Aesthetic Dermal Filler Injections for Facial Rejuvenation

Tam Nguyen, MD, FAAFP
Elyas Parsa, DO
ACTIVITY DISCLAIMER

The material presented here is being made available by the American Academy of Family Physicians for educational purposes only. Please note that medical information is constantly changing; the information contained in this activity was accurate at the time of publication. This material is not intended to represent the only, nor necessarily best, methods or procedures appropriate for the medical situations discussed. Rather, it is intended to present an approach, view, statement, or opinion of the faculty, which may be helpful to others who face similar situations.

The AAFP disclaims any and all liability for injury or other damages resulting to any individual using this material and for all claims that might arise out of the use of the techniques demonstrated therein by such individuals, whether these claims shall be asserted by a physician or any other person. Physicians may care to check specific details such as drug doses and contraindications, etc., in standard sources prior to clinical application. This material might contain recommendations/guidelines developed by other organizations. Please note that although these guidelines might be included, this does not necessarily imply the endorsement by the AAFP.
DISCLOSURE

It is the policy of the AAFP that all individuals in a position to control content disclose any relationships with commercial interests upon nomination/invitation of participation. Disclosure documents are reviewed for potential conflict of interest (COI), and if identified, conflicts are resolved prior to confirmation of participation. Only those participants who had no conflict of interest or who agreed to an identified resolution process prior to their participation were involved in this CME activity.

All individuals in a position to control content for this session have indicated they have no relevant financial relationships to disclose.

The content of my material/presentation in this CME activity will not include discussion of unapproved or investigational uses of products or devices.
Tam Nguyen, MD, FAAFP

Physician, Washington Township Medical Foundation (WTMF), Fremont, California.

Dr. Nguyen is a graduate of Pennsylvania State University College of Medicine in Hershey. He completed his residency at Family Practice at San Jose-O'Connor Family Medicine Residency Program. He practices inpatient and outpatient family medicine at WTMF. His topics of specialty include dermatology and diabetes. Dr. Nguyen instructs physicians of various specialties on aesthetic procedures, including the use of botulinum toxin, lasers, liposuction, and nonsurgical facial reconstruction. He also consults with providers on how to establish an aesthetic practice. Dr. Nguyen believes family medicine's most critical challenge is caring for the uninsured and underinsured.
Elyas Parsa, DO
Learning Objectives

1. Assemble plans to address requests for dermal fillers, particularly among patients who may want injections to reduce the signs of aging.
2. Outline appropriate treatment modalities and duration of action required for dermal filler injections.
3. Assess the costs involved in ordering and performing dermal filler injections.
4. Assess the risks and benefits involved in performing dermal filler injections.
Introduction

• Concept of filler 1900’s or even earlier → replacement of facial defects with fat

• Early cosmetic fillers
  – Silicone
  – Animal sources
    • Bovine (collagen)
    • Rooster combs
Introduction

• Restylane, a hyaluronic acid (HA) introduced 1996
  • Animal products quickly became obsolete

• Restylane → majority of market share the until introduction of other fillers
STRUCTURE

Hyaluronic acid is a polymer

- **Polymer** (from Greek many part) → large molecule with repeating structural units
Types of polymers

• 3 main classes of biopolymers
  – Polysacharides
  – Polypeptides
  – Polynucleotides
Polymers & Aesthetic

Natural Polymers
• Proteins → collagen
• Polysacharides → Hyaluronic Acid

Synthetic Polymers
• Poly-L-lactic acid (Sculptra)
• Polymethyl methacrylate (Artefil)
• Silicone (Silikon 1000)
Hyaluronic Acid (HA)

- Hyaluronic acid
  - Naturally occurring, found in all living organisms
- Chemically identical in all species → no tissue specificity
- A carbohydrate not a protein → low risk of allergic reaction
  - No skin testing required
Hyaluronic Acid (HA)

- Skin houses majority of HA
  - Essential component of extracellular matrix & connective tissue of all animal tissues
  - Volume & pliability
  - Cell growth

- Other locations → muscles, skeleton, synovial fluid
Hyaluronic Acid

• Basic unit is a disacharide

![Chemical structures of glucuronic acid and N-acetyl-glucosamine](image)

• Length of the final polymer chain is the only difference between a human HA & a bacterial HA
Hyaluronic Acid

- Commonly used in moisturizers → high capacity to bind H2O → excellent characteristic for filler material → helps hold shape
Hyaluronic Acid (HA)

- HA must be stabilized to prevent prompt degradation
- **NASHA** → Non Animal Stabilized Hyaluronic Acid
- 1,4-butanediol diglycidyl ether (BDDE) most commonly used for stabilization
- Distinct filler intrinsic properties due to
  - Particle Size
  - Concentration
  - Method /degree of crosslinking
  - Gel hardness
  - Cohesivity
Hyaluronic Acid (HA)

- Promotes collagen deposition & volumization
- HA implanted in forearm skin
  - Biopsy at 4 & 13 wks
  - ↑ procollagen & stretched fibroblasts
    - indicative of synthetic response
- 3 HA injections /lower cheek 4 wks apart
  - Elasticity & surface morphology improved
WHAT IS CROSS LINKED?

- A liquid have no cross links
- A gel have some cross links
- A solid have many cross links
- Cross linking affects gel hardness (G’) & longevity of HA
Hyaluronic Acid

• HA with high amount of cross links have better longevity.

• HA would only last a few days or even hours in the body if not cross linked.

• Compromise with cross linking
  – longevity vs useability
Hyaluronic Acid

- **Gel Hardness Factor** \( \rightarrow \) **\( G' \)**
  - \( \uparrow \) cross-linking \( \rightarrow \) \( \uparrow \) hardness of gel \( \rightarrow \) \( \uparrow G' \)

- **\( G' \)** is obtained by
  - Placing gel between 2 plates
  - Lateral force applied
  - Resistance to deformation = \( G' \)
Hyaluronic Acid

• **Factors contributing to gel hardness**
  – Degree of cross-linking
  – Concentration of HA
  – Molecular size

• Products with higher $G'$ are used for deeper corrections
Hyaluronic Acid

- Higher G’ $\rightarrow$ decrease flow characteristic

- Manufacturer controls flow characteristic
  - Needle size
  - G’ (cross linking is most important)
Ideal Filler

- Long lasting
- Natural in appearance
- No allergic potential
- Easy to administer
- No skin test

- Forgiving
- No down time
- Easy shipping & storage
- Painless
Ideal Filler

• Not there yet but close!
• Current Popular Fillers
  – Restylane (HA)
  – Perlane (HA)
  – Juvederm Ultra (HA)
  – Juvederm Ultra Plus (HA)
  – Radiesse (Calcium Hydroxylapatite)
  – Scuptra (Poly L Lactic Acid)
  – Artefil (Polymethylmethacrylate)
Juvederm Ultra

- Hyaluronic acid
- Bacterial source (Streptococcus)
- 24mg/cc, G’ 170
- No anesthetic
- FDA approved
  - Nasal labial folds
Juvederm Ultra

• Mid-dermis placement
• 30 g needle
• nasolabial folds, lip, glabella, tear trough, facial contouring
• Manufactured by Allergan (maker of Botox)
Juvederm XC

- Same as Juvederm Ultra but have lidocaine
- No need if use nerve block
Juvederm Ultra Plus

- Larger molecule give more lift for same volume of material
- 24mg/cc, G’ 200
- 27 g needle
- No anesthetic
- Deep dermis placement
- Nasolabial folds, lip augmentation, facial contouring
- Use for deeper lines
Restylane

- Hyaluronic Acid
- Bacterial source (streptococcus)
- Firmer than Juvederm
- 20mg/cc, G’ 660
- Mid-dermal placement
- No anesthetic
- 30 gauge needle
- FDA approved → nasal labial folds
- Nasal labial folds, lips, glabella, teartrough, facial contouring
- Manufactured by Medicis
Restylane L

- Restylane with lidocaine
- Same as Restylane
Perlane

- From maker of Restylane
- Larger molecule, same concept as Juvederm Ultra plus
- More lift for the same volume of material
- 20mg/cc, G’ 588
- Mid-deep dermis injection
- 28 gauge needle
- Not as forgiving as Restylane
- NLF, tear trough, deep wrinkles, more swelling if use in lips
Radiesse

• Originally use for
  – vocal cord fold & maxillofacial augmentation
  – radiographic tissue marking

• Initial cosmetic use → FDA approved for AIDS wasting

• Approved by FDA for NLF

• Off-label use → Tear-trough, cheek, nose….

• 28 gauge needle
Radiesse

Composition

- CaHA particles 25-45 microns (30%)
- Gel carrier (70%)
- Approx 12-18 months duration
- Gel carrier & particles give immediate effects
- Gel carrier degrade in 3-4 months
- CaHA particles → replace by collagen
- New collagen formation → increase duration compare to HA
Radiesse

- No particles migration or adverse effects
- Duration & response may vary from individual to individual
  - CaHA are phagocytized & replaced with collagen by fibroblasts
  - Duration may depends on
    - Age
    - Rate of metabolism
    - Area of correction
Artefil

- Permanent!
- PMMA (polymethylmethacrylate) beads in 3.5% bovine solution carrier
- PMMA beads are the permanent filler
- Components → 25% PMMA & 75% bovine solution
- Contains 0.3% lidocaine
Artefil

- PMMA beads $\rightarrow$ 40 microns
- No evidence of migration
- Smooth correction with correct technique
- Collagen matrix forms around beads after dissipation of bovine carrier
What to use?

- Factors to consider
  - Skill level
  - Experience with products
  - Patient desires
Evaluation/Patient Selection

• Realistic expectation!
  – ? Excessive skin sagging
  – ? Large folds
  – ? Perhaps facelift
• Volume replacement
• Scar correction
  – ? Ice pick
Contraindications

Absolute

- Prenancy
- Hemophilia/coagulation disorder
- Anticoagulant (warfarin)
- Previous Allergic Reaction
- Active Herpes Simplex
Contraindications

Relative

• ASA/NSAIDS
• Herbs (Gingko Biloba, Garlic)
Technique

• Anesthesia
  – Topical
  – Nerve Block
  – Ice
  – Mixing Filler with lidocaine
Technique

• Clean treatment area with alcohol
• Insert needle at 10-15 degree bevel up
• Placement → mid dermis
• Needle contour visible but not color of it.
• Even pressure while pulling backward
• **Stop** injecting before needle is pulled out
Technique

- Objective is to fill the depression and structurally support the line and provide volume
  - Inject filler into the deep dermis and subdermal plane
  - Use non-dominant index finger to guide needle
  - Deeper threads can be placed to bolster depression
  - Use thumb and forefinger to massage and mold filler
Technique

- Use 0.5” or 1.25” 27g needle
- Lidocaine infiltration may be suitable
- Use fanning technique with retrograde threading to lift and fill marionette line
- Be conservative with volume and do not place material too deep
- Treat the entire zone- may include lateral chin area, not just the line
- Progressively bring to full correction
- Massage with thumb and forefinger as needed
LIPS

- Technically more difficult
- Tissue planes dissect less evenly than NLF’s
- Symmetry more difficult & **asymmetry easier to detect**
LIPS

– Injection to vermillion border least difficult

– Symmetry harder to control to body of lips

– Practice on NLF first !!!
Lips

• Lip Augmentation
  – Be conservative
  – Symmetry is important
  – Danger area Cupid’s Bow → “Trout Mouth”
Techniques

• The more superficial the injection the smaller the needle.
• Less forgiving material requires deeper injection.
• Blanching → Stop! → Massage, Massage, Massage……
• Typical usage <2cc per site
COMPLICATIONS

• Infection
  – Biofilm
    • Aggregate of microorganisms in which cells are stuck to each other and/or to a surface
    • Biofilms → well recognized in implants (prosthetic valves, breast implants, fillers)
    • Delayed reaction, may occur weeks after injection
COMPLICATIONS

- Biofilm /infection
  - Sterility is essential → ? povidone iodine prep.
  - Antibiotic
    - Dicloxacillin
    - Keflex
    - Ancef
COMPLICATIONS

- Skin necrosis, Blindness
  - Vascular occlusion
  - **Hyaluronidase** (+/- 25 units), nitropaste, warm compress
- Allergy
- Bruising
  - **Arnica** ointment or tablets
- Swelling
- Tyndall Effect → superficial placement → blue/purple color
COMPLICATIONS

• Lumps & Nodules
  – Lumps → Improper placement or techniques
    • Massage
    • Hyaluronidase
    • Stab incision
  – Granuloma → Steroid injection (Triamcinolone 5mg/cc)
    • Make sure not infection!
Best Practice Recommendations

• Treat any one area to full effect
• Expect mild-moderate swelling
• Bruising always a possibility
• Do not over correct
• Correction may be better in 2-3 days post swelling
• Practice on friends and family first!
• Show confidence
• Patients can smell fear!!!!
THANK YOU!!