Zones of the Face

- Upper zone—Anterior hairline to glabella
- Middle zone—Glabella to nasolabial angle
- Lower zone—Nasolabial angle to mentum

CT Scan Shows Age-Related Decreases in Mean Angular Measurements

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Glabellar Angle</th>
<th>Pyriform Angle</th>
<th>Maxillary Angle</th>
<th>Nasal Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female, 25 to 44 years old</td>
<td>77.1°</td>
<td>60.5°</td>
<td>64.4°</td>
<td>610.4 mm²</td>
</tr>
<tr>
<td>Female, ≥65 years old</td>
<td>71.4°</td>
<td>56.9°</td>
<td>53.6°</td>
<td>669.8 mm²</td>
</tr>
</tbody>
</table>

Age-Related Changes in the Face

- Wide, Deep Orbit
- Midface Resorption
- Jaw Resorption
- Corrugator supercilii
- Frown Lines
- Orbicularis Oculi m.
- Nasolabial Fold
- Cheek Fat
- Jowl (Broken Jaw line)
- Platysma m.
- Obtuse Cervical Angle
- Platysma Plus Fat

Steve Yoelin MD
Private Practice
Newport Beach, California

“Injectables....”
The Triangle of Youth Becomes the Pyramid of Aging...

Gravitational changes lead to descent of underlying muscle and soft tissue

Elevator/Depressors/Abductors of Brows

Facial muscles responsible for vertical and horizontal glabellar rhytides, forehead rhytides, and brow depression and elevation

General Principles for the Upper Face

- Hyperfunctional rhytides are the most prominent feature in the upper face
  - Botulinum toxin has become the standard of care for nonsurgical upper facial rejuvenation
- Volume changes in the upper face include deflation of the brow and hollowing of the temples

General Principles for the Midface

- Key to midface rejuvenation is volume restoration
  - Dermal fillers
  - Panfacial volumizing agents
- Malar contour should be restored
  - Treatment of malar area improves surrounding areas, such as NLF

NLF, nasolabial fold.
General Principles for the Lower Face: Restoring Volume

- The primary goals are to restore volume, control muscle hypermobility, and treat for rhytides
- View and treat the lower face as a whole rather than as individual regions
- Treatment with fillers is considered standard of care
  - However, consider combination treatment with botulinum toxin and dermal filler where appropriate
- When treating the lips, it is important to consider shaping as well as volumizing
- When treating the perioral area with botulinum toxin, avoid overtreatment to prevent mouth incompetence

Injectable Botulinum Toxins

- Produced by various strains of *Clostridium botulinum*
- Seven known serotypes
  - Serotypes A and B developed for clinical use
- Serotype A
  - OnabotulinumtoxinA = BOTOX® Cosmetic
  - AbobotulinumtoxinA = Dysport™
  - IncobotulinumtoxinA = Xeomin®
- Serotype B
  - rimabotulinumtoxinB = MYOBLOC®

OnabotulinumtoxinA, AbobotulinumtoxinA and IncobotulinumtoxinA are FDA approved for cosmetic use (glabellar lines).

Botulinum Toxin
Overview of products

<table>
<thead>
<tr>
<th>Product</th>
<th>OnA (Botox)</th>
<th>AboA (Dysport)</th>
<th>IncA (Xeomin)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer</td>
<td>Allergan</td>
<td>Ipsen (Europe)</td>
<td>Merz Pharmaceuticals</td>
</tr>
<tr>
<td>Units per vial</td>
<td>50 or 100 Botox Units (BU)</td>
<td>300 Dysport Units (DU)</td>
<td>50 or 100 Xeomin Units (XU)</td>
</tr>
<tr>
<td>Active ingredient (molecular weight)</td>
<td>Botulinum toxin serotype A Complex (900 kDa)</td>
<td>Botulinum toxin serotype A Complex (500-900 kDa)</td>
<td>Uncomplexed Botulinum toxin serotype A (150 kDa)</td>
</tr>
<tr>
<td>Total toxin protein per vial (active toxin + NAPs)</td>
<td>5 ng</td>
<td>2.61 ng</td>
<td>0.6 ng (in 100 units)</td>
</tr>
<tr>
<td>Excipients</td>
<td>Human serum Albumin 500 µg NaCl 0.9 mg</td>
<td>Human serum Albumin 125 µg Lactose 2.5 mg</td>
<td>Human Serum Albumin 1 mg Sucrose 4.7 mg</td>
</tr>
<tr>
<td>Bacterial Source</td>
<td>Clostridium botulinum, Hall strain²</td>
<td>Clostridium botulinum, Hall strain²</td>
<td>Clostridium botulinum, Hall strain²</td>
</tr>
<tr>
<td>Storage conditions</td>
<td>2-8°C</td>
<td>2-8°C</td>
<td>Up to 25°C</td>
</tr>
<tr>
<td>Purification process</td>
<td>Dialysis and acid precipitation then vacuum dried</td>
<td>Column chromatography然后 freeze dried (lyophilized)</td>
<td>Column chromatography然后 freeze dried (lyophilized)</td>
</tr>
</tbody>
</table>

- Molecular weight of AboA is not firmly established
- Neurotoxin-associated proteins.
- There are numerous Hall strains and the manufacturers do not necessarily use identical bacteria.

Botulinum Toxins
Pre-Existing Neuromuscular Disorders

- Individuals with peripheral motor neuropathic diseases, amyotrophic lateral sclerosis, or neuromuscular junctional disorders (e.g., myasthenia gravis or Lambert-Eaton syndrome) should be monitored particularly closely when given botulinum toxin
- Patients with neuromuscular disorders may be at increased risk of clinically significant effects including severe dysphagia and respiratory compromise from typical doses of Botox Cosmetic, Dysport, Xeomin and Mybloc
## Commonly Used Hyaluronic Acid–Based Fillers

<table>
<thead>
<tr>
<th>Manufacturer/ Distributor</th>
<th>Trade Name</th>
<th>Syringe Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q-Med/Medicis Aesthetics</td>
<td>Restylane®</td>
<td>0.4 mL, 1.0 mL, 2.0 mL</td>
</tr>
<tr>
<td></td>
<td>Restylane®/-L*</td>
<td>0.5 mL, 1.0 mL</td>
</tr>
<tr>
<td></td>
<td>Perlane®/-L*</td>
<td>1.0 mL</td>
</tr>
<tr>
<td>Allergan</td>
<td>Juvéderm® Ultra Plus/XC*</td>
<td>1.0 mL</td>
</tr>
<tr>
<td></td>
<td>Juvéderm® Ultra/XC*</td>
<td>1.0 mL</td>
</tr>
<tr>
<td>Mentor Corporation</td>
<td>Prevelle® SILK*</td>
<td>0.9 mL</td>
</tr>
<tr>
<td>Anika Therapeutics</td>
<td>Hydrelle™*</td>
<td>1.0 mL</td>
</tr>
</tbody>
</table>

All HA fillers approved for NLFs. Restylane approved for submucosal implantation for lip augmentation in patients over 21.

*Preparation with lidocaine.

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## Non-HA Soft Tissue Fillers

### Collagen Stimulator

- **Calcium hydroxylapatite (Ca HA) – Radiesse**
  - Manufactured by Merz Aesthetics
  - Major mineral constituent of bone
  - >10 years of use in dentistry and reconstructive surgery
  - Injected Ca HA particles act as a scaffold for new collagen
  - No animal-based ingredients; skin testing is not required
  - Over time, Ca HA particles slowly dissolve into calcium and phosphate ions through normal metabolic processes

### Indications

- Moderate to severe facial wrinkles (NLF)
- HIV-associated lipoatrophy

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## Complications: Botulinum Toxin

<table>
<thead>
<tr>
<th>Complication</th>
<th>Prevention</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brow ptosis</td>
<td>Avoid treating lower portion of frontalis</td>
<td>Treat brow depressors</td>
</tr>
<tr>
<td>Eyelid ptosis</td>
<td>Proper injection technique (avoid placement deep and medial to lateral orbital rim)</td>
<td>iopidine drops 0.5%, naphazoline, (Vasocon-A, Naphcon-A, Opcon-A) 1 drop to affected eye for 4–6 hrs as needed</td>
</tr>
<tr>
<td>Headache</td>
<td>Avoid injection below periosteum</td>
<td>NSAIDs, ibuprofen</td>
</tr>
<tr>
<td>Bruising (Hematoma)</td>
<td>Avoid blood vessels</td>
<td>Wear magnification when injecting</td>
</tr>
</tbody>
</table>

---

## Treatment Areas
Glabellar Necrosis

**Tear troughs**

**Inappropriate placement of dermal filler**

- Nodule of filler product is visible under this patient’s right eye, resulting from superficial placement of HA*.
- Superficial small linear threads of filler are apparent at the left lower lid.

*Restylane

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**Lip Augmentation**

- Enhancement of vermilion border
- Volume (plumping)
  - Enhancement of tubercles (upper lip, 3; lower lip, 2)
- Eversion
  - Enhancement of lip above gingivolabial sulcus

---

**Prevention** of Complications Secondary to Dermal Filler Injection - Ischemia

- Inject slowly (<0.3 mL/min) and with low pressure
- Consider the use of a blunt cannula, rather than syringe needle to prevent embolic event
- Watch for danger signs such as sudden or delayed pain or blanching

**KNOW YOUR ANATOMY!**
Managing Necrosis Secondary to Dermal Filler Injection

**INJECTION**
Apply ice immediately post-injection

**BRUISING, SWELLING, PAIN**
(severe)

**OBSERVE**
(Arnicia gel)

**FOLLOWUP & FURTHER MANAGEMENT**
• Follow patient daily for further signs of occlusion/necrosis
• Continue hyaluronidase & 2% nitroglycerin paste as needed
• Continue ASA, antacid & topical oxygen therapy until wound has healed
• If edema progresses begin methylprednisone therapy (Medrol Dose pack)
• Consider hyperbaric therapy for necrosis resistant to above-mentioned treatment options
• If ischemia is not reversed, contact plastic or reconstructive surgeon

**ASSESS FOR OCCLUSION**
Presentation
Immediate or early blanching followed by a dusky purple discoloration

**IF OCCLUSION SUSPECTED**

**TREATMENT**
• Massage
• Inject 10 – 30U hyaluronidase per 2x2 cm area
• Massage 2 % Nitroglycerin Paste into area and apply warm compresses
• Begin 325 ASA (enteric coated) and antacid regimen
• Initiate antibiotic regimen as needed
• Consider application of topical oxygen cosmeceutical therapy BID

**RESOLVES WITHIN 30 MINUTES**

**DISCONTINUE INJECTIONS**

**HA Soft Tissue Filler “Eraser”**

- **Hyaluronidase - Vitrase**
  - Distributed by ISTA Pharmaceuticals
  - Purified preparation of ovine testicular hyaluronidase – protein enzyme
  - Modifies the permeability of connective tissue through the hydrolysis of hyaluronic acid
  - Inject just beneath the HA depot
  - Hyaluronidase should not be injected in an area which has been treated with botulinum toxin within the previous 48 hours (spread – function of MOA of hyaluronidase)

- **Indication**
  - Adjuvant to increase the absorption and dispersion of other injected drugs; for hypodermoclysis and as an adjunct in subcutaneous urography for improving resorption of radiopaque agent

Thank you!