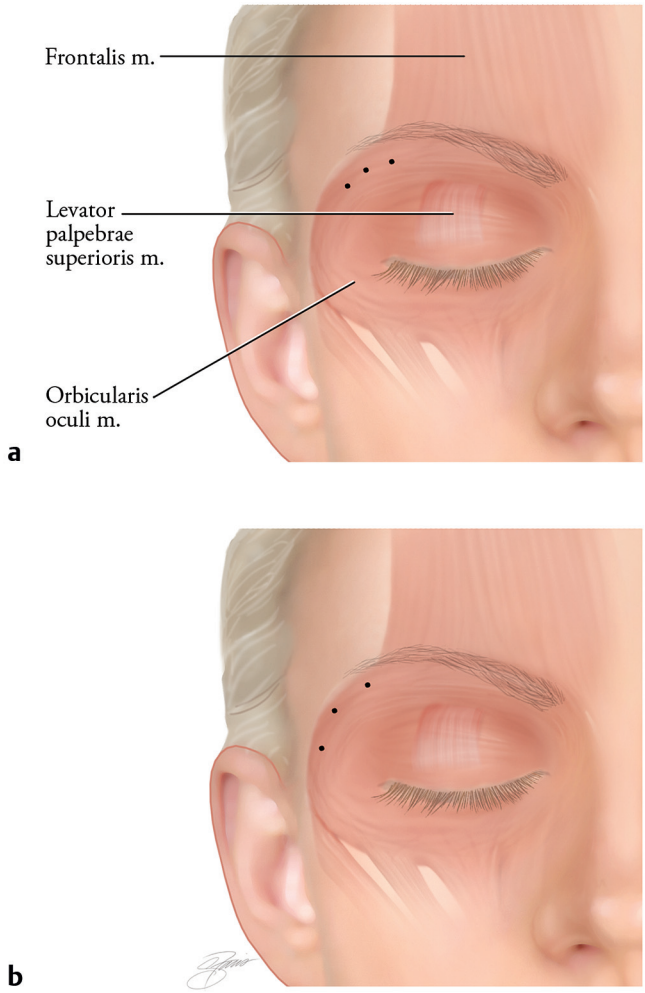


Fig. 9.1 (**a,b**) Suggested patterns of BoNTA injection of the lateral aspect of the orbicularis muscle can result in a lateral brow lift.

Additional Reading

[1] Ahn MS, Catten M, Maas CS. Temporal brow lift using botulinum toxin A. Plast Reconstr Surg. 2000; 105(3):1129–1135, discussion 1136–1139

[2] Chen AH, Frankel AS. Altering brow contour with botulinum toxin. Facial Plast Surg Clin North Am. 2003; 11(4):457–464

[3] Maas CS, Kim EJ. Temporal brow lift using botulinum toxin A: an update. Plast Reconstr Surg. 2003; 112(5) Suppl:109S–112S, discussion 113S–114S

10 Neurotoxin Injection for Chemical Brow Lift

Difficulty: ●●
Patient Satisfaction: ●
Risk: ●●

Indications

Volume loss in the forehead, combined with hyperactive corrugator, procerus, and orbicularis oculi muscles, is often responsible for brow ptosis. Vertically and obliquely oriented muscle fibers, when activated or with baseline resting muscle tension, pull down on the position of the brow relative to the upward pull of the frontalis muscle.

Anatomic Considerations

The corrugator, procerus, and lateral orbicularis oculi muscles are brow depressors. Inactivation of the depressor muscles permits the elevation of the brow by allowing the frontalis muscle to overcome their downward pull. Medial elevation is obtained by placing BoNTA in the corrugator and procerus muscles. Lateral brow lift is achieved by treating the lateral orbicularis oculi muscles. It is imperative to preserve muscle function in the forehead by not overly treating (relaxing) the frontalis muscle with BoNTA as the forehead will not be able to elevate the brow, and brow ptosis may occur.

Injection Technique

Topical anesthesia may be used; ice may be applied though neither is necessary in most cases. Essentially, this lift is created by combining the techniques of treating the glabella and lateral brow (see also Chapter 6 and Chapter 9 of this book). A total of 20 to 30 BU or 60 to 90 DU may be necessary for this treatment.

Precautions

Place injections at least 1 cm away from the bony orbital rim to reduce the risk of spread to the levator palpebrae superioris muscle.

Post-Injection Instructions

Hold firm pressure for any bleeding. Bruising is possible and more likely in the temporal area than in many others. Patient instructions may include the following: avoid exercise for the day, and do not bend over, lie flat, or push on the injection sites for 4 hours. However, there are no clinical studies to show that these instructions actually improve the results or minimize ptosis.

Risks

There are few risks so long as the neurotoxin does not affect the levator palpebrae superioris muscle.

Pearls of Injection

- Not all patients obtain the same degree of brow elevation using this technique.

- Overtreatment of the frontalis muscle will negate any possible brow elevation achieved with these techniques.
- Patients with severe brow ptosis are less likely to obtain a significant lift from a neurotoxin.

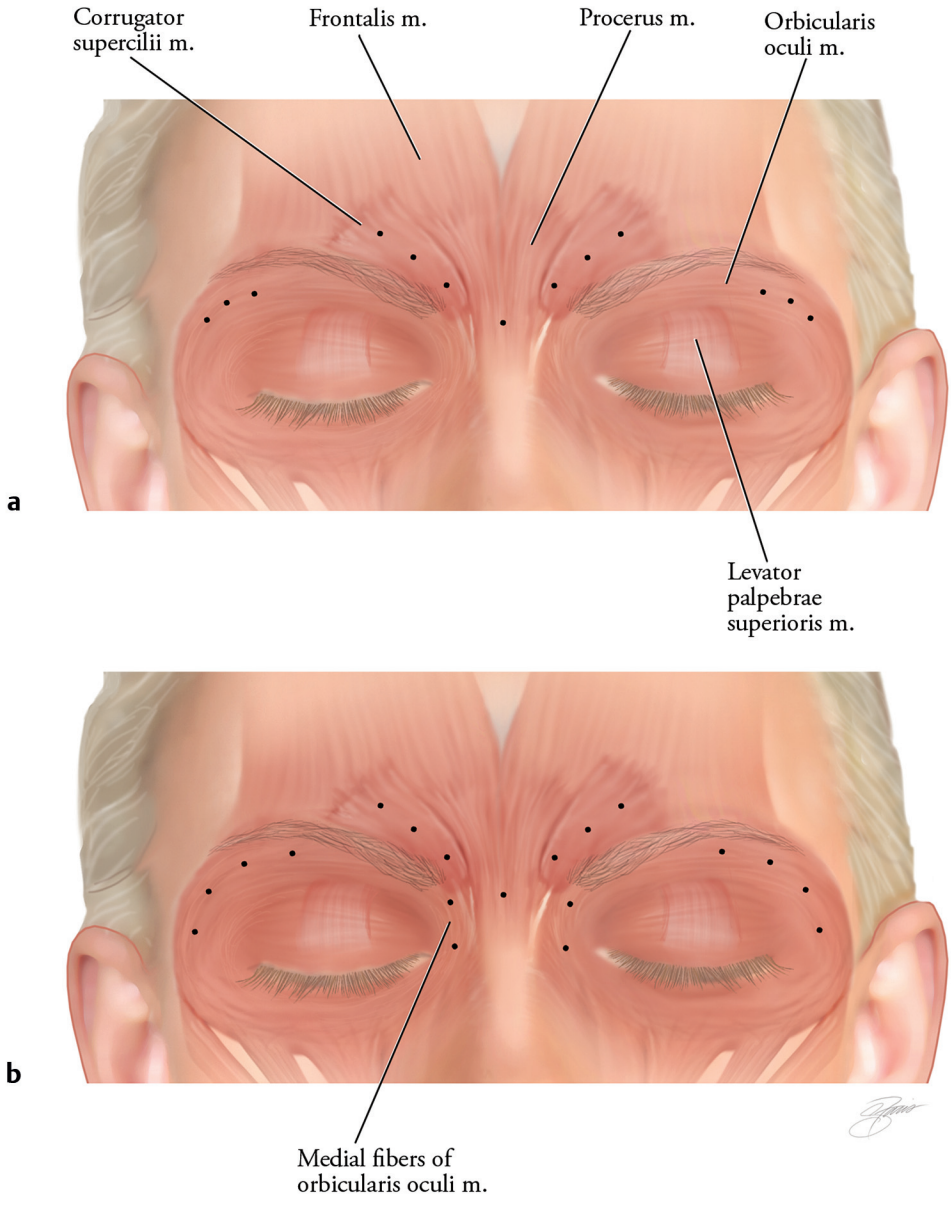


Fig. 10.1 (**a**,**b**) A chemical brow lift can be produced by treating the procerus and corrugator muscles centrally and the orbicularis oculi muscle laterally. The frontalis muscle must not be treated so that it can take over the upward pull of the brow. Alternative techniques are demonstrated.

Additional Reading

[1] Carruthers J, Carruthers A. Botulinum toxin (botox) chemodenervation for facial rejuvenation. Facial Plast Surg Clin North Am. 2001; 9(2):197–204, vii

[2] Chen AH, Frankel AS. Altering brow contour with botulinum toxin. Facial Plast Surg Clin North Am. 2003; 11(4):457–464

[3] Dorizas A, Krueger N, Sadick NS. Aesthetic uses of the botulinum toxin. Dermatol Clin. 2014; 32(1):23–36

[4] Frankel AS, Markarian A. Cosmetic treatments and strategies for the upper face. Facial Plast Surg Clin North Am. 2007; 15 (1):31–39, vi

11
Neurotoxin Injection for Lower Eyelid Roll

Difficulty: ●●
Patient Satisfaction: ●●
Risk: ●●

Indications

Hypertrophy of the orbicularis oculi muscle can cause a fullness of the lower eyelid when smiling or squinting but is not noticeable at rest.

Anatomic Considerations

The orbicularis oculi muscle surrounds the eye and is divided into three parts: orbital, preseptal, and pretarsal. Hypertrophy of the pretarsal portion of the muscle can result in a fullness of the lower eyelid when the patient smiles.

Injection Technique

Botulinum toxin (1 to 2 BU) is injected at the midpupillary line approximately 3 mm below the lash line. A single injection is placed per eyelid. The injection is immediately subcutaneous.

Precautions

Injection of the pretarsal orbicularis muscle will result in a widening of the palpebral aperture. Do not inject patients who have a preexisting lower lid laxity, excessive scleral show, or a history of dry eye.

Post-Injection Instructions

None.

Risks

Widening of the palpebral aperture may result in dry eyes. Inject with caution in patients with lax lower eyelids or with dry eye syndrome. Bruising may occur after injection.

Pearls of Injection

- Check the tone of the lower eyelid prior to injection (snap test). Accurate diagnosis is key in these patients, who complain of lower lid "bags."
- Patients must be counseled on the differences between lower lid fat herniation and orbicularis muscle hypertrophy and treated appropriately.
- Because of the increased zone of effect for Dysport, Botox is preferred for these injections.

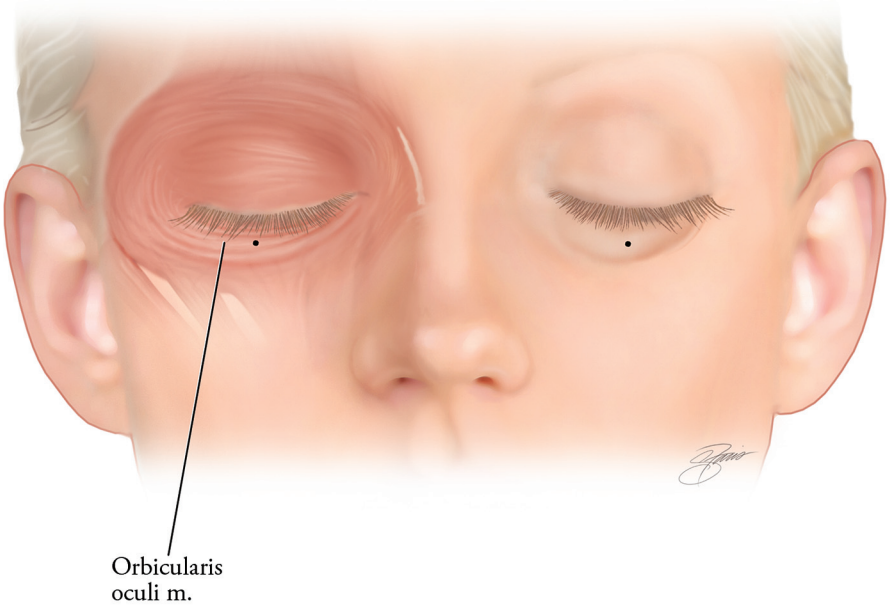


Fig. 11.1 BoNTA is injected at the midpupillary line into the superficial subcutaneous tissue to reduce the bulging of a hypertrophic orbicularis oculi muscle.

Additional Reading

[1] Carruthers J, Carruthers A. Aesthetic botulinum A toxin in the mid and lower face and neck. Dermatol Surg. 2003; 29 (5):468–476

[2] Flynn TC, Carruthers JA, Carruthers JA. Botulinum-A toxin treatment of the lower eyelid improves infraorbital rhytides and widens the eye. Dermatol Surg. 2001; 27(8):703–708

[3] Loyo M, Kontis TC. Cosmetic botulinum toxin: has it replaced more invasive facial procedures? Facial Plast Surg Clin North Am. 2013; 21(2):285–298

12
Neurotoxin Injection for Bunny Lines

Difficulty: ●
Patient Satisfaction: ●●
Risk: ●●

Indications

"Bunny lines" are wrinkles that radiate from the medial canthal region and run inferomedially on each side of the nose. Bunny lines are not found on every patient and are not universally disliked but can be unacceptable for some patients. Occasionally these rhytids can become stronger over time when all the other upper facial muscles have been treated with BoNTA and these are the only muscles left that the patient can move. They also contribute to deep horizontal glabellar rhytids. In those cases, BoNTA injections can be used to soften this region.

Anatomic Considerations

The superior portion of the nasalis muscle (pars transversa) originates over each incisor foramen and inserts into an aponeurosis on the nasal dorsum. At this aponeurosis, the fibers meet those of the opposite nasalis muscle and the midline procerus muscle. When contracted, these muscles create wrinkles or lines on the nose as well as pull the center of the forehead down and contribute to horizontal glabellar creases.

Injection Technique

Topical anesthesia may be used and ice may be applied, though neither is necessary in most cases. These patients are usually asked to wrinkle their nose up "like a bunny," or "like they smell something bad." This movement will indicate where the muscle is located and the strength of the nasalis fibers.

A single injection point can be placed into the muscle on each side using 2 to 3 BU. Assessing muscle location and activity during contraction is essential in determining the proper placement of BoNTA in this area. The muscle is not deep, so the injection need only be placed in the subdermal subcutaneous tissue.

Another technique is to insert the needle across the belly of the muscle and then inject retrograde. The injection occurs at or perpendicular to the direction of the actual bunny lines seen during muscle contraction. Alternately, for larger muscles and extensive lines, more injections can be placed, with care being taken not to extend too far laterally.

Precautions

The treatment in this area needs to be kept more medial to avoid relaxing the nearby levator labii superioris alaeque nasi muscle. Spread to that muscle could lead to lip ptosis or flattening of the nasolabial

fold. Injections also should be kept medial to avoid injection into the angular artery.

Post-Injection Instructions

Because this is a highly vascular and visible area, bruising is possible. Firm pressure should be applied after injection.

Risks

Undertreatment of one side will leave asymmetrical sniffing, which is usually not very noticeable and is easy to adjust with a small injection "boost." Overtreatment is far more troublesome, as it can result in a flattening of the cheek, nasolabial fold, or upper lip droop. It is advisable to begin with conservative dosing and to keep the area of injection at or near the level of the nasal bones and upper lateral cartilages of the nose.

Pearls of Injection

- Some patients may not understand why you are treating this area, not realizing that they move the area or that they gesture during smiling. You may need to demonstrate these creases to them in a mirror and explain that it is an important adjuvant in lifting the central glabella and softening the frown lines.

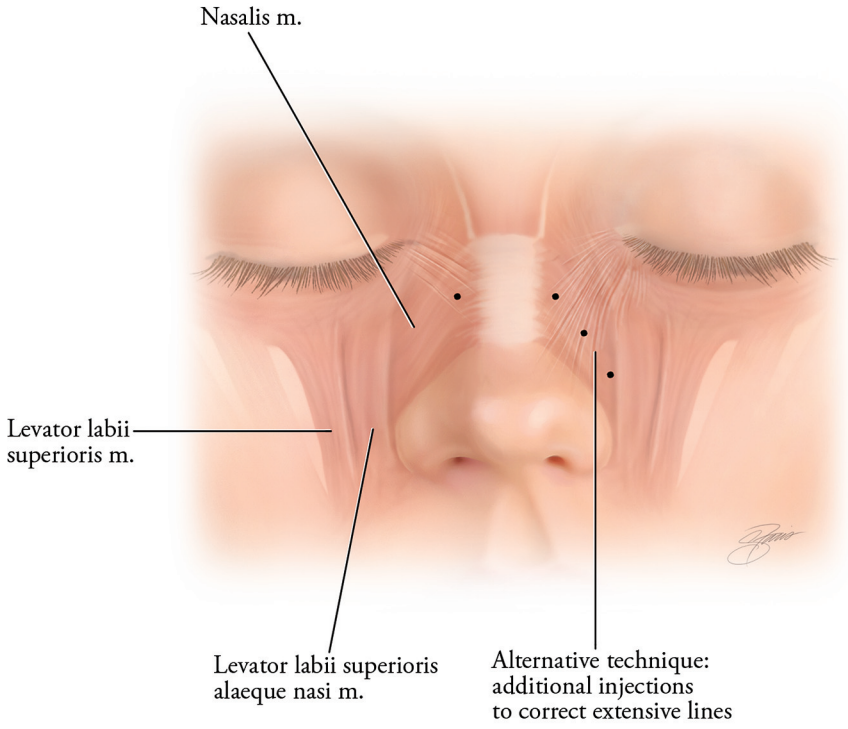


Fig. 12.1 A single injection is used for each muscle, or, for larger muscles, several injections may be placed, with care being taken to stay medial to the levator labii superioris alaeque nasi.

Additional Reading

[1] Carruthers J, Carruthers A. Botulinum toxin (botox) chemodenervation for facial rejuvenation. Facial Plast Surg Clin North Am. 2001; 9(2):197–204, vii

[2] Carruthers J, Fagien S, Matarasso SL, Botox Consensus Group. Consensus recommendations on the use of botulinum toxin type A in facial aesthetics. Plast Reconstr Surg. 2004; 114(6) Suppl:1S–22S

[3] Erickson BP, Lee WW, Cohen J, Grunebaum LD. The role of neurotoxins in the periorbital and midfacial areas. Facial Plast Surg Clin North Am. 2015; 23(2):243–255

13 Neurotoxin Injection for Nasal Tip Lift

Difficulty: ●
Patient Satisfaction: ●●
Risk: ●●

Indications

Neurotoxin can be injected into the base of the nasal columella to produce a subtle elevation of the nasal tip (increase in tip rotation). This is indicated in patients with a mild drooping of the nasal tip. It will not improve a severely ptotic nose with thick, sebaceous skin: consider surgical treatment for severely ptotic noses. This procedure is a mild "finesse" technique.

Anatomic Considerations

The depressor septi nasi muscle is an extension of the orbicularis oris muscle and inserts onto the medial crural foot-plates. It pulls the nasal tip down with smiling. Weakening of this muscle will result in elevation of the tip or widening of the nasolabial angle. The nasolabial angle should be approximately 90 degrees in men, and more obtuse in women.

Injection Technique

Topical anesthesia may be used; however, this single injection usually can be tolerated without anesthesia. The depressor septi nasi muscle is located at the base of the columella and is the muscle targeted with the injection. Use approximately 2 BU or 5 to 9 DU.

Precautions

This injection will not improve a severely ptotic tip. Use with caution in women who already have an elevated tip. Use with caution in men, who generally do not want an over-rotated tip.

Post-Injection Instructions

None. Bruising is unlikely.

Risks

Overtreatment of this area may cause a drooping of the upper lip.

Pearls of Injection

- Proceed slowly; try half the suggested dose first.
- Make sure that the patient is aware that this is a subtle improvement.
- Do not overtreat.

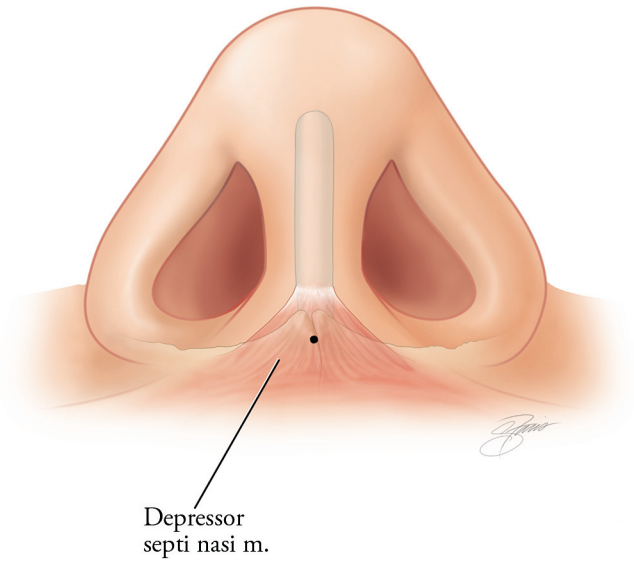


Fig. 13.1 A single injection at the base of the columella can produce a subtle nasal tip elevation.

Additional Reading

[1] Carruthers J, Carruthers A. Aesthetic botulinum A toxin in the mid and lower face and neck. Dermatol Surg. 2003; 29 (5):468–476

[2] Cigna E, Sorvillo V, Stefanizzi G, Fino P, Tarallo M. The use of botulinum toxin in the treatment of plunging nose: cosmetic results and a functional serendipity. Clin Ter. 2013; 164(2): e107–e113

[3] Redaelli A. Medical rhinoplasty with hyaluronic acid and botulinum toxin A: a very simple and quite effective technique. J Cosmet Dermatol. 2008; 7(3):210–220

14
Neurotoxin Injection for Nasal Flare

Difficulty: ●●●
Patient Satisfaction: ●●
Risk: ●●

Indications

Some individuals inadvertently flare their nostrils while speaking.

Anatomic Considerations

The dilator nasalis muscle is the lower portion of the nasalis muscle and attaches to the alar cartilage. Contraction of the dilator nasalis muscle results in alar flaring. This muscle lies superficial to the lateral crura of the lower lateral cartilage.

Injection Technique

Topical anesthesia may be used; however, this single injection usually can be tolerated without anesthesia. One injection point is used per side. Approximately 5 BU or 15 DU are used per side. Inject into the immediate subdermal tissue, with care being taken to avoid the alar cartilage.

Precautions

None.

Post-Injection Instructions

None. Bruising is unlikely.

Risks

None.

Pearls of Injection

- Proceed slowly; try half the suggested dose first.
- Make sure that the patient is aware that this is a subtle improvement.
- Do not overtreat.
- Results may last 3 to 4 months; however, frequent injections may not be necessary as the patient may "unlearn" to contract the muscle while speaking.

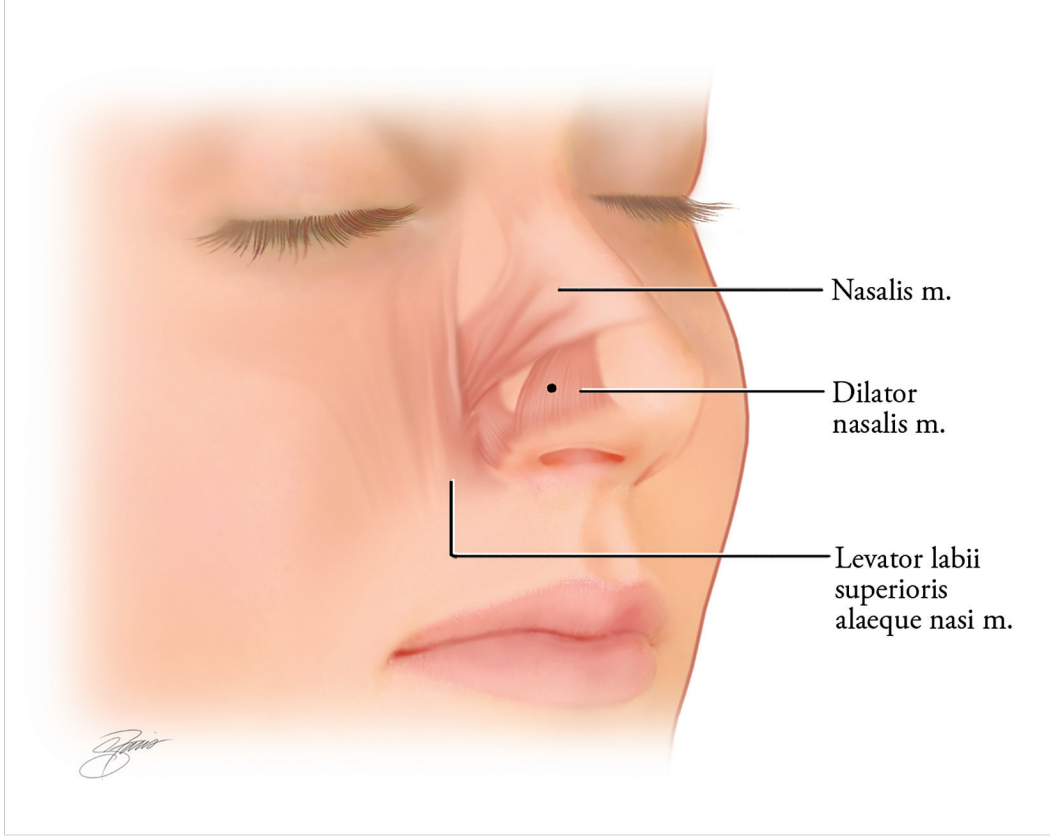


Fig. 14.1 A single injection of BoNTA is placed in the superficial subcutaneous tissue (on each side) to decrease nostril flare.

Additional Reading

[1] Carruthers J, Carruthers A. Aesthetic botulinum A toxin in the mid and lower face and neck. Dermatol Surg. 2003; 29 (5):468–476

[2] Gassia V, Raspaldo H, Niforos FR, Michaud T. Global 3-dimensional approach to natural rejuvenation: recommendations for perioral, nose, and ear rejuvenation. J Cosmet Dermatol. 2013; 12(2):123–136

15 Neurotoxin Injection for Elevating the Oral Commissures

Difficulty: ●●
Patient Satisfaction: ●●
Risk: ●●

Indications

Neurotoxin can be injected in the depressor anguli oris (DAO) muscles to elevate the oral commissures. This is indicated in patients with downturned corners of the mouth. Neurotoxin alone can be used in this area, but most often must be combined with filler injections to the oral commissure (see also Chapter 43).

Anatomic Considerations

The DAO muscle originates along the oblique line of the mandible and inserts into the modiolus. Contraction of the DAO muscle pulls down the corners of the mouth. Weakening this muscle will result in a compensatory upward pull of the zygomaticus muscles, which results in elevation of the oral commissures.

Injection Technique

A single injection per muscle is suggested and well tolerated. The DAO muscle should be palpated while having the patient actively frown. If the belly of the muscle cannot be palpated, a rough estimate of its location can be made by going 1 cm lateral to the oral commissure and then 1 cm inferiorly. Inject approximately 2 to 5 BU or 6 to 15 DU deeply into each muscle.

Alternate Technique

To avoid other perioral muscles, injections may be placed into the inferior aspect of the muscle. A single injection is placed just above the mandibular border, diagonally and inferior to the oral commissure.

Precautions

This injection will not improve severely depressed oral commissures and will not elevate the marionette lines.

Post-Injection Instructions

None. Bruising is unlikely.

Risks

Overtreatment of this area is unlikely. It is more likely that only a mild improvement in the downturned oral commissure is seen, especially in patients with heavy surrounding skin. The major risk of injection in this area is incorrect placement of the BoNTA injection, which can affect the more medial lip depressor muscle (depressor labii inferioris) and thus affect the smile.

Pearls of Injection

- Neurotoxin alone may improve mild down-turning of the oral commissures. More resistant cases likely will require hyaluronic acid filler injection to the oral commissure in addition to BoNTA injection of the DAO muscles.
- Be sure to inform the patient that only a subtle improvement is likely.

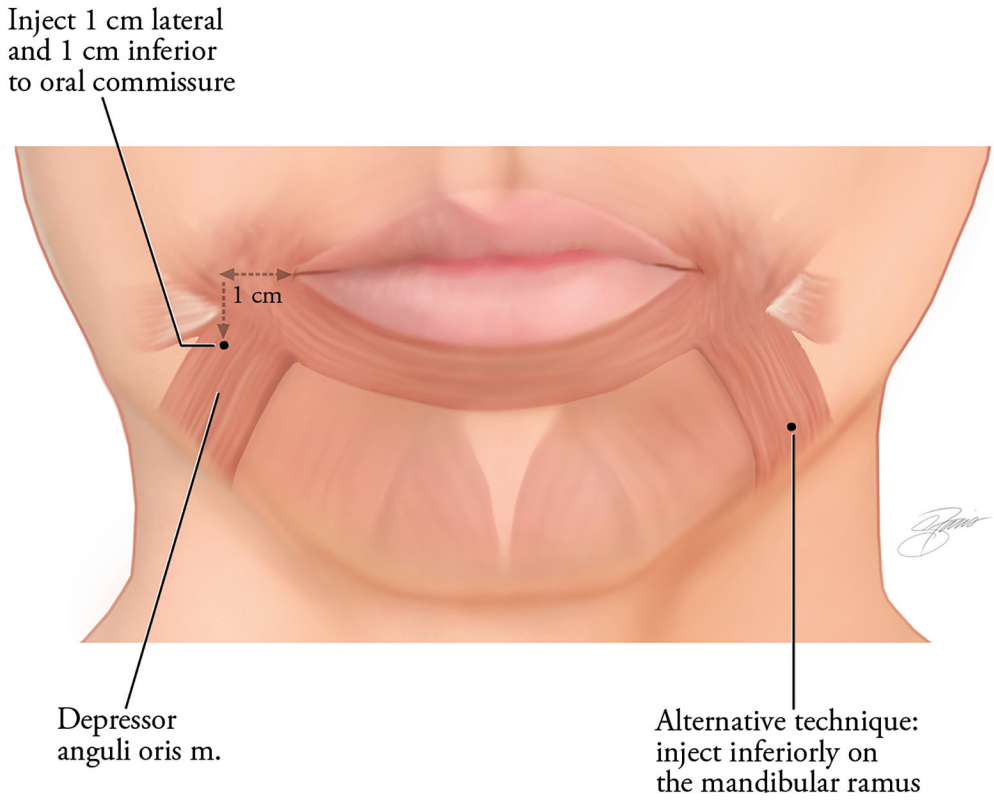


Fig. 15.1 (Left) BoNTA can be injected into the depressor anguli oris muscle, which can be palpated 1 cm lateral and inferior to the oral commissure. (Right) Alternate injection site of the depressor anguli oris muscle is 1 cm above the mandibular border, on a line positioned diagonally and inferior to the oral commissure.

Additional Reading

[1] Carruthers J, Carruthers A. Aesthetic botulinum A toxin in the mid and lower face and neck. Dermatol Surg. 2003; 29 (5):468–476

[2] Dayan SH, Maas CS. Botulinum toxins for facial wrinkles: beyond glabellar lines. Facial Plast Surg Clin North Am. 2007; 15(1):41–49, vi

[3] Fabi SG, Massaki AN, Guiha I, Goldman MP. Randomized split-face study to assess the efficacy and safety of abobotulinumtoxinA versus onabotulinumtoxinA in the treatment of melomental folds (depressor anguli oris). Dermatol Surg. 2015; 41(11):1323–1325

16
Neurotoxin Injection for Lip Lift

Difficulty: ●●
Patient Satisfaction: ●●
Risk: ●●

Indications

A small improvement in the visible pink lip can be achieved by the use of BoNTA in some patients. This can be used to enhance the upper and/or lower lips.

Anatomic Considerations

The orbicularis oris muscle is the sphincter that surrounds the mouth. The pull of the muscle is toward the center; therefore, weakening this pull will allow the upper lip elevators and the lower lip depressors to increase their pull on the lips. This increased pull will result in more visible pink lip and a slight "lip lift."

Injection Technique

Botulinum toxin is injected at the base of the philtrum at the vermillion border. The corresponding location of the lower lip may also be injected. Approximately 1 to 2 BU is used for each injection. (Because of the increased zone of effect of Dysport, the authors prefer to use Botox in this area.)

Precautions

Injections around the mouth must be symmetric to avoid asymmetry of the mouth when smiling or puckering the lips. Avoid these injections in persons who play the flute, whistle, or do similar activities. Warn patients that they may initially experience difficulty drinking through straws.

Post-Injection Instructions

None.

Risks

Asymmetry can be reduced by ensuring that the injections are placed symmetrically.

Pearls of Injection

- This technique produces a very subtle augmentation in the lips, possibly a 1 to 2 mm increase in pink lip visibility.
- The relative size of the lip increases, but there is no increase in lip volume. The patient should not expect that this procedure will produce the same results as fillers; however, this procedure can be used in addition to fillers and is encouraged in patients who have very thin lips.

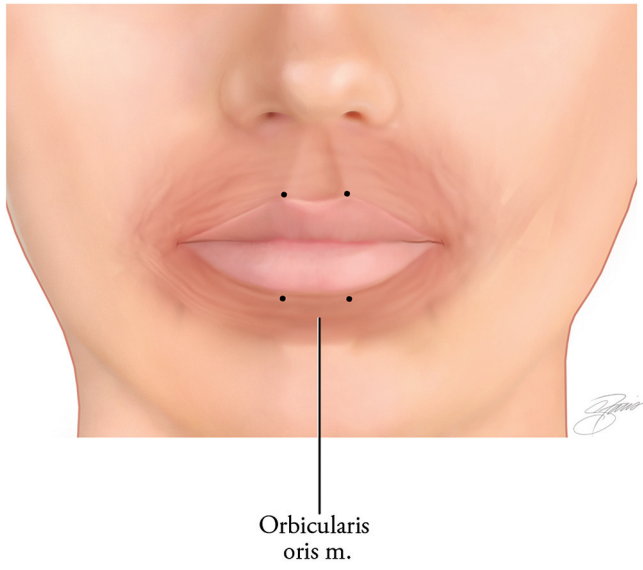


Fig. 16.1 BoNTA is injected at the base of the philtral columns on the upper lip and may also be injected in similar locations on the lower lip to cause a subtle increase in pink lip, or a pseudo-augmentation.

Additional Reading

[1] Fagien S. Botox for the treatment of dynamic and hyperkinetic facial lines and furrows: adjunctive use in facial aesthetic surgery. Plast Reconstr Surg. 1999; 103(2):701–713

[2] Semchyshyn N, Sengelmann RD. Botulinum toxin A treatment of perioral rhytides. Dermatol Surg. 2003; 29(5):490–495, discussion 495

17
Neurotoxin Injection for Smoker's Lines

Difficulty: ●●
Patient Satisfaction: ●●
Risk: ●●

Indications

Perioral wrinkles extend radially from the lips due to the repeated puckering motion from speaking or smoking. In women, lipstick may "bleed" into these lines. In nonsmokers, these lines can be produced in patients who purse their lips while talking.

Anatomic Considerations

The orbicularis oris muscle is the sphincter that surrounds the mouth. Repeated contraction of this muscle may result in circumoral rhytids.

Injection Technique

BoNTA is injected at the vermillion border, usually 1 to 2 units per quadrant. Not more than four injections are performed on each lip, and not more than two per side. (Because of the increased zone of effect for Dysport, the authors prefer Botox in this area.) The wrinkles themselves do not necessarily need to be injected, as the mild paresis of the muscle will improve the entire region injected.

Precautions

Injections around the mouth must be symmetric, to avoid asymmetry of the mouth when smiling or puckering the lips. Avoid these injections in persons who whistle, play the flute, or do similar activities. Warn patients that they may initially have difficulty drinking through straws.

Post-Injection Instructions

None.

Risks

Asymmetry can be reduced by ensuring that the injections are placed symmetrically.

Pearls of Injection

- This technique can be performed on one or both lips, but care must be taken not to inject near the oral commissure, and not to over-inject the lips, which potentially could cause oral incompetence.
- The concomitant use of fillers in this area can improve results.
- For those who charge by the unit, the benefit–risk ratio for this area is not favorable, and only tiny a mounts are used, resulting in low reimbursement, yet the risk of asymmetry and/or overtreatment is high because of the small sensitive muscles being treated. The novice injector should beware.

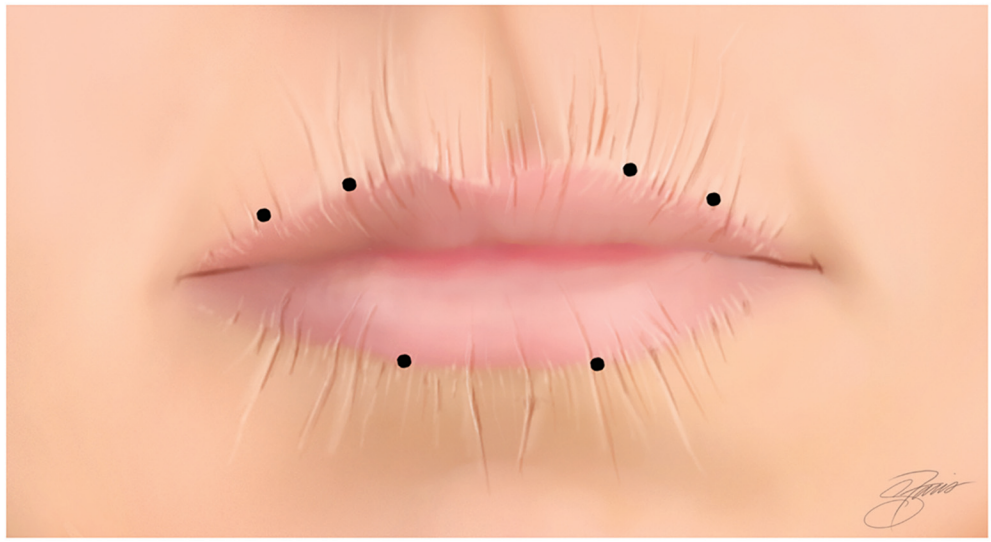


Fig. 17.1 To treat smoker's lines, either 2 or 4 injections should be placed symmetrically on the upper and/or lower lip. Do not attempt to inject every wrinkle.

Additional Reading

[1] Carruthers J, Fagien S, Matarasso SL, Botox Consensus Group. Consensus recommendations on the use of botulinum toxin type A in facial aesthetics. Plast Reconstr Surg. 2004; 114(6) Suppl:1S–22S

[2] Cohen JL, Dayan SH, Cox SE, Yalamanchili R, Tardie G. OnabotulinumtoxinA dose-ranging study for hyperdynamic perioral lines. Dermatol Surg. 2012; 38(9):1497–1505

[3] Romagnoli M, Belmontesi M. Hyaluronic acid-based fillers: theory and practice. Clin Dermatol. 2008; 26(2):123–159

18
Neurotoxin Injection for Gummy Smile

Difficulty: ●●●
Patient Satisfaction: ●●
Risk: ●●

Indications

Some patients pull their upper lip up dramatically while smiling, which reveals a large part of the gingival tissue, often referred to as a "gummy smile." Some patients also develop a strong horizontal crease just below the columella in the mid-lip area. Both of these problems are often helped with this treatment.

Anatomic Considerations

The upper lip is elevated during smile by the levator labii superioris alaeque nasi muscles. These muscles originate on the frontal process of the maxilla and insert on the skin of the lateral aspect of the nostril and upper lip. Unilateral contraction of this muscle results in an upper lip snarl, and this muscle has been referred to as the "Elvis" muscle.

Injection Technique

Topical anesthesia may be used, but this single injection (per side) usually can be tolerated without anesthesia.

The levator labii superioris alaeque nasi muscle travels just lateral to the nose; 1 to 2 BU is used in this area. Titrate to determine the necessary dosing for the patient.

Precautions

This injection will elongate the upper lip. Use with caution in older patients who may have long upper lips. Younger patients may benefit more from this procedure than do elderly patients.

Use with caution in patients who cannot tolerate a weakening of the upper lip (e.g., wind instrument musicians, actors).

Post-Injection Instructions

None. Bruising is unlikely.

Risks

Overtreatment of this area may cause severe drooping of the upper lip.

Pearls of Injection

- Proceed slowly; try half the suggested dose first.

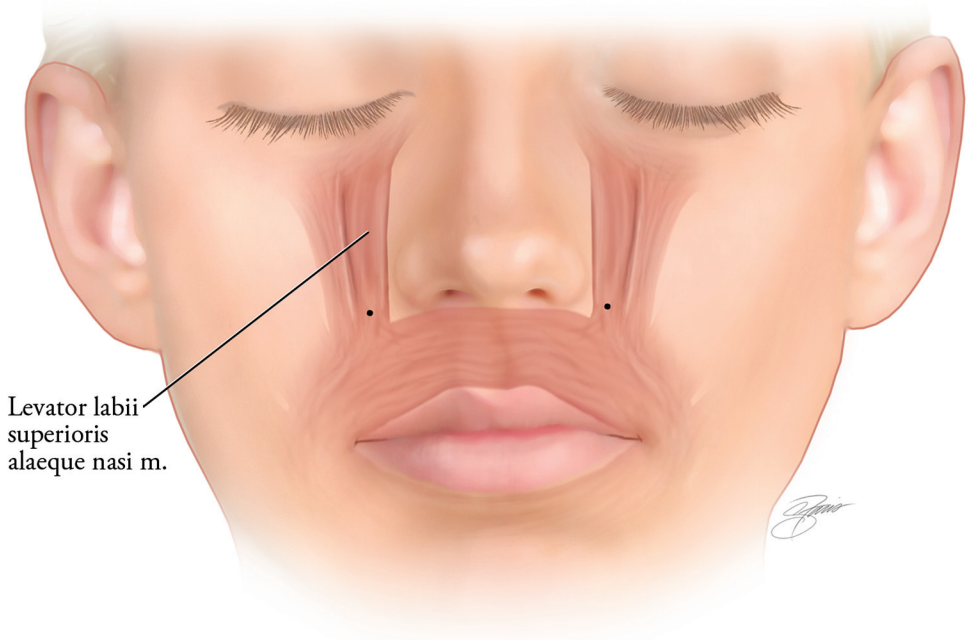


Fig. 18.1 Injection of BoNTA into the inferior aspect of the levator labii superioris alaeque nasi muscle will decrease the upward pull on the lip when the patient smiles.

Fig. 18.2 (**a**) Patient with gummy smile pre-injection. (**b**) Post-injection BoNTA with patient producing maximum smile excursion. Also note improvement in the horizontal crease below the columella.

Additional Reading

[1] Polo M. Botulinum toxin type A (Botox) for the neuromuscular correction of excessive gingival display on smiling (gummy smile). Am J Orthod Dentofacial Orthop. 2008; 133(2):195–203

[2] Stephan S, Wang TD. Botulinum toxin: clinical techniques, applications, and complications. Facial Plast Surg. 2011; 27 (6):529–539

19
Neurotoxin Injection for Dimpled Chin

Difficulty: ●
Patient Satisfaction: ●●●
Risk: ●

Indications

Some patients inadvertently wrinkle their chins either at rest or while talking. Usually it is not noticed by the patient until it is pointed out by the clinician. Dimpled chins can also be seen after chin implants, or in patients with retrognathia. Atrophy of the subcutaneous fat and dermis overlying the muscles can contribute to a dimpled appearance. Because this dimpling somewhat resembles the skin of an orange, this deformity is called "peau d'orange" chin.

Anatomic Considerations

The paired mentalis muscles originate on the incisor fossa of the mandible and insert directly onto the dermis of the chin skin. Contraction of the mentalis muscles elevates the lower lip, producing a "pout." Contraction also contributes to the mental crease.

Injection Technique

Botulinum toxin is injected deeply into each muscle in three or four injection sites. A total of 3 to 10 BU or 9 to 30 DU is injected.

Precautions

Place injections low and medially in the chin, between the mental crease and the lower edge of the mandible.

Post-Injection Instructions

None.

Risks

- Injection above the mental crease can affect the orbicularis oris muscle and may result in lower lip droop, or even drooling.
- Under-treatment may result in abnormal contraction of the muscle, and an additional "boost" of BoNTA may be required to improve this deformity.

Pearls of Injection

- Inject symmetric amounts of neurotoxin into the muscle bodies.
- This is a relatively painless injection.
- Show patients how their muscle looks contracted, so that they may understand the rationale for this treatment.

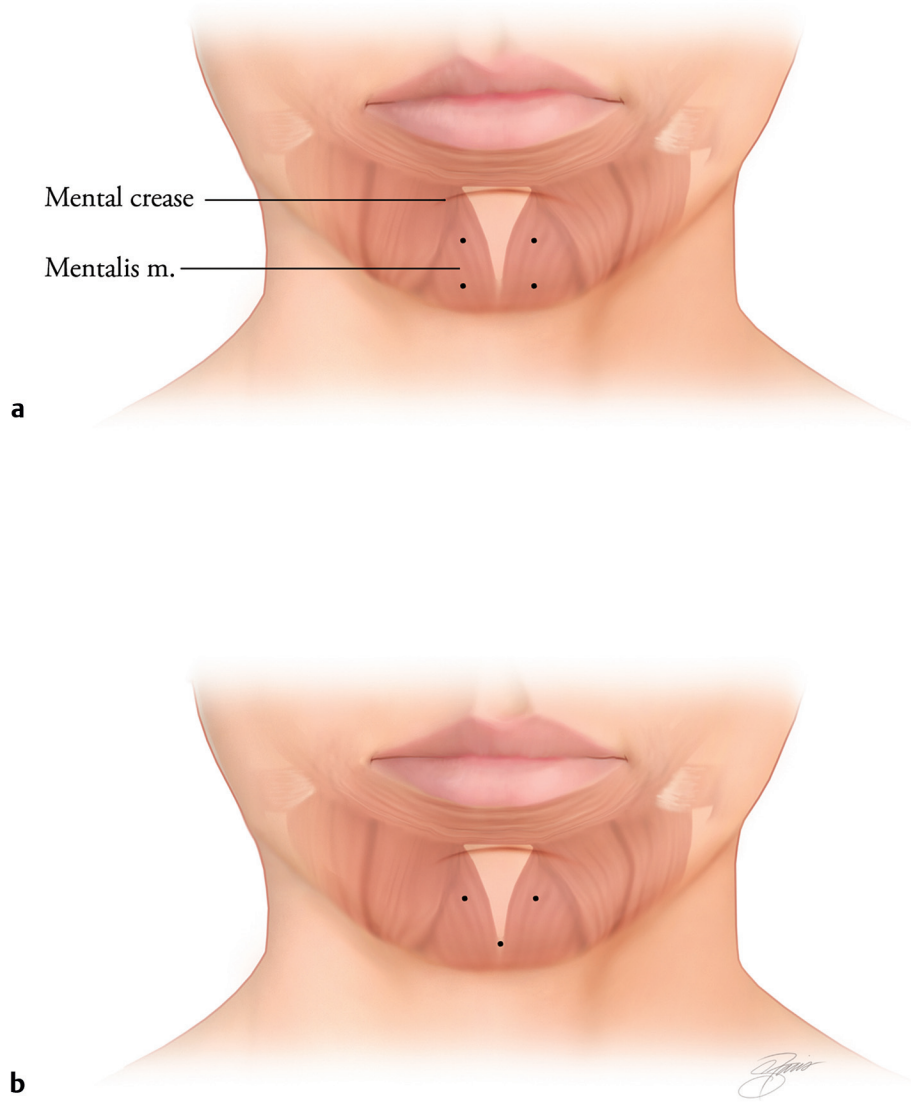


Fig. 19.1 (**a**,**b**) Suggested techniques for injection of BoNTA into the paired mentalis muscles to improve dimpled chin.

Additional Reading

[1] Carruthers J, Carruthers A. Aesthetic botulinum A toxin in the mid and lower face and neck. Dermatol Surg. 2003; 29(5):468–476
[2] Carruthers J, Fagien S, Matarasso SL, Botox Consensus Group. Consensus recommendations on the use of botulinum toxin type A in facial aesthetics. Plast Reconstr Surg. 2004; 114(6) Suppl:1S–22S
[3] Wise JB, Greco T. Injectable treatments for the aging face. Facial Plast Surg. 2006; 22(2):140–146

20 Neurotoxin Injection for Platysmal Banding

Difficulty: ●●●
Patient Satisfaction: ●
Risk: ●

Indications

Platysmal bands are vertical bands in the neck that are seen at rest and are accentuated with neck tightening and forced jaw opening. This procedure may be used in younger patients who are not yet ready for surgery, or in older patients who do not desire surgery, and to treat recurrent bands in postoperative patients.

An additional indication is the patient who has been treated with submental fat therapies that have unmasked platysmal banding.

Anatomic Considerations

The platysma muscle is a thin, superficial muscle that originates on the clavicle and upper chest and inserts onto the superficial musculoaponeurotic system (SMAS), the skin of the lower face, the facial muscles, and the mandible. Although in youth it is considered a continuous sheet, in the elderly this muscle may splay centrally and produce prominent vertical bands. Platysmal bands can be prominent in patients with thin necks, with thin skin, and without abundant overlying fat.

Injection Technique

Having the patient grimace to tighten the neck will often bring out the problem muscles and make the injection easier to perform. Ask the patient to sit upright and lean forward slightly, with the chin elevated just above the horizontal plane. With the platysma muscle in full contraction, the edge of the muscle band is grasped with two fingers while the muscle is injected. The needle is placed deeply into the muscle, between the fingers and perpendicular to the muscle fibers. Approximately 3 to 5 BU is injected into each injection site, for a total of 15 BU per band or 35 to 45 DU per band. A series of approximately three injections is placed down the length of the band approximately 1.5 to 2.0 cm apart. If lateral bands are prominent on full contraction, then these can be injected in the same fashion, though they may need fewer units. Begin injections at the cervicomental angle and work inferiorly, staying approximately 2.0 to 2.5 cm below the mandibular border so as not to affect the upper facial muscles of expression.

Precautions

Over-injection in this region may affect the muscles involved in swallowing. Bruising is not uncommon.

Post-Injection Instructions

Hold pressure to prevent bruising.

Risks

- Patients with a heavy neck may not be good candidates for this procedure, as the results of injection may not be impressive and may need the fat addressed first.
- Over-injection of BoNTA in this region can result in dysphagia or dysphonia.

Pearls of Injection

Although very effective for some patients, the results can be short-lived and can require large doses. This technique may need to be combined with submandibular gland injection for optimal neck contouring (see also Chapter 26). Appropriate surgical candidates should be given the option for lower face and neck lift surgery.

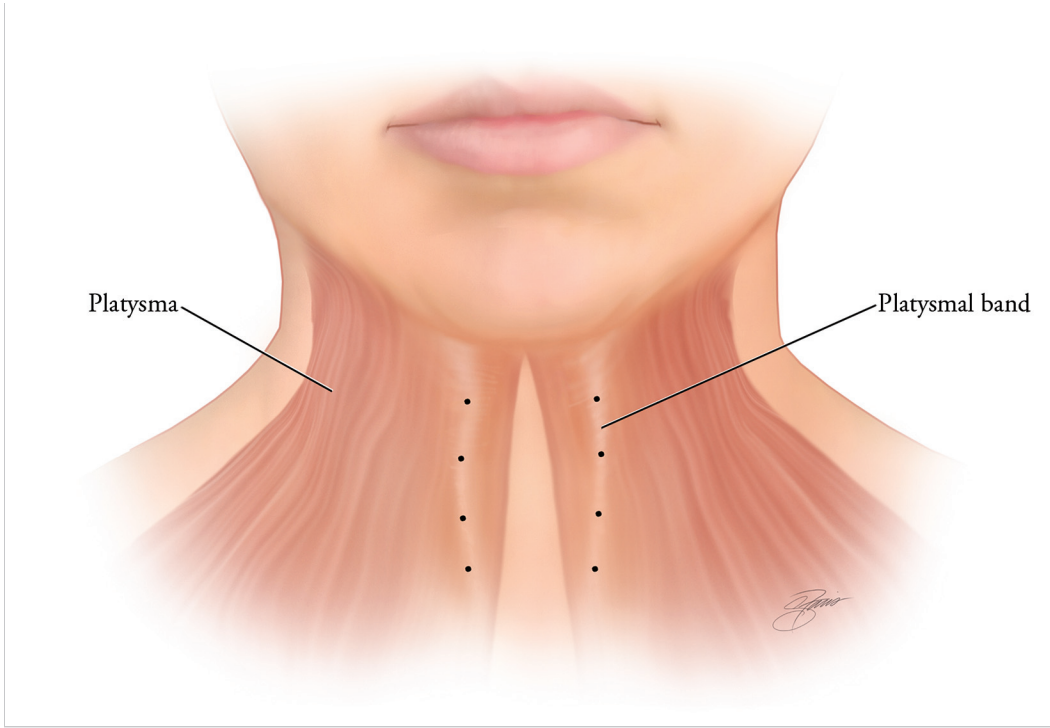


Fig. 20.1 A 1-inch (2.5-cm) or longer needle is usually required to place BoNTA well into the muscle of each platysmal band. Grasp the muscle during injection to ensure intramuscular injection.

Additional Reading

[1] Carruthers J, Fagien S, Matarasso SL, Botox Consensus Group. Consensus recommendations on the use of botulinum toxin type A in facial aesthetics. Plast Reconstr Surg. 2004; 114(6) Suppl:1S–22S

[2] Matarasso A, Matarasso SL, Brandt FS, Bellman B. Botulinum A exotoxin for the management of platysma bands. Plast Reconstr Surg. 1999; 103(2):645–652, discussion 653–655

[3] Prager W, Bee EK, Havermann I, Zschocke I. IncobotulinumtoxinA for the treatment of platysmal bands: a single-arm, prospective proof-of-concept clinical study. Dermatol Surg. 2015; 41 Suppl 1:S88–S92

21
Neurotoxin Injection for Necklace Lines

Difficulty: ●●
Patient Satisfaction: ●
Risk: ●

Indications

Horizontal lines of the neck are noted at rest and can deepen with aging.

Anatomic Considerations

These lines occur due to the dermal attachments of the superficial musculoaponeurotic system (SMAS). They are seen in the neck from birth but can increase and deepen during the aging process. Treatment of these areas will soften the lines in this area but not completely remove them.

Injection Technique

This is an intradermal injection. One or 2 BU is injected at 1.0- to 1.5-cm intervals along the horizontal crease. There should be a wheal of product in the skin. Do not use more than 15 to 20 units per treatment session.

Precautions

Deep injection may affect the muscles involved in swallowing.

Post-Injection Instructions

None. Bruising is unlikely.

Risks

Because the swallowing muscles are cholinergic, overtreatment of this area can result in a weak or diminished swallow.

Pearls of Injection

- Stay intradermal: do not inject deeply.
- Proceed slowly; try half the suggested dose first.
- Inform the patient that this is only a subtle improvement.
- Do not overtreat.
- Inform the patient of the risk of diminished swallowing.

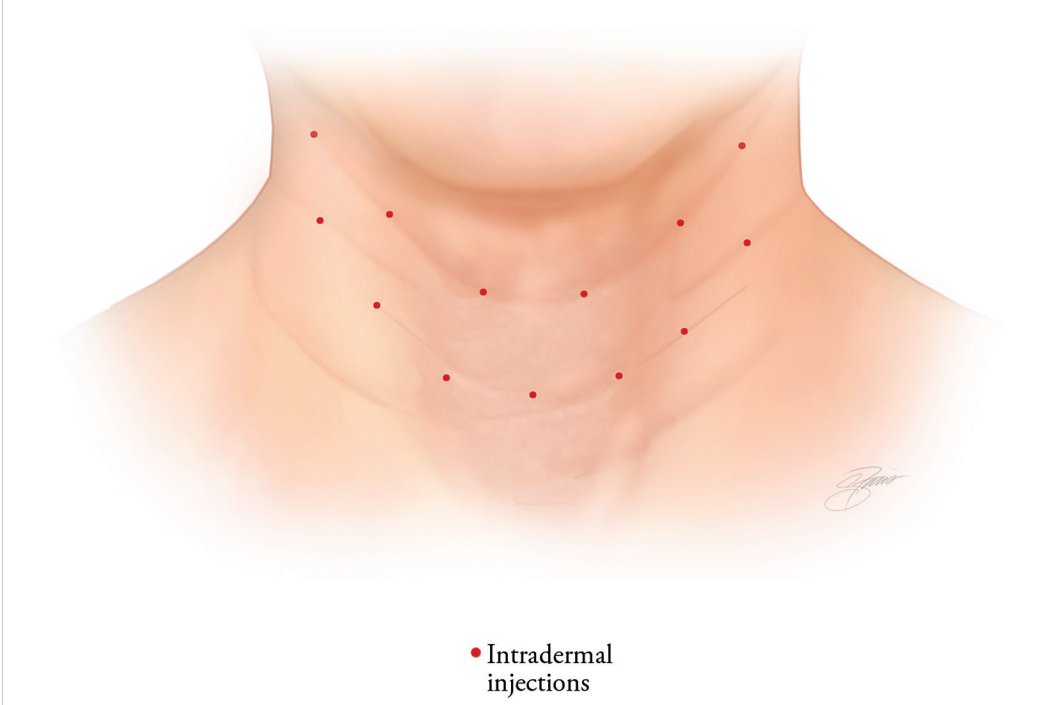


Fig. 21.1 Superficial injections of BoNTA are placed at 1.0- to 1.5-cm intervals along the crease to soften "necklace lines" of the neck.

Additional Reading

[1] Carruthers J, Carruthers A. Aesthetic botulinum A toxin in the mid and lower face and neck. Dermatol Surg. 2003; 29 (5):468–476

22
Neurotoxin Injection for the Décolleté

Difficulty: ●●
Patient Satisfaction: ●
Risk: ●

Indications

Vertical wrinkles can emanate from the cleavage area superiorly, especially when the arms are crossed. These wrinkles can be mild in younger patients, yet become deep-set creases in older patients. Such wrinkles may be troublesome to women who like to wear blouses or dresses with low necklines.

Anatomic Considerations

The platysma muscle originates in the chest attaching to the fascia of the pectoralis major muscles generally at the level of the second interscostal space. In some patients, this origination can be lower and contributes to the presence of décolleté lines.

The skin of the chest is often quite photodamaged, and complete treatment of the décolleté may involve a combination of skin care and intense pulsed light (IPL) treatments.

Injection Technique

This is not a painful injection; either no anesthesia or topical anesthesia can be used. Neurotoxin is placed in a V-shaped pattern starting at the cleavage and extending upward toward the clavicle. The injection sites are separated by approximately 2 cm, and usually 10 to 12 injections are placed. Each injection should deposit approximately 3 to 5 BU or 7 to 10 DU for a total of approximately 30 to 50 BU or 70 to 100 DU. The injections are placed approximately 4 mm deep (which is half the length of the needle if using the BD syringe) and oriented perpendicular to the skin. If longer needles are used, then care must be taken not to go too deep. The needle can be oriented tangentially to deposit the BONT-A in the deep subcutaneous-muscle level.

Precautions

This is a very safe procedure, so long as lengthy needles are not inserted deeply into the chest. Often mild bruising results from this procedure.

Post-Injection Instructions

None.

Risks

Ideal patient selection is important for patient satisfaction. Some older patients have décolleté lines due to sleeping on their sides (sleep creases), and these will not improve with neurotoxin injection.

Pearls of Injection

- Patient selection is important for patient satisfaction.

- Results can sometimes be improved by also treating the platysmal bands of the neck (see also Chapter 20).
- Adjuvant treatment can be achieved with filler to the décolleté (see also Chapter 65).

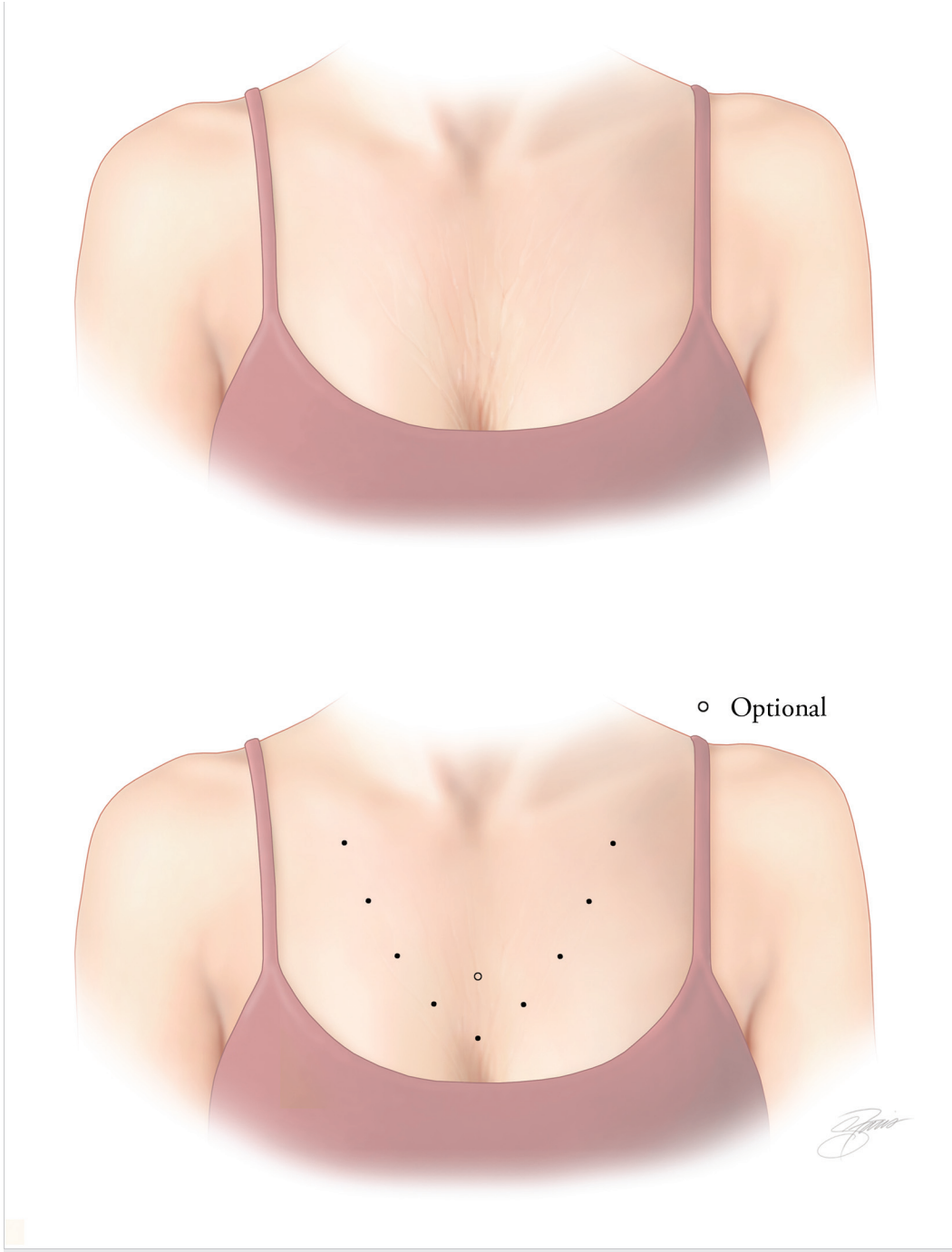


Fig. 22.1 Injection pattern to treat the décolleté with BoNT-A. Open circles denote optional injection sites.

Additional Reading

[1] Ascher B, Talarico S, Cassuto D, et al. International consensus recommendations on the aesthetic usage of botulinum toxin type A (Speywood Unit)–Part II: Wrinkles on the middle and lower face, neck and chest. J Eur Acad Dermatol Venereol. 2010; 24(11):1285–1295

[2] Becker-Wegerich PM, Rauch L, Ruzicka T. Botulinum toxin A: successful décolleté rejuvenation. Dermatol Surg. 2002; 28 (2):168–171

23
Neurotoxin Injection for Nefertiti Neck Lift

Difficulty: ●●●
Patient Satisfaction: ●
Risk: ●●

Indications

Queen Nefertiti of Ancient Egypt is referred to as one of the most beautiful women to have ever lived. Images of Nefertiti generally bring to mind a very graceful neck and a sculpted jawline, based on the famed 3,300-year-old bust found in Egypt in 1912 and now displayed in Berlin. In selected patients, the "Nefertiti neck lift" procedure uses BoNTA to increase the definition of the mandible.

Anatomic Considerations

The platysma muscle is a neck depressor. It originates at the clavicle and fascia of the upper chest and inserts onto the mandible and skin of the chin and cheek. Release of the downward pull of the platysma will allow the facial elevators to elevate the sagging skin over the lower face and more clearly define the mandibular border.

Injection Technique

Patient selection is extremely important when performing this procedure. Patients who desire a more defined mandibular contour should be assessed for the extent of platysmal pull on their lower face. It is suggested that the patient be asked to contract the platysma muscles; if the mandibular border becomes less visible, then this patient is a good candidate for the procedure.

Injections of BoNTA are placed along the inferior aspect of the mandible and in the upper aspect of the strongest lateral platysmal band. Injections are deep into the muscle; approximately 14 to 20 BU (or 42 to 60 DU) is used per side in equal injections.

Precautions

Extending these injections too far medially can affect the depressor labii inferioris and cause a lip droop or asymmetric smile. Do not inject medial to a line drawn down from the lateral extent of the nasolabial fold to the mandible.

Post-Injection Instructions

None.

Risks

Over-injection of this area can result in dysphagia or an irregular smile. Excessive pull upward on the lower face can result in irregular bunching of the tissue over the mandible.

Pearls of Injection

- This technique is difficult to perform well and should be done only by experienced injectors.
- Careful patient selection and meticulous technique are imperative.
- Stay low and lateral on the mandible to avoid complications.
- Results may last up to 6 months.

Fig. 23.1 Photograph of the famed Queen Nefertiti bust, crafted circa 1345 BC in Egypt and unearthed in 1912. (Courtesy of Album/Art Resource, NY)

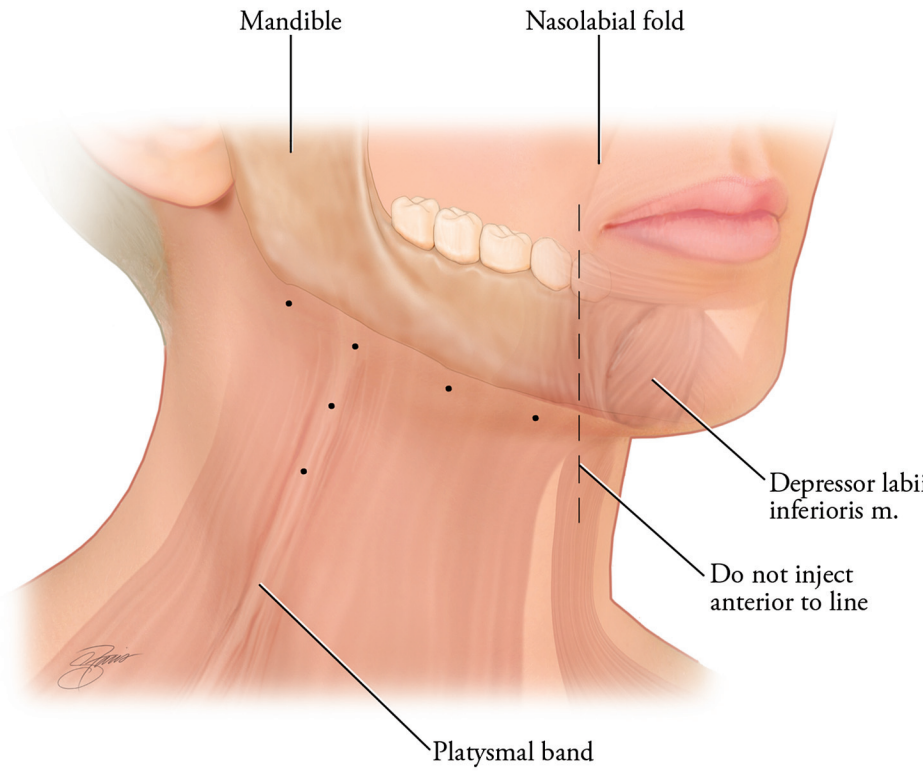


Fig. 23.2 Injections of BoNTA should be placed along the inferior aspect of the mandibular border and into the strongest platysmal band noted during contraction. Stay lateral to avoid weakening the depressor labii inferioris muscle.

Additional Reading

[1] Levy PM. The 'Nefertiti lift': a new technique for specific re-contouring of the jawline. J Cosmet Laser Ther. 2007; 9 (4):249–252

[2] Levy PM. Neurotoxins: current concepts in cosmetic use on the face and neck–jawline contouring/platysma bands/ necklace lines. Plast Reconstr Surg. 2015; 136(5) Suppl:80S–83S

24
Neurotoxin Injection for Masseter Hypertrophy

Difficulty: ●●●
Patient Satisfaction: ●●
Risk: ●●

Indications

Square jaw lines and wide mandibular borders are often desirable masculine characteristics but can be unattractive for women and become exaggerated when anatomic hypertrophy exists. Bruxism (teeth grinding), anxiety, and clenching can lead to masseter muscle enlargement and accentuate the horizontal width of the mandibular border. Occasionally patients, especially of East Asian descent, express concern about hypertrophic masseter muscles and request improvement in this area.

Anatomic Considerations

The masseter muscle's origin is along the inferior aspect of the anterior zygomatic arch, and it inserts into the angle of the mandible along both the horizontal (body) and the vertical portions of the mandible (ramus).

Injection Technique

Two different techniques for injecting the muscle can be attempted: intraoral or transcutaneous. In the intraoral technique, the injector's thumb is placed inside the mouth along the buccal mucosa until the angle of the mandible is palpated, and the patient is asked to bite down (but not on the injector's thumb!). The anterior edge of the masseter muscle is palpated between the thumb and fingers of the same hand resting outside on the cheek. A 1-inch (2.5-cm), 30-gauge needle is passed intraorally anterior to the mandibular ramus and into the muscle belly. This will be somewhat uncomfortable for the patient. BoNTA is injected in a retrograde fashion as the needle is withdrawn. Two to four passes are performed in several tangential intramuscular injections for a total of 20 BU (or 60 DU) to the muscle.

In the transcutaneous technique, it is useful to place one finger along the lower border of the mandible, one along the vertical border of the mandible, and one as a reference at the inner aspect of the mandibular angle, with the patient clenching as a way to mark out the perimeter of the muscle. With a half- or ¾-inch (1.3 or 1.9 cm) needle or longer, injection can be performed inside that perimeter down to just above the bone, and depot injections of 4 to 5 units can be placed per area. An average of 20 units should be used depending on the mass of the muscle being treated.

Precautions

Care must be taken to keep the injections low and posterior, and centered in the

muscle itself. If placed too far anteriorly, the smile may be affected by diffusion into the zygomaticus major or risorius muscles.

Post-Injection Instructions

Holding pressure and gentle massage help to prevent bruising. It can take up to a month for atrophy of the muscle to occur.

Risks

Improper injection into surrounding muscles can result in swallowing and speech disorders. Over-injection of the masseter is unlikely to result in problems with bite or chewing because the temporalis muscle, one of the strongest primary muscles of mastication, is unaffected. Over-injection can lead to masseteric and parotid atrophy, with excessive hollowing of the preauricular area. Undertreatment can be re-treated with more product and can be tested by asking the patient to clench while you palpate the masseter.

Pearls of Injection

- Reduction of muscle hypertrophy and mandibular width narrowing occur gradually and it may take 6 weeks to see the full effect.
- If not adequately improved, touch-up treatments may be required approximately 6 weeks after the initial treatment.
- Adjust injection amounts accordingly for patients with asymmetric muscle hypertrophy.
- Results can last 6 to 12 months.

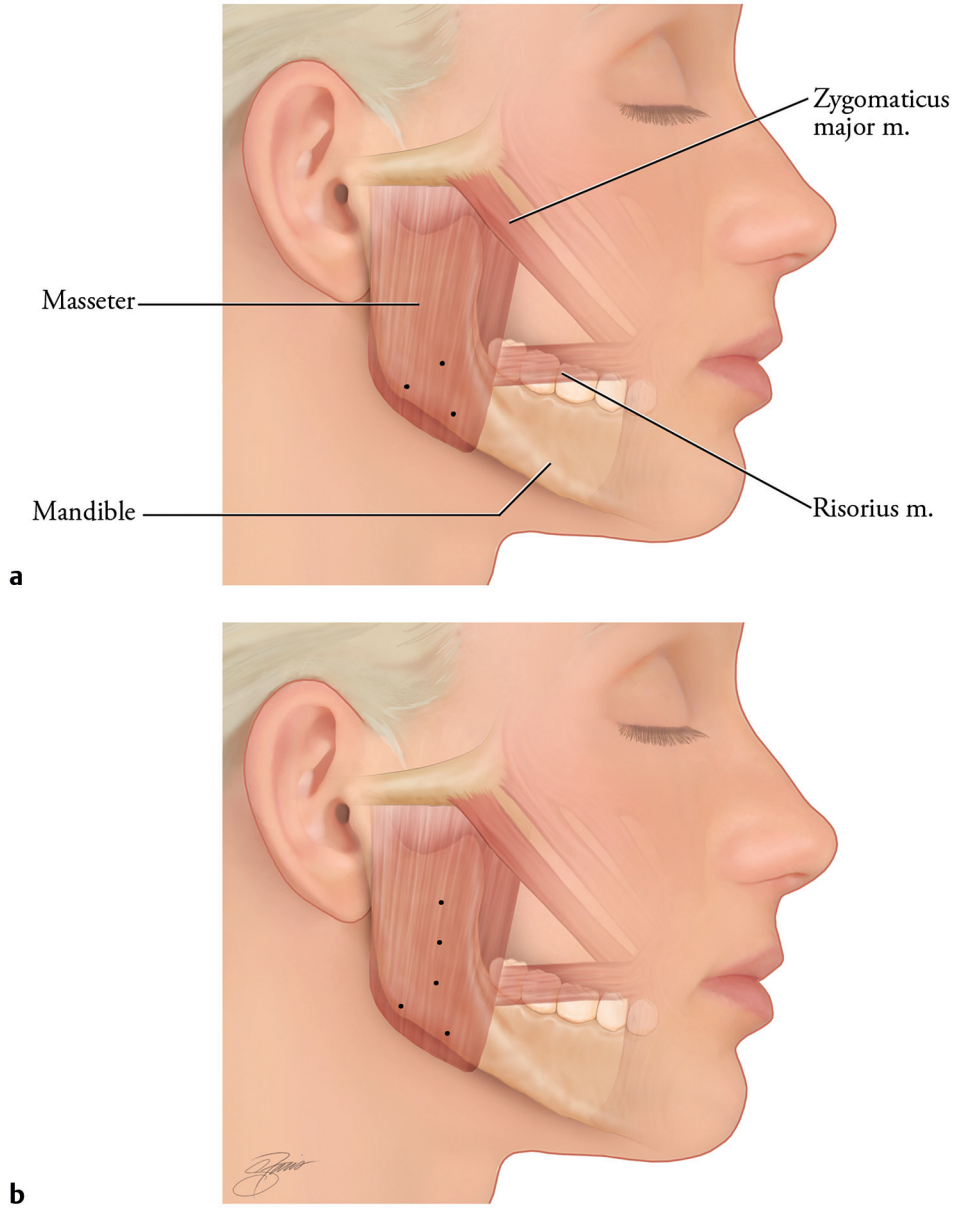


Fig. 24.1 (**a,b**) Possible injection patterns for transcutaneous BoNTA injection for the treatment of masseter hypertrophy.

Additional Reading

[1] Choe SW, Cho WI, Lee CK, Seo SJ. Effects of botulinum toxin type A on contouring of the lower face. Dermatol Surg. 2005; 31(5):502–507, discussion 507–508

[2] Wu WT. Botox facial slimming/facial sculpting: the role of botulinum toxin-A in the treatment of hypertrophic masseteric muscle and parotid enlargement to narrow the lower facial width. Facial Plast Surg Clin North Am. 2010; 18(1):133–140

[3] Yu CC, Chen PK, Chen YR. Botulinum toxin a for lower facial contouring: a prospective study. Aesthetic Plast Surg. 2007; 31(5):445–451, discussion 452–453

25
Neurotoxin Injection for Parotid Gland Hypertrophy

Difficulty: ●●●●
Patient Satisfaction: ●●
Risk: ●●●

Indications

Hypertrophy of the parotid gland can be caused by many different factors. Ruling out neoplasms and other diseases should be undertaken before beginning treatment to shrink the gland with BoNTA. Benign glandular enlargement from aging and xerostomia conditions are sometimes appropriate indications for neurotoxin injection. HIV patients can develop lymphoepithelial enlargement of the parotid, and bulimic patients can also develop benign parotid enlargement.

Anatomic Considerations

The parotid gland rests anterior to the ear, beneath the superficial musculoaponeurotic system (SMAS) and platysma muscles, over the lateral mandible. The external carotid artery and posterior facial vein pass just posterior to the gland. The five branches of the facial nerve, which provides motor innervation to facial mimetic musculature, pass through the middle of the gland.

Injection Technique

A 30-gauge, 1-inch (2.5-cm) needle is inserted perpendicular to the gland, and 20 to 30 BU (or 60 to 90 DU) of BoNTA is injected as the needle is withdrawn via several passes through the parenchyma of the gland. It is definitely discernable that the needle has entered the firmer body of the gland after passing through the SMAS/platysma muscle. Patients will also be able to sense when the needle is in the gland as they will feel an electric or tingling sensation that is clearly different from what they felt before the needle passed into the gland. It is necessary to use a longer needle (1 inch/2.5 cm) to reach the gland.

Precautions

Injection above the gland and through the mandibular notch can lead to neurotoxin spread into the lateral pterygoids, which assist in jaw opening and contralateral jaw thrust.

Post-Injection Instructions

Holding pressure and gentle massage helps to prevent bruising. It can take up to a month for involution and shrinking of the gland to occur. Shrinkage of 20 to 30% can be seen, often lasting 6 months or longer. Repeat treatments can be expected. If cosmetic narrowing of the lower third of the face is desired, then injection of the masseter muscle should be undertaken at the same time (see also Chapter 24).

Risks

Improper injection into surrounding muscles can result in swallowing and speech disorders. Hematoma or major bruising could result from injury to one of the large vessels near the gland. Because BoNTA's action is at the neuromuscular junction, injection in this region does not risk facial paralysis.

Pearls of Injection

- Turning the patient's head slightly upward and away from the side of injection, and grasping either side of the gland with the thumb and first finger to stabilize it, will help ensure proper placement of the neurotoxin.

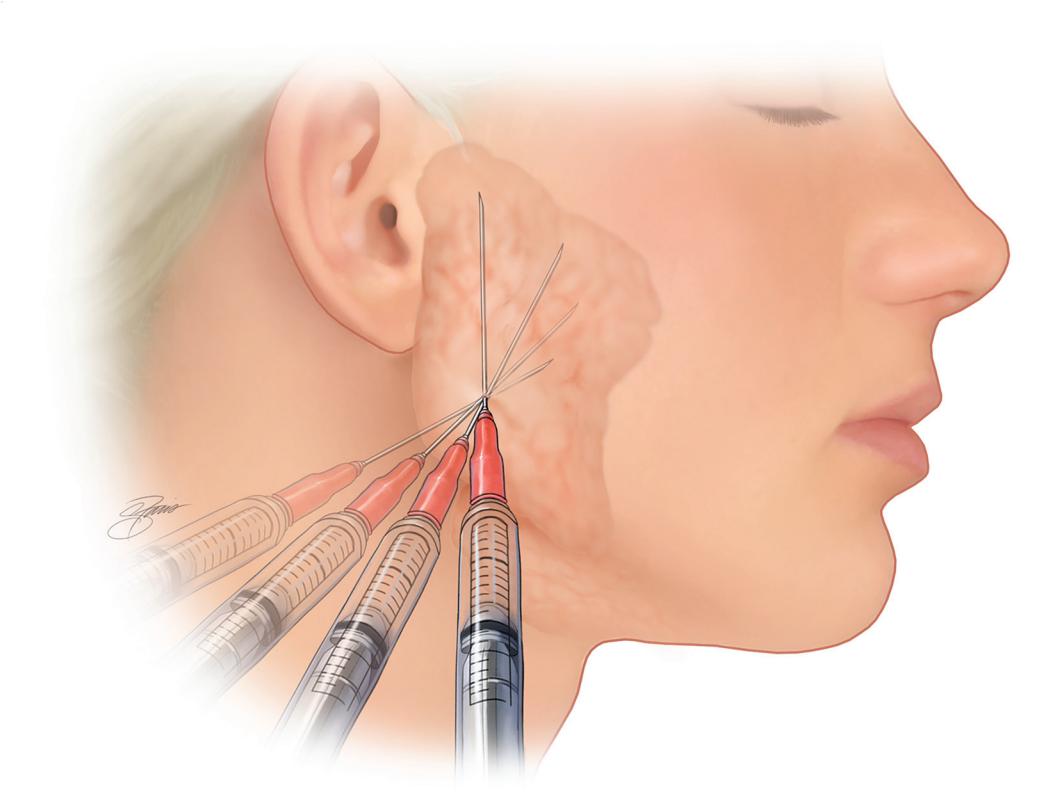


Fig. 25.1 BoNTA is injected into the body of the parotid gland by using a fanning technique to reduce gland hypertrophy.

Additional Reading

[1] Bae GY, Yune YM, Seo K, Hwang SI. Botulinum toxin injection for salivary gland enlargement evaluated using computed tomographic volumetry. Dermatol Surg. 2013; 39(9):1404–1407

[2] Wu WT. Botox facial slimming/facial sculpting: the role of botulinum toxin-A in the treatment of hypertrophic masseteric muscle and parotid enlargement to narrow the lower facial width. Facial Plast Surg Clin North Am. 2010; 18 (1):133–140

26
Neurotoxin Injection for Submandibular Gland Hypertrophy

Difficulty: ●●●●
Patient Satisfaction: ●●
Risk: ●●●

Indications

Ptosis or hypertrophy of the submandibular glands can be seen with aging. Post-necklift/facelift and liposuction patients are often left with more elegant jaw lines; however, ptotic submandibular glands can be unmasked, which can produce an unsightly lump on an otherwise smooth neck. Benign hypertrophy of the submandibular glands can be treated with BoNTA.

Anatomic Considerations

The submandibular glands are located under the mandible, beneath the platysma muscle, 2 to 3 cm posterior from midline, on each side of the neck. The facial artery passes just posterior to the gland, the marginal mandibular branch of the facial nerve passes over the capsule of the gland, and the facial vein passes around the gland's posterior aspect. Deep to the gland are pharyngeal muscles and muscles of the floor of the mouth and base of the tongue.

Injection Technique

Botulinum toxin (12 to 15 BU, or 36 to 45 DU, per gland) is injected in a retrograde fashion via several passes through the parenchyma of the gland. The injector should "feel" that the needle has entered the firmer body of the gland after passing through the platysma. Patients will be able to sense when the needle is in the gland as they will feel an electric or tingling sensation that is clearly different from what they felt before the needle passed into the gland. It is necessary to use a longer needle (1.0 to 1.5 inch/2.5 to 3.8 cm) to enter the gland.

Precautions

Injection into surrounding structures may result in significant side effects, including bleeding, hematoma, intravascular injection, swallowing dysfunction, and tongue movement disorders. Care must be taken to ensure that the BoNTA is injected into the body of the gland.

Post-Injection Instructions

Holding pressure over the injection site and gentle massage help to prevent bruising. It can take up to a month for involution and shrinking of the gland to occur. Shrinkage of 30 to 60% can be seen.

Risks

Improper injection into surrounding muscles can result in swallowing and speech disorders or even aspiration.

Hematoma or major bruising could result from injury to one of the facial vessels near the gland.

Pearls of Injection

- Proper placement of BoNTA can be ensured by turning the patient's head slightly upward and away from the side of injection. The gland should be grasped and stabilized during injection.
- Reflux on the syringe prior to injection prevents intravascular injection.

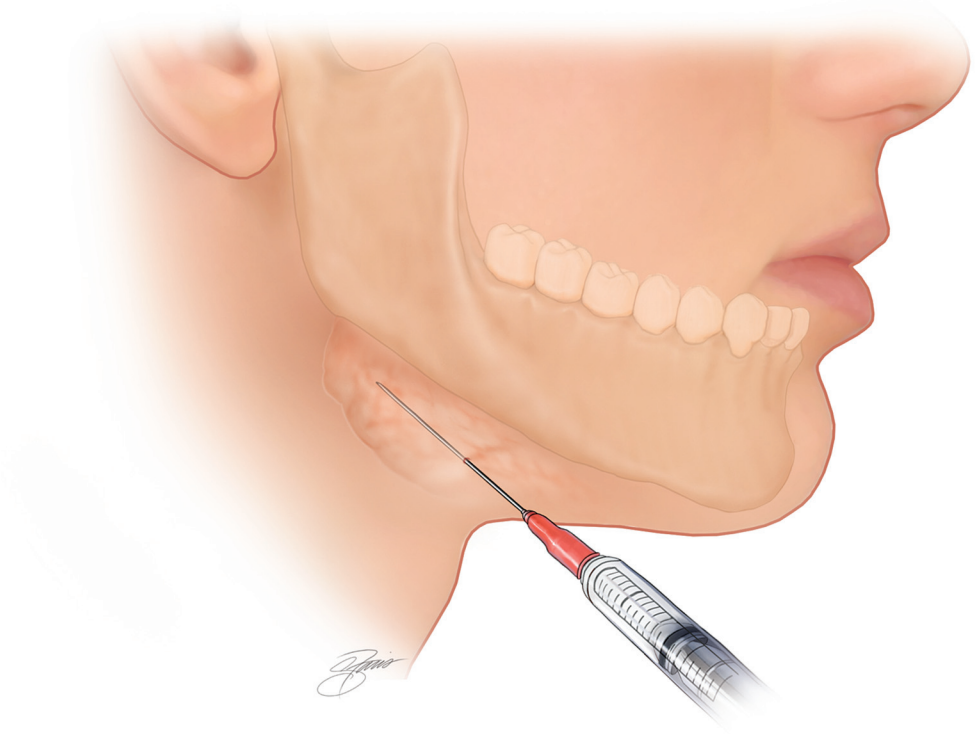


Fig. 26.1 A long needle is used for injecting BoNTA into the body of the submandibular gland to improve submandibular gland hypertrophy.

Additional Reading

[1] Bae GY, Yune YM, Seo K, Hwang SI. Botulinum toxin injection for salivary gland enlargement evaluated using computed tomographic volumetry. Dermatol Surg. 2013; 39(9):1404–1407

27
Neurotoxin Injection for Gustatory Sweating (Frey Syndrome)

Difficulty: ●●●●
Patient Satisfaction: ●●
Risk: ●●

Indications

Gustatory sweating can be seen after superficial parotidectomy. These patients notice mild to profuse sweating of the cheek during meals.

Anatomic Considerations

Acetylcholine, the neurotransmitter blocked by botulinum toxin, is released when eating, and it stimulates secretion of saliva by the salivary glands. When the gland has been partially resected, such as in superficial parotidectomy, the acetylcholine is released and diffuses to the skin, where it stimulates the sweat glands. These patients notice sweating of the cheek skin overlying the parotid bed.

The starch-iodine test is useful when first treating these patients because the pattern of sweating may not be predictable. On subsequent treatments, once the injector has developed an idea of the affected sites, further treatments may be performed without repeating the starch-iodine test. It can also be utilized for touch-up treatments in order to identify areas that require re-treatment.

If the starch-iodine test can be performed prior to injection, then povidone iodine (Betadine) is painted over the cheek on the side of the parotidectomy and is left for a few minutes to air dry. The Betadine application should extend over the mandible into the neck, onto the ear, and into the temporal hairline. Corn starch (available from a grocery store) is sprinkled lightly onto the cheek; a large makeup brush works well for this application. The patient may need to suck on a piece of sour candy to stimulate the salivary glands. The areas of sweating will cause the cornstarch to turn black, and a grid is drawn in the area of the sweating. The area is marked with a surgical marker, then the starch and iodine are cleaned prior to injection.

Injection Technique

This is a slightly uncomfortable procedure, and is generally well tolerated by pre-treating with topical anesthetics. Usually 30 to 50 BU or 100 to 150 DU may be necessary for this treatment. The product is injected into the dermis in small wheals separated by 1.0 to 1.5 cm. Each injection is 0.05 to 0.1 mL, or approximately 1 to 2 units per injection.

Precautions

Care must be taken to maintain the level of injection into the dermis.

Post-Injection Instructions

None.

Pearls of Injection

- Inject in a grid pattern and inject superficially.
- Wait at least 2 weeks for maximum response before considering a touch-up.
- Weakening of the facial mimetic muscles is unlikely and can be prevented by keeping injections lateral to the anterior border of the masseter muscle.

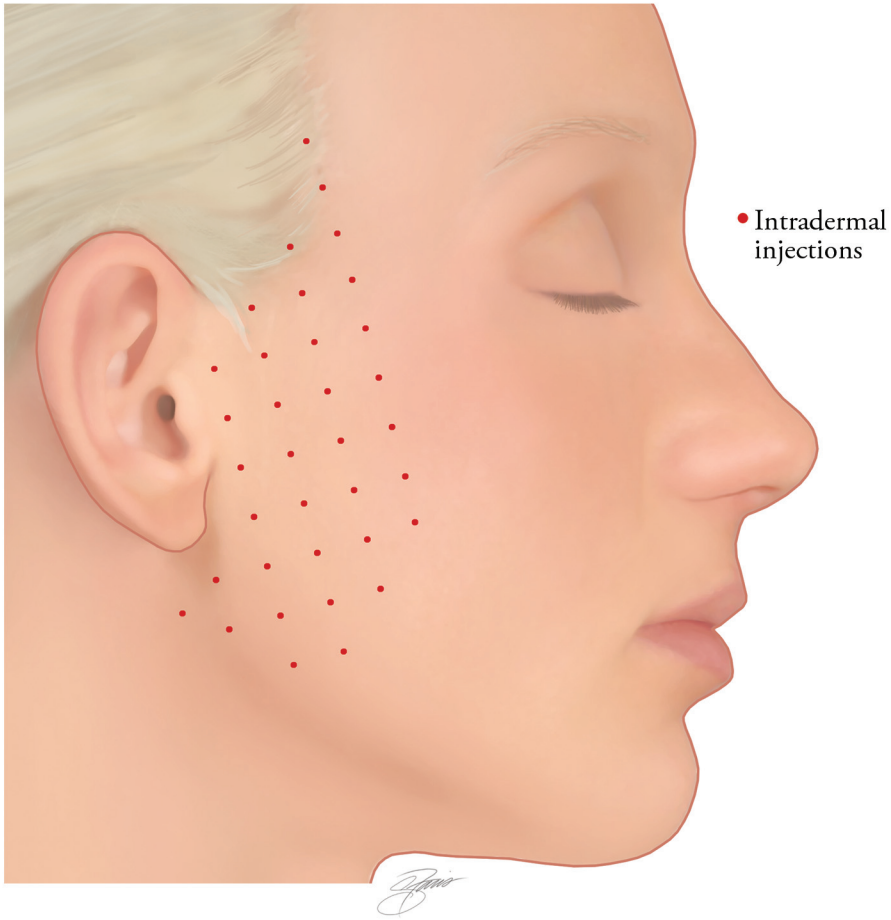


Fig. 27.1 A starch-iodine test is used to delineate the areas of gustatory sweating, and BoNTA is injected intradermally in a grid-like pattern at the sites of maximum sweating.

Additional Reading

[1] Arad-Cohen A, Blitzer A. Botulinum toxin treatment for symptomatic Frey's syndrome. Otolaryngol Head Neck Surg. 2000; 122(2):237–240

[2] Guntinas-Lichius O. Management of Frey's syndrome and hypersialorrhea with botulinum toxin. Facial Plast Surg Clin North Am. 2003; 11(4):503–513

[3] Xie S, Wang K, Xu T, Guo XS, Shan XF, Cai ZG. Efficacy and safety of botulinum toxin type A for treatment of Frey's syndrome: evidence from 22 published articles. Cancer Med. 2015; 4(11):1639–1650

28
Neurotoxin Injection for Profusely Sweating Underarms

Difficulty: ●●
Patient Satisfaction: ●●●
Risk: ●

Indications

Profuse sweating of the armpits can be treated with BoNTA. Results of treatment are impressive and can last up to a year.

Anatomic Considerations

Neurotoxins act by preventing release of acetylcholine from nerve endings at the neuromuscular junction, the effect of which is to inhibit muscle contraction. Acetylcholine is also the neurotransmitter for the sweat glands. Injection of botulinum toxin into sweat glands will prevent sweating and is an excellent treatment for patients who complain of profuse underarm sweating. The starch-iodine test can be performed prior to injection. The axilla is painted with Betadine and is left for a few minutes to air dry. Corn starch (available from a grocery store) is sprinkled lightly onto the axilla; a large makeup brush works well for this application. The areas of sweating will cause the cornstarch to turn black. The treatment area is marked with a surgical marker, and the starch and iodine are cleaned prior to injection.

This is a messy procedure and often unnecessary because most sweating usually occurs in the hair-bearing skin of the axilla. Touch-up treatments are occasionally required several weeks later if not all areas were adequately treated. A starch–iodine test can be helpful in these cases.

Injection Technique

This is a relatively painless procedure, well tolerated without the use of topical anesthetics. Usually 100 BU or 300 DU is used for this treatment, divided evenly for each axilla. The product is injected into the dermis in small wheals separated by 1.0 to 1.5 cm. Each injection is 0.05 to 0.1 mL, or approximately 1 to 2 BU or 3 to 6 DU per injection.

Precautions

Care must be taken to maintain the level of injection into the dermis. Deep injection may weaken the muscles of the arm. Deep injection also will not adequately treat the sweat glands, which lie in the dermis.

Post-Injection Instructions

None.

Pearls of Injection

- Inject in a grid pattern, into the hair-bearing areas of the axilla.
- The injector may make use of the starch-iodine test for more accurate injections or for touch-up treatments.
- Wait at least 2 weeks for maximum response before considering a touch-up.

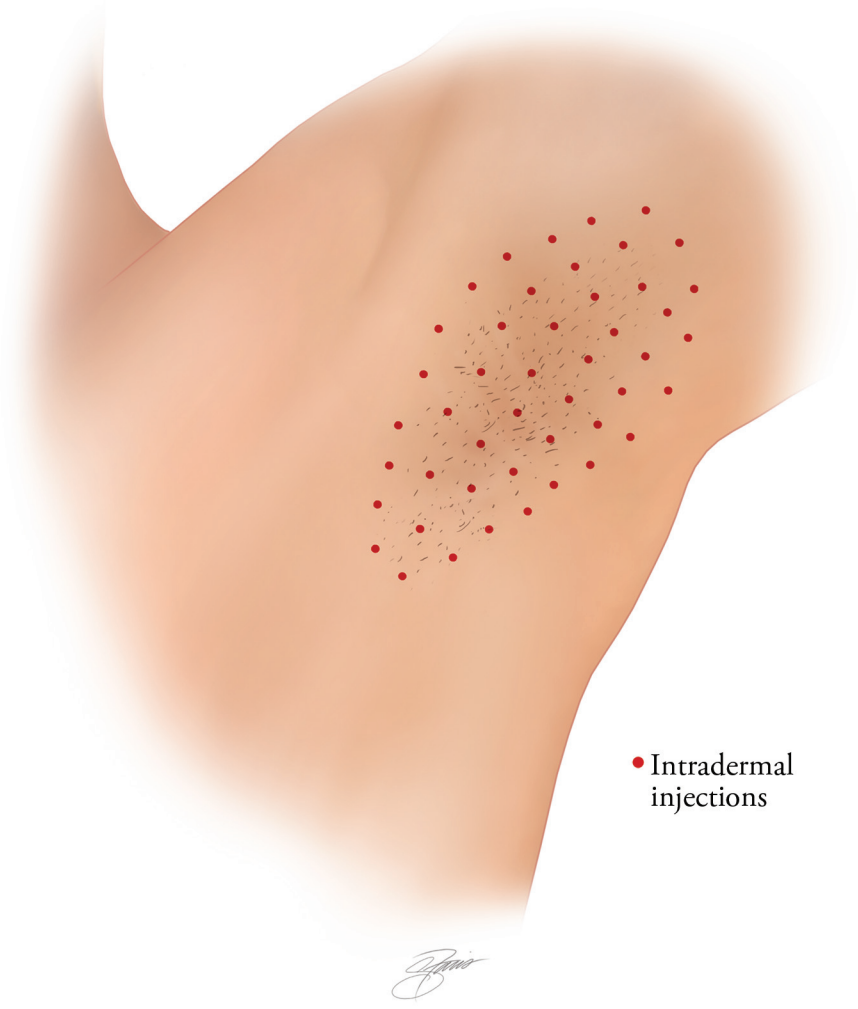


Fig. 28.1 Injection of BoNTA in the axilla is intradermal and placed in a grid-like pattern with injections separated by 1.0 to 1.5 cm. If a starch-iodine test is not performed, injections should be placed in the hair-bearing area.

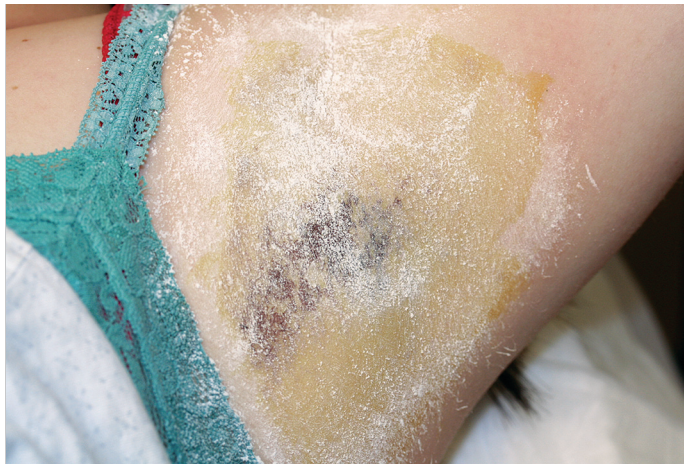


Fig. 28.2 Corn starch is lightly brushed on the area that has been painted with Betadine.

Fig. 28.3 The injection grid is placed in the areas of maximum sweating, denoted by the dark areas.

Additional Reading

[1] Cohen JL, Solish N. Treatment of hyperhidrosis with botulinum toxin. Facial Plast Surg Clin North Am. 2003; 11(4):493–502

[2] de Almeida AR, Montagner S. Botulinum toxin for axillary hyperhidrosis. Dermatol Clin. 2014; 32(4):495–504

[3] Doft MA, Hardy KL, Ascherman JA. Treatment of hyperhidrosis with botulinum toxin. Aesthet Surg J. 2012; 32 (2):238–244

[4] Naver H, Swartling C, Aquilonius S-M. Palmar and axillary hyperhidrosis treated with botulinum toxin: one-year clinical follow-up. Eur J Neurol. 2000; 7(1):55–62

29
Neurotoxin Injection for Profusely Sweating Scalp and Forehead

Difficulty: ●●
Patient Satisfaction: ●●●
Risk: ●

Indications

Profuse sweating of the forehead and scalp is a bothersome problem for some individuals, especially postmenopausal women.

Anatomic Considerations

Injection of neurotoxin into the sweat glands prevents their action and can reduce sweating. These injections must be placed intradermally for maximal effect. Patients can usually identify the region of their scalp and forehead that produces the troublesome sweating. Often these areas are based along the hairline and forehead. Although these injections are intradermal, patients receiving injections to the forehead may exhibit some spread to the frontalis muscle; therefore care must be taken in patients with ptotic brows.

Injection Technique

Use of a starch-iodine test for these patients is usually not performed because of the messiness involved if placed in the scalp and hair.

Injections are placed 1.0 to 1.5 cm apart into the dermis, along the hairline and forehead, in the areas of maximal sweating as noted by the patient. Each injection is 0.05 to 0.1 mL, or approximately 1 to 2 BU or 3 to 6 DU. Depending on the area treated, approximately 50 to 100 BU or 150 to 300 DU may be required.

Similar injections can be placed in the back of the head and scalp along the hairline if sweating is noted in those areas.

Precautions

Care must be taken to maintain the level of injection into the dermis. Even if placed correctly, there may be some spread to the frontalis muscle. Likewise, deep injections will not adequately treat the sweat glands.

Post-Injection Instructions

None.

Pearls of Injection

- Have the patient outline the areas of excess sweating.
- Keep the injections intradermal.
- Use caution when treating the forehead in patients with ptotic brows; keep the injections in these patients closer to the hairline.
- Wait at least 2 weeks for maximal response before considering touch-up injections.

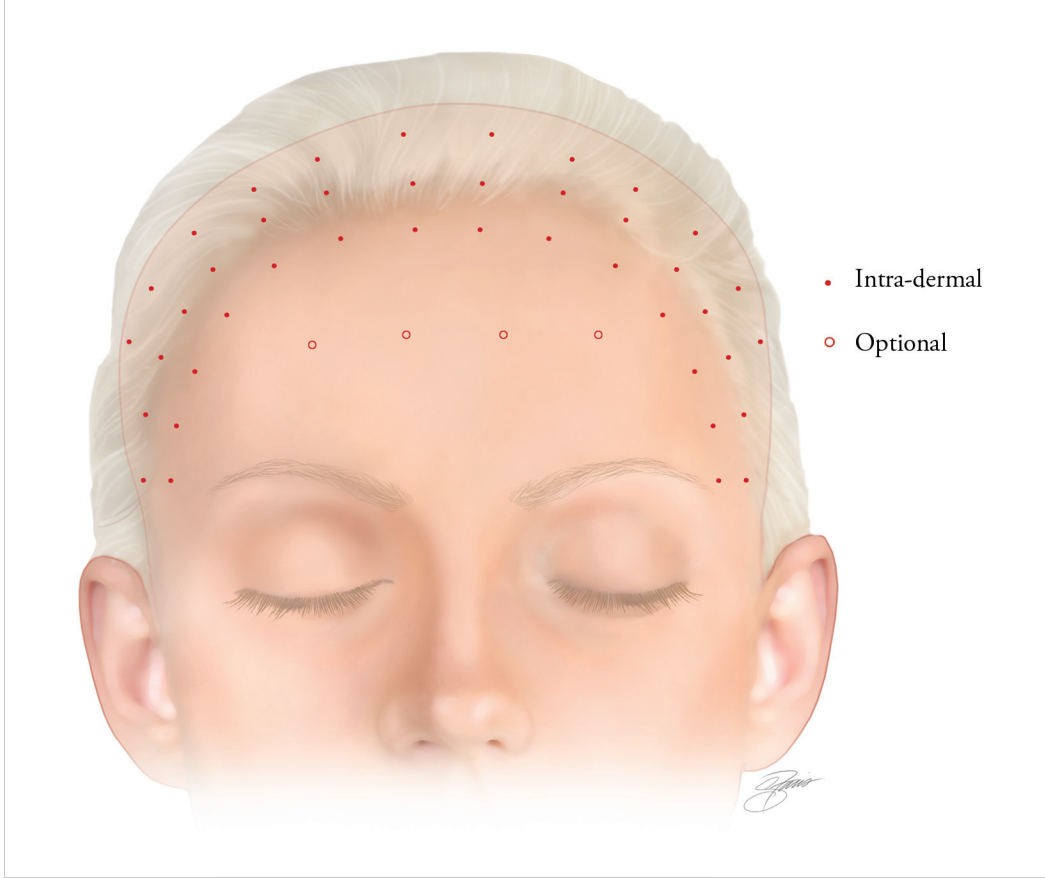


Fig. 29.1 Intradermal injections are placed along the hairline and into the scalp. Injections can also be placed into the forehead. Patient history is the key in determining location of the injection sites.

Additional Reading

[1] Karlqvist M, Rosell K, Rystedt A, Hymnelius K, Swartling C. Botulinum toxin B in the treatment of craniofacial hyperhidrosis. J Eur Acad Dermatol Venereol. 2014; 28(10):1313–1317

30
Neurotoxin Injection for Profusely Sweating Hands

Difficulty: ●●●
Patient Satisfaction: ●●
Risk: ●●

Indications

Profuse sweating of the hands may be treated by BoNTA injections.

Anatomic Considerations

Neurotoxins act by preventing release of acetylcholine from nerve endings at the neuromuscular junction, the effect of which is to inhibit muscle contraction. Acetylcholine is also the neurotransmitter for the sweat glands. Injection of botulinum toxin into sweat glands will prevent sweating and is an excellent treatment for patients who complain of profuse sweating of the hands.

Injection Technique

This is a painful procedure, and sedation or general anesthesia is usually required. Because of the thick skin of the hands, topical anesthetics may not be well absorbed by callused hands. Numbing the hands in ice baths, using a regional block, or even sedation may be necessary.

Usually 100 BU (or 300 DU) is used for this treatment, divided evenly for each hand. The product is injected into the dermis in small wheals separated by 1.0 to 1.5 cm. Each injection is 0.05 to 0.1 mL, or approximately 1 to 2 BU or 3 to 6 DU per injection. Because of the thickness of the skin, a 30- or 26-gauge needle may be necessary.

Precautions

Care must be taken to maintain the level of injection into the dermis. Deep injection may weaken the hand muscles.

Post-Injection Instructions

None.

Pearls of Injection

- Needles dull quickly when used on hands and feet, so multiple needles may be needed.
- Be careful to inject superficially.
- Patients are likely to experience some weakness of the hand muscles during maximal grip, which can last for several weeks post-injection.
- Results can last an average of 6 months.

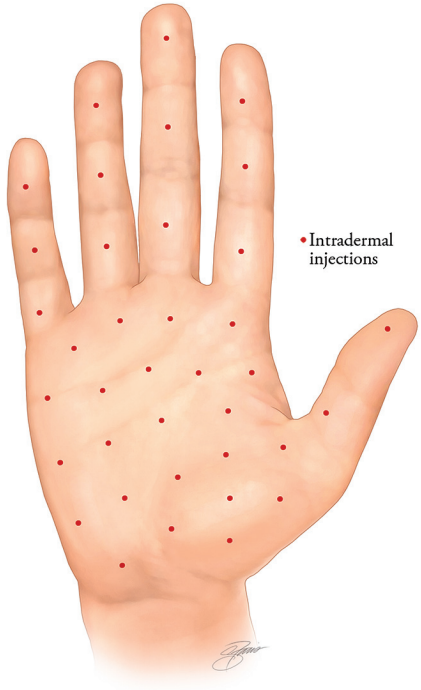


Fig. 30.1 BoNTA is injected in a grid-like pattern on the palmar surface of the hand to reduce profuse sweating.

Additional Reading

[1] Cohen JL, Solish N. Treatment of hyperhidrosis with botulinum toxin. Facial Plast Surg Clin North Am. 2003; 11 (4):493–502

[2] Doft MA, Hardy KL, Ascherman JA. Treatment of hyperhidrosis with botulinum toxin. Aesthet Surg J. 2012; 32 (2):238–244

[3] Weinberg T, Solish N, Murray C. Botulinum neurotoxin treatment of palmar and plantar hyperhidrosis. Dermatol Clin. 2014; 32(4):505–515

[4] Yamashita N, Shimizu H, Kawada M, et al. Local injection of botulinum toxin A for palmar hyperhidrosis: usefulness and efficacy in relation to severity. J Dermatol. 2008; 35 (6):325–329

31
Neurotoxin Injection for Profusely Sweating Feet

Difficulty: ●●●
Patient Satisfaction: ●●
Risk: ●●

Indications

Profuse sweating of the feet.

Anatomic Considerations

Neurotoxins act by preventing release of acetylcholine from nerve endings at the neuromuscular junction, the effect of which is to inhibit muscle contraction. Acetylcholine is also the neurotransmitter for the sweat glands. Injection of botulinum toxin into sweat glands will prevent sweating and is an excellent treatment for patients who complain of profuse sweating of the feet.

Injection Technique

This is a painful procedure, and sedation or general anesthesia is usually required. Because of the increased thickness of the skin, topical anesthetics may not be well absorbed by callused feet. Using a regional block (posterior tibial and sural nerve block) or even sedation anesthesia may be necessary.

Usually 100 BU or 300 DU is injected for this treatment, divided evenly for each foot (occasionally more is necessary for larger feet). The product is injected into the dermis in small wheals separated by 1.0 to 1.5 cm. Each injection is 0.05 to 0.1 mL, or approximately 1 to 2 BU or 3 to 6 DU per injection. Because of the thickness of the skin, a 30- or 26-gauge needle may be necessary.

Precautions

Care must be taken to maintain the level of injection into the dermis. Deep injection may weaken the muscles of the foot.

Post-Injection Instructions

None.

Pearls of Injection

- Needles dull quickly on the hands and feet, so multiple needles may be needed.
- Be careful to inject superficially.
- Results of treatment can last up to a year.

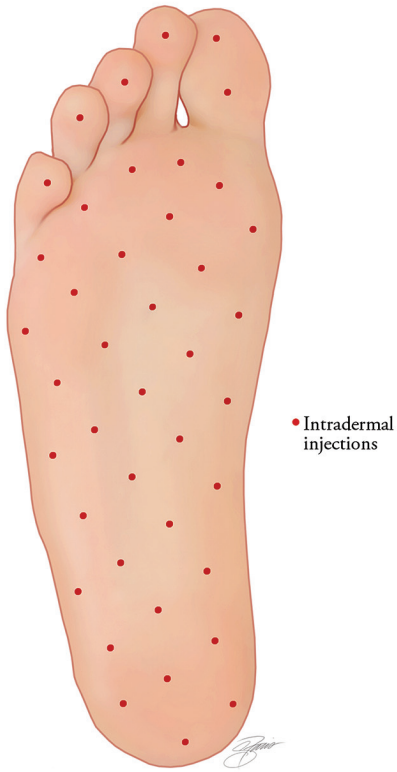


Fig. 31.1 BoNTA is injected in a grid-like pattern on the soles of the feet to reduce profuse sweating.

Additional Reading

[1] Cohen JL, Solish N. Treatment of hyperhidrosis with botulinum toxin. Facial Plast Surg Clin North Am. 2003; 11 (4):493–502

[2] Doft MA, Hardy KL, Ascherman JA. Treatment of hyperhidrosis with botulinum toxin. Aesthet Surg J. 2012; 32 (2):238–244

[3] Weinberg T, Solish N, Murray C. Botulinum neurotoxin treatment of palmar and plantar hyperhidrosis. Dermatol Clin. 2014; 32(4):505–515

32
Neurotoxin Injection for Chronic Migraines

Difficulty: ●●●
Patient Satisfaction: ●
Risk: ●●

Indications

Symptoms of classic migraines may include auras, photophobia, unilateral foci, nausea, and pounding headaches. BoNTA has been used successfully in some patients to reduce the frequency or severity of their headaches. Similarly, BoNTA may be used to treat patients with recurrent tension headaches in the frontal and occipital regions. Botox is the only BoNTA currently FDA approved to treat chronic migraines.

Anatomic Considerations

Individual patients may be able to determine "trigger points" for their headaches. If feasible, try to inject directly into the site of the trigger area. Most often, the glabella, forehead, and lateral brow as well as the temporalis muscle and upper portion of the trapezius muscle as it enters the occiput are the most common areas in which injection can relieve classic or common migraines and tension headaches.

Injection Technique

Topical anesthesia may be used, and ice may be applied, though neither is necessary in most cases. Injection techniques as described herein for the treatment of the glabella, forehead, and lateral brow-lift are used for migraine headache as well. In addition, BoNTA injections of the temporalis muscle may be performed on the offending side.

For the posterior type headaches, trigger points are identified by digital pressure to the back of the neck near the origin of the trapezius muscle. A 1-inch (2.5-cm) needle is then directed into the muscle through the skin, deep toward the bone, and BoNTA is injected into the muscle. Typically 5 to 10 BU (or 15 to 30 DU) is injected into this trigger area and massaged into the muscle after injection.

Precautions

None, outside of normal injection precautions. Be sure that the patient's headaches are confirmed to be migraines.

Post-Injection Instructions

None.

Risks

None; minimal to no bruising.

Pearls of Injection

- Some patients experience immediate relief, although there is a 25% initial placebo effect in most patients.
- Botox has been FDA-approved for the treatment of chronic migraine pain and has been shown to reduce the number of painful days in a percentage of migraine sufferers.
- In those patients for whom this treatment is effective, results can last 3 to 6 months and can be profound. In others, there can be no noticeable results at all.

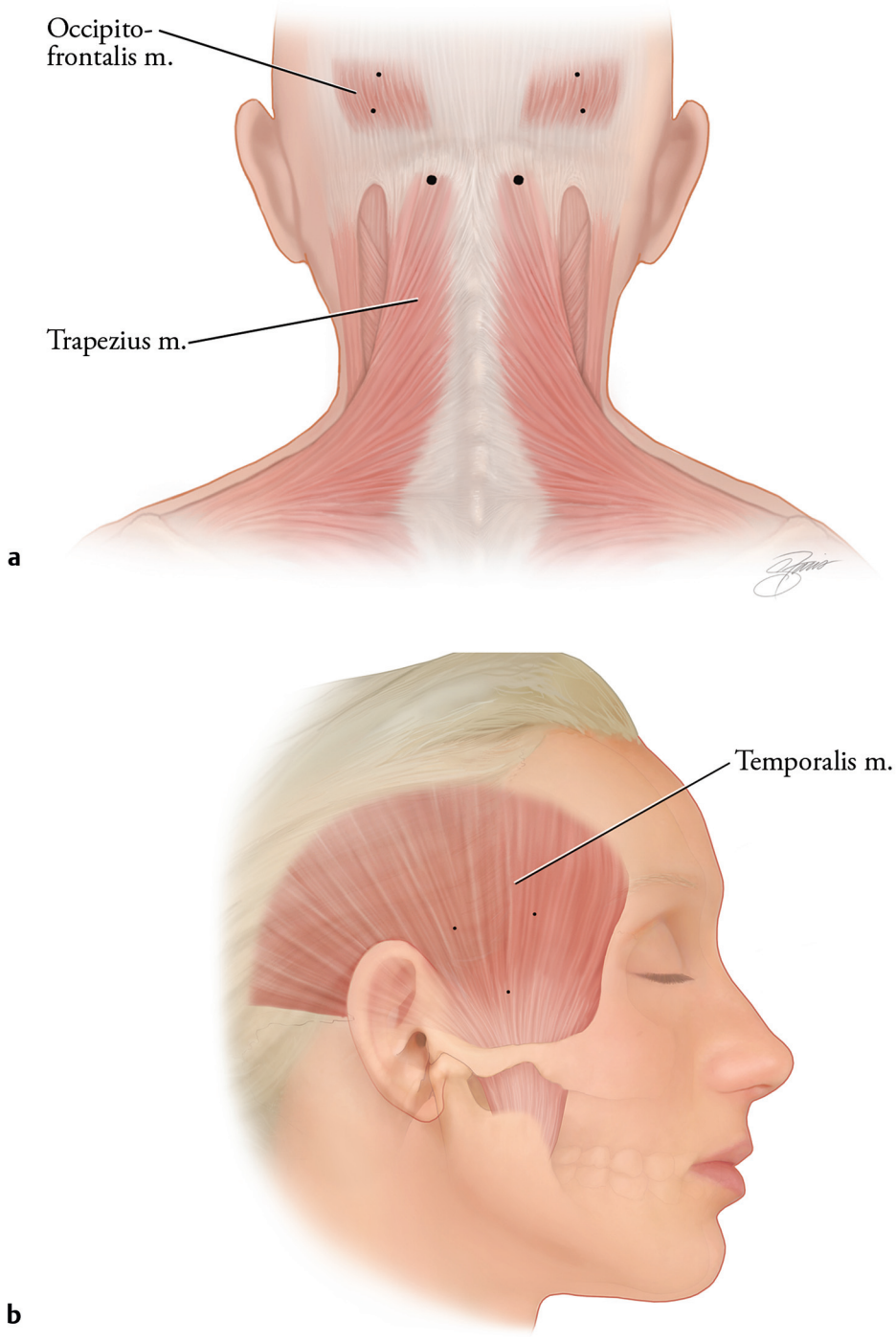


Fig. 32.1 (**a,b**) Trigger points identified by the patient are injected with BoNTA. These may include the trapezius, occipitofrontalis, and temporalis muscles.

Additional Reading

[1] Binder WJ, Blitzer A. Treatment of migraine headache with botulinum toxin type A. Facial Plast Surg Clin North Am. 2003; 11(4):465–475

[2] Blumenfeld A, Evans RW. OnabotulinumtoxinA for chronic migraine. Headache. 2012; 52(1):142–148

[3] Escher CM, Paracka L, Dressler D, Kollewe K. Botulinum toxin in the management of chronic migraine: clinical evidence and experience. Ther Adv Neurol Disorder. 2017; 10(2):127–135

[4] Mathew NT, Frishberg BM, Gawel M, Dimitrova R, Gibson J, Turkel C, BOTOX CDH Study Group. Botulinum toxin type A (BOTOX) for the prophylactic treatment of chronic daily headache: a randomized, double-blind, placebo-controlled trial. Headache. 2005; 45(4):293–307

33 Management of Neurotoxin Injection Complications

Introduction

The key to managing complications of neurotoxins is their prevention. Accurate assessment and planning of injection sites will minimize the chances of unsatisfactory results. Because of the duration of clinical effect of only approximately 12 weeks, most side effects are self-limiting and mild.

Headache

Although BoNTA can be used to treat migraine, some patients complain of headache following injection. Some practitioners feel this is due to "bumping" the periosteum with the needle before injection. These headaches usually do not require treatment.

Asymmetries

Occasionally BoNTA results are not symmetric, usually due to poor injection planning. These asymmetries may be remedied with a small "touch-up" injection into the mobile muscle.

Brow Ptosis

Usually brow ptosis occurs from overtreatment of the forehead in an already ptotic brow. The key to managing this is prevention, but a way to counter brow ptosis is to treat the infrabrow area (as described in Chapter 9 and Chapter 10) to overcome the downward pull on the brow by the orbicularis muscle.

Eyelid Ptosis

Due to the diffusion of BoNTA into the levator palpebrae superioris muscle, this complication is usually self-limited and may last 2 to 3 weeks. Make sure the correct diagnosis is made: evaluate the patient to assess if the complication is brow ptosis or lid ptosis.

Treatment of Eyelid Ptosis

Often supportive measures are all that is necessary. Stimulation of Müller's muscle with an α-adrenergic agonist can be used in patients who are uncomfortable with the appearance of the ptosis. These medications include the following:

- *Naphcon* A (naphazoline and pheniramine): a nonprescription over-the-counter allergy ophthalmic drop used for allergic ocular symptoms (Alcon Inc., Fort Worth, Texas)
- *Iopidine* 0.5% (apraclonidine): a prescription drop used to treat glaucoma (Alcon Inc.)

Dosing of these drops is titrated by effect; usually 1 to 2 drops can be used 2 to 3 times a day. Side effects or overuse of the drops may result in blurred vision, dry eye, tearing, and lid edema.

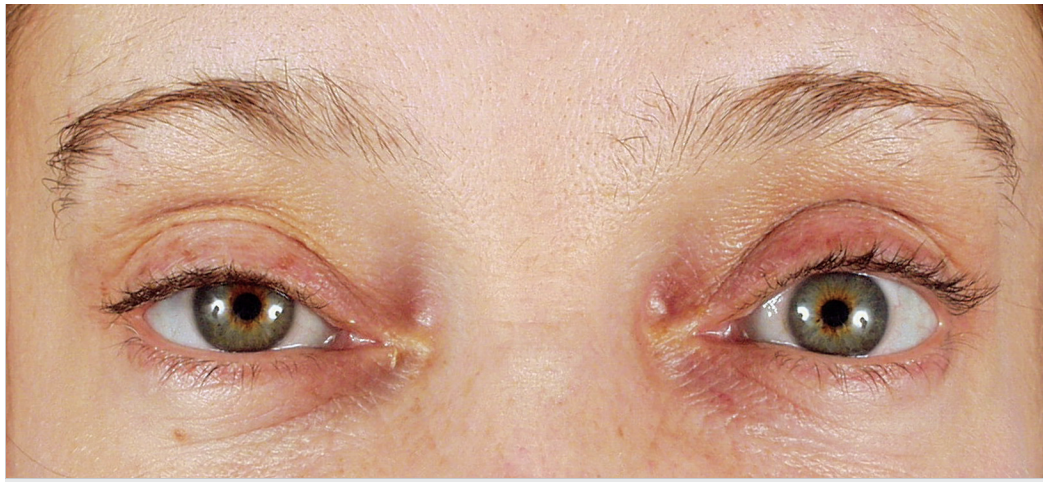


Fig. 33.1 Right upper lid ptosis developed 1 week after BoNTA injection to the glabella.

Additional Reading

[1] Dayan SH. Complications from toxins and fillers in the dermatology clinic: recognition, prevention, and treatment. Facial Plast Surg Clin North Am. 2013; 21(4):663–673

[2] Sundaram H, Signorini M, Liew S, et al. Global Aesthetics Consensus Group. Global aesthetics consensus: botulinum toxin type A–evidence-based review, emerging concepts, and consensus recommendations for aesthetic use, including updates on complications. Plast Reconstr Surg. 2016; 137(3):518e–529e

Section IV

Introduction to Fillers

IV

34
Fillers Overview

The use of injectable fillers has become one of the most requested minimally invasive treatment options to re-volumize the aging face. Bovine collagen use was limited both by its short duration of effect and its potential for allergic reaction. In 2003, the introduction of hyaluronic acid (HA) as a facial filling agent revolutionized the world of fillers. Currently the FDA has approved various types of HAs, biostimulatory products like calcium hydroxylapatite and poly-L-lactic acid, as well as polymethylmethacrylate, a permanent filler. Although these fillers are FDA approved only for certain indications, their "off-label" use has become the mainstay for facial rejuvenation in the United States.

Hyaluronic Acid

Composition

Hyaluronic acid is a polysaccharide normally found in the connective tissues of the body. Original HA products were made from animals (e.g., rooster combs); however, newer products are synthetic.

Injection

Some of these products are premixed with lidocaine. Injection is performed using 27- or 30-gauge needles. Cannulas may be used, but we prefer needles for accurate placement of this product. Topical anesthetics or regional blocks may be required.

Uses

This class of fillers is used to improve mild to moderate folds and wrinkles. These fillers may be used anywhere on the face, including the lips, nose, and around the mouth.

Precautions

These products should be placed in the deep dermis, superficial subcutaneous tissue, or pre-periosteal planes. When injected too superficially, the product can be seen through the skin and has a blue appearance. This is due to the particles scattering blue light, referred to in physics as the Tyndall effect. Because of more uniform particle size, Belotero may be placed more superficially and is less likely to produce a Tyndall effect. When injecting HAs, care must be taken not to cause vascular injury by occlusion or compression.

Calcium Hydroxylapatite

Composition

Calcium hydroxylapatite (CaHA) is a biostimulatory filler of CaHA spheres suspended in an aqueous gel.

Injection

Injection is performed using a 27-gauge needle. Cannulas can also be used to inject this product, and may decrease the chances

of vascular injury. Topical anesthetics or regional blocks may be required.

Uses

This thicker paste is used to improve moderate to severe folds and wrinkles. It should not be used around the eyes or in the lips.

Precautions

This product should be placed in the subdermal or preperiosteal plane. When injecting this product, care must be taken not to cause vascular injury by occlusion or compression. This product is radiopaque and can be seen on X-rays and computed tomography (CT) scans.

Polymethyl Methacrylate

Composition

Polymethyl methacrylate (PMMA) is a permanent filler composed of PMMA microspheres (20%) suspended in a bovine collagen gel.

Properties

This thick gel must be kept refrigerated. Allow the syringe to come to room temperature prior to injection. A 26-gauge needle or cannula may be used for injection. Topical anesthetics or regional blocks may be required.

Uses

Due to the permanence of this product, it should be injected only for improvement of the nasolabial folds, cheeks/midface, and marionette lines. Fill to 80% correction at the first injection and place 20% more at second treatment approximately 4 to 6 weeks later. Do not overcorrect with this product.

Precautions

A skin test is required 1 month prior to injection of this product to rule out allergy to bovine collagen. This product is a permanent filler and should not be used around the eyes and lips. Injection should be placed in the subdermal or pre-periosteal plane. When injecting this product, care must be taken not to cause vascular injury by occlusion or compression.

Poly-L-Lactic Acid

Composition

Poly-L-lactic acid (PLLA) is a biostimulatory filler composed of lyophilized crystals of PLLA resuspended in water.

Injection

PLLA must be resuspended with water prior to use. We recommend using 5 to 8 mL of preserved water. At the time of injection, 1 to 2 mL of lidocaine (1 or 2%) is added to the vial. Avoid shaking this product in the vial because foam in the bottle increases needle clogging. Multiple treatments are needed at 4- to 8-week intervals until sufficient collagen has been produced. The patient may require three to five treatment sessions for adequate correction. A maintenance “boost” of one to two vials will be required every 1 to 3 years. Injection may be performed with 25- or 26-gauge needles or cannulas. Topical anesthetics or regional blocks may be required.

Uses

This product is FDA approved to restore volume to faces that have developed lipoatrophy from aging or HIV medications. It also can be used to improve deep folds and lines. More recent off-label uses include firming of the wrinkles in the décolleté and

injection into stretch marks and cellulite depressions. Of note, injection into the back of the hands is no longer recommended by most key opinion leaders.

Precautions

This product should be injected in the subdermal or pre-periosteal planes. Nodules or granulomas can form if the product is injected too superficially (dermis) or if too concentrated. The patient should be advised to massage the injected areas for 5 minutes, 5 times a day, for 5 consecutive days. When injecting this product, care must be taken not to cause vascular injury by occlusion or compression.

Table 34.1 Facial Fillers Currently FDA-Approved in the United States.

Year FDA Approved	Product Name	Composition
1981	Zyderm 1	Bovine collagen
1983	Zyderm 2	Bovine collagen
1985	Zyplast	Bovine collagen
2003	CosmoDerm 1 CosmoPlast Restylane	Human collagen Human collagen Hyaluronic acid (HA)
2004	Hylaform Hylaform Plus Captique Sculptra (HIV)	HA HA HA Poly-L-lactic acid (PLLA)
2005	CosmoDerm 2	Human collagen
2006	Juvéderm Ultra/Ultra Plus Artefill (now Bellafill) Radiesse	HA Polymethyl methacrylate (PMMA) Calcium hydroxylapatite (CaHA)
2007	Perlane Elevess	HA HA
2008	Prevelle Silk Evolence	HA + lidocaine Porcine collagen
2009	Hydrelle (formerly Elevess) Sculptra Aesthetic	HA PLLA
2010	Juvéderm XC Ultra, Ultra Plus Restylane-L Perlane-L (now Restylane Lyft)	HA + lidocaine HA + lidocaine HA + lidocaine
2011	Belotero Balance	HA
2013	Juvéderm Voluma XC	HA + lidocaine
2014	Restylane Silk	HA + lidocaine
2015	Radiesse Plus	CaHA + lidocaine
2016	Juvéderm Volbella XC	HA + lidocaine
2017	Restylane Refyne Restylane Defyne Juvéderm Vollure	HA + lidocaine HA + lidocaine HA + lidocaine

35
Anesthesia Techniques

Indications

Needle injections to the face are painful, especially in certain facial areas. The injector can shake the lip, use numbing cream, or tap the cheek to "fool the brain," but patients will tell you (and everybody else) that these injections hurt! Although some injectables now have lidocaine pre-added to the product or can have lidocaine mixed into the product at the time of injection, it is the needle that is painful. In addition, the lidocaine does not take effect for several minutes after injection. In sensitive areas like the lip or when broad areas are being treated, most patients will require some form of anesthesia. Options include topical anesthesia, ice, or regional blocks.

Even some of the most stoic patients who dislike the feeling of regional blocks have eventually succumbed to accepting a numbing block because, when done correctly, it is much more comfortable during the injection process. By using such blocks, not only is the patient made more comfortable but the injector is more at liberty to inject where necessary to provide a better overall outcome. The keys to well-executed anesthesia are knowledge of the anatomy, practice, and having a routine.

Anatomic Considerations

An intimate knowledge of the anatomy of the trigeminal nerve (fifth cranial nerve) is essential because its branches (V1, V2, and V3) provide cutaneous sensory innervation to the face. The injector should also understand how and why anesthetics work to relieve pain. The most commonly used blocks are the infraorbital and mental blocks, though mini-mucosal blocks have been described and can be useful adjuncts for treating areas around the mouth.

Topical Anesthetics

Topical numbing creams are available to lessen the feeling of the needle insertion. These can be obtained as pre-compounded products, such as EMLA (eutectic mixture of local anesthetics) or Ela-Max (AstraZeneca, London, England). EMLA contains 2.5% lidocaine and 2.5% prilocaine. It is obtained only by prescription and must be applied for 1 hour with or without occlusion. Occlusion with plastic wrap can be used to increase absorption, if desired. Ela-Max (4 or 5% lidocaine) (AstraZeneca) is available without a prescription, has a 30-minute onset of analgesia and can be used with or without occlusion. In addition, a cream can be compounded per the physician's specifications and may include benzocaine (20%), lidocaine (6%), and tetracaine (4%) (BLT; Bayview Pharmacy, Baltimore, Maryland). BLT has a quicker onset of action of approximately 20 minutes.

Injection Technique

Regional or "dental" blocks can be performed for the midface (V2), lower face (V3), or both. The injection technique should be directed at the base of the nerve as it exits the bone, which will provide the most effective and broadest area of anesthesia. This technique also permits the least use of lidocaine (with or without epinephrine) and the least distortion of surrounding soft tissues. As such, to adequately reach the desired target areas it is often necessary to use at least a 1-inch (2.5-cm) or longer needle. If a finger is placed over the infra-orbital foramen, then the needle can be directed percutaneously toward the foramen, and approximately 0.5 mL of local injection placed on the periosteum near the nerve, but not in the opening. Similarly, if the mental foramen can be palpated in its position near the first molar, then the needle can be angled to land near its location on the face of the mandible. A second injection is done with the needle in the submucosal plane along the gingival-buccal sulcus. This is performed in a retrograde fashion, as the needle that has been passed from the first premolar posteriorly to the back molar is withdrawn.

Mini-blocks are a series of 0.1-mL aliquots of local anesthesia injected just submucosally in the sulcus approximately 1 cm apart to anesthetize the lips and nasolabial folds. These blocks tend to be more variable in effect and shorter acting in duration. One major benefit is that they are very useful in numbing the center of the upper lip when the regional blocks fail in this area.

Alternate Technique

Dental block may be performed intra-orally only via a buccal sulcus injection into the canine fossa and inferiorly at the mental foramen. The areas not anesthetized by these blocks are treated with topical anesthetics, which may be placed at the philtrum and lateral oral commissures.

Precautions

Especially with the use of epinephrine, the patient may experience some mild tachycardia and some rarer cases of lightheadedness and occasional fainting. In those patients who are particularly sensitive, a note should be placed in the chart noting epinephrine sensitivity. Alternately, 1 or 2% plain lidocaine can be utilized, but the anesthesia result may not be as dense or as long acting.

Post-Injection Instructions

The duration of effect of the injection typically is 1.5 to 2 hours.

Risks

Minimal to none unless bupivacaine is used. (Intravascular bupivacaine injections have been known to cause irreversible cardiac arrhythmias.) *Lidocaine can be toxic, and overdose may be fatal.* Patients should be observed when topical applications are used on large areas of the body.

Pearls of Injection

- Caffeine intake, lack of sleep, hormonal variations, and stress can all make a painful experience more so.
- Shaking the lip when the needle enters the mucosa, or actually pulling the mucosa onto the tip of the needle, can minimize the discomfort of the initial numbing injection.
- Use of topical intraoral lidocaine can also make the entrance of the needle easier in the most sensitive patients.

- In areas where a regional or local block is not possible, distraction using the gate theory of pain can help to decrease discomfort. Use of tapping or vibration at the site or an adjacent site can flood and then downregulate the perception of painful stimuli felt by the central nervous system.

Additional Resources

Dentists can provide valuable assistance when one is learning to perform regional blocks. Ask a dentist to show you how to provide regional anesthesia or "dental blocks."

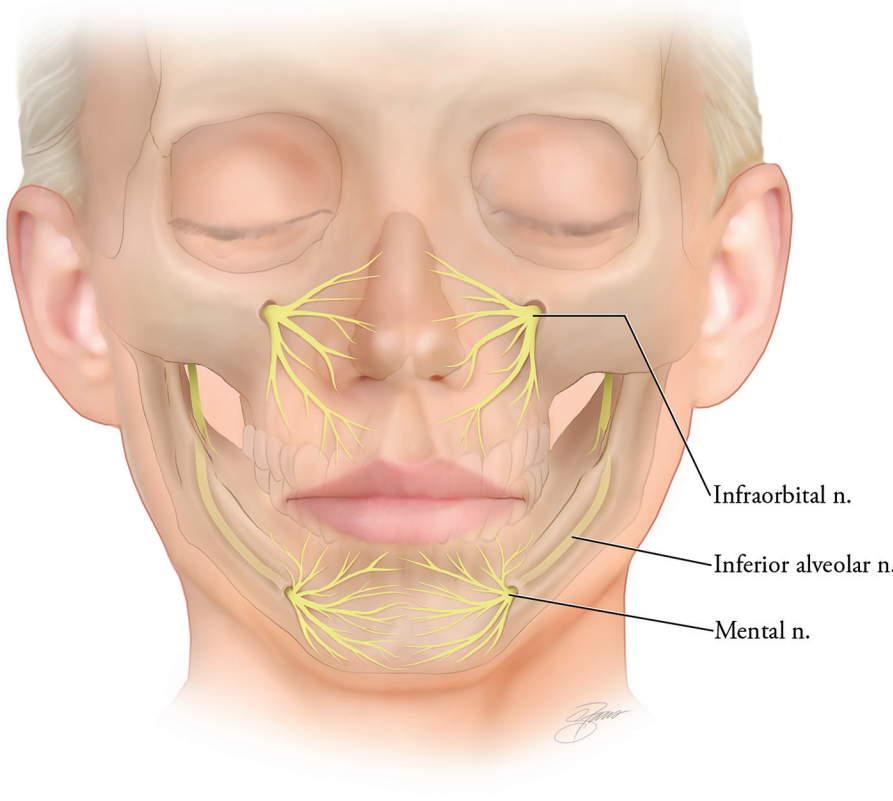


Fig. 35.1 Maxillary (V2) and mandibular (V3) divisions of the trigeminal nerve supply sensation to the middle and lower face.

Additional Reading

[1] Dillane D, Finucane BT. Local anesthetic systemic toxicity. Can J Anaesth. 2010; 57(4):368–380

[2] Niamtu J , III. Simple technique for lip and nasolabial fold anesthesia for injectable fillers. Dermatol Surg. 2005; 31 (10):1330–1332

36
Filler Injection Methods

Linear Threading

Product is injected in a line or "thread" as the needle is moving.

Anterograde Injection

The needle is advanced as product is being injected ahead of the needle. The injector can usually visualize the product tracking in front of the needle. This technique may be used for the vermillion border or the tear trough.

Retrograde Injection

The needle is fully advanced without injection, and injection commences as the needle is withdrawn, filling the tract with product.

Depot

Small aliquots of product are deposited in the desired plane. When depot injections of HA are placed into the dermis in a grid-like pattern, they provide a hydrating, plumping effect in addition to filling in fine lines. This technique has been called "skin boosting."

Peaking or Deep Depot

The needle is inserted perpendicular to the skin, and product is injected retrograde as the needle is withdrawn. The depot is often placed deep along the periosteum, and tissue is lifted. This is an excellent technique for lifting the cheek. Generally, there is less swelling, bruising, and risk of surface irregularity.

Serial Puncture

Also called a "string of pearls" injection, multiple closely spaced depot injections are placed in a linear fashion along a wrinkle or fold.

Fanning

From a single entry point, the needle is fanned in multiple directions, and product is placed by retrograde injection. In this technique, it is important to stop injecting as the needle nears the insertion site to prevent buildup of product at the point of entry. In addition, the needle must be almost completely removed from the patient before redirecting to create a new tunnel. Often fanning tracts are overlapped by using several sites of insertion.

Cross-Hatching

Multiple linear threads placed in an X-shaped fashion.

Grid

Linear threads intersecting at right angles.

Ferning

The needle is fully inserted, and injection is performed in a retrograde fashion. The

needle is then directed to each side of the central tract, and product is placed in small quantities, like the branches of a fern. This technique is useful when treating fine lines with filler.

Cannulas

The choice of needles or cannulas for injection of fillers is based on the personal preference of the injector. Cannula use lessens the chances of intravascular injury and may diminish bruising; however, the trade-off is precise control of the product. We have found that cannulas may be used for large-volume injections of product placed pre-periosteally or subcutaneously, but we prefer needles for fine, controlled injections placed more superficially.

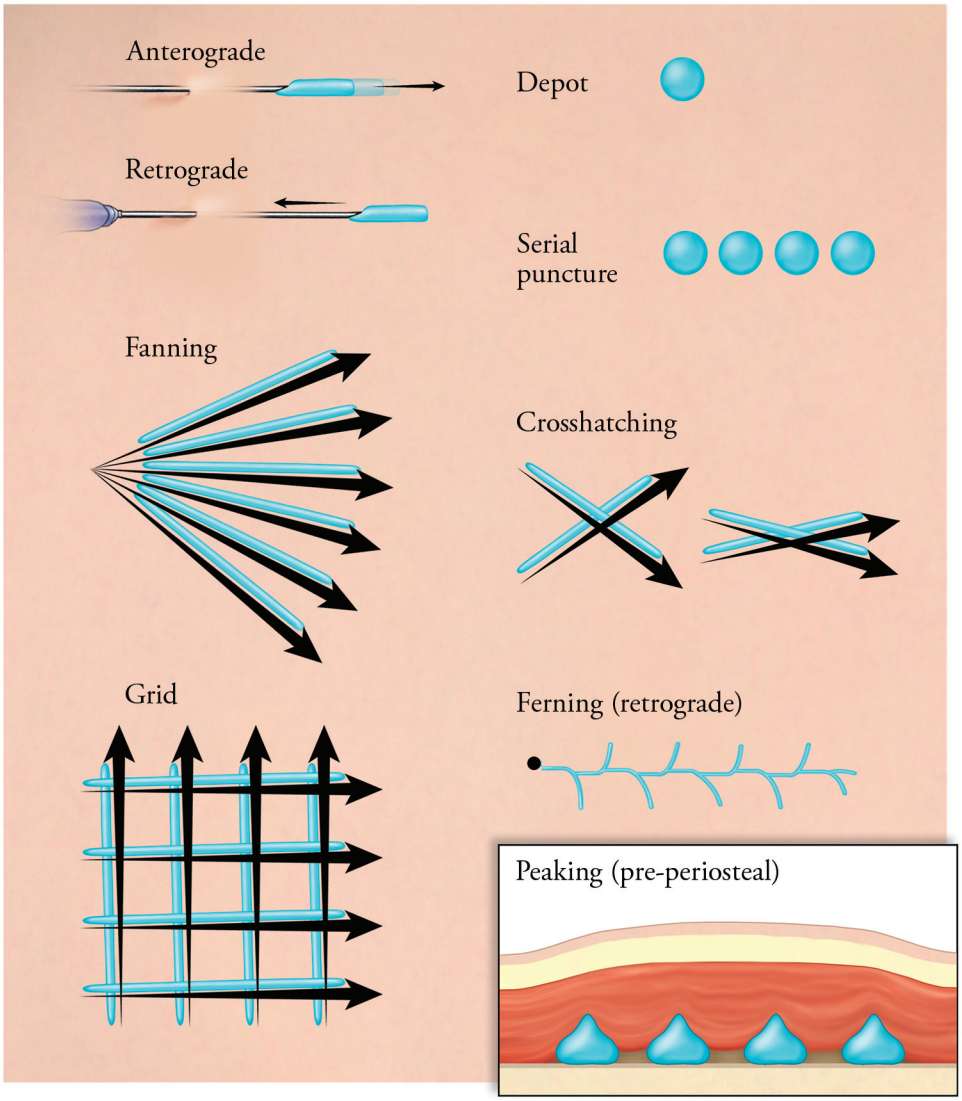


Fig. 36.1 Injection techniques.

37
Choosing the Right Filler

Initial Approach

A combination of different types of fillers is desirable for an active filler practice. With the growing variety of choices available from many different companies, it can often be a bewildering and expensive task to understand, master, stock, and be comfortable recommending all of the products on the market that are perfectly suited to each area in each patient. For high-volume, experienced injectors with patients willing to do multiple syringes, often over multiple sessions, using up to eight different fillers can be appropriate and even common in the course of a busy day. For the inexperienced injector, however, a wholly different approach is needed. ▶ Table 37.1 can aid in selection of appropriate soft-tissue fillers.

Gel Properties

A provider must have an understanding of the basic concepts of G prime (G´), which is more or less analogous to hardness or firmness when compressed. Products with higher G´ also tend to have greater lift capacity, which is useful when trying to elevate thicker skin and deeper rhytids, or to sharply define a lip border. The original Restylane-L and Restylane Lyft-L products tend to have higher G´ than Juvéderm Ultra XC and Ultra Plus XC.

Cohesivity is another characteristic of the HA gels that determines flow through the syringe and how the gel performs once injected into the skin. A product with high cohesivity will stretch further and bounce back together before separating. Clinically it

Table 37.1 Soft-Tissue Filler Options.

Product	Uses/comments	Areas to avoid/comments
Restylane-L Juvéderm Ultra /Ultra Plus Vollure Belotero	Good all-around fillers that provide moderate lift	Avoid Juvéderm in the tear trough
Juvéderm Voluma Restylane Lyft	High capacity for lifting, especially in the cheeks	Cleanse the skin well prior to injecting long-lasting products
Volbella Restylane Silk	Lips and fine lines, lip hydration	Post-injection edema can be seen
Refyne Defyne	More elastic and pliable, less likely to form palpable lumps; designed for circumoral region	Will not provide any lift or support
Radiesse	Thickest filler, good for deep folds	Avoid lips, tear trough
Sculptra	Natural full facial volumization	Avoid lips

is described as smoothness and pliability in the skin and somewhat softer and more forgiving.

Hyaluronic acids are very good products to integrate into a new filler practice as they provide immediate gratification and little downtime, and have little to no risk or commitment as they are reversible with hyaluronidases as opposed to some of the collagen-stimulating fillers. The newer types of HAs offer thinner versions and longer-lasting varieties for all types of applications.

Longevity

One determination in choosing a filler that is made in discussion with the patient and often with regard to the cost, has to do with the desired length of time a filler will last. Certainly, longevity will vary depending on location of injection, but a choice can be made between a filler with an FDA indication and clinical experience of approximately 6 months for Restylane Silk in the perioral area and lips versus up to a year in the same area with Volbella XC. Though there can be differences in the degree of initial swelling, which can be overcome, there is a significant price differential in our practice based on the difference in proven longevity.

Consultation

Often during the consultation, patients are not able to adequately choose which product they want or need, and wisely leave the choice to the provider's judgment and experience. The choice will then fall to either staying with the loyalty points products have accumulated, usually at the provider's office, or choosing between a shorter- or longer-lasting option. The provider then chooses whether the thinner/softer products or the firmer/harder products are more appropriate depending on what is being treated and where. Pricing should be clearly spelled out ahead of time to avoid surprises at the end.

Post-Injection Consult

As some products are more hydrophilic than others and thus swell more, different post-injection instructions will be necessary. Under the eyes, Juvéderm Ultra and Ultra Plus tend to swell more than other products and will require more ice and elevation. Voluma tends to swell slightly less than Restylane Lyft. All swell less than Juvéderm. Restylane Silk and Volbella feel very natural and soft in the lip. Silk, moreso than Volbella, can cause significant swelling in some people.

Stocking the Toolbox

Whether one fills the injection cupboard with two fillers or a dozen, knowing when and where to use them appropriately is the most important factor in achieving good outcomes. Having a versatile filler that can be used for deep and superficial applications as well as one that is either of greater longevity or specific for fine lines would be a good complement to a new filler practice. An example could be Restylane-L and Restylane Silk, or Juvéderm Ultra XC and Volbella. Alternatively, one could use Restylane and Sculptra, or Juvéderm Ultra XC and Voluma as a versatile and long-term pairing. As one's practice and expertise expand, more products can be added to the portfolio to suit the wide variety of patients' needs.

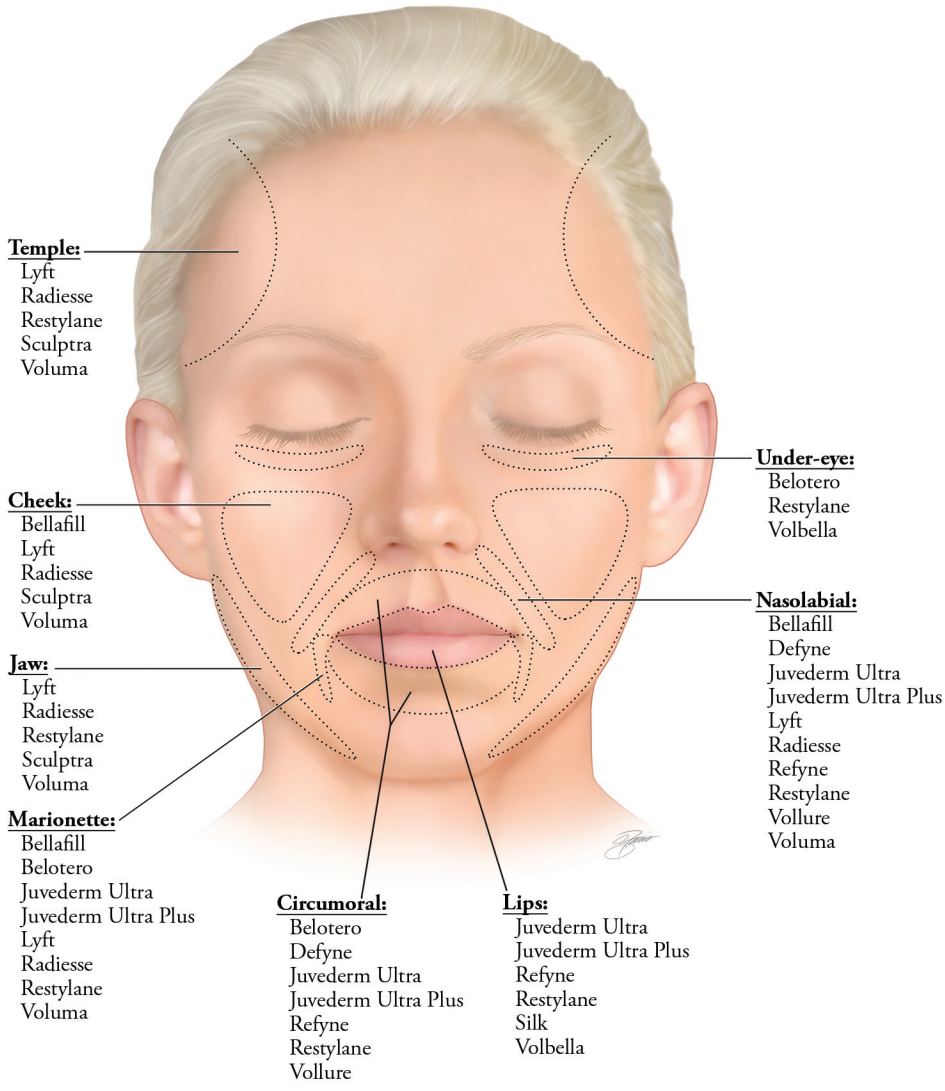


Fig. 37.1 Options for soft-tissue fillers.

Section V

Filler Injection Techniques

V

38
Filler Injection for Nasolabial Folds

Difficulty: ●
Patient Satisfaction: ●●●
Risk: ●●

Indications

The nasolabial fold (NLF), the groove from the corner of the nose to the outer corner of the mouth, is perhaps one of the most maligned, studied, poked, filled, and worried-about features in facial cosmetic surgery. It is present in youth, deepens with the aging process, and is not well addressed by facelift surgery. It is the site of most "on-label" filler product applications, it is easiest to study as it has a built-in control (the opposite side), and there are good grading scales that have long been agreed upon to describe various severities of the notorious fold. In the quest to eradicate this bane of the aging face, it important to consider that not all faces should be completely "nasolabial fold-free," and in fact complete flattening or overfilling of the fold produces quite an unnatural appearance. Some NLFs are etched creases in the skin, whereas others are deep structural folds transitioning from the lip to full "apple" cheeks.

Anatomic Considerations

Volumetric loss of the malar mound and descent of the cheek can contribute to folding over of the skin lateral to the fold. Thinning of the upper lip and perioral complex can lead to sinking of the medial portion of the fold. Injection deep into the area near the corner of the nasal ala can be perilously close to the angular artery, a branch of the facial artery.

Injection Technique

Placement of product in this region may be performed by using the cross-hatching, fanning, linear threading, or serial puncture techniques. The product generally is placed at varying depths, deeper for folds and more superficial for wrinkles. The area injected should be massaged into place after injection to minimize lumpiness. The injection technique should be mostly perpendicular to and medial to the fold, just barely crossing or coming to the edge of the fold so as not to augment lateral to the fold. It is best to imagine a tall, thin, triangular deficit in front of the fold that must be filled with fanning or threading injections rather than large boluses, or a fat sausage roll placed parallel to and under the fold.

Alternate Technique

Injection can begin as described above with filler placed in a deeper plane, perpendicular to the fold, to act as scaffolding. A second layer is placed more superficially parallel to and slightly medial to the fold. A fanning technique can be

performed at the nasal–alar junction, with care being taken not to inject the angular artery.

Precautions

Injecting deeply onto bone at the corner of the nasal ala, near the pyriform aperture, can provide nice elevation of a deep fold. However, extreme caution must be used with proper placement and either aspiration or perhaps the use of a blunt cannula to avoid intravascular injection. Superficial injections, especially parallel to the fold, will increase the risk of the Tyndall effect.

Post-Injection Instructions

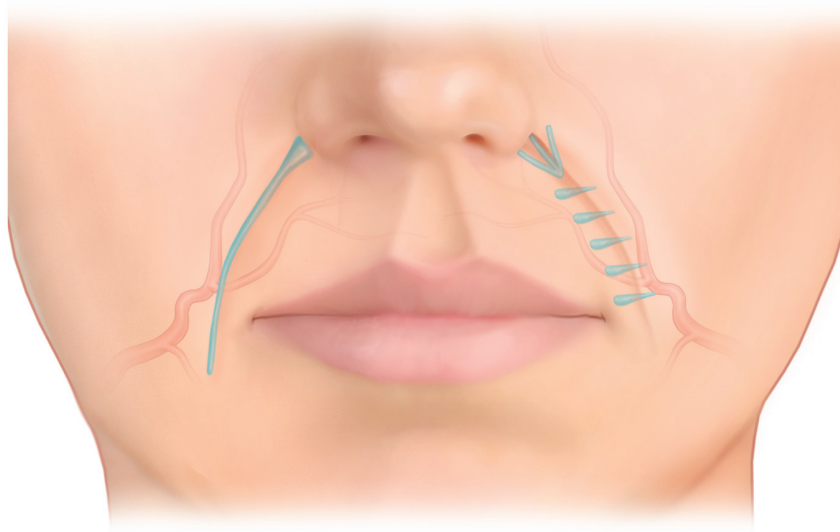
Ice and pressure are helpful to prevent bruising in this region. The product will swell some with hyaluronic acid (HA) and feel firmer to palpation the first week, and then blend in more naturally. This is also true of CaHA injections, which become firm, then soften over time.

Risks

Minimal risks exist other than bruising and Tyndall effect from too superficial injection into the dermis.

Pearls of Injection

- Overcorrection of the nasolabial fold can look unnatural and should not be overly flattened.
- Many products have been approved for use in this region including HA, CaHA, and PMMA. All are injected similarly, with care being taken to place CaHA and PMMA deep in the superficial subcutaneous layers and avoid more superficial injection.
- PMMA is a permanent filler, and patients are generally “under-filled” initially, with re-injection 6 weeks later.



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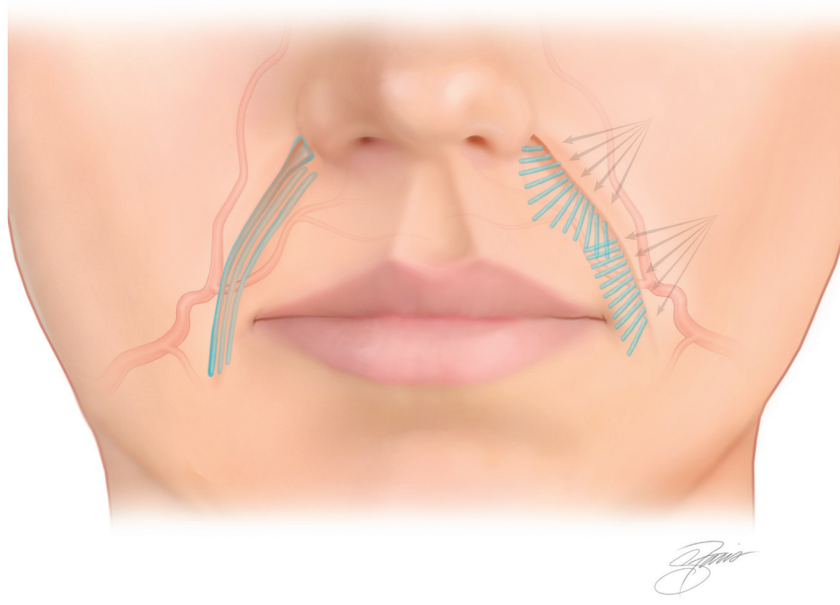

b

Fig. 38.1 Possible techniques to treat the nasolabial fold are shown. The injector may choose to perform a combination of these techniques to achieve maximum correction of the fold. (**a**) Filler may be placed along the depth of the fold as well as horizontally to act as a scaffold for the filler. Fanning technique can be performed at the nasal–alar crease. (**b**) Some patients will require the placement of more filler medial to the fold, as shown.

Additional Reading

[1] Bass LS, Smith S, Busso M, McClaren M. Calcium hydroxylapatite (Radiesse) for treatment of nasolabial folds: long-term safety and efficacy results. Aesthet Surg J. 2010; 30 (2):235–238

[2] Fedok FG. Advances in minimally invasive facial rejuvenation. Curr Opin Otolaryngol Head Neck Surg. 2008; 16(4):359–368

[3] Lee JC, Lorenc ZP. Synthetic Fillers for Facial Rejuvenation. Clin Plast Surg. 2016; 43(3):497–503

[4] Lupo MP, Smith SR, Thomas JA, Murphy DK, Beddingfield FC , III. Effectiveness of Juvéderm Ultra Plus dermal filler in the treatment of severe nasolabial folds. Plast Reconstr Surg. 2008; 121(1):289–297

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39
Filler Injection with Polymethyl Methacrylate (Bellafill)

Difficulty: ●●●●
Patient Satisfaction: ●●
Risk: ●●●

Indications

Polymethyl methacrylate (PMMA) is used as a permanent filler for improving the nasolabial folds. This filler is most often used in patients who have used absorbable fillers and desire a more permanent correction. This is also a filler to consider for men, who often do not want to undergo multiple treatments.

Anatomic Considerations

Because of its permanence, we prefer to use this product only in the nasolabial folds, cheeks, and marionette lines. It is contraindicated for use in the lips.

Injection Technique

Injection should be placed in the subdermal plane. The product is stored in the refrigerator and must be allowed to come to room temperature prior to injection. Retrograde tunneling, cross-hatching, or depot injection techniques are appropriate.

Precautions

The PMMA microspheres are suspended in a bovine collagen matrix. A skin test is required prior to injection to determine if the patient has an allergy to bovine collagen. Some injectors avoid permanent fillers altogether because of the historic risk of long-term sequelae as well as the changes that happen to the aging face, to which the permanent injectable implants may not adapt.

Post-Injection Instructions

Ice as needed.

Risks

Do not overcorrect with this product. Fill to 80% correction with the first treatment and give 20% more at the second treatment, usually 4 to 6 weeks later. Nodules may form if the product is injected into the lips or around the eyes. Because of the large particle size, care must be taken to avoid intravascular injection and possible vessel occlusion.

Pearls of Injection

- Polymethyl methacrylate should be used with caution in patients who are filler naive. It may be preferable to inject patients first with a reversible or semi-permanent filler.
- The bovine collagen matrix absorbs in 4 weeks, so a second treatment should be performed at that time.

- Patients should be informed that their results will actually improve over time as the body forms collagen around the PMMA particles. Thus their 5-year results may look better than their 1-year results.

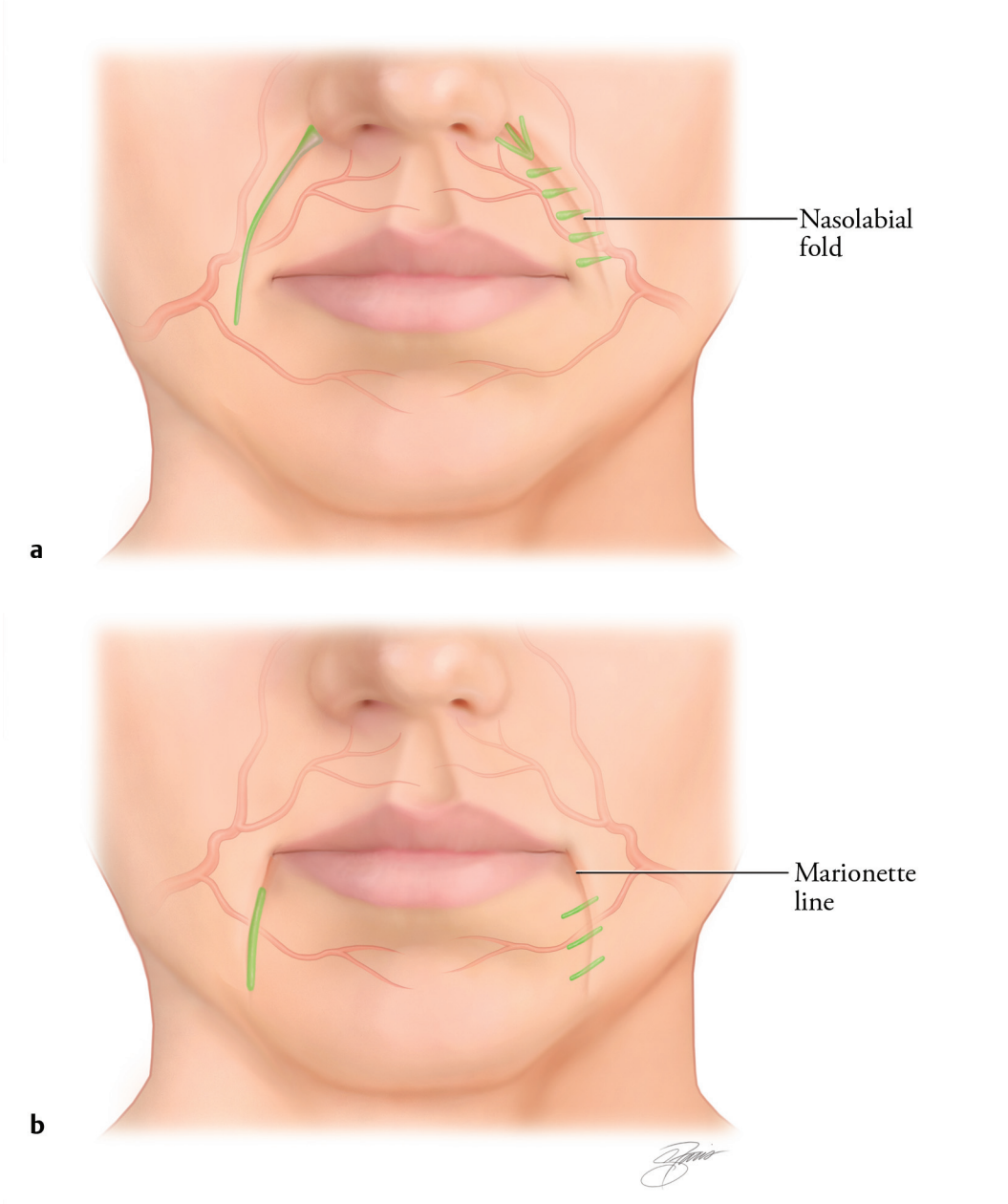

Fig. 39.1 (**a**) Polymethyl methacrylate (PMMA) is placed in the subcutaneous tissue to augment the nasolabial fold. Injections can be placed along the fold as shown, or these techniques can be combined as needed to optimize results. (**b**) The marionette lines can be treated similarly with either technique shown or a combination of these techniques.

Additional Reading

[1] Cohen SR, Berner CF, Busso M, et al. Five-year safety and efficacy of a novel polymethylmethacrylate aesthetic soft tissue filler for the correction of nasolabial folds. Dermatol Surg. 2007; 33 Suppl 2:S222–S230

[2] Hilinski JM, Cohen SR. Soft tissue augmentation with ArteFill. Facial Plast Surg. 2009; 25(2):114–119

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40
Fine Line Fillers and Skin Boosters

Difficulty: ●●●●
Patient Satisfaction: ●●●
Risk: ●●

Indications

A common complaint among female patients is that fine lines or wrinkles are present around the mouth, on the cheeks vertically, or around the eyes. Often the clinician dreads this complaint as they perceive that the patient has a critical eye and foresee that the remedy will not be a simple one. Fine lines, as opposed to folds or hollows, require different injection techniques and are often more time intensive to treat.

Anatomic Considerations

Fine rhytids are a symptom of thinning skin often due to advancing age in combination with photoaging. Genetic factors, including lower Fitzpatrick skin type, are predisposing to developing fine lines on the face. These fine lines may develop in younger patients and then turn into deeper etched lines or may become diffuse over time. Injection of hyaluronic filler into the sub-dermis or deep dermis often results in fullness or ridging without effacement of the fine lines at all. The superficial nature of the rhytid and the very thinness of the skin itself lead to the skill necessary to appropriately treat these lines.

Injection Technique

Careful product selection and injection technique will make a world of difference in achieving better outcomes for fine lines. The choice of lower concentration HA fillers and ones with lower G´s will often limit the risk of surface visibility and ridging. Typical choices would include Restylane Silk, Volbella, Vollure, and Belotero. For lines and creases in weathered or thicker skin a firmer filler, such as Restylane-L, may be more appropriate. The technique is painstaking and slow and often involves some degree of discomfort for the patient as stretching of the dermis is painful in general. Use of a small-gauge needle, such as 30-gauge or smaller, is appropriate to thread parallel to and often perpendicular to the lines in question, in order to firm and thicken the area that is wrinkling due to thinning. This technique of evenly crosshatching an area to firm the skin, or injecting intradermally in micro-aliquots using the depot technique, is known as “skin boosting.” Following and threading multiple fine parallel lines across the cheeks can be a slow and tenuous process. From a cost/benefit basis, it may be worth considering charging extra for this injection process.

When treating crow’s feet or radiating lines in the brow with filler a trio of passes with the needle can work nicely. Each pass will be superficial enough to

see the movement of the needle and feel the resistance of the dermis. The first pass will be right under the rhytid and then one each parallel and just to either side of the midline. This technique also works well for single long, lateral cheek lines to efface and prevent ridging from occurring.

Another technique that can be used to efface lines after they have been injected linearly is to place the needle just into the epidermis and inject slowly to allow the product to diffuse into the tissue. The line is then treated in a very superficial depot fashion. This works nicely using Belotero and Refyne.

Precautions

Attempting to inject in the superficial layer of the skin with HA can involve several risks: (1) over-injection in the superficial plane resulting in a worm-like ridge or bump, (2) Tyndall effect, or (3) injecting too deeply and missing the intended target.

Post-Injection Instructions

Bruising is common after multiple needle injection sites so pressure is important as well as ice following the treatment.

Risks

As the injection is very superficial, the risk for intravascular injection should be very low. It is recommended to perform retrograde injection to further minimize complications.

Pearls of Injection

- Skin boosting can be used to treat many areas of the face and even neck and chest skin to treat and prevent fine lines.
- A metered 0.01-mL click syringe adapter for uniform dose product placement may be on the horizon to aid in skin-boosting applications.

Fig. 40.1 Fine lines can be treated with very superficial injection of fillers with low G′. Stretching the skin while injecting helps keep the injection superficial.

Additional Reading

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[2] Streker M, Reuther T, Krueger N, Kerscher M. Stabilized hyaluronic acid-based gel of non-animal origin for skin rejuvenation: face, hand, and décolletage. J Drugs Dermatol. 2013; 12 (9):990–994

41
Filler Injection for Marionette Lines

Difficulty: ●
Patient Satisfaction: ●●
Risk: ●

Indications

The groove that descends vertically from the corner of the mouth toward the mandible is known as the marionette line, drool line, or melolabial groove. These folds are prominent contributors to signs of facial aging due to volume loss in the prejowl region, and may create a sad, tired, and more aged facial countenance.

Anatomic Considerations

The action of the depressor anguli oris (DAO) muscle underlies the melolabial groove and acts to deepen the groove. Volumetric loss of the prejowl and chin soft tissues can also lead to deepening this region.

Injection Technique

The injection technique should be perpendicular to and medial to the fold so as not to augment lateral to the fold. It can be helpful to pinch or squeeze the fold with the thumb and first finger on either side of the line down onto the chin to accentuate the line and demonstrate its extent. This technique will also demonstrate the accessory lines that are generally parallel to the marionette lines, and other weakened areas of skin and volume loss in the vicinity. Once those are determined, the appropriate treatment can begin. Fill should occur in the areas of concavity, avoiding thicker areas of convexity.

Precautions

Undercorrection of this area will lead to unsatisfactory results, and patients will feel "that it didn't make much difference." It can often take 1 mL of product in each marionette line to correct the entire area and blend in on the chin and all the way down toward the mandible, not even including the prejowl or along the mandibular border, to achieve a proper correction.

Post-Injection Instructions

Ice and pressure are helpful to prevent bruising. The product will swell some with an HA and feel firmer to palpation the first week and then blend in more naturally. Massage of the area after injection can help reduce lumpiness.

Risks

Minimal risks exist other than bruising and Tyndall effect from overly superficial injection into the dermis.

Pearls of Injection

- Overcorrection of this area is unlikely, unless there are no lines to begin with before injection.
- Bruising is quite common.
- As this area blends in with the oral commissure, techniques to augment the oral commissure will assist in improving the appearance of this fold.

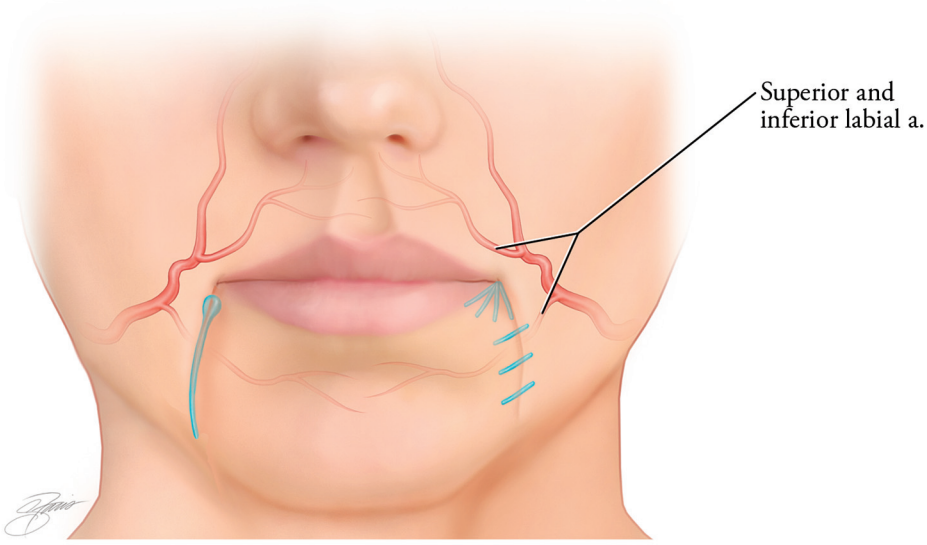

Fig. 41.1 A combination of techniques may be necessary to improve this region, including injection into the fold, horizontal filling across the fold, and fanning at the oral commissure. Combine techniques as needed to obtain the desired clinical result.

Additional Reading

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[2] Wise JB, Greco T. Injectable treatments for the aging face. Facial Plast Surg. 2006; 22(2):140–146

42
Filler Injection for Lip Augmentation

Difficulty: ●
Patient Satisfaction: ●●
Risk: ●●

Indications

One of the most requested filler treatments is that of lip rejuvenation or augmentation. Unfortunately, poor technique in performing this injection has resulted in patients being fearful of unnatural and overdone results.

Anatomic Considerations

It is important when filling the lips to decide what area needs to be augmented: the volume of the lip, the outline, or both. The lips can be accentuated and shaped by filling the vermillion border. There is a potential space that, if entered accurately, will allow the product to track along the lip margin.

Volume can be placed in the body (pink) of the lips for augmentation or rejuvenation, or to improve symmetry. The ideal lip ratio for upper to lower lip is 1:1.6. Achieving this ratio produces natural-looking lips.

Often overlooked are the philtral columns, which flatten with aging. A small amount of filler to accentuate the philtrum will give more definition to cupid's bow and slightly evert the upper lip.

Injection Technique

Only HA fillers should be used to augment the lips. Filler injections into the lips can be quite painful. A dental block or topical anesthetic may be placed prior to injection. Some injectors believe that no anesthetic is necessary when using fillers with added lidocaine. A skillful injector will inject slowly and enter the skin in areas previously injected that have become anesthetized. These injections are generally placed in the superficial subcutaneous plane. Massage after injection helps to evenly distribute the product.

Injection of the vermillion proceeds from lateral to medial. Palpation is important to feel how far along the vermillion the filler has traveled and to detect untreated or skipped areas. Injection may be performed in an anterograde fashion as the filler can track along a plane along the vermillion. Alternatively, filler may be placed in a retrograde fashion.

The body of the lips can be improved by filling in the zones that require augmentation. Do not think of the lip as one long unit but rather as smaller subunits, and fill appropriately. Overdone lips are usually the result of overfilling the lip without paying attention to aesthetic units. Do not fill the lips like "filling a sausage."

The philtral columns can be redefined using a small amount of filler. Pinch the

philtrum after injection to further define the ridges.

Precautions

As a general rule, do not inject more than 2 mL into the lips at one time. Avoid over-injection of the upper lip, especially in patients with very small lips. Rather than over-filling small lips, consider the adjunctive use of BoNTA to evert and lift the lips (see also Chapter 16).

Post-Injection Instructions

Ice as needed. Bruising and edema are likely. Advise patients that the edema will subside in a few days.

Risks

Injections into the lips can stimulate recurrence of herpes simplex viral eruptions. Any patient receiving lip injections who has a history of fever blisters should be placed on a short course of antiviral medication.

Pearls of Injection

- Consider treating the oral commissures when treating the lips (see also Chapter 15).
- Take photographs prior to performing the dental block, as the block itself will likely produce some asymmetries. Once the injection is completed, persistent asymmetries may be evident. Wait until the effects of the local anesthetic and swelling/bruising have worn off before assessing the final results.
- Because of its hydrophilic properties and syrup-like consistency, Juvéderm may be preferable for use in the body of the lips.
- For deep upper lip rhytids or to create a well-defined vermillion border, Restylane is often the product of choice.
- If swelling is a concern, Volbella and Restylane Refyne seem to swell the least in the author's experience.
- Restylane Silk and Volbella both feel very soft and can be used close to the upper dermis, but are not as good for effacement of deeper perioral rhytids.

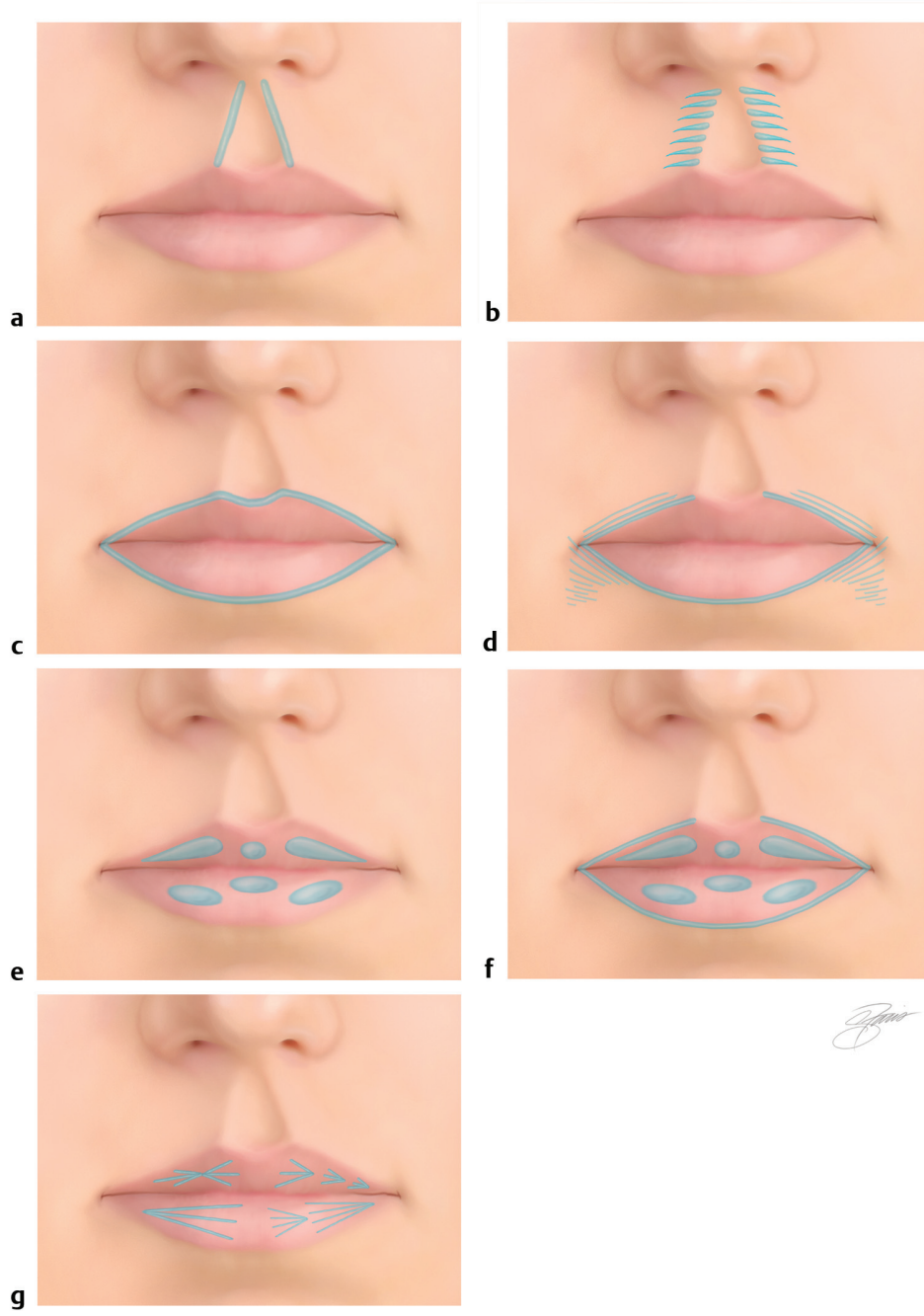

Fig. 42.1 Filler injections for lip augmentation. (**a**) The philtral columns can be augmented linearly along the fold. (**b**) Alternatively, the philtral columns can be augmented with small horizontal retrograde injections injected medial to lateral. (**c**) Definition of the lips is accomplished by augmenting the vermillion border, injection either retrograde or anterograde, from lateral to medial. (**d**) Small amounts of filler may need to be placed outside the vermillion after augmentation to decrease shadowing. (**e**) Lip fullness is achieved by directed injection into the body of the lips, artistically filling in deficient areas. (**f**) A combination of these techniques may be necessary to achieve the desired results. (**g**) Fanning technique to smooth pink lip often used for Volbella or Restylane Silk.

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[4] Sclafani AP. Soft tissue fillers for management of the aging perioral complex. Facial Plast Surg. 2005; 21(1):74–78

43
Filler Injection for Elevating the Oral Commissures

Difficulty: ●●
Patient Satisfaction: ●●
Risk: ●●

Indications

The corner of the mouth, known as the oral commissure, turns downward with age, and often there is a genetic predisposition to this downward turn. Filling the oral commissure can significantly alter the sad or angry appearance; it can "turn a frown upside down."

Anatomic Considerations

In childhood, the corner of the mouth turns up in a slight smile. In the teens to early twenties, the commissure becomes level to neutral in position. It is not until later in life, when skin, soft tissue, and volumetric loss in the lower face and chin develop, that the oral commissure angle drops and may become turned downward or negative in its vector. When this occurs, the overall effect is one of a mistakenly sad, tired, or stern facial countenance.

Injection Technique

The most frequently used products in this area are the hyaluronic acids (HAs). The injection technique involves placing an X-like injection at the oral commissure. A depot of product inferiorly also can help turn the commissure upward. Occasionally an injection of filler can be placed perpendicular to the commissure. A slight immediate overcorrection, which takes a down-turned lip and makes it into a slightly up-curved lip at the corner, is necessary to achieve a good result when the swelling subsides. Also, because this is such a highly mobile area it is necessary to use an adequate amount of product in the space or the effect will be relatively short lived.

Precautions

It is important to advise patients that they will experience an overcorrection at first, and that they should not be alarmed by a slight "joker-like" smile at first. This will resolve once the swelling subsides.

Post-Injection Instructions

Ice and pressure are helpful to prevent bruising. Bruising and a sense of firmness or hardness in the corner are not uncommon. Gentle massage also may be necessary post injection as lumpiness can occasionally be palpable intraorally.

Risks

Minimal risks occur besides bruising and the Tyndall effect from overly superficial injection into the dermis.

Pearls of Injection

- The action of the depressor anguli oris (DAO) muscle pulls the corners down. In

cases where fillers result in inadequate upturning of the commissures, consider also treating the DAO with BoNTA (see also Chapter 15).

- The use of a firmer HA is appropriate in this area. Commonly used products include Restylane, Restylane Lyft, Juvéderm Ultra or Ultra Plus, Voluma, Restylane Refyne, Restylane Defyne, and Vollure. The thinner products, such as Volbella, Restylane Silk, and Belotero, can be used for fine lines at the surface but do not have enough lift capacity to elevate the oral commissures.

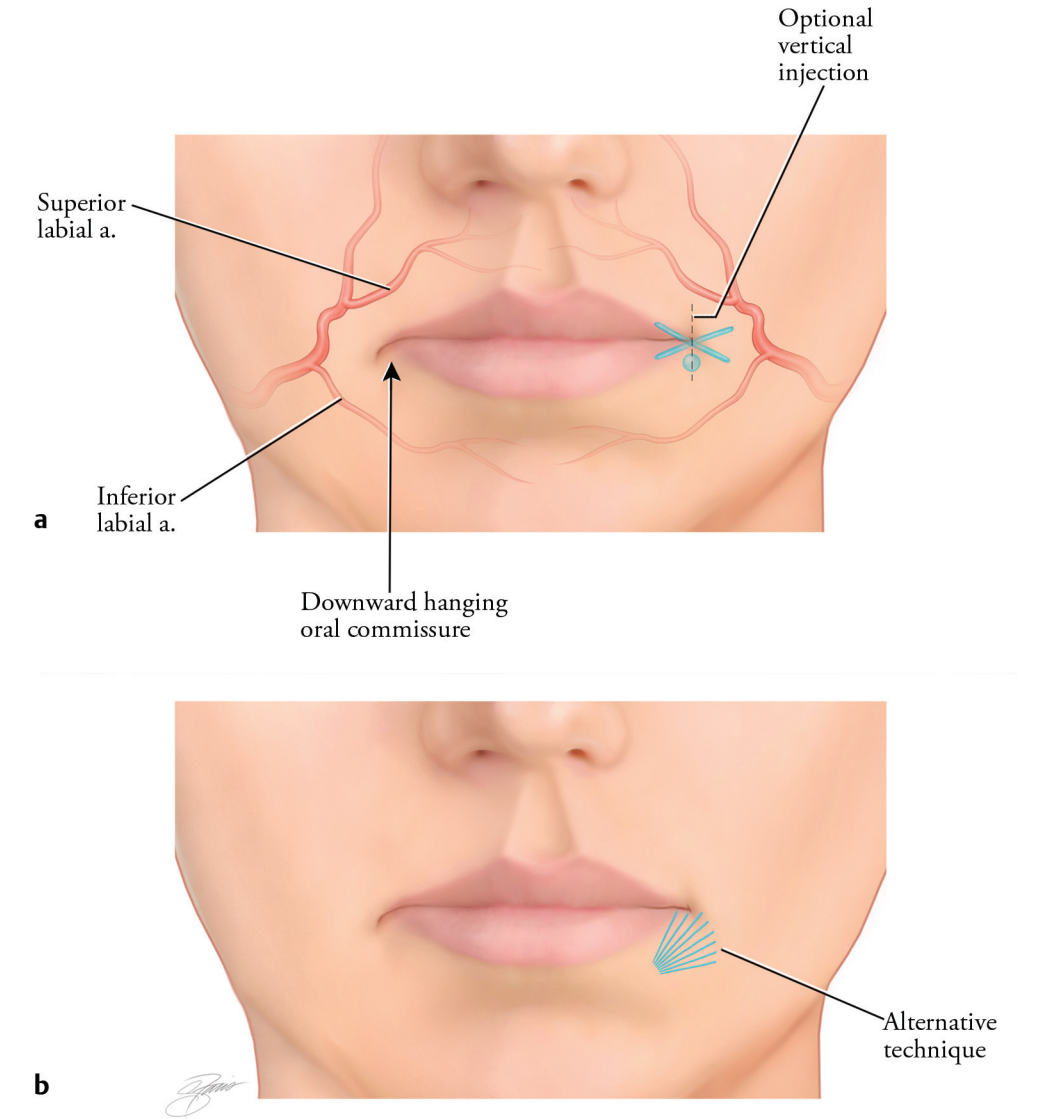

Fig. 43.1 (**a**) The oral commissure can be elevated by injecting in an X-shaped fashion as shown. An optional vertical injection can also be placed. A depot of filler will also act to support the commissure. (**b**) Alternate fanning technique may be used alone or in combination with other procedures described.

Additional Reading

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[3] Perkins SW. The corner of the mouth lift and management of the oral commissure grooves. Facial Plast Surg Clin North Am. 2007; 15(4):471–476, vii

44
Filler Injection for Vertical Lip Lines

Difficulty: ●●●
Patient Satisfaction: ●●
Risk: ●●

Indications

Perioral wrinkles extend radially from the lips due to the repeated puckering motion from speaking or smoking. In women, lipstick may "bleed" into these lines. In nonsmokers, these lines can be produced in patients who purse their lips while talking.

Anatomic Considerations

The orbicularis oris muscle is the sphincter that surrounds the mouth. Repeated contraction of this muscle may result in circumoral rhytids.

Injection Technique

Because of the risk of visible product ridges under the skin, this is a difficult area to correct with fillers. Only low-concentration hyaluronic acid (HA) fillers and small volumes of product should be used in this area. Restylane Silk and Volbella were developed to treat these fine lines. The initial injection is placed along the vermillion border. Subsequent injections are placed in the skin of the lips; a combination of linear threading and cross-hatching techniques can be used. Injection in the lips is painful. Patients may require topical anesthesia or a dental block.

Precautions

Consider antiviral medication when injecting patients with a history of fever blisters (herpes simplex).

Post-Injection Instructions

Ice as needed.

Risks

Risks include asymmetry, incomplete correction, swelling, and bruising. Some patients experience 2 to 3 days of significant lip edema after treatment with Restylane Silk. Patients should be counseled that fillers and neurotoxins cannot fully eradicate lip lines. Over-injection may produce ridges or a simian-like thickening of the upper lip.

Pearls of Injection

- Do not over-inject this area.
- Massage after injection to minimize lumpiness.
- The concomitant use of neurotoxins in this area can improve results (see also Chapter 17).
- Appropriate filler choices depend upon the thickness of the skin and the depth of the rhytids. For deep upper lip rhytids Restylane is often the product of choice, although Restylane Refyne and Vollure also work nicely in this area. Restylane Silk, Belotero, and Volbella all feel very

soft and can be used close to the upper dermis, though they are not as good for deeper rhytid effacement.

- Perioral lines can be quite resistant to many forms of treatment. Consider laser resurfacing, chemical peel, dermabrasion, or other adjunctive measures to treat stubborn lines.

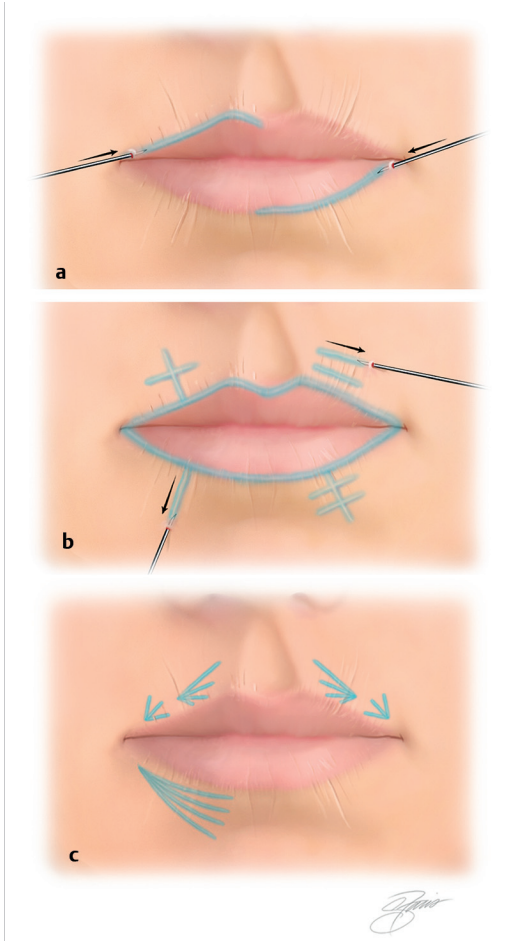

Fig. 44.1 (**a**) The vermillion is treated first, injecting from lateral to medial in an anterograde or retrograde fashion. (**b**) After the vermillion is outlined, the lip lines are treated in a vertical or a cross-hatch fashion and massaged after injection to minimize lumpiness. A combination of these techniques may be required to optimize clinical results. (**c**) Fanning technique should be performed with a thinner filler like Volbella, Refyne, or Restylane Silk.

Additional Reading

[1] Ali MJ, Ende K, Maas CS. Perioral rejuvenation and lip augmentation. Facial Plast Surg Clin North Am. 2007; 15(4):491–500, vii

[2] Barton FE , Jr, Carruthers J, Coleman S, Graivier M. The role of toxins and fillers in perioral rejuvenation. Aesthet Surg J. 2007; 27(6):632–640

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45
Filler Injection for Glabellar Frown Lines

Difficulty: ●●●
Patient Satisfaction: ●●
Risk: ●●●

Indications

Neurotoxins are commonly used to treat the vertical lines between the brows. Fillers can be used in conjunction with neurotoxins, or as a primary mode if patients are afraid of BoNTA injections. The horizontal lines on the nasal dorsum can be similarly treated.

Anatomic Considerations

The vertical lines of the glabella are produced by contraction of the paired corrugator supercilii muscles, and the horizontal lines are caused by contraction of the centrally located procerus muscle.

Branches of the supraorbital and supratrochlear vessels are located in the glabella. The supratrochlear artery is a distal branch of the ophthalmic artery.

Injection Technique

Topical anesthesia may be used; however, this injection usually can be tolerated without anesthesia. Prior to injecting, have the patient furrow the brow. Filler is placed parallel to the wrinkle with a 30-gauge needle. Filler is placed into the superficial to mid-dermis in a retrograde fashion and massaged to prevent lumpiness. Inject small amounts of HA slowly, and continuously watch for blanching of the forehead, which can indicate a vascular occlusion.

If there is also a concavity below the glabellar furrow, then product can be placed in a depot fashion onto the galea (after a refluxing maneuver) to bring the area up to the correct level.

Precautions

Injection of fillers in this region should be considered with some trepidation. Warnings in the past about collagen injections suggested that arterial embolization and possible skin necrosis could occur with injection in the glabella. Additionally, particles can travel retrograde in the supratrochlear vessels and embolize the ophthalmic artery. Because of the high risk in this area and the potential for lumpiness, hyaluronic acids (HAs) are the product of choice in this region.

Post-Injection Instructions

Ice as needed.

Risks

When treating the vertical lines of the glabella, reflux on the syringe prior to

injecting to minimize the risk of arterial injury, and do not inject deeply in this area. Do not overfill in this area to minimize lumpiness and the risk of vascular compression. However, injection of the horizontal lines over the nasal bridge is much safer and can be injected into the subdermal plane. Massage is also necessary to prevent lumpiness.

Pearls of Injection

- Patients who have persistent glabellar lines after BoNTA treatment may benefit from injection of fillers into the residual creases.
- Patients find that the combination of fillers and neurotoxins in this region produces a longer-lasting result.

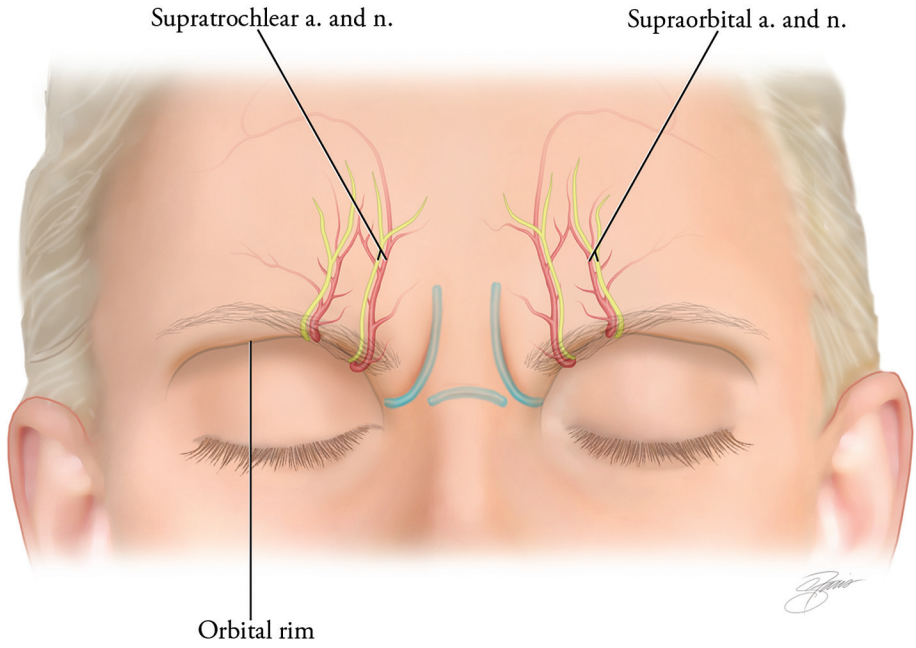

Fig. 45.1 Hyaluronic acid is placed deep to and parallel to the glabellar creases. Stay very superficial in this region so as to avoid injury to the supraorbital and supratrochlear vessels.

Additional Reading

[1] Carruthers J, Carruthers A. Volumizing the glabella and forehead. Dermatol Surg. 2010; 36 Suppl 3:1905–1909

[2] Glaich AS, Cohen JL, Goldberg LH. Injection necrosis of the glabella: protocol for prevention and treatment after use of dermal fillers. Dermatol Surg. 2006; 32(2):276–281

46
Filler Injection for Forehead Wrinkles

Difficulty: ●●
Patient Satisfaction: ●●
Risk: ●●

Indications

Transverse wrinkles of the forehead in patients who have had insufficient response from BoNTA injections, or who are not candidates for BoNTA injection of the forehead.

Anatomic Considerations

Transverse wrinkles of the brow generally respond to neurotoxin injection; however, even with BoNTA some rhytids may not fully improve. Also, some patients are opposed to BoNTA injections. Patients with ptotic brows may not be candidates for BoNTA because the ptosis can be accentuated (and constantly raising a ptotic brow is likely the reason they have rhytids in the first place). In certain cases, the injector may elect to augment deep transverse folds of the forehead with filler.

Injection Technique

Multiple injections are required in this area, so topical anesthetic is recommended. Small depot injections are placed along the line of the wrinkle in the immediate subdermal plane. The filler is marched along the fold along its entire length. After several injections, the product should be massaged to evenly distribute the filler into the wrinkle. Hold firm pressure over areas that bleed.

An alternative technique for injection is retrograde threading, both in the deep dermis with a 30-gauge needle and in the immediate subdermis with a 27-gauge cannula. A thinner product is required the more superficial the plane of injection.

Precautions

Care must be taken to smooth the product well and to place very small amounts directly into the fold to elevate the crease. Inject only the amount of product necessary to improve the wrinkle, or an elevated ridge of product will be seen horizontally across the forehead.

Post-Injection Instructions

None. Ice may be used for bruising.

Risks

Although this is an easy technique, vascular interruption of the subdermal vessels can occasionally occur. If blanching of a wide area is seen during injection, then massage and warm compresses will usually restore the circulation to the region.

Pearls of Injection

- Use a small needle (30- or 32-gauge) and inject only enough filler to elevate the wrinkle.
- Do not over-inject!
- Because of the chance of lumpiness, we prefer hyaluronic acids in this area.
- Combining fillers with BoNTA can also improve results.

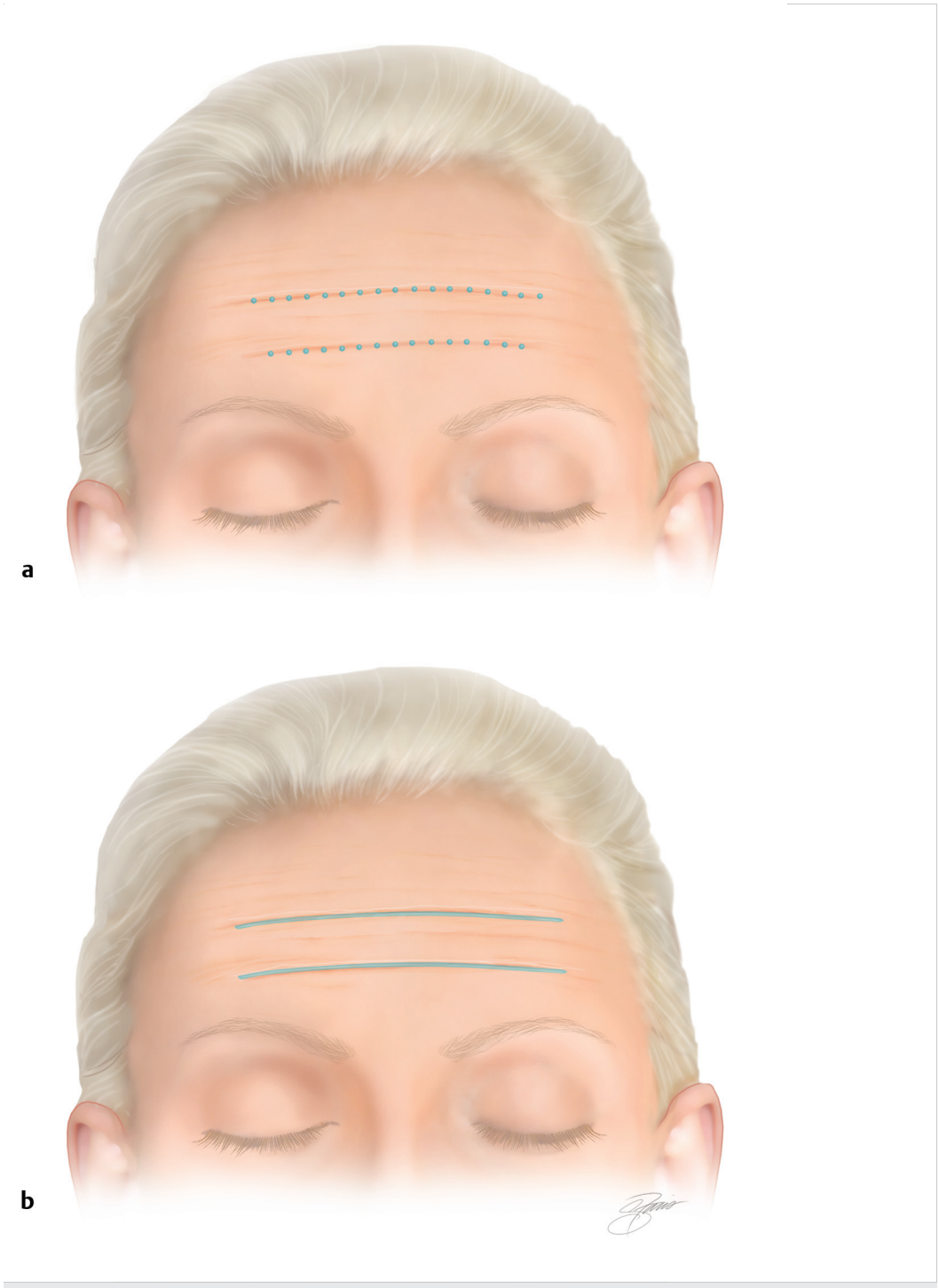

Fig. 46.1 (**a**) Filler is placed like a string of pearls along the forehead crease. The serial puncture (depot) technique is used and the product is smoothed by gentle massage of the treated areas. (**b**) Alternatively, filler can be placed parallel to the crease by linear threading technique.

Additional Reading

[1] Carruthers JDA, Glogau RG, Blitzer A, Facial Aesthetics Consensus Group Faculty. Advances in facial rejuvenation: botulinum toxin type A, hyaluronic acid dermal fillers, and combination therapies–consensus recommendations. Plast Reconstr Surg. 2008; 121(5) Suppl:5S–30S, quiz 31S–36S

[2] Coleman KR, Carruthers J. Combination therapy with BOTOX and fillers: the new rejuvnation paradigm. Dermatol Ther (Heidelb). 2006; 19(3):177–188

[3] Dubina M, Tung R, Bolotin D, et al. Treatment of forehead/glabellar rhytide complex with combination botulinum toxin A and hyaluronic acid versus botulinum toxin A injection alone: a split-face, rater-blinded, randomized control trial. J Cosmet Dermatol. 2013; 12(4):261–266

47
Filler Injection for Tear Trough Deformity

Difficulty: ●●●●
Patient Satisfaction: ●●●
Risk: ●●

Indications

The semicircular depression under the eyes may be filled with hyaluronic acid (HA) fillers to lessen the shadowing in this area. Fillers may be used to delay blepharoplasty surgery in patients with mild fat herniation.

Anatomic Considerations

Classically the tear trough referred to the most medial segment of the under-eye crease; however, with aging the infra-orbital rim becomes more skeletonized, and filler may be placed at the top of the rim along its entirety.

Injection Technique

This is not a painful area to inject, but it is quite unsettling for many patients. Options for anesthesia include topical anesthetic cream, or an infraorbital nerve block using a small amount of lidocaine.

This is one of the most difficult areas to inject well. Ideally a 1-inch (2.5-cm), 30-gauge needle should be used to allow the point of entry to occur below the thin skin of the lower eyelid. Use of a half-inch (1.25 cm) 30-gauge needle is also possible, although this requires pushing the cheek skin upward to reach the highest point on the orbital rim for proper product placement. This inferior entry point will greatly reduce the amount of bruising, as most of the blood vessels are in the orbicularis muscle. The needle is then passed upward at an angle until it comes to rest at the top of the orbital rim, where the finger of the opposite hand is positioned so as to direct the needle, confirm the location, and protect the contents of the orbit. Injection should not proceed until the tip of the needle has been placed against the bone and its precise location has been verified.

Inject very slowly and deeply onto the bone. It is very important that the product be precisely placed at the highest point along the upper edge of the maxilla at the top of the infraorbital rim. If due to hesitation or fear the injection is placed lower, then one runs the risk of creating a deeper trough by augmenting the cheek while neglecting the deep valley. Massage the product as it is injected in small 0.1- to 0.2-mL depot boluses to fill in the depressed areas. The patient should be placed in a sitting position. Have the patient vary the eye position, as this may accentuate bulges and depressions and aid in evaluating for symmetry.

Precautions

Inject deeply onto the orbital rim periosteum. Superficial injections will increase bruising and increase the risk of the Tyndall effect.

Post-Injection Instructions

Firm pressure over the injection sites and ice are necessary. Bruising is possible but less common when injected as described above. If injected through the thin skin or superficially, then bruising will be very common. Lumpiness and unevenness of the lower lid should not be seen if the injection has been done properly, unless a hematoma occurs. If it persists for more than 2 weeks, have the patient place a warm compress over the lid for 20 minutes while applying firm pressure. This can help flatten lumps and improve minor irregularities.

Risks

Although there are no serious risks to injecting the tear trough, the greatest risk of injection is an unsatisfactory result. Particularly with the HAs, the Tyndall effect can be seen even if the HA is deposited deeply. Hyperpigmentation can be seen in patients who complain of a "bruise" lasting more that 2 to 3 weeks. This post-inflammatory hyperpigmentation may require hydroquinone to improve. The HA can occasionally increase fluid retention in the entire periocular area in certain patients and lead to prolonged swelling in the malar area or a delayed bluish color in the medial orbicularis muscle. If this occurs, hyaluronidase injections into the subcutaneous tissue can often disperse the swelling and discoloration. If the injection is placed too inferiorly at the mid-pupillary line, there is a risk of injuring the infraorbital nerve and intravascular injection into the foramen vessels.

Pearls of Injection

- It is not uncommon for patients to become vasovagal with cosmetic injections, but this is particularly seen with tear trough injections. Patients are often quite anxious about being injected in this area. They also complain of an unsettling feeling when the lower lid becomes numb. At the completion of the procedure, ensure that the patient does not feel lightheaded upon standing.
- Hyaluronic acids are the products of choice in this area. The uniform particle size and lower HA concentration of Belotero, Restylane Silk, and Volbella allow for more superficial injections and less chance of the Tyndall effect.
- Twitching of the eyelid muscles can be seen occasionally due to the lidocaine, and will resolve spontaneously.
- For optimal results, the injector should proceed slowly and only inject 1 mL of product at a time. It helps to have the patient return 2 weeks after the initial injection for a re-treatment, if necessary.
- Patient education is key for this procedure. The patients must be patient with the process until the final result is achieved.

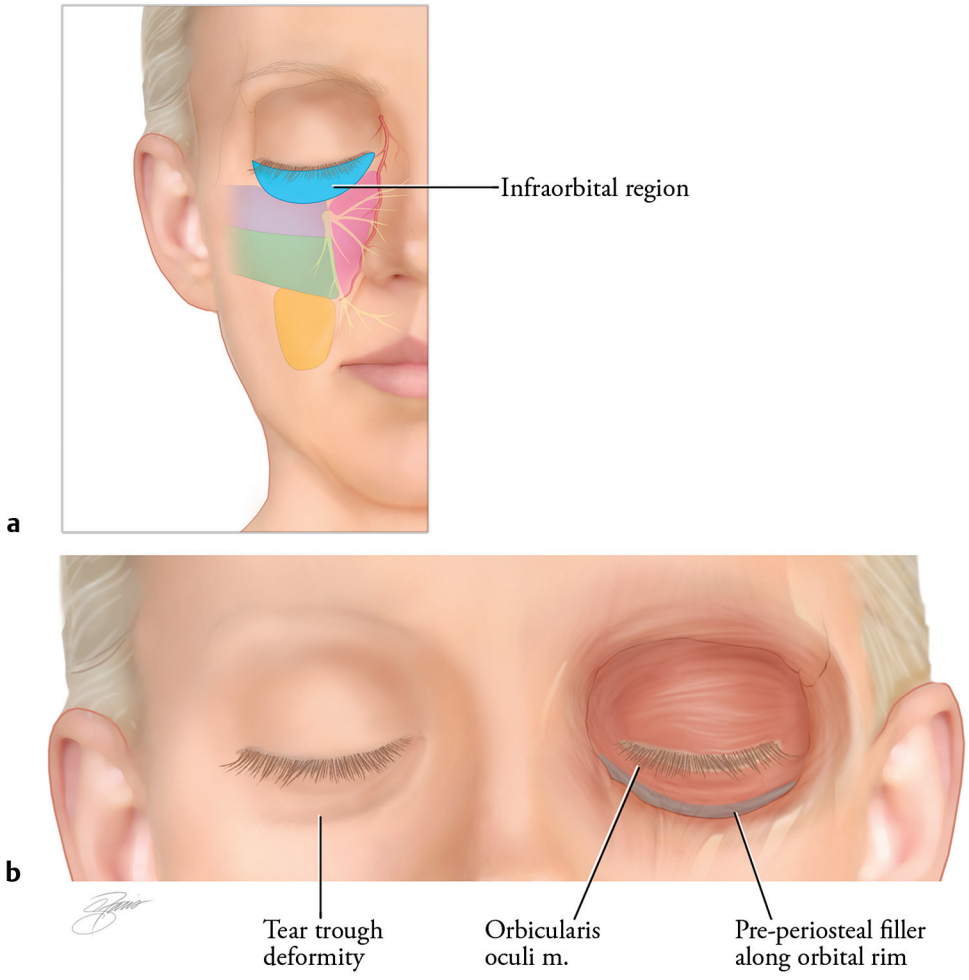

Fig. 47.1 (**a**) The intraorbital region of the midface. (**b**) Filler is placed along the infraorbital rim periosteum to improve inferior orbital hollowing. If necessary, filler can be placed subcutaneously, but this technique runs the risk of the Tyndall effect with some products.

Additional Reading

[1] Andre P. New trends in face rejuvenation by hyaluronic acid injections. J Cosmet Dermatol. 2008; 7(4):251–258

[2] Donath AS, Glasgold RA, Meier J, Glasgold MJ. Quantitative evaluation of volume augmentation in the tear trough with a hyaluronic acid-based filler: a three-dimensional analysis. Plast Reconstr Surg. 2010; 125(5):1515–1522

[3] Lee S, Yen MT. Nonsurgical rejuvenation of the eyelids with hyaluronic acid gel injections. Semin Plast Surg. 2017; 31 (1):17–21

[4] Morley AM, Malhotra R. Use of hyaluronic acid filler for tear-trough rejuvenation as an alternative to lower eyelid surgery. Ophthal Plast Reconstr Surg. 2011; 27(2):69–73

48
Filler Injection for Sunken Upper Eyelids

Difficulty: ●●●●
Patient Satisfaction: ●●●
Risk: ●●●

Indications

The hollow or sunken upper eyelid can be unattractive and an aging sign on the face. Genetics, aging, illness, and overly aggressive surgical fat resection can all contribute to a skeletonized, bony appearance of the medial third to half of the superior orbital rim as it blends into the nasal bridge. Restoring the look of lost soft tissue fullness in this area can greatly improve the youthful aesthetic of a hollow orbit.

Anatomic Considerations

The upper lid skin is usually quite thin in most individuals; there are sensory nerves of the supraorbital and supratrochlear nerve branches, as well as vascular bundles to avoid during the injection of this area. This is an area that requires advanced knowledge and experience; it should be approached only by the confident injector who is experienced and comfortable with the pertinent anatomy and the management of all aspects of complicated filler patient care.

Injection Technique

We prefer hyaluronic acid (HA) for these injections. The best injection plane is directly onto the periosteum on the lower to inferior aspect of the superior orbital rim. Whether performed as a series of depot pearl-like injections massaged together or with a long retrograde injection, the goal is to coat the bone with a uniform layer of product so as to cushion and fill the space between the bone and the skin/muscle complex. The area is most safely approached from a lateral to medial direction, keeping the injections lateral to the medial aspect of the brow. The safest technique is to use a 30- to 32-gauge, half-inch (1.25 cm) to 1-inch (2.5 cm) needle; place the tip of the needle firmly on the bone and perform retrograde injections. Careful observation will reveal where extra sculpting is necessary to augment the deepest concavities of the upper eyelid complex and improve the upper lid contour. This is one area where use of a cannula may be the best choice for product placement and avoidance of vascular injury.

Precautions

Injecting higher along the face of the frontal bone away from the free edge of the orbit will create two potential problems. The first would be a risk of injury to or injection into one of the neurovascular bundles as it exits the bone or orbit. The second possible problem would be the potential for creating the appearance of frontal bossing if filler is placed along the bone rather than in the orbital hollow.

Post-Injection Instructions

Immediate pressure and then ice are helpful to minimize bruises. The eyelid will swell and may need to be iced for several days.

Risks

Risks for swelling and bruising are real, but the catastrophic intravascular, periocular accidents that could arise are enough to deter most novice and even experienced injectors from trying this new area of volumetric correction.

Pearls of Injection

- Keep the injection volume low at first. Inject from the lateral toward the medial upper eyelid, staying low and keeping the needle moving while introducing product. Often there is not a true foramen for the supraorbital nerve, so it can be expected to exit from the orbit and course superiorly over the bony rim.
- Consider dilution of the HA with Xylocaine.
- Consider using a cannula technique when treating this region.

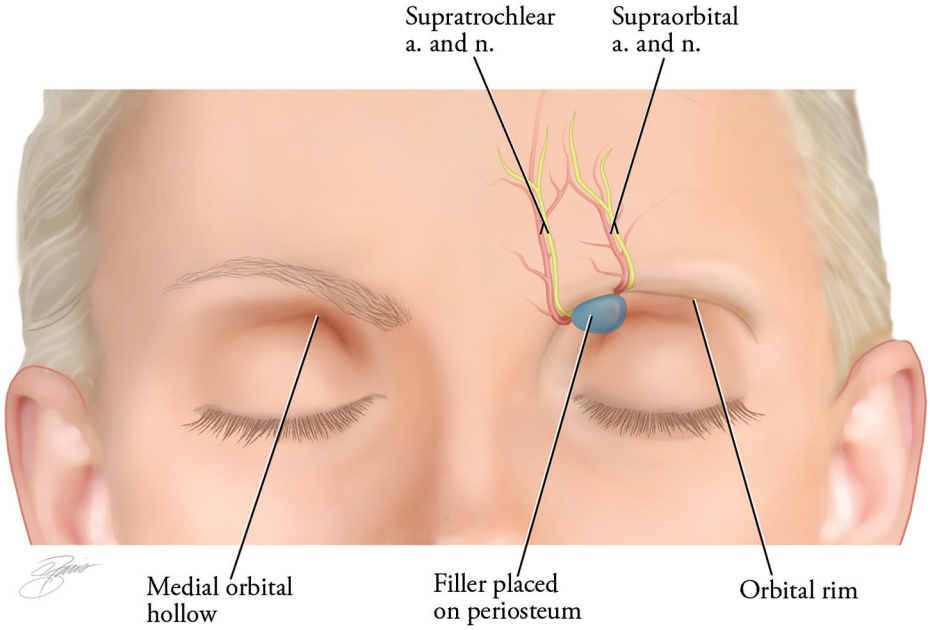

Fig. 48.1 Filler is placed along the superior orbital rim periosteum to camouflage a supraorbital hollow. Care should be taken to avoid injury to the supraorbital and supratrochlear neurovascular bundles.

Additional Reading

[1] Lambros V. Volumizing the brow with hyaluronic acid fillers. Aesthet Surg J. 2009; 29(3):174–179

[2] Morley AM, Taban M, Malhotra R, Goldberg RA. Use of hyaluronic Acid gel for upper eyelid filling and contouring. Ophthal Plast Reconstr Surg. 2009; 25(6):440–444

[3] Romeo F. Upper eyelid filling with or without surgical treatment. Aesthetic Plast Surg. 2016; 40(2):223–235

49
Filler Injection for Lateral Brow Lift

Difficulty: ●●●
Patient Satisfaction: ●●
Risk: ●

Indications

The brow becomes ptotic or droopy because of volume loss between the skin and the bone, with hollowing of the temple and skeletonization of the lateral orbital rim. As a result, the position of the brow hairs can be much lower than desired, and the overall position of the brow can cause a sad or even stern appearance. When placed properly, fillers can be used to restore fullness, volume, and actual lift to a flat or bony brow.

Anatomic Considerations

The skin is usually thin in individuals who are candidates for lateral browlift with volumetric filling, and there may be a great deal of superficial vascularity. Typically, there is a single perforating sentinel vein just superolateral to the orbital rim that is perpendicular to the surface of the skin, whereas all the other vessels spread out parallel with the surface and can be avoided with deep injection.

Injection Technique

The best injection plane is deep to the orbicularis and the aponeurotic fascia and galea, but just above the periosteum. It is often easiest if this plane is first entered with a 30-gauge needle and some local anesthetic (1% lidocaine with 1:100,000 epinephrine buffered with sodium bicarbonate 1:9). When the patient is numb, the product is inserted via a long needle (1.0- to 1.5-inch/2.5- to 3.8-cm needle) under the deep, tight, thicker fascia just above the periosteum. Once the needle is in place above the bone but below the level of the brow hairs, the injector will not be able to lift the needle vertically away from the bone. A retrograde injection can then occur as the needle is withdrawn slowly. A second or third pass directed at a slightly different angle could help build a mound or roll of fullness in the area of the lateral brow.

Alternate Technique

Filler is layered on the periosteum and also in the subdermal tissue until adequate elevation of the brow is achieved. Massage into place after injection, and confirm bilateral brow symmetry.

Precautions

Do not over-inject this area. Be careful to maintain symmetry.

Post-Injection Instructions

Immediate pressure and then ice are helpful to minimize bruises. The brow will swell and may need to be blended out laterally to the temple or the lateral orbit to achieve a natural look.

Risks

Minimal risks occur besides bruising using the superficial technique, so long as the injections are smooth and even.

Pearls of Injection

- Keep the injection at the tail of the brow at or under the brow hairs initially to make the best use of the product and get the most lift. Also, keeping the volume at or below the level of the brow will keep the brow lifting rather than potentially making the brow appear heavier.
- Hyaluronic acid or calcium hydroxylapatite may be used in this region.
- Consider treatment of the lateral orbicularis muscle with BoNTA (see also Chapter 10).

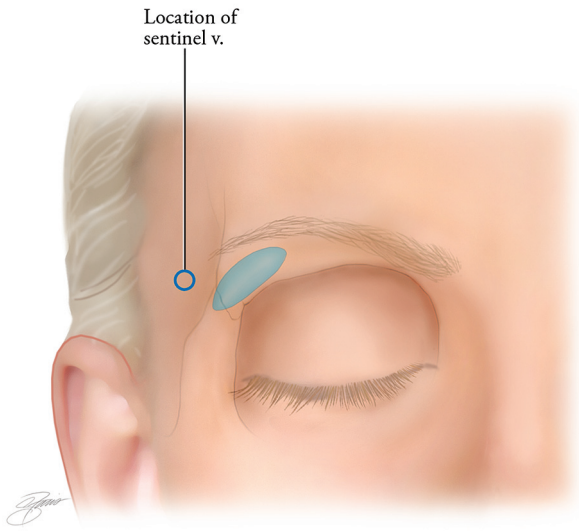

Fig. 49.1 Filler is placed along the periosteum of the lateral orbital rim to produce a lateral brow lift.

Additional Reading

[1] Carruthers JD, Carruthers A. Facial sculpting and tissue augmentation. Dermatol Surg. 2005; 31(11 Pt 2):1604–1612

[2] Moradi A, Watson J. Current concepts in filler injection. Facial Plast Surg Clin North Am. 2015; 23(4):489–494

50
Filler Injection for Sunken Temples

Difficulty: ●●
Patient Satisfaction: ●●●
Risk: ●●

Indications

Hollowing of the temporal fossa can lead to a sunken or gaunt look that ages the upper half of the face. Though fat loss can occur from trauma or disease states, the most common cause is natural aging. Other causes include surgical deformities, HIV-associated lipoatrophy, or thin patients with little body fat.

Anatomic Considerations

The anatomic boundaries of the temple are the temporal line superiorly, the tail of the brow and lateral orbital rim medially, the hairline posteriorly, and the zygomatic arch inferiorly. Several large veins and arteries run superficially in this region. The temporalis muscle fills the temporal fossa. Injections are placed through the muscle, down to the periosteum of the temporal fossa.

Injection Technique

Hyaluronic Acid

The superior and medial aspects of the temporal area provide the most benefit aesthetically, and should be filled first. Injection of hyaluronic acid (HA) requires use of a 1-inch (2.5-cm) needle to inject deep onto the periosteum in the upper half of the fossa and then deep onto or below the temporalis fascia more inferiorly. Depot injections must be used in this region to minimize contour irregularities. Placing the product deep and then massaging it into place will ensure uniform volumization of the temporal fossa. It would not be unusual to use 1 mL of product in each temple in moderately to severely sunken temples.

Calcium Hydroxylapatite

Calcium hydroxylapatite (CaHA) may be injected into the temporal fossa to give a firmer feel to the temples. The injection technique is similar to that used for HAs.

Poly-L-Lactic Acid

The depot technique similarly is used, laying product onto the periosteum. A 25-gauge needle of at least 1.0 to 1.5 inches (2.5 to 3.8 cm) in length is preferable to ensure deep placement. To evenly spread the product, massage is performed by the injector just after placement and by the patient for 5 days posttreatment (for 5 minutes, 5 times a day). With a 6- to 8-mL dilution of poly-L-lactic acid (PLLA), 1 to 2 mL of product is administered to each temporal fossa, depending on the amount of atrophy. Two or three treatment sessions may be required. An interval of 4 to 8 weeks between injections is recommended, and increased improvement

continues for 3 to 6 months after the final injection.

Precautions

There are many surface vessels in the temple, and care should be taken to perform depot injections between or below them. If a vessel is traumatized, firm pressure for several minutes will minimize bruising.

Post-Injection Instructions

Massage is helpful for the HA patients, and mandatory for the PLLA patients. Cold compresses can help prevent both soreness of the temporalis muscle and discomfort while chewing.

Risks

Bruising is possible; apply firm pressure should a vessel be violated. Filling too close to the surface can result in an uneven or lumpy appearance. Trismus may be noted in some patients for 1 to 2 days posttreatment and will resolve without treatment.

Pearls of Injection

- The end point of treatment usually occurs when the area is still slightly concave to flat but not overcorrected to bordering on convex. Proper depth of placement is the key to smooth results.
- It is difficult to overfill this area. It is valuable to look at both sides of the patient to compare after completing the first side. Show the patient the difference in the two sides, as it is often dramatic; this will give the patient an idea of the treatment end point as well.
- Because of the high vascularity in this region, it is often helpful to perform a reflux maneuver on the syringe before injecting the product to prevent intravascular injection.
- Some patients will notice an elevation of the lateral brow with improvement of the temporal hollowing.

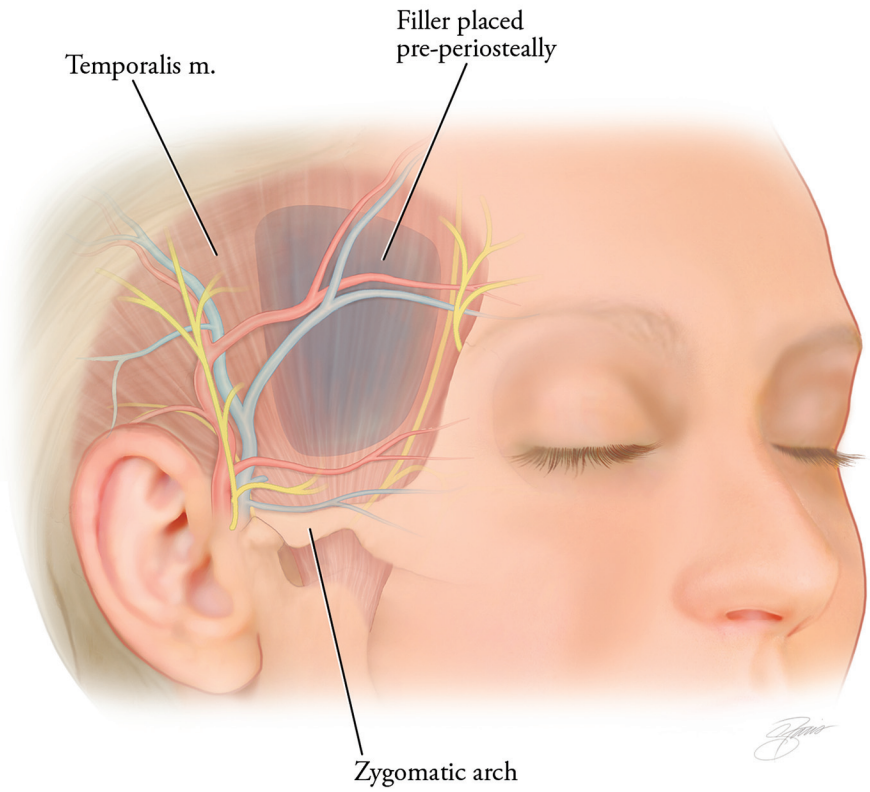

Fig. 50.1 Filler is placed deep to the temporalis muscle onto the periosteum to volumize the temples. Care is taken to avoid injury to the numerous vessels in this region.

Additional Reading

[1] Fitzgerald R, Vleggaar D. Facial volume restoration of the aging face with poly-L-lactic acid. Dermatol Ther (Heidelb). 2011; 24(1):2–27

[2] Lambros V. A technique for filling the temples with highly diluted hyaluronic acid: the "dilution solution". Aesthet Surg J. 2011; 31(1):89–94

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[4] Ross JJ, Malhotra R. Orbitofacial rejuvenation of temple hollowing with Perlane injectable filler. Aesthet Surg J. 2010; 30 (3):428–433

51
Filler Injection for Nonsurgical Rhinoplasty

Difficulty: ●●●●
Patient Satisfaction: ●●●
Risk: ●●

Indications

Because the nose occupies the center of the face, even mild asymmetries can be quite striking. Rhinoplasty surgery is not always a perfect procedure, and postsurgical defects can be difficult to correct. As a result, the use of fillers in small quantities to treat specific nasal deformities has become a way to fine-tune postsurgical noses. In addition, in some patients who refuse surgery or who are not surgical candidates, a nonsurgical approach to their nasal concerns may be possible by the use of filling agents.

Anatomic Considerations

Knowledge of the ideal proportions of an attractive nose will be necessary as well as knowledge of the basic anatomy of the bony, cartilaginous, and soft tissue structures involved. It is also important from a safety standpoint to be aware of the key vascular channels to avoid intravascular injections.

Injection Technique

When injecting a hollow or void in the nose, it is best to start deep on the bone or cartilage and perform a retrograde injection with a threading movement so as to avoid a direct depot injection that could possibly flow into a blood vessel.

Dorsal Hump

To straighten a dorsal hump, inject both above and below it as needed to straighten the dorsal profile. This technique can also be used on a wide nose to give the illusion of a higher and narrower nasal profile.

Saddle Nose Deformity

In these cases, there is little to no supporting cartilage at the base of the concavity. Therefore it is necessary to inject into the immediate dermal/subdermal plane to thicken the skin layer, allowing improved bridging from the bony dorsum to the cartilaginous tip. Secondary injection to the deeper plane below will help to further support and elevate the concave area and augment the bridge contour.

Twisted/Crooked Nose

When dealing with the twisted nose, it is possible to imagine a single line that passes through the midline. Usually there are portions of the twisted nose that will wind in a C or S shape onto either side of the midline. By filling the concavities the nose will appear straighter.

Drooping Tip

When there is little tip definition and a droopy tip, a new, more rotated and defined tip can be "created" by placing filler depot injections into appropriate anatomic locations. The injections can mimic a tip graft that will augment and better define the tip, and can also increase the tip projection and increase tip rotation. The thickness of the skin and the amount of scar tissue in the area will determine whether and to what extent this technique will be successful.

Precautions

Often, if there are large pores in the area being injected, the needle may need to be passed at a deeper or different angle if product begins to extrude through one of the dilated pore tracts. Over-injection of a given area can lead to blanching or even intravascular occlusion. Restylane is the preferred hyaluronic acid (HA) for the nose, because the hydrophilic nature of Juvéderm accentuates edema in this region. Calcium hydroxylapatite (CaHA) may be used, although, because of its permanence, the injector should proceed with extreme caution.

Post-Injection Instructions

Ice and pressure are helpful to prevent bruising. The product will swell some with an HA and feel firmer to palpation the first week and then blend in more naturally. The patient should expect that the areas injected will look raised and welted at first. Swelling should improve within about 2 to 4 days.

Risks

Nasal injections must be placed in an avascular plane, either preperiosteal or pre-perichondral. Care should be taken not to inject into the dermis to avoid the dermal vascular plexus.

The most significant risks involve injection into a vessel that could lead to vascular necrosis. Retrograde injections and avoiding high pressure on, or blanching of, the skin during treatments can help prevent this devastating complication. Because of the high risk of vascular compromise in these areas, consider using only HAs in this region.

Pearls of Injection

- Undercorrection is recommended in this region.
- Keep the needle in motion so as not to inject into a vessel and create an occlusion or embolic situation.
- Proceed with caution in post-rhinoplasty patients because prior surgery may compromise the blood supply to the nasal skin, which may increase the chance of skin necrosis.
- Always perform a reflux maneuver before injecting.

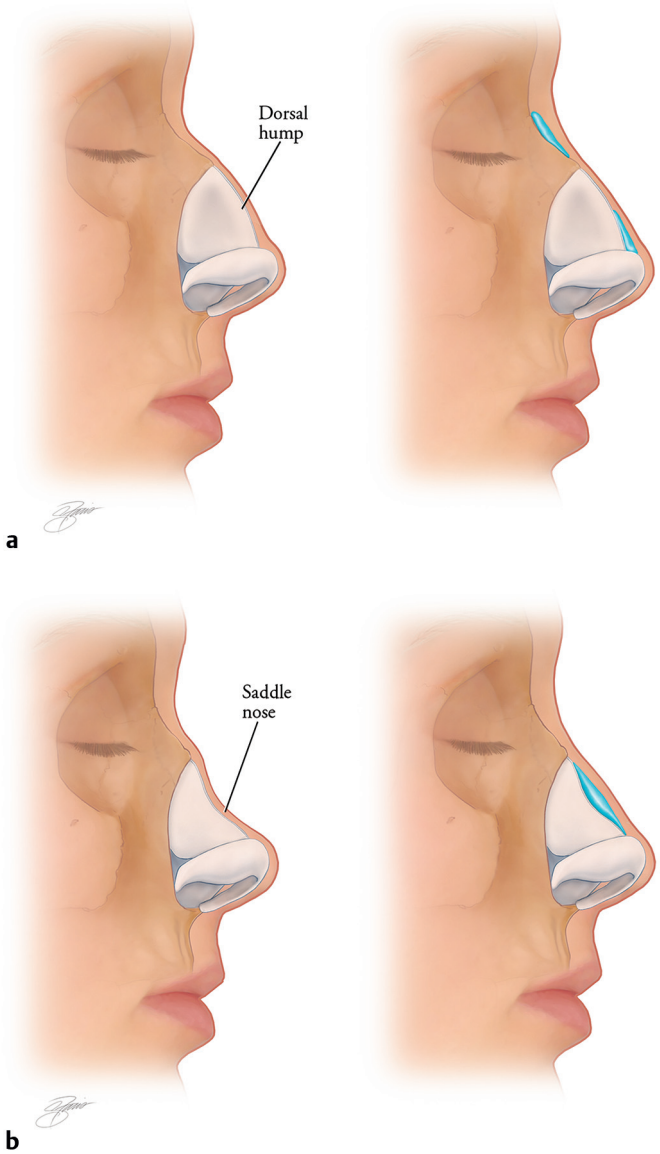
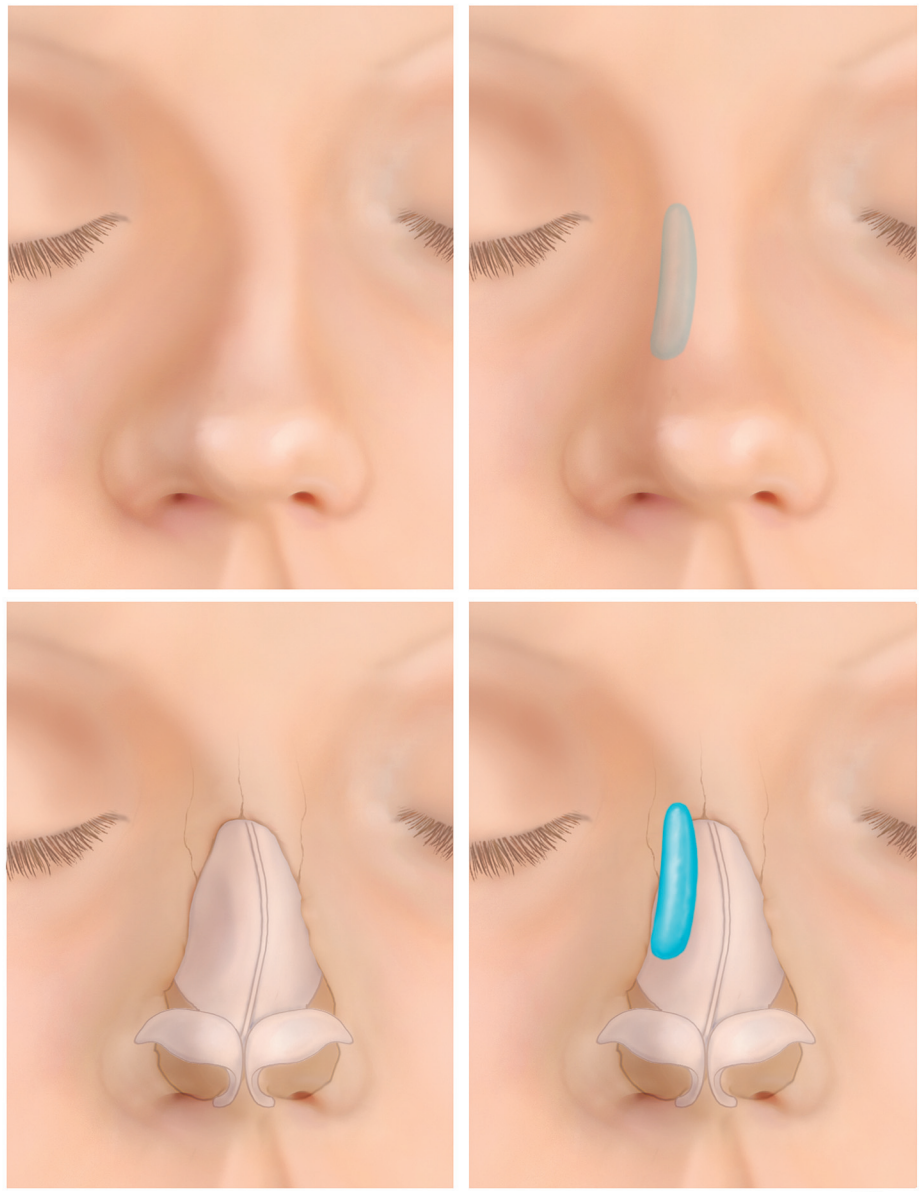


Fig. 51.1 Fillers for nonsurgical rhinoplasty. (**a**) Dorsal hump. Filler can be placed above and below a dorsal hump to straighten the dorsal profile. (**b**) Saddle nose. The concavity of the dorsum seen in the saddle nose deformity can be improved nonsurgically by using filler.



c

Fig. 51.1 (*Continued*) (**c**) Crooked nose. Filler is placed along the periosteum or perichondrium in the concave aspect of the nasal sidewall to give the illusion of a straight dorsum. Pre- (left upper and lower panels) and post- (right upper and lower panels) injections along the right nasal sidewall improve a mildly crooked nose in a patient with a persistent deformity after closed reduction of a nasal fracture.

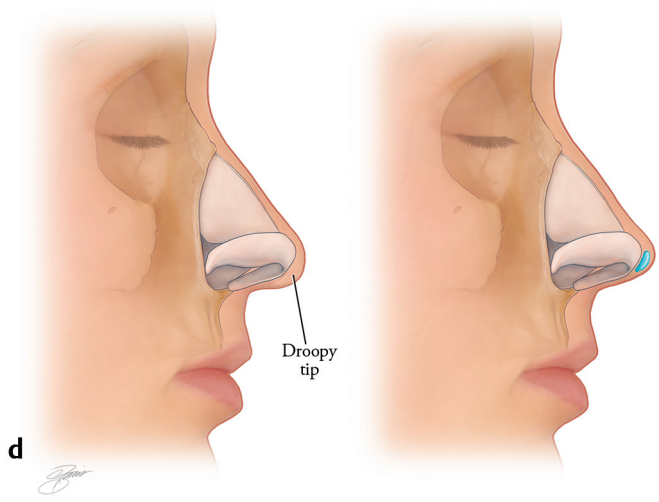


Fig. 51.1 (*Continued*) (**d**) Droopy tip. Filler can be used as a "tip graft" to define and elevate a ptotic tip.

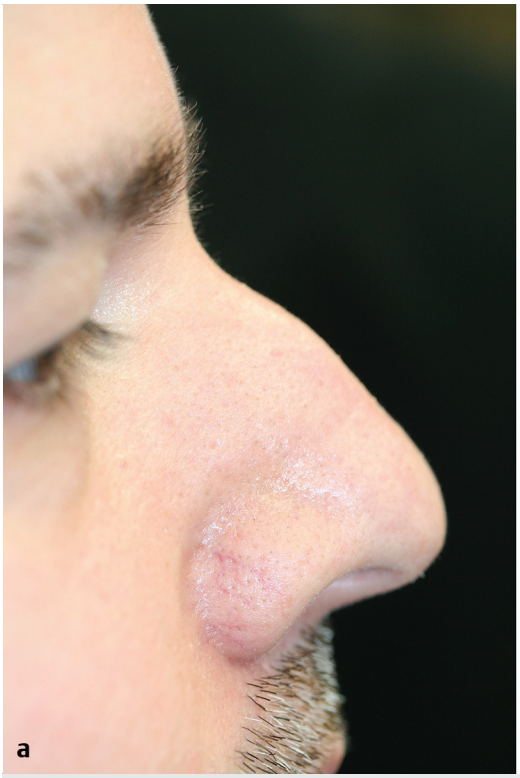


Fig. 51.2 (**a**) Dorsal hump with deep radix. (**b**) Improvement of nasal dorsum immediately post injection by placing filler as shown in ▶ Fig. 51.1a.

Additional Reading

[1] Humphrey CD, Arkins JP, Dayan SH. Soft tissue fillers in the nose. Aesthet Surg J. 2009; 29(6):477–484
[2] Kontis TC. Nonsurgical rhinoplasty. JAMA Facial Plast Surg. 2017; 19(5):430–431–; [Epub ahead of print]
[3] Kontis TC. The art of camouflage: when can a revision rhinoplasty be nonsurgical? Facial Plast Surg. 2018; 34(3):270–277
[4] Redaelli A. Medical rhinoplasty with hyaluronic acid and botulinum toxin A: a very simple and quite effective technique. J Cosmet Dermatol. 2008; 7(3):210–220
[5] Wang LL, Friedman O. Update on injectables in the nose. Curr Opin Otolaryngol Head Neck Surg. 2017; 25(4):307–313

52
Filler Injection for Nasal Valve Stenting

Difficulty: ●●●●
Patient Satisfaction: ●●
Risk: ●

Indications

Collapse of the internal and external nasal valves is generally treated surgically. In patients who have not had adequate improvement after surgery, or those who refuse surgery, filler can be used to stent the valve and prevent collapse with inspiration. Filler material can be used similar to how cartilage grafting is used in the nose.

Anatomic Considerations

The internal nasal valve is the acute angle formed by the junction of the septum and the lateral crus of the lower lateral cartilage. The external nasal valve refers to the area created by the ala, columella, and nasal floor.

Injection Technique

Topical anesthetics or intranasal 4% Xylocaine is adequate anesthesia for this procedure. Avoid using injected local anesthesia as it will change the shape of the valve and negate the filler effect.

Internal Nasal Valve

Very small amounts of filler are deposited intranasally in the area of the lateral crus or scroll region until the patient notices improvement in the airway. Before injection, ask the patient to rate the nasal patency on a scale of 1 to 10. Inject a small amount of filler, and ask the patient to rate the airway patency again. Inject until the nasal patency is acceptable.

External Nasal Valve

Very small amounts of filler are placed along the alar rim until there is improvement of collapse during deep inspiration.

Precautions

Lumpiness may be seen externally if over-injected.

Post-Injection Instructions

None. Bruising is unlikely.

Risks

Over-injection can weigh down the ala and worsen collapse.

Pearls of Injection

- Optimal results are obtained with thicker fillers like calcium hydroxylapatite or more concentrated hyaluronic acid fillers. The advantage of HA fillers is that they can be reversed with hyaluronidase in case of intravascular injection, over-injection, or blanching.

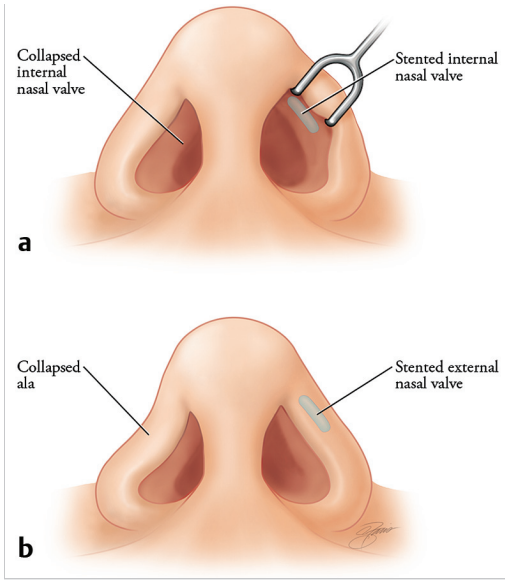


Fig. 52.1 (**a**) Filler is injected intranasally at the scroll region to stiffen the internal nasal valve. (**b**) Filler can be used to strengthen a collapsed ala and improve the external nasal valve.

Additional Reading

[1] Nyte CP. Hyaluronic acid spreader-graft injection for internal nasal valve collapse. Ear Nose Throat J. 2007; 86(5):272–273

[2] Nyte CP. Spreader graft injection with calcium hydroxylapatite: a nonsurgical technique for internal nasal valve collapse. Laryngoscope. 2006; 116(7):1291–1292

53
Filler Injection for Medial Midface Hollowing

Difficulty: ●●●
Patient Satisfaction: ●●●
Risk: ●●

Indications

Facial aging is a complex combination of volume loss and tissue ptosis. However, midface hollowing can be seen with facial aging or occasionally in younger individuals who present with an anatomically flattened midface.

Anatomic Considerations

The medial midface is the triangular zone below the infraorbital rim, lateral to the nasal sidewall and medial to the infraorbital foramen adjacent to the submalar region.

Injection Technique

Hyaluronic acid (HA) or calcium hydroxylapatite (CaHA) may be injected into this area for facial volume restoration. Injection may be placed deeply onto the periosteum or more superficially in the superficial subcutaneous tissue. A fanning technique can ensure even placement of the product. Massage after placement helps to evenly distribute product and allows the injector to palpate any areas that were not fully injected.

Precautions

Bruising is common in this area. The angular artery runs lateral to the nose, and care must be taken not to injure this vessel, either by compression or by embolization. Avoid injecting into the infraorbital nerve foramen.

Ask the patient to refrain from applying heavy pressure on the injected cheeks (either from ice after treatment or from pressure from sleeping) to prevent flattening the revolumized areas.

Post-Injection Instructions

Ice and pressure are helpful to prevent bruising. The product will swell some with HA or CaHA and feel firmer to palpation the first week and then blend in more naturally.

Risks

There are minimal risks of injection in this area. The most difficult aspect of injection here is ensuring symmetry.

Pearls of Injection

- To reduce the risk of vascular injury, consider the use of cannulas in this region when performing deep injections. Fine-tuning of the injection in a more superficial plane may require the use of needles.

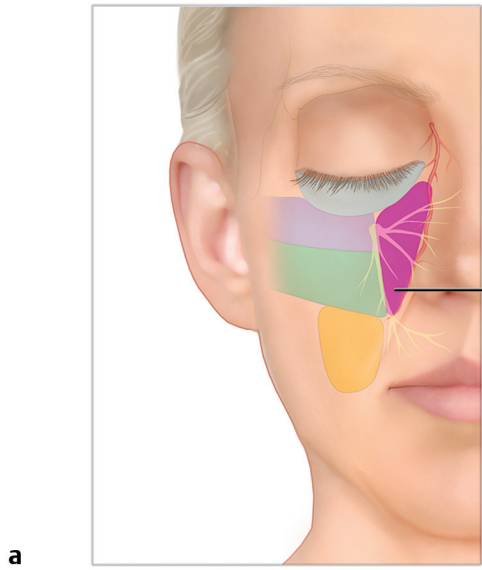


Fig. 53.1 (**a**) Anteromedial subdivision of the midface lies medial to the infraorbital nerve, lateral to the angular artery, and inferior to the infraorbital rim. (**b**) Filler may be placed along the periosteum and massaged into place to improve a flattened midface.

Additional Reading

[1] Few J, Cox SE, Paradkar-Mitragotri D, Murphy DKA. A multicenter, single-blind randomized, controlled study of a volumizing hyaluronic acid filler for midface volume deficit: patient-reported outcomes at 2 years. Aesthet Surg J. 2015; 35 (5):589–599

[2] Funt DK. Avoiding malar edema during midface/cheek augmentation with dermal fillers. J Clin Aesthet Dermatol. 2011; 4(12):32–36

[3] Raspaldo H. Volumizing effect of a new hyaluronic acid subdermal facial filler: a retrospective analysis based on 102 cases. J Cosmet Laser Ther. 2008; 10(3):134–142

[4] Tansavatdi K, Mangat DS. Calcium hydroxyapatite fillers. Facial Plast Surg. 2011; 27(6):510–516

54
Filler Injection for Cheekbone Augmentation

Difficulty: ●●
Patient Satisfaction: ●●●
Risk: ●●

Indications

Fillers may be used to augment the cheekbones, or lateral malar prominence. (Alternatively, permanent malar implants may be inserted surgically, or fat augmentation can be performed.)

Anatomic Considerations

The malar bone and overlying soft tissue form the lateral malar prominence. High cheekbones contribute to a youthful arc seen in three-quarter view. Some patients with aging of the midface display a fat pad of the lateral malar prominence, referred to as the "malar mound." This triangular prominence results from the orbital retaining and zygomaticocutaneous ligaments.

Injection Technique

Topical anesthesia may be used for this procedure. Fillers with lidocaine may be placed deeply at first injection to anesthetize the infraorbital nerve. Dental blocks are discouraged and may actually distort the anatomy. To volumize the lateral malar prominence, fillers may be placed through the intraoral or percutaneous route. Intraoral injection does not predispose the patient to infection. Filler can be placed deep in the subcutaneous tissue and pre-periosteal planes.

To camouflage the malar mound, hyaluronic acid (HA) fillers can be placed more superficially (deep dermal or subcutaneous) over the retaining ligaments. In addition, deep injection over the malar prominence will also camouflage the malar mound and elevate the lateral cheek.

Precautions

As this is a very safe injection location, HA or calcium hydroxylapatite (CaHA) may be used. Avoid injection into the malar mound fat because this might increase edema of the fat pad.

Post-Injection Instructions

Ice may be used as needed, but instruct the patient not to press firmly on the injected site or to sleep on that side for a few days to minimize flattening of the product.

Risks

Bruising is possible. The greatest challenge with performing this procedure is ensuring symmetry.

Pearls of Injection

- Lateral malar augmentation may be performed through a single-entry point on each cheek. Cannulas may be used for the deep injections.

- Injections that are placed too inferior or medial, as well as over-injection of this area, can create an unnatural look in many patients.
- Preexisting asymmetry is the rule in most patients, and achieving a symmetrical final outcome should be the goal.

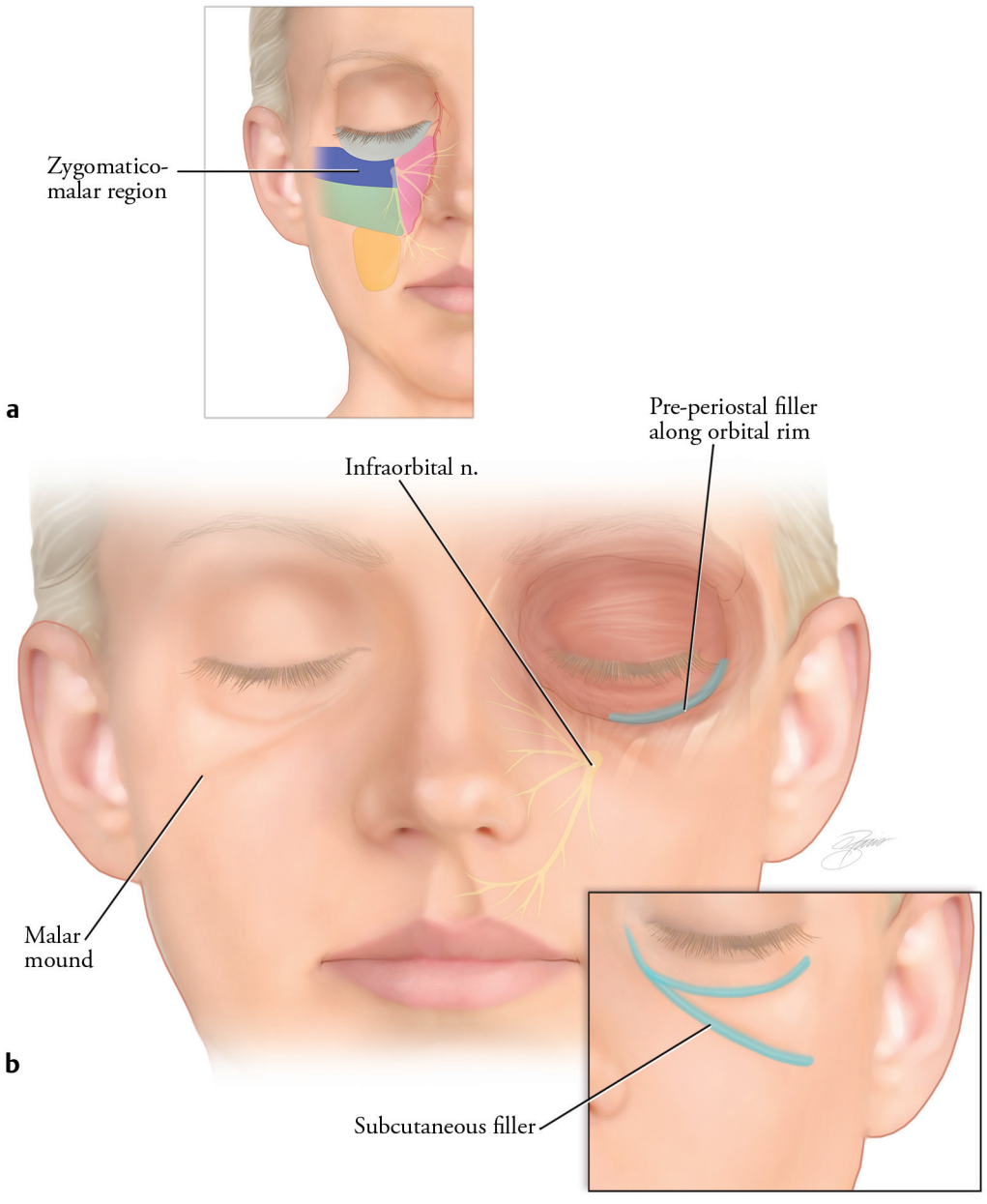


Fig. 54.1 (**a**) The zygomaticomalar subdivision of the midface lies inferior to the infraorbital rim and lateral to the infraorbital nerve. (**b**) The prominence of the cheekbones is improved by augmenting the zygomaticomalar region. Injection may include deep injection along the infraorbital rim and zygomatic arch as well as a more superficial injection to camouflage the malar mound.

Additional Reading

[1] Carruthers JD, Carruthers A. Facial sculpting and tissue augmentation. Dermatol Surg. 2005; 31(11 Pt 2):1604–1612

[2] Few J, Cox SE, Paradkar-Mitragotri D, Murphy DKA. A multicenter, single-blind randomized, controlled study of a volumizing hyaluronic acid filler for midface volume deficit: patient-reported outcomes at 2 years. Aesthet Surg J. 2015; 35(5):589–599

[3] Lowe NJ, Grover R. Injectable hyaluronic acid implant for malar and mental enhancement. Dermatol Surg. 2006; 32 (7):881–885, discussion 885

[4] Mendelson BC, Muzaffar AR, Adams WP , Jr. Surgical anatomy of the midcheek and malar mounds. Plast Reconstr Surg. 2002; 110(3):885–896, discussion 897–911

55
Filler Injection for Sunken Cheeks

Difficulty: ●●
Patient Satisfaction: ●●
Risk: ●

Indications

Hollowing of the cheeks can be seen in some patients who present with serious volume deficits. The loss of malar and buccal fat pads often can lead to a windswept post-facelift appearance as well as wrinkled cheeks, deepened nasolabial folds, and the presence of jowls. In many cases, the hollow submalar and buccal concavities are better suited to augmentation than surgery; however, filling these regions with autologous fat may be performed as an adjunct to rejuvenation surgery.

In evaluating the patient as a whole, often he or she is noted to have flattened cheekbones and a hollow appearance under the eyes. Implementation of the techniques described in Chapter 53 and Chapter 54 often improves the appearance of the submalar area and decreases the volume necessary to correct the deformity in this region.

Anatomic Considerations

The area under the zygomatic arch and lateral to the nasolabial fold and modiolus comprises the submalar and buccal regions of the midface.

Injection Technique

Topical anesthesia is usually sufficient for these injections. The injection technique should be a grid or fanning pattern, spreading the product in a medial to lateral fashion. The plane of injection is usually at the dermal–subcutaneous junction. Gentle massage after injection helps to smooth irregularities.

Newer injection techniques developed by de Maio have been described using the higher G′, products like Juvéderm Voluma and Restylane Lyft. Volumization of this region is performed by pulling/pinching the cheek laterally and placing product along the periosteum in a depot or peaking type of injection. Improvement in the nasolabial fold and occasionally the upper marionette region can be seen using this technique.

To conserve product and achieve a nice elevation, the maximal cheek prominence region can be identified and one bolus placed in this “sweet spot” for malar elevation. This can also camouflage the malar mound.

Precautions

Injecting too superficially in this region can result in ridges or striping of material. Placing the product in deeper planes will necessitate using more material. Lumpiness in this region is common after injection, and the injector should massage the area after injection to ensure even placement of product. Placement of product too deeply will project some of the volume into the oral cavity because the buccal area is not supported by bone.

Post-Injection Instructions

Ice and pressure are helpful to prevent bruising. The product will swell some and will feel firmer to palpation the first week, and then blend in more naturally. A gentle post-injection kneading massage can be helpful. Care should be taken to avoid excessive pressure in the injected region for 24 hours. Instruct the patient to apply ice packs lightly to the cheeks to avoid flattening out the product.

Risks

This is a low-risk procedure, but if very large volumes of product are necessary, the excess filler can "weigh down" the cheek. In these excessively hollow patients, consider using poly-L-lactic acid (PLLA) or fat augmentation. Care must also be taken to ensure symmetry is achieved.

Pearls of Injection

- Inject at different levels and massage to evenly disperse product. Large volumes of product are necessary to properly correct these areas.
- To best treat a patient on a modest budget, begin the injection medially and near the inferior aspect of the zygomatic arch.
- The goal is to ease the transition from the high to low regions and create a softer step-off transition.

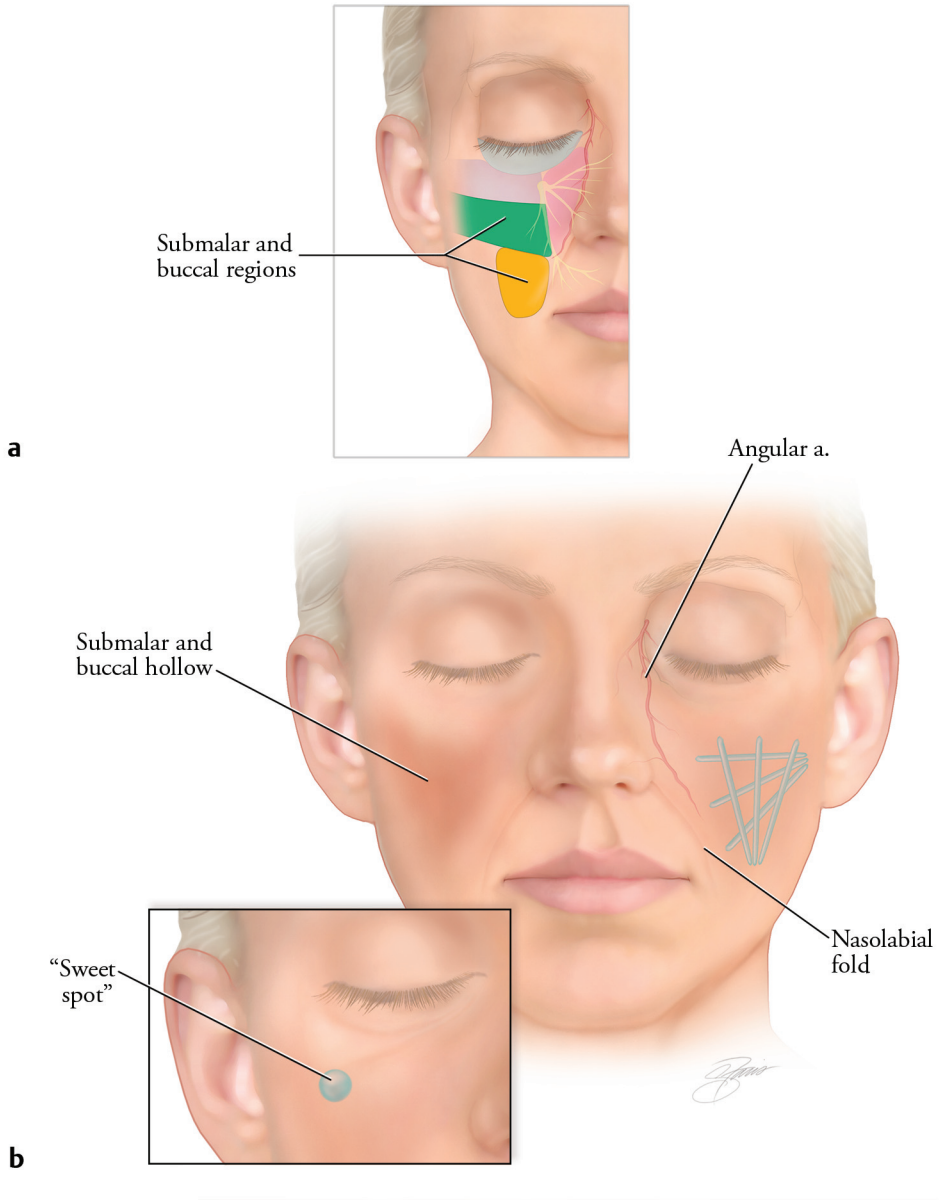


Fig. 55.1 (**a**) The submalar and buccal regions of the midface lie inferior to the zygomaticomalar region and lateral to the infraorbital nerve. (**b**) Filler is placed at different depths in a crossed fanning technique to elevate the submalar and buccal hollows. (**c**) "A sweet spot" peaking injection elevates the cheek with one targeted injection.

Additional Reading

[1] Cattin TA. A single injection technique for midface rejuvenation. J Cosmet Dermatol. 2010; 9(3):256–259

[2] Raspaldo H, Aziza R, Belhaouari L, et al. How to achieve synergy between volume replacement and filling products for global facial rejuvenation. J Cosmet Laser Ther. 2011; 13 (2):77–86

56
Filler Injection for Cheek Lift: de Maio Technique

Difficulty: ●●
Patient Satisfaction: ●●●●
Risk: ●●

Indications

Fillers may be used to augment the cheekbones or lateral malar prominence either when a bony deficiency exists or when soft tissue overlying the bone has been lost due to aging and volume loss or redistribution. Dr. Mauricio de Maio, a plastic surgeon from Brazil who has lectured as a speaker for Allergan, describes a repeatable technique using Juvéderm Voluma XC to augment the cheek bones with the goal of addressing volumetric loss in the midface, lift and widen the midface, decrease hollows under the eye, soften the nasolabial folds and marionette lines somewhat, and lift the face in general.

Anatomic Considerations

The malar bone, the inferior and lateral orbital rims, orbicularis oculi muscle, and infraorbital nerve are important anatomic landmarks in the area of this injection. High cheekbones, a short lower eyelid, and a smooth transition to the cheek contribute to a youthful arc seen in three-quarter view. Utilization of this technique may decrease the amount of filler needed to treat the nasolabial folds.

Injection Technique

Although de Maio described this technique using Juvéderm Voluma XC, other fillers that provide lift and support can also be used in this area, including the thicker HA products, calcium hydroxylapatite (CaHA), or even PLLA. This technique involves injecting depots (or peaking technique) of approximately 0.2 mL into four distinct areas described as V1 through V4, while pulling the cheek posteriorly and superiorly to "spot weld" the tissue, resulting in a cheek lift. Some patients will need more and some less than 0.2 mL depending upon their degree of volume loss. The depot injections are placed deep onto the maxillary periosteum.

The first step is to determine the lid–cheek junction and note or mark it on the patient, as well as the zygoma or cheek bone out toward the ear. The lid–cheek junction marks the transition of the thin skin of the eyelid to the thicker skin of the cheek, often coinciding with the lower edge of the dark circle under the orbital fat.

The V1 injection site is a few centimeters outside the lateral canthus at a point where the lid–cheek junction has been determined to fall on the patient. V2 corresponds to the point on the line dropped perpendicular from the lateral canthus as it hits the lid–cheek junction. V3 is then 1 to 2 cm medial to the lateral

canthus, but lateral to the infraorbital nerve and foramen, which is 2 cm below the orbital rim at the level of the pupil. Finally, V4 lies inferiorly and lateral to V2 on the lower aspect of the zygomaticomalar junction. This injection is more commonly a combination of subcutaneous and depot rather than pure depot as it is filling a broader submalar hollow.

A further modification of this technique by the authors, which can provide more lift to the lower face and a more natural cheek, is the addition of a second syringe lateral to V1 in a depot technique extending in small boluses V-1 to V-2 along the outer edge of the zygoma out to the hairline. This can also extend up the lateral orbital rim Y1 superior to V2 in order to increase the center of gravity of the cheekbone and lift the eye further.

Precautions

This is a very safe injection location so long as the vessels in the infraorbital area are avoided. Performing a reflux maneuver during the injection increases safety by avoiding direct vessel injection in this area.

Post-Injection Instructions

Ice may be used as needed; no massaging is necessary except when PLLA is used. Swelling can increase for a few days before resolving. If a patient likes the appearance while swollen, then the patient should wait a few weeks before coming back for more, so as to get the clearest picture of how much is truly needed.

Risks

Bruising is possible. The greatest challenge with performing this procedure is ensuring symmetry. Pretreatment photography, including 3D images, is useful for achieving optimal results and reminding patients of what they looked like before treatment began.

Pearls of Injection

- Cannulas may be used for the deep injections in the V4 area especially, as they deliver product from a side port in contradistinction to a needle, which will accurately place product on the periosteum.

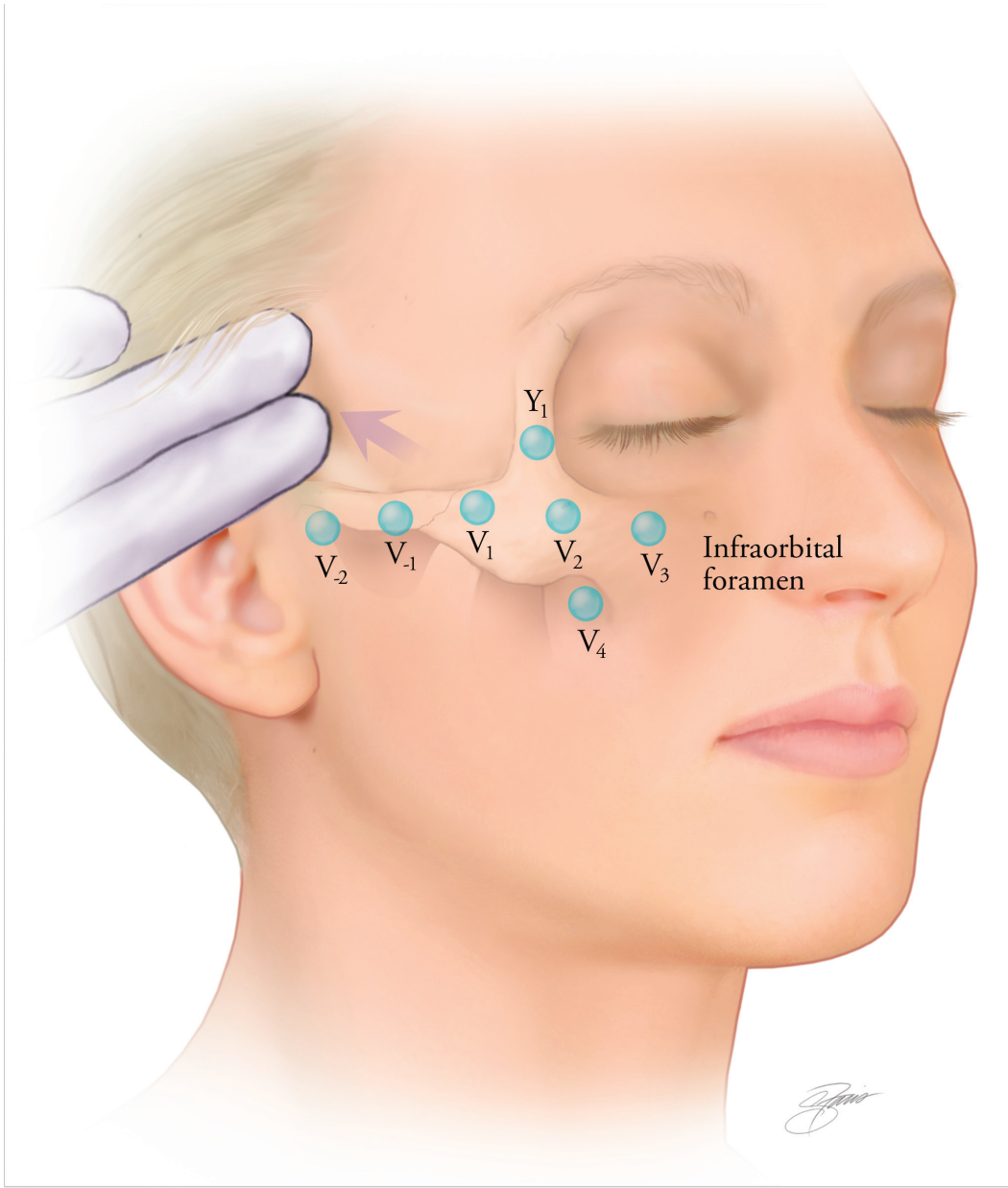


Fig. 56.1 The de Maio injection technique: depot or peaking techniques placed deeply. V1, zygomatic arch; V2, zygomatic eminence; V3, anteromedial cheek; V4, submalar. Further modification of this technique may include V-1 and V-2 placed posteriorly and Y1 placed superiorly to soften the transition zones and "blend" the volumization.

Additional Reading

[1] Cotofana S, Schenck TL, Trevidic P, et al. Midface: clinical anatomy and regional approaches with injectable fillers. Plast Reconstr Surg. 2015; 136(5) Suppl:219S–234S

[2] De Maio M, Rzany B. Injectable Fillers in Aesthetic Medicine. 2nd ed. Springer-Verlag; 2014

57
Filler Injection for Chin Augmentation

Difficulty: ●●
Patient Satisfaction: ●●●
Risk: ●

Indications

The weak chin is usually best addressed with a permanent surgical solution, such as an alloplastic implant. However, augmentation with a filler can be a good alternative in the following situations: the patient needs only small amounts of augmentation; the patient is elderly or a poor surgical candidate; the patient is already scheduled to undergo lower facial volume restoration; the patient is looking for immediate results without surgical downtime or great expense; the patient is considering a chin implant but is hesitant about receiving a permanent implant; or the patient has a cleft chin and wants a smooth contour across the center of the chin.

Anatomic Considerations

The bone structure of the mandible can be too "squared," "pointed," or "weak," and filler can be used creatively to shape or augment the chin. During injection, be cognizant of the location of the mental nerves and adjacent vessels exiting the mental foramen.

Injection Technique

There are two basic techniques that are useful for filling the chin: deep depot injections onto the periosteum to truly mimic a surgical implant; and fanning, threading-type injections in the subdermal plane that spread over a broad area. The more superficial injection techniques should be at the dermal subcutaneous junction so as to add volume as well as to firm the overlying skin, which is often less firm than it once was. With the threading technique, a longer 1.0- to 1.5-inch (2.5- to 3.8-cm) needle of 27- to 30-gauge works best. The depot is easily placed along the border of the mandible so long as the mental foramen is avoided.

Precautions

Determine where the mental foramen and nerve are located, and avoid that region when injecting. If a chin implant is already in place, use careful sterile technique and avoid directly injecting into or onto the implant to avert seeding the implant with bacteria. Consider a short course of antibiotics post injection if the chin implant is encountered with the needle.

Post-Injection Instructions

Immediate pressure and then ice are helpful to minimize bruises. The chin initially will appear swollen and more rounded than it will appear once the edema subsides.

Risks

Minimal risks occur, besides bruising, with the superficial technique if the injections are smooth and even. When injecting deeply onto the bone, there are more inherent risks for damage to the mental nerve, and possible intravascular injection if a depot injection is used.

Pearls of Injection

- Evaluate the chin from all angles to ensure that it looks proportionate and balanced all over, as symmetry will be important as well as challenging when trying to fill a whole midline structure.
- Massage of the area will aid in smoothing any injection irregularities.

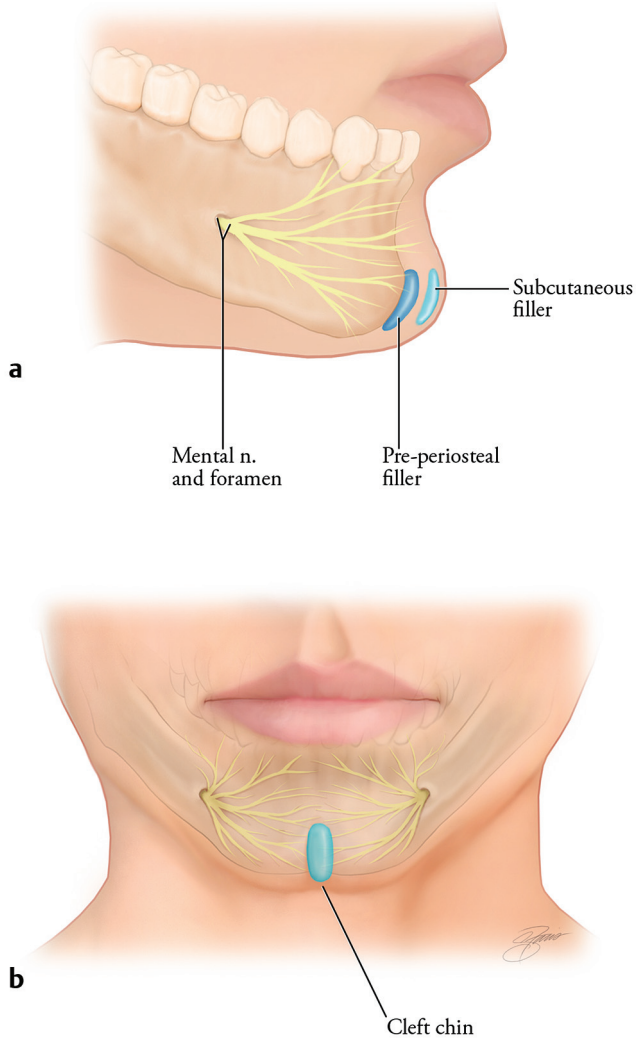


Fig. 57.1 (**a**) Filler is placed on the periosteum and/or in the subcutaneous tissue to increase prominence of the chin. (**b**) Filler may be placed subcutaneously to camouflage a chin cleft.

Additional Reading

[1] Binder WJ, Dhir K, Joseph J. The role of fillers in facial implant surgery. Facial Plast Surg Clin North Am. 2013; 21(2):201–211

[2] Sykes JM, Fitzgerald R. Choosing the best procedure to augment the chin: is anything better than an implant? Facial Plast Surg. 2016; 32(5):507–512

58
Filler Injection for the Mental Crease

Difficulty: ●
Patient Satisfaction: ●●
Risk: ●

Indications

The mental crease (or chin crease) is the horizontal crease between the lower lip and chin, which can be quite deep in some individuals.

Anatomic Considerations

The paired mentalis muscles originate on the incisor fossa of the mandible and insert directly into the dermis of the chin skin. Contraction of the mentalis muscles elevates the lower lip and contributes to the mental crease.

Injection Technique

This is a painful area to inject; a topical or dental block may be utilized. Filler is injected at multiple levels in the dermis and subdermal subcutaneous tissue to elevate the crease. A combination of linear threading both parallel and perpendicular to the crease can be used. Deeper creases can be treated with depot techniques.

Precautions

Superficial injection of some hyaluronic acids (HAs) will result in bluish blebs of material. Do not over-inject this area. Massage after injection to maximize smoothness.

Post-Injection Instructions

Bruising is possible; ice as needed.

Risks

This is a very safe area to inject. Deep creases may require a large amount of filler.

Pearls of Injection

Filler used alone in this area tends to last for very short periods of time. However, in conjunction with BoNTA injection to the mentalis, the duration of any filler in this area is significantly improved. Neurotoxin may be injected into the mentalis muscles as in treatment of the peau d'orange chin (see Chapter 19), which may also help to flatten the mental crease.

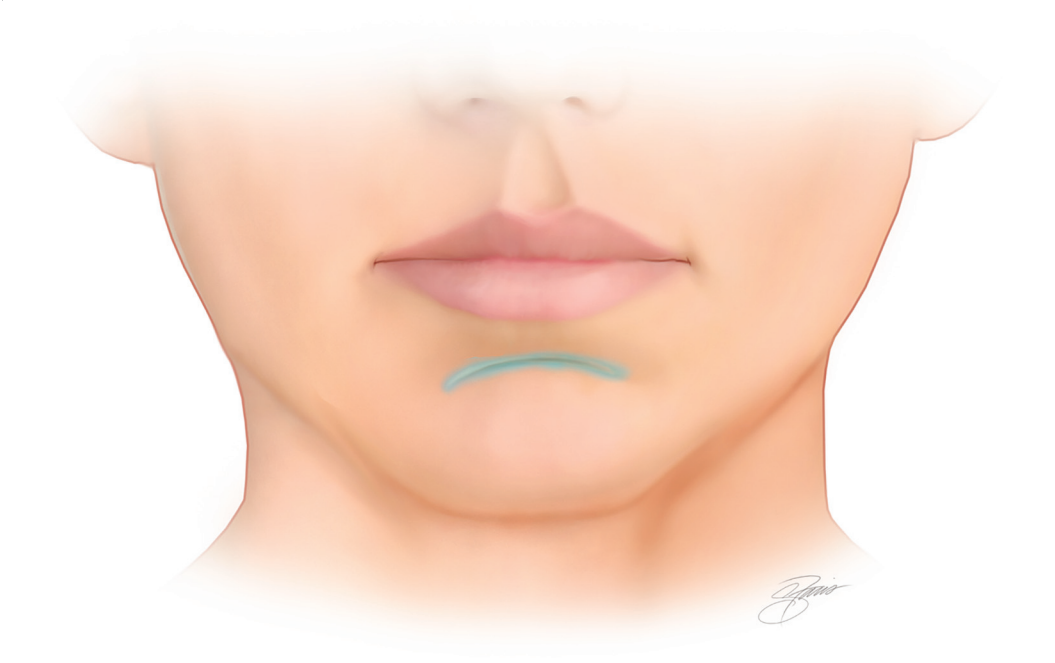


Fig. 58.1 The mental crease can be improved by injection of filler in the subcutaneous tissue beneath the concavity.

Additional Reading

[1] Brandt FS, Cazzaniga A. Hyaluronic acid fillers: Restylane and Perlane. Facial Plast Surg Clin North Am. 2007; 15(1):63–76, vii

[2] Romagnoli M, Belmontesi M. Hyaluronic acid-based fillers: theory and practice. Clin Dermatol. 2008; 26(2):123–159

59
Filler Injection for Jawline Rejuvenation

Difficulty: ●●
Patient Satisfaction: ●●
Risk: ●

Indications

Prejowl sulcus fat loss and descent of the midface can accentuate the formation of the jowls. By filling the concave area just anterior to the jowl, a straighter, more youthful jawline can be achieved. However, the formation of jowls is multifactorial, and often a facelift is the only treatment that can adequately lift or remove the jowl.

Anatomic Considerations

Aging changes of the jawline are a result of draping of excess skin, sagging of buccal fat, loss of prejowl fullness, and changes in the submental platysmal angle. Filling the prejowl area, both in the area of the marionette lines as well as in the area at and below the mandible, creates a much more pleasing anterior mandibular contour. Augmentation of the prejowl sulcus must occasionally be addressed when surgical options are planned, by the use of either filling agents or prejowl surgical implants.

Injection Technique

Hyaluronic acids (HAs) are commonly used in this area. They may be injected at the dermal subcutaneous junction so as to add volume as well as to firm the overlying skin, which is often less firm than it once was. A threading technique with 1.0- or 1.5-inch (2.5- to 3.8-cm) needles of 27- or 30-gauge works best. The injection must bridge all the way from the high point of the jowl and blend forward to the firm, level portion of the chin.

Alternate Technique

Subdermal injections may be combined with depot injections along the mandible. For such deep injections, HA, calcium hydroxylapatite (CaHA), or polymethyl methacrylate (PMMA) can be used safely, and these deep injections can mimic a true prejowl implant. This technique requires more product volume than do the more superficial injections to achieve a similar effect.

Precautions

Bruising is very common with the subdermal injection. Care must be taken to avoid the mental foramen, as paresthesias could occur with a direct injection into the foramen.

Post-Injection Instructions

Immediate pressure and then ice are helpful to minimize bruising.

Risks

Minimal risks occur, besides bruising, with the superficial technique if the injections are smooth and even.

Pearls of Injection

- Massage the product to shape it and re-create the mandibular jawline.
- Include injection along the inferior aspect of the mandible to fill in the entire prejowl concavity.
- Consider using a cannula for injection into this region, as precision of filler placement is not required in this location.

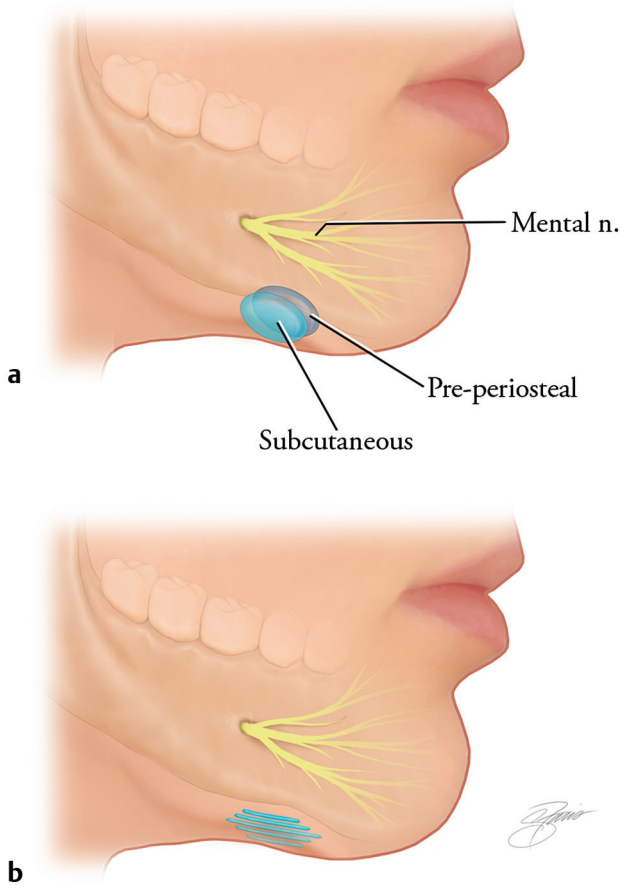


Fig. 59.1 (**a**) Filler can be placed in the preperiosteal or subcutaneous planes to augment the prejowl sulcus. (**b**) Filler can also be placed subcutaneously in a linear fashion. A combination of these techniques may be required for optimal correction.

Additional Reading

[1] Braz A, Humphrey S, Weinkle S, et al. Lower face: clinical anatomy and regional approaches with injectable fillers. Plast Reconstr Surg. 2015; 136(5) Suppl:235S–257S

[2] Moradi A, Watson J. Current concepts in filler injection. Facial Plast Surg Clin North Am. 2015; 23(4):489–494

60
Filler Injection for Mandibular Angle Augmentation

Difficulty: ●●
Patient Satisfaction: ●●●
Risk: ●

Indications

A strong jawline is considered a masculine characteristic, and some men request augmentation of this region. In the past, alloplastic implants were used, but filler can now be used to augment this region nicely. This injection technique may also be used in women who have a very small mandibular angle prominence, or to improve symmetry in patients with obvious mandibular asymmetries.

Anatomic Considerations

The mandibular angle has both a horizontal and a vertical component, and the injector must assess which areas require augmentation.

Injection Technique

Marking out the planned injection is often helpful in treating these patients. Ideal fillers for this region are thicker and provide enhanced lift and can include CaHA, PLLA, and the thicker HAs like Restylane Lyft, Restylane Defyne, and Juvéderm Voluma.

Topical anesthetic is placed and a 30-gauge needle is used, although a 25-gauge, 1.5-inch (3.8 cm) needle or a small cannula can be useful for tunneling product and preventing multiple needle sticks. Injections are placed in the deep subcutaneous plane in a retrograde tunneling fashion, then molded into place to prevent lumpiness. Achieving symmetry is the most difficult part of this procedure.

PLLA can also be used in this area, with product placed in the deep subcutaneous tissues and massaged for 5 minutes, 5 times a day for 5 days. Approximately three treatment sessions are performed 6 weeks apart until improvement is seen. Results with PLLA can last up to 2 years.

Precautions

Injections should be placed low along the mandibular border and extended superiorly in the preauricular region. Care should be taken to avoid the retromandibular vessels.

Post-Injection Instructions

Injections in this region are well tolerated. Ice can be used as needed, although bruising and swelling are usually minimal.

Risks

Asymmetric enhancement and undercorrection are the most common complications with this procedure.

Pearls of Injection

- Marking the areas prior to injection helps in assessing the area of mandibular deficiency and planned injection sites.
- Some patients request excessive augmentation, and multiple treatment sessions for such patients is recommended.

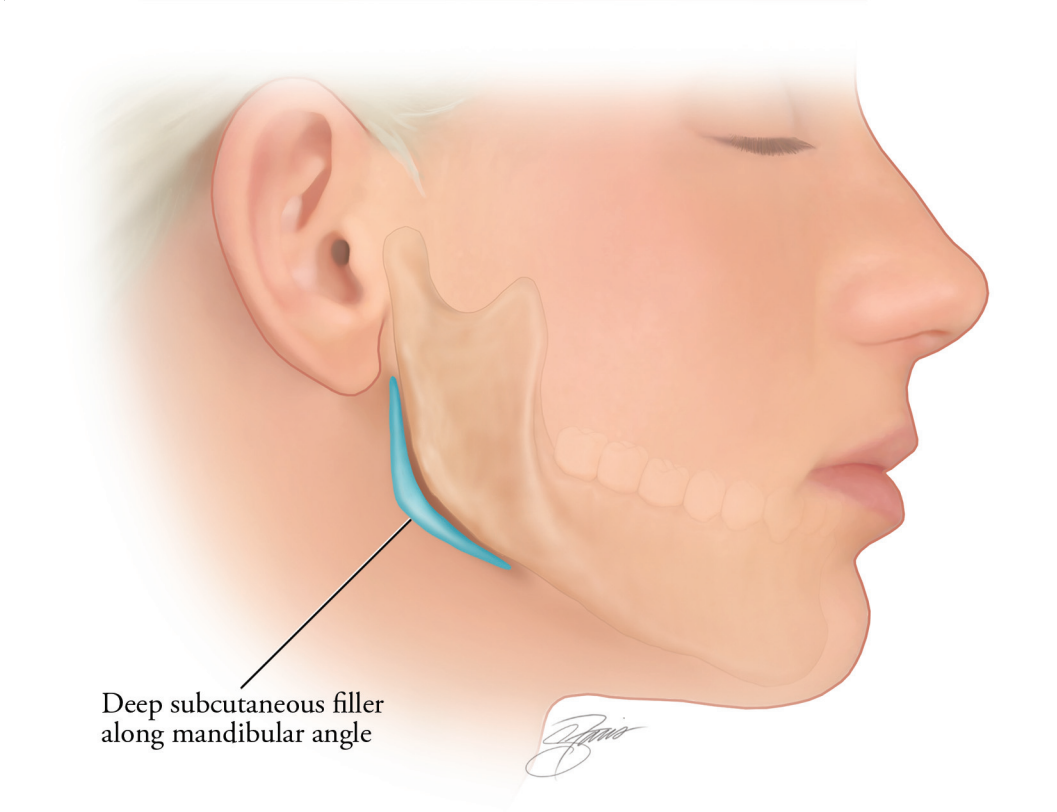


Fig. 60.1 Injection of filler to augment the mandibular angle.

Additional Reading

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[2] Schierle CF, Casas LA. Nonsurgical rejuvenation of the aging face with injectable poly-L-lactic acid for restoration of soft tissue volume. Aesthet Surg J. 2011; 31(1):95–109

61
Filler Injection for Earlobe Rejuvenation

Difficulty: ●
Patient Satisfaction: ●●●
Risk: ●

Indications

The earlobes flatten with age and lose their volume. This flattening combined with elongated piercing holes can result in the downward hanging of stud earrings. Re-volumization of the lobes contributes to a more youthful look and more attractive earring positioning.

Anatomic Considerations

Fill the lower aspect of the earlobe to provide structural support to the earring and restore volume to the earlobe.

Injection Technique

Hyaluronic acid (HA) should be placed in the subcutaneous tissue in a U-shape around the pierced hole until adequate filling of the earlobe is seen. Alternately, poly-L-lactic acid (PLLA) may be used in a similar fashion, but the results will take longer to achieve. The added volume and support of the earlobes help add firmness needed to elevate drooping earrings.

Precautions

None.

Post-Injection Instructions

Ice as needed.

Risks

None: this is a very safe procedure to perform, yielding high patient satisfaction.

Pearls of Injection

- This is a nice technique to offer patients, especially when looking for an appropriate place for the last little bit of product remaining in the syringe after treatment of other facial areas.

Fig. 61.1 Hyaluronic acid may be placed in the earlobe both to support a hanging pierced earring and to restore volume to the deflated aging lobe.

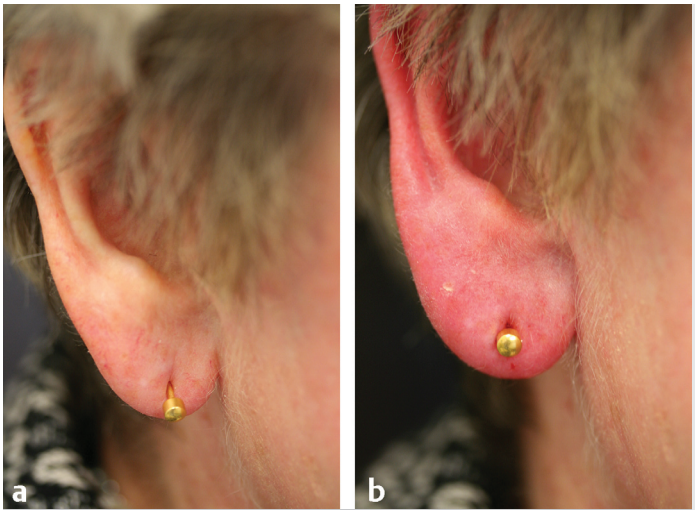

Fig. 61.2

Additional Reading

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[2] Qian W, Zhang YK, Cao Q, Hou Y, Lv W, Fan JF. Clinical application of earlobe augmentation with hyaluronic acid filler in the Chinese population. Aesthetic Plast Surg. 2017; 41(1):185–190

62
Filler Injection for Acne Scars

Difficulty: ●●
Patient Satisfaction: ●●
Risk: ●

Indications

Severe cystic acne can lead to large, depressed facial scars. These scars can include depressions in the dermis as well as the subdermal fat. The shadowing of these depressed scars can accentuate their deep appearance, and elevation with fillers will minimize the shadowing and improve the overall skin contour. Although some flattened scars and concavities can be improved with fillers, enlarged pores and icepick scars will not improve with such injections.

Anatomic Considerations

Prior to injection of the scar, the injector may perform a "stretch" test to determine if the scar will improve with filler injection. If the scar flattens out with skin stretching, the scar will likely elevate and improve with filler. If it does not elevate, it may require release of the dermal attachments by subcision, or it may require direct excision. Most injections will be placed intradermally or in the immediate subdermal plane. To prevent lumpiness in areas with thin skin, such as the temple and the lower eyelid, very small amounts of filler should be injected.

Injection Technique

Any filler may be used for these injections; however, we commonly use hyaluronic acids (HAs) or PMMA. The injection technique should start with a 30-gauge needle so as to layer and cross-hatch the intended area with multiple passes from different angles. Part of the correction requires subcision within the dermis and subdermis to break up fibrosis and scar tissue. The action of the needle moving back and forth across the scar will disrupt the fibrous attachments deep to the scar and permit its elevation with filler. A significant amount of force is necessary to introduce the product into the scar area. If no resistance is met, then the needle is probably too deep. It is best to introduce the needle 4 to 5 mm away from the edge of the scar area so that the product does not escape out of the puncture site when the needle is withdrawn or when the next pass is made from a different angle.

Precautions

If there are large pores in the area being injected, the needle may need to be passed at a deeper or different angle, especially if product begins to extrude through one of the dilated pore tracts. Over-injection of a given area can lead to blanching or even intravascular occlusion.

Post-Injection Instructions

Ice and pressure are helpful to prevent bruising and lumpiness. The product will swell somewhat with an HA and feel firmer to palpation the first week and thereafter blend in more naturally. The

patient should expect that the areas injected will look raised initially.

Risks

Minimal risks exist besides bruising and Tyndall effect from overly superficial injection into the dermis.

Pearls of Injection

The force of the injection and the presence of the product in the expanded space of the scar can actually stimulate neocollagenesis. Unless adequate release of scar tissue is performed at the center of a depressed scar, filling the area can create a mound that will accentuate the shadowing at the base of the scar.

Consider layering fillers, placing calcium hydroxylapatite (CaHA) deeply in the subcutaneous tissues and HA more superficially in the deep to superficial dermis. Restylane has more lifting qualities than does Juvéderm and is preferred for acne scars. Collagen is also an excellent scar elevator. Polymethyl methacrylate (PMMA) may be used as well, usually several days after subcision has been performed.

Fig. 62.1 Some acne scars may be elevated by placing filler deep to the scars. Scars that do not elevate with filler alone may require subcision to release dermal attachments prior to injection.

Additional Reading

[1] Carvalho Costa IM, Salaro CP, Costa MC. Polymethyl methacrylate facial implant: a successful personal experience in Brazil for more than 9 years. Dermatol Surg. 2009; 35(8):1221–1227

[2] Goldberg DJ, Amin S, Hussain M. Acne scar correction using calcium hydroxylapatite in a carrier-based gel. J Cosmet Laser Ther. 2006; 8(3):134–136

[3] Joseph JH, Eaton LL, Cohen SR. Current concepts in the use of Bellafill. Plast Reconstr Surg. 2015; 136(5) Suppl:171S–179S

[4] Smith KC. Repair of acne scars with Dermicol-P35. Aesthet Surg J. 2009; 29(3) Suppl:S16–S18

63
Filler Injection for Aging Hands

Difficulty: ●●●
Patient Satisfaction: ●●●
Risk: ●●

Indications

The back of the hand is an area that often shows a person's age even while the face and body are well maintained and physically fit. The aging hands manifest dyschromias, loss of fat, thinning of the skin, and grooving of the spaces between the extensor tendons of the fingers.

Anatomic Considerations

For superficial injections of the hand dorsum, the anatomic concerns include a superficial venous arcade and the long extensor tendons. For deeper injections, the injector must be aware of the location of the interosseus muscles and the five metacarpal bones of the hand.

Injection Technique

Hyaluronic acid (HA) or calcium hydroxylapatite (CaHA) can be used to augment this region. These fillers provide instant gratification and a soft, even fill in the space between the skin and the interosseous muscles. The injections should be performed as if there are separate compartments between each metacarpal. It is best to avoid injecting directly over the tendons and bones, as it is more likely to lead to surface irregularities. As the area being injected is a long, narrow compartment with many large veins throughout, it is best to us a long needle (either 1.0- or 1.5-inch [2.5- or 3.8-cm], of 25- to 27-gauge) to inject product deep to veins and the skin into the deep subcutaneous layers, or right above the muscle if necessary. All injections should be performed as retrograde threading or fanning to avoid vessel injection.

An alternative technique is to place depot injections and massage the product to fill in the hollows between the tendons.

Precautions

With so many large and torturous vessels in this area, hitting one or even a few is often inevitable. Ice ahead of time, and quick, firm pressure on the site of injection as soon as the needle is withdrawn, can help keep hematomas or very large bruises from forming.

Post-Injection Instructions

Ice and firm pressure are helpful to prevent bruising. The product will swell somewhat with an HA and feel firmer to palpation the first week and thereafter blend in more naturally. The patient should expect that the areas injected will look raised and welted at first. Swelling should settle down within about 2 to 4 days.

Risks

The most significant risks involve injection irregularity and the product not feeling and looking smooth. It is important to massage uneven areas soon after injection so as to avoid a longer-term problem, although an even injection technique is always more effective than any amount of massage.

Pearls of Injection

- Undercorrection is usually safest, as well as injecting with the needle in motion so as not to inject into a vessel and create an occlusion or an embolic situation.

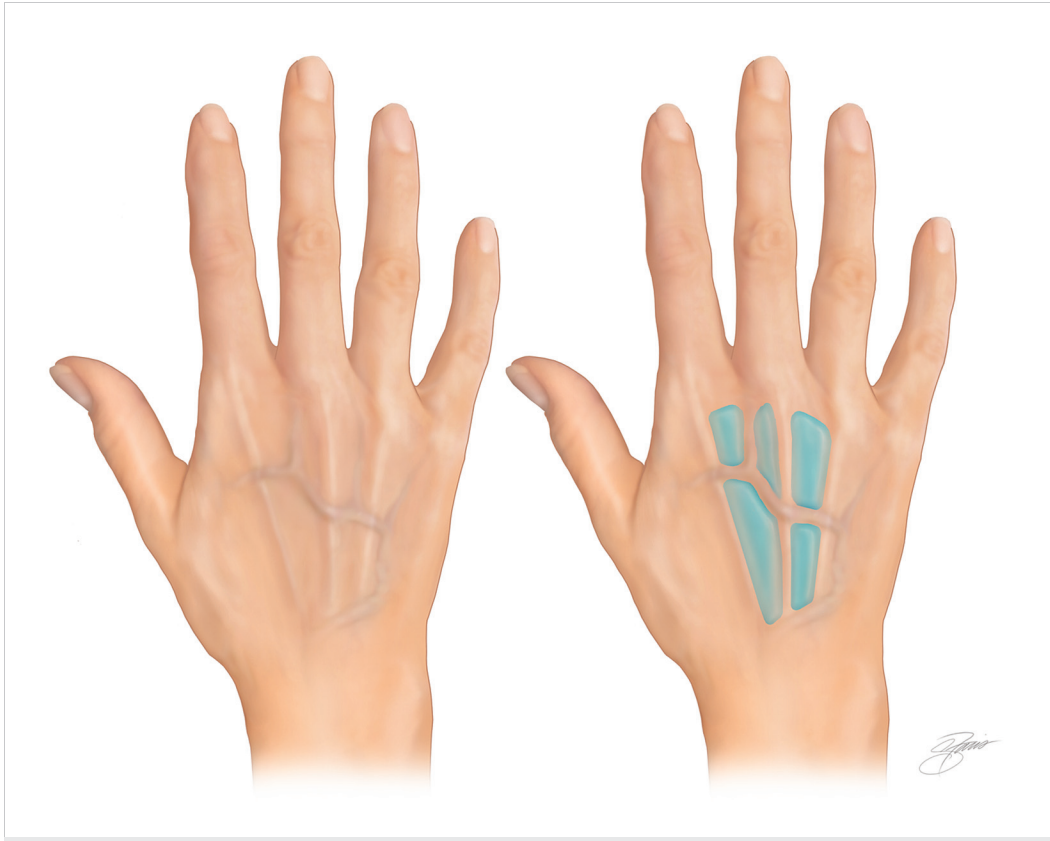

Fig. 63.1 Filler is placed subcutaneously and massaged into place to improve the hollows of the aging hand.

Additional Reading

[1] Butterwick K, Sadick N. Hand rejuvenation using a combination approach. Dermatol Surg. 2016; 42 Suppl 2:S108–S118

[2] Edelson KL. Hand recontouring with calcium hydroxylapatite (Radiesse). J Cosmet Dermatol. 2009; 8(1):44–51

[3] Lefebvre-Vilardebo M, Trevidic P, Moradi A, Busso M, Sutton AB, Bucay VW. Hand: clinical anatomy and regional approaches with injectable fillers. Plast Reconstr Surg. 2015; 136(5) Suppl:258S–275S

64
Filler Injection with Poly-L-Lactic Acid for Facial Volumizing (Sculptra)

Difficulty: ●●●
Patient satisfaction: ●●
Risk: ●●●

Indications

The aging face undergoes lipoatrophy and essentially "deflates" prior to succumbing to the effects of gravity. Fat augmentation of the face is gaining in popularity; however, poly-L-lactic acid (PLLA) may provide similar results without the need for a surgical intervention. In addition, many thin faces are part of a body that is also depleted of fat, so with no adequate donor site for fat augmentation, PLLA may be a viable alternative. PLLA is a biostimulatory filler, and multiple treatments are necessary.

Anatomic Considerations

Prior to injecting this product, it is essential to have a thorough understanding of the facial aging process to accurately restore volume to a more youthful shape. PLLA is not intended to be injected into the muscle. Therefore, the injections should be directed either into the more superficial subcutaneous planes in the lower face or near the periosteum below the muscles of the upper face.

Injection Technique

Re-suspension of product is performed preferably 48 hours prior to injection, but product may be reconstituted anytime between 20 minutes to 3 days prior to the procedure using preserved water. Preserved water is preferred because it allows a longer shelf life after rehydration. (According to the manufacturer, if saline is inadvertently used for re-suspension, then the product should not be used. However, some injectors routinely use saline and have not reported any problems.) The volume of water used should be 5 mL or more per vial. Xylocaine (1 or 2%) should be added to each vial (1 to 3 mL) just prior to performing the injections to increase patient comfort. Some injectors advocate using lidocaine with epinephrine 1:100,000 to theoretically minimize bruising: the authors do not use this mixture and have not found that its benefits outweighed its complications.

Targeted on-label areas for injection include the temples, nasolabial folds, cheeks, pre- and post-jowl regions, and melolabial folds. Advanced areas that lead to good results in experienced hands include the brows, infraorbital rims, midface, and lateral orbital rims. Injection is placed in the superficial subcutaneous or pre-periosteal planes, *not intradermally* or in the lips or lip lines. Typically a patient will receive one or two vials at each treatment session. A pan-facial volumization often requires the use of at least six vials over three sessions. In severe cases, more product can be used.

Injection techniques include linear threading in a grid pattern, which is an on-label use, along the cheeks and the whole lower face, or fanning, which is not an on-label use, but results in fewer injection entry sites through the skin. Depot onto the periosteum is used for volumization of the upper half of the face in all areas above the inferior border of the orbicularis oculi muscle. Due to the suspension particle size of the PLLA product, it is necessary to use at least a 26-gauge needle and preferably a 25-gauge needle to inject. With both the depot and the fanning and threading techniques, the use of a 1.0- to 1.5-inch (2.5- to 3.8-cm) needle makes for many fewer puncture sites and a more efficient placement of the product.

Post-Injection Instructions

Immediately after injection, the face is massaged. We apply a thin moisturizer onto the skin, which allows the fingers to glide smoothly. At that time, we teach the patients the massage technique. They are instructed to perform a deep tissue massage of the injected areas for 5 minutes, 5 times a day, for the next 5 days. Bruising can be quite significant, and patients should be warned that they may need to be camouflaged for a week or more because of the volume of injection and the size of the needles.

Patients should be aware that this is a slow process for volumization. They may not see any volume enhancement after the first treatment. In addition, the initial volumization they see is from the injected water, which will resorb in a few days.

Precautions

Nodule formation is the great fear for those injecting this product and is due in most cases to faulty technique. Overly concentrating the particles in one area and not placing the injection at the right plane are the most common reasons for clumping of the product and subsequent collagen overgrowth or granulomatous reaction. The occurrence of nodules and injection sequelae has diminished greatly due to the higher dilutions used and the injection training requirement by the manufacturing company.

Do not inject this product in the circular muscles of the face—the orbicularis oculi and oris—as there is increased incidence of nodules in these areas.

Risks

Intravascular injection is possible, especially along the nasal–alar junction. Perform a reflux maneuver on the syringe prior to injections in this area. One consolation, despite the blanching or hematoma, is that the product is almost entirely watery and that any embolic event will be self- limiting compared with a solid injectable substance.

Pearls of Injection

- Do not attempt this injection without the proper training. Make sure patients understand that it will take several treatments at 4- to 6-week intervals to see results.
- It is almost impossible to over-inject a patient with PLLA.
- To prevent the syringes or needles from plugging, after adding the water reconstitute, allow the product to sit for 48 hours without agitating. When you are ready to add the lidocaine, gently vibrate, stir, or agitate for 5 to 10 minutes to fully suspend the particles. Try to avoid shaking the vial and causing the production of foam, as this tends to increase clogging of the needle.

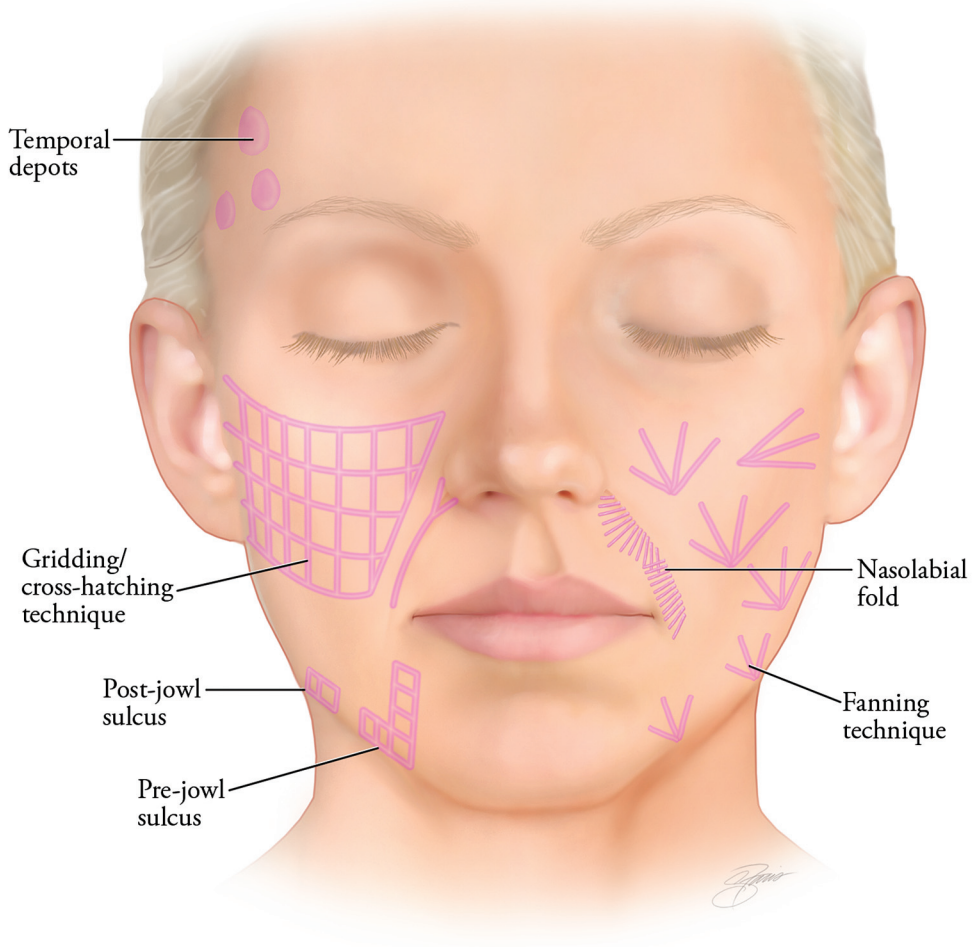

Fig. 64.1 Multiple techniques may be used to inject PLLA. The depot technique is generally used to augment the temples. A grid technique may be used for the cheeks and pre- and post-jowl regions. The injection also may be placed along the nasolabial fold. Alternatively, a fanning technique can be used. A combination of these techniques is also acceptable.

Additional Reading

[1] Fitzgerald R, Vleggaar D. Facial volume restoration of the aging face with poly-L-lactic acid. Dermatol Ther (Heidelb). 2011; 24(1):2–27

[2] Lacombe V. Sculptra: a stimulatory filler. Facial Plast Surg. 2009; 25(2):95–99

65
Filler Injection with Poly-L-Lactic Acid for the Décolleté

Difficulty: ●●
Patient Satisfaction: ●●●
Risk: ●●

Indications

The décolleté (the central chest area) is a region that is often quite sun damaged and wrinkled in women, especially those who grew up in an era before adequate sunscreens. The vertically oriented rhytids fanning upward from the sternal notch, dyschromias, loss of subcutaneous fat, thinning of the skin, and grooving of the spaces between the ribs in more extreme ectomorphs are characteristic of changes found in the aging chest anteriorly.

Anatomic Considerations

For superficial injections of the décolleté, the anatomic concerns include avoiding injury to superficial veins and the presence of preexisting surgical scarring. Deep injections into the muscle or past the bone should be avoided as vital organs and vessels of the thorax lie below.

Injection Technique

Poly-L-lactic acid (PLLA) can be used to effectively augment this region. This stimulatory filler provides a gradual firming to the thin, creased skin so as to provide a thicker, less wrinkle-prone foundation to the chest skin, especially when the elbows are brought together. The dilution of the PLLA should approach 10 to 12 mL of sterile water for injection with or without lidocaine, to insure even distribution of the particles. The injections should be performed in the dermal subcutaneous junction, fanning perpendicular to the vertical rhytids. As the area being injected is a long vertical region, it is best to use a long needle (either 1.0- or 1.5-inch [2.5-to 3.8-cm], of 25- to 27-gauge) to maximize the area of the fanning while decreasing the number of skin entry points, which are the most uncomfortable parts of the procedure. All injections should be performed as retrograde threading or fanning to avoid vessel injection. Typically one vial is injected per session, with usually three sessions performed about 4 to 6 weeks apart.

Precautions

The avoidance of bruising is the most common precaution during the injection process. Pre-treatment with ice, and quick, firm pressure on the site of injection as soon as the needle is withdrawn can minimize larger bruises.

Post-Injection Instructions

Swelling should resolve within about 2 to 4 days. Vigorous massaging for 5 minutes

2 to 5 times per day with a moisturizer, pushing down to feel the underlying sternum and ribs, is necessary for the next 5 to 10 days. The first massage is performed immediately after the initial injection.

Risks

The most significant risks involve injection irregularity and the product not feeling and looking smooth. It is important to massage uneven areas soon after injection so as to avoid a longer-term problem, although an even injection technique is always more effective than any amount of massage.

Pearls of Injection

- Undercorrection is usually safest, as well as injecting with the needle in motion so as not to inject a large bolus of PLLA into a single area and stimulate a bump or nodule formation.

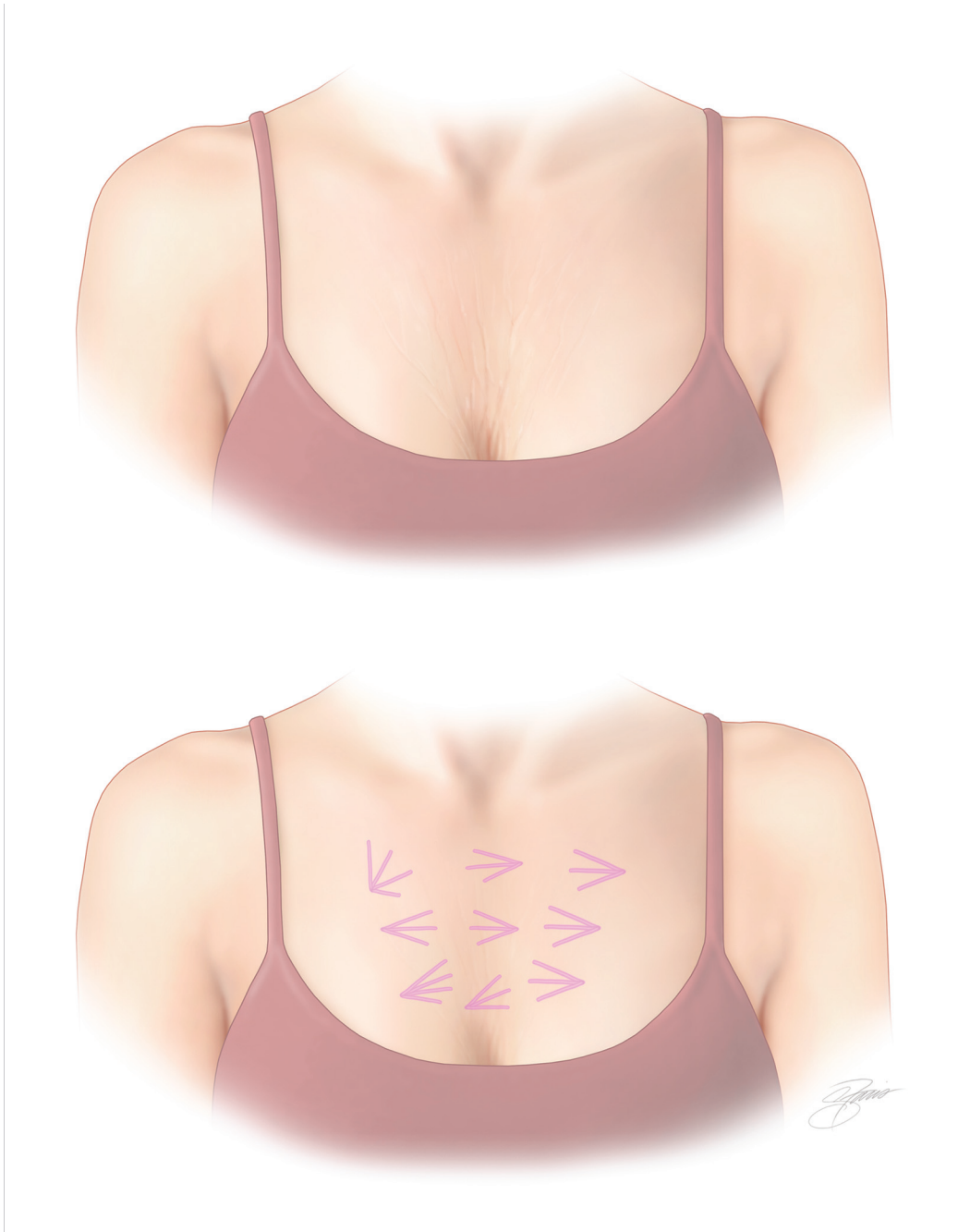

Fig. 65.1 Fanning technique for PLLA injection to décolleté.

Additional Reading

[1] Fulton J, Caperton C, Weinkle S, Dewandre L. Filler injections with the blunt-tip microcannula. J Drugs Dermatol. 2012; 11 (9):1098–1103

[2] Jabbar A, Arruda S, Sadick N. Off face usage of poly-L-lactic acid for body rejuvenation. J Drugs Dermatol. 2017; 16 (5):489–494

66
The “Liquid Facelift”

Difficulty: ●●●
Patient Satisfaction: ●●●
Risk: ●●

What Is a Liquid Facelift?

A combination of fillers and neurotoxins can be used to rejuvenate the face. This technique can be offered to patients who are not willing to undergo surgical treatments. It can be used to contour the face and rejuvenate wrinkles and folds. The results are temporary, and repeated treatments are usually necessary, but overall, the patients note a fresher, more youthful appearance.

“Liquid facelift” is somewhat of a misnomer, as it is not truly a facelift. Applied correctly and artistically, the techniques discussed in this book can be used alone or in combination to improve a patient’s appearance and “set the clock of aging back” perhaps 5 to 10 years.

What a Liquid Facelift Is Not

The liquid facelift is not a replacement for traditional facelift surgery. No amount of fillers and toxins can reposition the superficial musculoaponeurotic system (SMAS), improve the jowls, and remove fat and excess skin from the neck. It is important to accurately counsel patients about what fillers and neurotoxins can and cannot do for them: be sure that patients have the correct expectations prior to treatment.

Complementary Procedures

Fillers and neurotoxins can be used as an adjunct to facial surgical procedures. Treatment of the crow’s feet with neurotoxins (see also Chapter 8) and augmenting the lips with fillers (see also Chapter 42) can be nice adjuvants to facial rejuvenation surgeries.

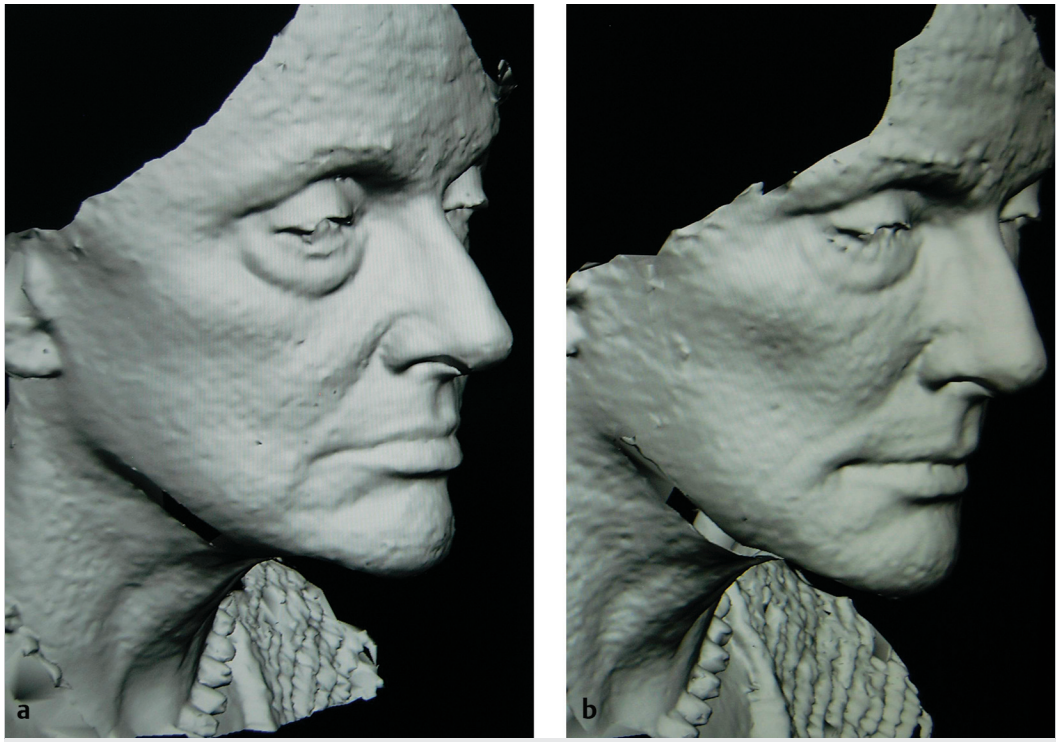

Fig. 66.1 Three-dimensional volume assessment of a patient before (**a**) and after (**b**) treatment with 10 mL Restylane and 50 units of Botox.

67
Gender-Specific Injections

Introduction

Today's patients may not only want to look younger or more rested, they also might wish to masculinize or feminize their face. Combinations of fillers and neurotoxins can be used to achieve these changes in men, women, and transgender patients.

Injections to Masculinize a Face

When one thinks of a masculine face, a heavy brow, strong jawline, and strong chin come to mind. The male brow is lower than the female brow, sits at or slightly below the superior orbital rim, and is minimally arched. The mandibular angle is square, and the chin is prominent. Also, a strong nasal dorsum is usually evident, with a tip that forms a 90-degree (or less) angle with the upper lip. The male midface is more prominent medially than laterally. The lips are properly thin in most men, and rarely do men require lip augmentation. The male face is more angular than the female, with prominence of the brow and mandible.

Masculinization of the face can involve using BoNTA to the forehead to lower the brow (see also Chapter 7), filler to the mandibular angle (Chapter 60), and filler to the chin (Chapter 57). A strong nasal dorsum can also be achieved by adding HA to the nose (Chapter 12). Midface volume in men is much more medial than in women, so volume should be added to avoid accentuating the cheekbones (Chapter 53).

Injections to Feminize a Face

A feminine face usually has brows that sit at or above the superior orbital rim and form a nice arch. The nose can be slightly upturned, the mandible small, the lateral cheekbones prominent, and the lips volumized and well defined. The youthful face of a women is heart-shaped, with more volume superiorly in the temples and cheeks and less prominence of the mandible.

Injections to feminize a face can include BoNTA to the glabella to elevate the brow (see also Chapter 6 and Chapter 10), volumization of the temple (Chapter 50), and lower lid fillers to soften the lower lid–cheek junction. A square mandible can be softened by using BoNTA to the masseter (Chapter 24), and cheek bones elevated and accentuated (Chapter 54 and Chapter 55). Adding volume to and increasing the definition of the lips also feminizes the face (Chapter 42). BoNTA and HA can also be used in some patients to elevate the nasal tip (Chapter 13 and Chapter 51). A prominent nasal dorsal hump can be softened with fillers (Chapter 51).

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[1] de Maio M. Ethnic and gender considerations in the use of facial injectables: male patients. Plast Reconstr Surg. 2015; 136 (5) Suppl:40S–43S

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68
Management of Filler Injection Complications

Introduction

Fortunately, the most common complications from filler injections are minor and temporary, and may include swelling, bruising, and lumpiness. Rarely, more serious complications can occur, even in the best-trained hands. By having thorough knowledge of facial anatomy and understanding the filler properties, most serious complications can be avoided.

Tyndall Effect

Some hyaluronic acids (HAs) will refract blue light if placed too superficially or if they migrate superficially.

Treatment

A 20-gauge needle is used to puncture the pool of product, and the product is expressed through this tract. This is the preferred treatment for product in the lower face. Treatment of the lower lids with the puncture technique is difficult and can cause excessive bruising while trying to manipulate the product. In this region, 20 to 50 units of hyaluronidase (Vitrase, ISTA Pharmaceuticals, Irvine, California) can be used. Vitrase is sheep-derived (ovine) hyaluronidase supplied in 200 U/1 mL vials (20 units/0.1 mL). Other hyaluronidases include Hydase (PrimaPharm, Inc, distributed by Akorn Inc.), which has been FDA-approved as a "thimerosol-free," animal-derived hyaluronidase. Hylanex (Halozyme Therapeutics) was approved by the FDA in 2005 and is recombinant (rDNA) "human" hyaluronidase.

Herpetic Outbreak

When injections are placed in the lips, patients who have experienced prior herpetic outbreaks may have a flare-up of symptoms. Valtrex (500 mg) is typically started 3 days before injection and continued for 1 week afterward. More aggressive therapy with higher dosing and acyclovir creams is prescribed if herpetic eruptions occur despite prophylaxis.

Nodules/Lumpiness

Clumps of product may occur after injections. Massaging the product at the time of injection can lessen the occurrence of these lumps and bumps. Warm compresses and massage often help improve these lumps over time. Hyaluronidase can be used if HA lumps are unacceptable to the patient.

Granulomas

Granulomas are reactions to product that can be seen several months after injection. Granulomas may be treated with

Kenalog injections, oral methylprednisolone, and oral antibiotics. Some advocate using 5-fluorouracil (5-FU) for treatment. Excision is also an option.

Delayed Hypersensitivity

Erythema of the skin surrounding the injected product can be seen weeks to months after injection. It is theorized that biofilms play a role in this condition.

Treatment

Oral fluoroquinolones (ciprofloxacin, levofloxacin) or macrolides (clarithromycin or azithromycin) may be used for up to 6 weeks. Steroids and nonsteroidal anti-inflammatory drugs (NSAIDs) may encourage the formation of biofilms and should be avoided in these conditions. Injection of 5-FU may also be considered.

Vascular Compromise

Vascular compromise can be due to intravascular injection, vasospasm, or external compression. Immediate blanching of the skin is seen during injection.

Treatment

- Stop injection immediately.
- Massage the area.
- Apply warm compresses.
- Consider use of hyaluronidase (even if a calcium hydroxylapatite [CaHA] was used).
- Apply topical nitropaste.
- Prescribe aspirin by mouth.
- Follow the patient frequently; photodocument the injury and its progress.
- Consider consulting colleagues for assistance/advice.

Blindness

Blindness is a terrifying complication of nasal injections, and the best treatment is knowledge of the anatomy and injector expertise *before* any injections are performed. It is important to know the nasal vascular anatomy to both avoid important vessels and understand the mechanism for cases of ocular injury and blindness. Complications can arise from direct injury to the vessels, compression of vessels from surrounding over-injection, or intravascular embolization of product that travels retrograde into the ophthalmic vessels. The dorsal nasal artery, angular artery, and supratrochlear artery are connected to the ophthalmic artery. Intravascular injection into any of these terminal branches of the external carotid system can cause retrograde flow and embolization of the ophthalmic and retinal arteries.

Blindness due to filler injection emboli has been found to be irreversible in most cases. Should the patient complain of visual deficit during the injection, the injector should perform all the above-mentioned emergency maneuvers, seek immediate assistance from an ophthalmologist, and consider retrobulbar injection of hyaluronidase. Systemic steroids, antibiotics, and low-molecular-weight heparin should also be considered in management.

Fig. 68.1 (**a**) Blanching seen acutely at the time of vascular occlusion. (**b**) Purpura noted after facial artery occlusion. (**c**) Vascular injury from nonsurgical rhinoplasty in a postoperative patient. (**d**) Delayed hypersensitivity seen 6 months after HA injection. (**e**) Herpetic outbreak after filler injections to nasolabial folds. (**f**) Tyndall effect seen on the lower eyelids.

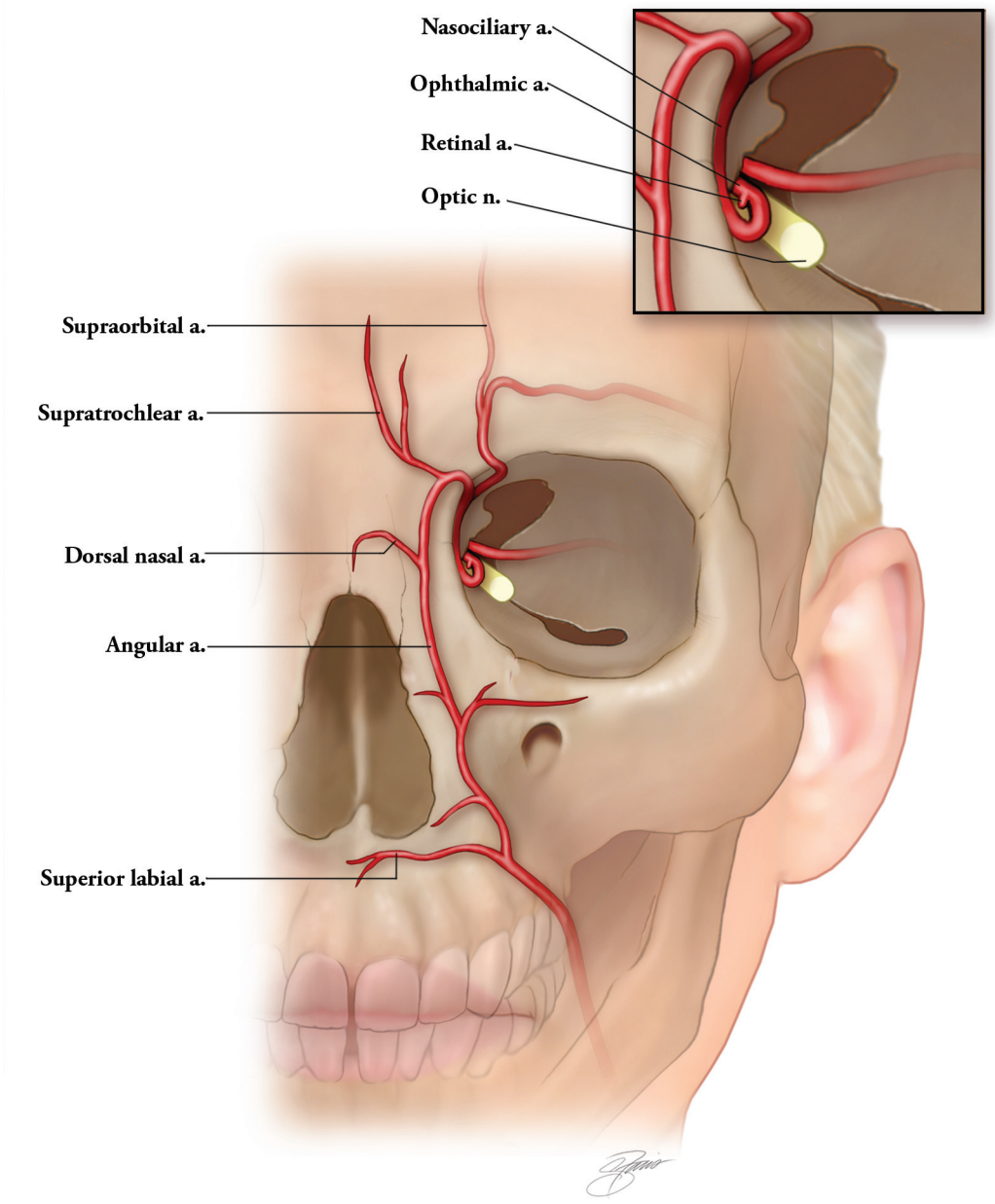

Fig. 68.2 The dorsal nasal artery, angular artery, and supratrochlear artery are connected to the ophthalmic artery. Intravascular injection into any of these terminal branches of the external carotid system can cause retrograde flow and embolization of the ophthalmic and retinal arteries.

Additional Reading

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[2] Dayan SH, Arkins JP, Brindise R. Soft tissue fillers and biofilms. Facial Plast Surg. 2011; 27(1):23–28

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[5] Scheuer JF , III, Sieber DA, Pezeshk RA, Gassman AA, Campbell CF, Rohrich RJ. Facial danger zones: techniques to maximize safety during soft-tissue filler injections. Plast Reconstr Surg. 2017; 139(5):1103–1108

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Section VI

Fat-Dissolving Injections

VI

69
Submental Fat Reduction

Difficulty: ●●
Patient Satisfaction: ●●
Risk: ●●

Indications

A new class of injectables is now available to treat moderate submental fullness due to an excess of pre-platysmal fat. Deoxycholic acid (Kybella) is a bile acid that acts to cause lysis of fat cells, as is its role in the digestive tract.

Anatomic Considerations

Deoxycholic acid is indicated for the treatment of pre-platysmal fat excess; however, it is not always easy for the injector to assess that the fat prominence is pre- or post-platysmal. The ideal patients for Kybella are younger, with more elasticity to their skin, and with a bulge of fat in the submental area that can be "pinched" between the thumb and index finger. Patients with massive amounts of submental fat are not good candidates. In addition, patients who have strong platysmal bands and poor cervicomental angles may be less-than-ideal candidates. Distinction should be made between good candidates and those others who would require a surgical necklift or facelift for optimal results.

On-Label Injection Technique

This is a somewhat painful injection, and a local anesthetic can be infiltrated prior to injection, although we have found that this causes more bruising; we now use only topical anesthetic cream, with ice immediately afterward. We also provide ibuprofen 800 mg orally for the patient about 30 to 60 minutes prior to the injection.

The boundaries of injection are drawn on the patient's submental region: the inferior mandibular margin and the submental crease, the hyoid, and the sternocleidomastoid muscles. A grid "tattoo" (provided in the kit) can be placed onto the neck using a moist compress, but after a few uses of this grid technique, it is usually unnecessary. Injections are placed 1 cm apart, deep into the subcutaneous fat, using a 30-gauge needle with 0.2-mL aliquots placed centrally and 0.1-mL on the periphery (to diminish risk of injury to the marginal mandibular nerve).

Kybella is supplied as 1-mL vials, and usually one or two vials are required, by assessing how many injection sites are needed to treat the marked area. Injections are performed monthly, and three to six sessions are necessary.

Off-Label Injection Technique

One suggestion to reduce pain is to add lidocaine to the Kybella prior to injection (1 part lidocaine to 2 parts Kybella). This decreases the need for pre-injection or topical numbing. While adding lidocaine increases the overall volume injected, it significantly reduces the pain after the procedure.

To achieve more optimal outcomes, it can sometimes be necessary to cautiously inject more laterally under the border of the mandible as far as the posterior mandibular angle, and to treat the jowl very superficially so as not to penetrate the platysma muscle. Staying more superficial and pinching up the fat upon injection will decrease the risk of the product spreading sub-platysmally to the marginal mandibular nerve, which can result in temporary demyelination and nerve paresis. These techniques require a confidence with anatomy and proper injection depths, and should only be performed by advanced injectors. Such techniques have resulted in superior results when used appropriately. Some patients with post-platysmal fat can also be treated with a longer needle in the midline, and the deeper fat is targeted with 0.2 mL boluses. Again, this technique requires knowledge of the local anatomy of the platysma, the muscles of the floor of mouth, as well as the location of the submandibular glands laterally. When more aggressive results are desired, it is not uncommon to use three to four vials of Kybella per session.

Precautions

Care must be taken during this injection to prevent injury to the marginal mandibular nerve. Injury to the nerve is usually transient but can sometimes take up to 6 months to resolve.

Post-Injection Instructions

Mild burning is noted for about 1 hour post-injection, and ice is used to lessen the discomfort. Significant edema is typical and can begin during the injection process. This edema lasts approximately 3 days, although many patients can expect to see some edema for at least 7 to 10 days, a possible problem if they have an important social activity in that time. Bruising is also typical and resolves in a few days. Numbness and/or localized firmness of the injected site is also typical and can last until the next injection.

Risks

Patient selection and patient education are paramount for this procedure. Patients must have realistic expectations and should be advised that not everybody has significant fat reduction after treatment. This may be due to the presence of sub-platysmal fat. Patients who are better candidates for surgery may want to consider facelift, necklift, or submental liposuction.

Care must be taken to avoid injury to the marginal mandibular nerve. Staying medial and using small injections along the periphery of the treatment area will lessen the risk of injury.

Pearls of Injection

- Keep injections medial and pre-platysmal to avoid injury to the marginal mandibular nerve.
- Counsel patients that they will experience significant edema and numbness post treatment, but these will be transient.
- Clinical results are not predictable, and up to six treatments may be required.
- Fat reduction occasionally unmasks platysmal banding.

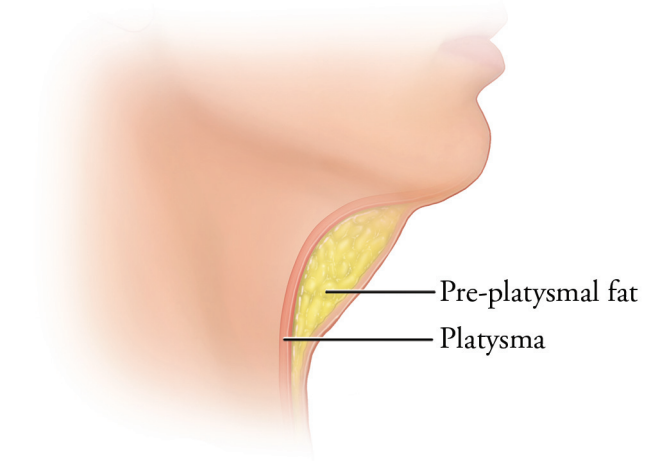

Fig. 69.1 On-label injection grid for treatment of submental fat. Central injections receive 0.2 mL while peripheral injections receive 0.1 mL.

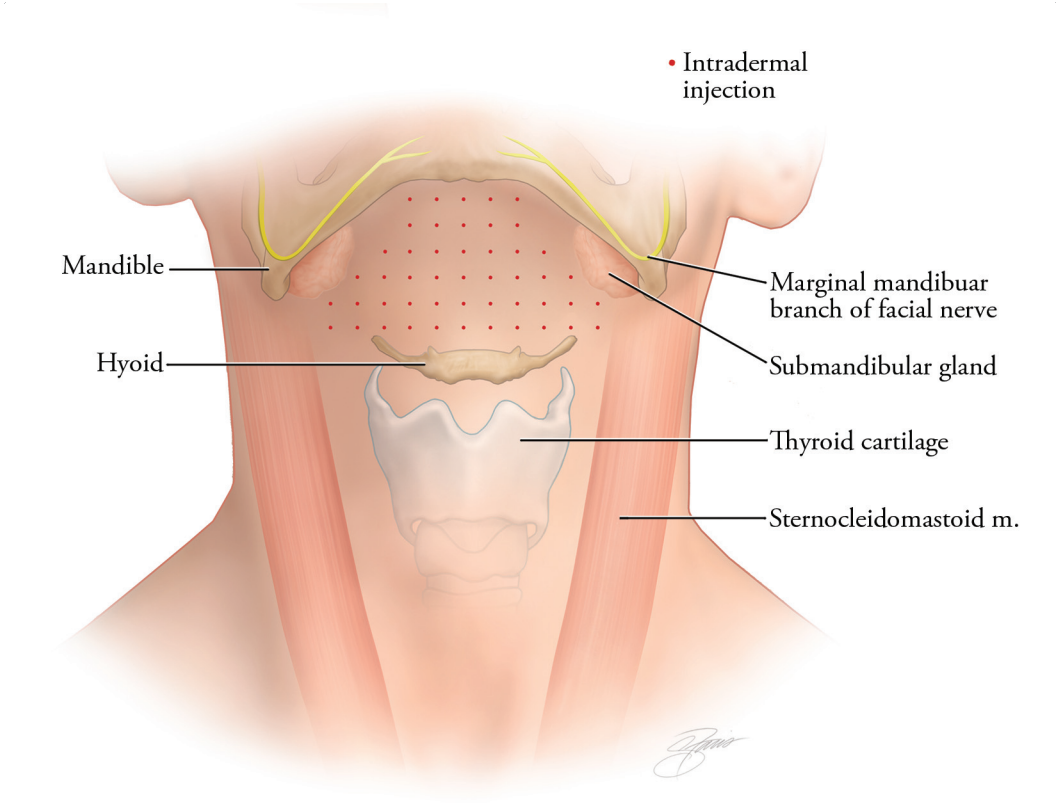

Fig. 69.2 Off-label injection technique to treat submental fat.

Additional Reading

[1] Dayan SH, Humphrey S, Jones DH, et al. Overview of ATX-101 (deoxycholic acid injection): a nonsurgical approach for reduction of submental fat. Dermatol Surg. 2016; 42 Suppl 1: S263–S270

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Section VII

Appendices

VII

Appendix A: Neurotoxin/Filler Injection Techniques by Advancing Difficulty and Injector's Experience

Beginner

BoNTA

- Glabella
- Crow's feet
- Nasal tip lift
- Peau d'orange chin
- Bunny lines

Fillers

- Nasolabial folds
- Lips
- Marionette lines
- Earlobe rejuvenation
- Mental crease

Intermediate

BoNTA

- Forehead
- Oral commissure/DAO
- Lateral browlift
- Chemical browlift
- Liplift
- Smoker's lines
- Necklace lines
- Hypertrophic orbicularis oculi
- Hyperhidrosis axilla
- Décolleté
- Hyperhidrosis forehead and scalp

Fillers

- Oral commissure
- Pre-jowl sulcus
- Forehead wrinkles
- Chin augmentation
- Temporal fossa
- Acne scars
- Lateral malar prominence
- Submandibular and buccal hollow
- Décolleté
- Mandibular angle
- Cheek lift

Kybella

Advanced

BoNTA

- Nefertiti necklift
- Platysmal banding
- Nasal flare
- Gummy smile
- Masseter hypertrophy
- Hyperhidrosis hands
- Hyperhidrosis feet
- Migraine

Fillers

- Vertical lip lines
- Refractory glabellar lines
- Medial midface
- Lateral browlift
- Dorsum of hands
- Liquid facelift
- Sculptra

Expert

BoNTA

- Frey syndrome
- Submandibular gland hypertrophy
- Parotid gland hypertrophy

Fillers

- Tear trough
- Rhinoplasty
- Nasal valve stenting
- Medial orbital hollow
- Fine Lines and Skin Boosters
- PMMA

Appendix B: Sample Informed Consent Form for Neurotoxin Injections

I authorize Dr. _____ to perform injection of *Botox/Dysport/Xeomin* on me.

Indications for procedure: Facial wrinkles

Risks of procedure: Bleeding, bruising, pain, infections, asymmetry, not fully improve wrinkles, temporary drooping of the eyelid, need for additional treatment, may also need filler for improved correction. In addition, there have been reports of distant spread of botulinum toxin that has resulted in secondary problematic weakness. These observations have only been reported in children being treated for spasticity and have never been reported with the cosmetic use of these products.

Alternative treatments: No treatment, filler injection, chemical peels, laser resurfacing, etc.

Photographs: I give my consent for photographs to be taken before and after the procedure for documentation.

I will allow these photographs to be shown to other patients. My name and other personal information will not be disclosed. YES NO

I will allow these photographs to be placed on the Internet. My name and other personal information will not be disclosed. YES NO

I understand that the results of these injections are not immediate, and it may take 7 to 10 days for the full effect of the injection to be seen.

I am aware that the practice of medicine and surgery is not an exact science, and I acknowledge that no guarantees have been given to me concerning the results of this procedure.

Patient_____

Date_____

Physician_____

Witness_____

Appendix C: Sample Informed Consent Form for Filler Injections

I authorize Dr. _____ to perform injection of _____ on me.

Indications for procedure: Facial wrinkles, facial aging

Risks of procedure: Bleeding, bruising, pain, infection or inflammation, asymmetry, not fully improve wrinkles, lumps, nodules, vascular injury or occlusion (including tissue loss, necrosis or blindness), scarring, need for additional treatments, delayed hypersensitivity, allergic reaction. *(Additional risk for PMMA: This is a permanent product and cannot be removed.)*

Alternative treatments: No treatment, use of a different filler product

Photographs: I give my consent for photographs to be taken before and after the procedure for documentation.

I will allow these photographs to be shown to other patients. My name and other personal information will not be disclosed. YES NO

I will allow these photographs to be placed on the Internet. My name and other personal information will not be disclosed. YES NO

Anesthesia: I consent to the administration of anesthetics considered necessary or advisable. I understand that all forms of anesthesia involve risk and the possibility of complications, injury, and allergic reaction.

I am aware that the practice of medicine and surgery is not an exact science, and I acknowledge that no guarantees have been given to me concerning the results of this procedure.

Patient_____

Date_____

Physician_____

Witness_____

Appendix D: Sample Informed Consent Form for Kybella Treatment

I authorize Dr. _____ to perform injection of Kybella (deoxycholic acid) on me.

Indications for procedure: Fat pad under the chin.

Risks of procedure: Bleeding, bruising, pain, infection of inflammation, temporary numbness, weakness of the marginal mandibular facial nerve (which can cause a crooked smile), inadequate resolution of the fat.

I understand that multiple treatments are necessary to achieve results, and results are not completely predictable.

Alternative treatments: Liposuction, necklift, facelift

Photographs: I give my consent for photographs to be taken before and after the procedure for documentation.

I will allow the photographs to be shown to other patients. My name and other personal information will not be disclosed. YES NO

I will allow these photographs to be placed on the Internet. My name and other personal information will not be disclosed. YES NO

Anesthesia: I consent to the administration of anesthetics considered necessary or advisable. I understand that all forms of anesthesia involve risk and the possibility of complications, injury, and allergic reaction.

I am aware that the practice of medicine and surgery is not an exact science, and I acknowledge that no guarantees have been given to me concerning the results of this procedure.

Patient_____

Date_____

Physician_____

Witness_____

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Note: Page numbers set in **bold** or *italic* indicate headings or figures, respectively.

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