Soft Tissue Augmentation: Fillers and Implants

University of Texas Medical Branch (UTMB Health)
Department of Otolaryngology
Grand Rounds Presentation
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September 27, 2012
The products available to facial plastic surgeons for soft tissue augmentation have rapidly grown over the last decade. It is important to understand what options are available and their indications.
Rhytids

- Large complaint in patients who are evaluated for facial rejuvenation.

- Vary by depth and etiology.

- Depth:
  - Deeper wrinkles - repeated and habitual contraction of the mimetic muscles.
    - Transverse forehead wrinkles - frontalis muscle
    - Oblique/vertical glabellar wrinkles - corrugator muscles
    - Transverse glabellar wrinkles - procerus muscles.
  - Superficial wrinkles:
    - Sun exposure
      - Photoaging / premature aging
      - UVA and UVA+UVB
Rhytids

- **Etiology**
  - Fat Atrophy
  - Histopathologic skin changes
  - Decreased $H_2O$ content
  - Gravity
  - Skeletal changes
  - Skin disorders
Histopathology of Aging Skin

- Flattening of the DEJ with loss of papillae
- Decrease in number of melanocytes
- Decrease in GAGs, proteoglycans, and ground substance
- Decrease in elastic fibers
- Decrease in total collagen, especially type III
Upper Face: Signs of Aging

- Transverse forehead wrinkles
  - *Frontalis m.*

- Oblique/vertical **glabellar** wrinkles
  - *Corrugator m.*

- Transverse **glabellar** wrinkles
  - *Procerus m.*

- Eyebrow/upper eyelid ptosis
Mid-face: Signs of Aging

- Mid-face fat atrophy:
  - Deepening of nasolabial folds
  - Infraorbital hollows
  - Decreased malar eminences
  - Crow’s feet
Lower Face: Signs of Aging

- Lengthening of upper lip including philtrum
- Thinning of red portion of upper lip
- Perioral rhytids
- “Marionette” line’s – extension of nasolabial crease
- Underprojection of the chin
- Jowling:
  - Ptosis of the buccal fat pad
J.S is a 64 year old male who presents to your clinic for evaluation. He says “I don’t like my forehead wrinkles and these folds. (points to nasolabial folds)” He has a PMH of HTN and takes a baby ASA daily. He is a smoker but is trying to quit. His remaining history is otherwise unremarkable. How would you manage this patient?

http://www.williamsfacialsurgery.com/photos/volumize-03-r-front-before_1.jpg
We have discussed surgical options of managing the aging face (forehead/brow lifts, face lifts, blepharoplasties, and neck lifts etc) but there is an increasing trend toward minimally invasive techniques.
I. Ensuring adequate skeletal framework and support
II. Tightening and repositioning the investing musculofacial aponeurotic system (eg: SMAS/platysmal complex)
III. Replace of soft tissue volume loss
IV. Redraping and removing excess skin
Soft Tissue Augmentation: Fillers and Implants

• History
• “Ideal” implant/filler
• Classification
• Dermal Fillers
• Subcutaneous Fillers
• Implants
• Botox
Let’s put things in perspective!


Final figures have been projected to reflect nationwide statistics and are based exclusively on the Board-Certified Plastic Surgeons; Otolaryngologists; and Dermatologists.
**Top 5 Surgical Procedures in 2011**

- Lipoplasty (liposuction): 325,332
- Breast Augmentation: 318,848
- Abdominoplasty (tummy tuck): 149,410
- Blepharoplasty (cosmetic eyelid surgery): 147,540
- Breast Lift: 127,564

Source: American Society for Aesthetic Plastic Surgery

**Top 5 Nonsurgical Procedures in 2011**

- Botulinum Toxin Type A (including Botox and Dysport): 2,616,739
- Hyaluronic Acid (including Hyalurax, Juvederm, Perlane/Restylane): 1,206,186
- Laser Hair Removal: 916,802
- Microdermabrasion: 499,427
- IPL Laser Treatment: 439,181

Source: American Society for Aesthetic Plastic Surgery

Quick Facts

- In 2006 the FDA announced their decision to reintroduce silicone gel breast implants to the market.
- Since 2000 Botox has been the most popular cosmetic nonsurgical procedure. Botox gained FDA approval for cosmetic use in 2002.
- Hyaluronic Acid injectables (including Hyalurax, Juvederm, Perlane/Restylane) have quickly been gaining in popularity. ASAPS added Hyaluronic Acid to the survey in 2004, and in 2011 these procedures are only 2nd in popularity to Botox.
- For the first time ever, this survey asked the doctors for the total number of nonsurgical procedures being performed in their practices by both physicians and their physician assistants and nurse injectors. Below is the TOTAL number of procedures performed:
  1. Botulinum Toxin Type A: 4,030,318
  2. Hyaluronic Acid: 1,932,480
  3. Laser Hair Removal: 1,462,880
  4. Microdermabrasion: 794,367
  5. IPL Laser Treatment: 720,126

Please credit the American Society for Aesthetic Plastic Surgery when citing statistical data.
Contact: ASAPS Communications • 212.921.0500 • medinfo@surgery.org • www.surgery.org • fax: 212.921.0011
Top 5 Cosmetic Surgeries by Gender

Top 5 Cosmetic Surgeries for Women in 2011

- **Breast Augmentation**: 316,848
- **Liposuction**
- **Abdominoplasty (tummy tuck)**: 142,567
- **Blepharoplasty (cosmetic eyelid surgery)**: 124,695
- **Breast Lift**: 127,854

Source: American Society for Aesthetic Plastic Surgery

Top 5 Cosmetic Surgeries for Men in 2011

- **Liposuction**: 41,663
- **Rhinoplasty**: 24,533
- **Blepharoplasty (cosmetic eyelid surgery)**: 22,905
- **Gynecomastia**: 17,946
- **Facelift**: 10,400

Source: American Society for Aesthetic Plastic Surgery

- Women had almost 3.4 million cosmetic procedures, 91% of the total
- The number of cosmetic procedures for women increased over 209% from 1997
- Men had almost 800,000 cosmetic procedures, 9% of the total
- The number of cosmetic procedures for men increased over 121% from 1997
1800's - Neuber reported fat grafting using small pieces of fat from the upper arm to reconstruct face defects in TB osteitis patients.

1899 - Gersuny – Paraffin injections; Others - vegetable oil, mineral oil, and beeswax = failed

In 1950, Peer reported fat augmentation had an average loss of 45% in weight by the first year post implantation.

“Ideal implant”

In 1962, Dow Corning’s “medical grade” silicone was widely being used – CONTROVERSIAL

1980’s - Bovine collagen (1st of the dermal fillers)

2000’s - Hyaluronic acid (HA) fillers
“Ideal” Implant or Filler

Success of an implant/filler is predicated upon its proximity to meeting the criteria of an “ideal” implant:

- Biocompatibility
- Minimal inflammation
- Non-immunogenic
- Non-carcinogenic/non-teratogenic
- Biodegradable or easily-retrievable
- Predictable
- Adjustable to the patient’s anatomy
- Persistent but not necessarily permanent
- Natural appearance.
Classification of Fillers

• **Source:**
  - Human
  - Non – Human
  - Synthetic

• **Permanence/durability:**
  - Absorbable
  - Non-absorbable
  - Temporary
  - Semi-permanent
  - Permanent

• **Depth:**
  - Dermis
  - Subcutaneous
  - Intramuscular

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### Table 1 Soft tissue fillers categorized by material

<table>
<thead>
<tr>
<th>Natural implants</th>
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<tbody>
<tr>
<td><strong>Autologous materials</strong></td>
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<tr>
<td>Fat transfer</td>
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<tr>
<td>Fat autograft muscle injection</td>
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<tr>
<td>Cultured human fibroblasts</td>
</tr>
<tr>
<td><strong>Cadaver-derived materials</strong></td>
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<tr>
<td>Dermis and extracellular matrix</td>
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<tr>
<td>Acellular allogeneic dermis</td>
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<tr>
<td>Injectable microparticulate acellular allogeneic dermis</td>
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<tr>
<td>Lyophilized human particulate fascia lata</td>
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<tr>
<td><strong>Collagen</strong></td>
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<tr>
<td>Bovine-derived collagen</td>
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<tr>
<td>Human-derived collagen from tissue culture</td>
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<tr>
<td><strong>Hyaluronic acid</strong></td>
</tr>
<tr>
<td>Hyaluronic acid derived from rooster combs</td>
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<tr>
<td>Nonanimal stabilized hyaluronic acid from bacterial fermentation</td>
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<tr>
<td>Viscoelastic nonanimal hyaluronic acid derived from bacterial fermentation</td>
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<tr>
<td><strong>Synthetic or pseudo-synthetic implants</strong></td>
</tr>
<tr>
<td>Silicone oil</td>
</tr>
<tr>
<td>Expanded polytetrafluoroethylene</td>
</tr>
<tr>
<td>Dual-porosity expanded polytetrafluoroethylene</td>
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<tr>
<td>Polymethylmethacrylate microspheres in denatured bovine collagen</td>
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<tr>
<td>Poly-L-lactic acid</td>
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<tr>
<td>Synthetic calcium hydroxylapatite microspheres suspended in aqueous polysaccharide gel</td>
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<td>Alkyl-imide gel polymer</td>
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### Table 2 Soft tissue fillers categorized by durability

<table>
<thead>
<tr>
<th>Temporary fillers</th>
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<tbody>
<tr>
<td>Fat transfer</td>
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<tr>
<td>Fat autograft muscle injection</td>
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<tr>
<td>Dermis and extracellular matrix</td>
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<tr>
<td>Acellular allogeneic dermis</td>
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<td>Injectable microparticulate acellular allogeneic dermis</td>
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<tr>
<td>Lyophilized human particulate fascia lata</td>
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<tr>
<td>Bovine dermal collagen</td>
</tr>
<tr>
<td>Bovine collagen cross-linked with glutaraldehyde</td>
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<tr>
<td>Human-based collagen isolated from human fibroblast tissue cultures</td>
</tr>
<tr>
<td>Human-based collagen cross-linked with glutaraldehyde</td>
</tr>
<tr>
<td>Nonanimal stabilized hyaluronic acid derived from bacterial biofermentation process</td>
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<tr>
<td>Viscoelastic nonanimal hyaluronic acid gel</td>
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<tr>
<td>Viscoelastic acid gel from rooster combs</td>
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<tr>
<td>Poly-L-lactic acid</td>
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</table>

<table>
<thead>
<tr>
<th>Semi-permanent fillers</th>
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</thead>
<tbody>
<tr>
<td>Synthetic calcium hydroxylapatite microspheres suspended in polyasaccharide gel</td>
</tr>
<tr>
<td>Expanded polytetrafluoroethylene</td>
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<td>Alkyl-imide gel polymer</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Permanent fillers</th>
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</thead>
<tbody>
<tr>
<td>Silicone oil</td>
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<tr>
<td>Polymethylmethacrylate microspheres in denatured bovine collagen</td>
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</tbody>
</table>
Dermal Fillers

- Collagen fillers
- Hyaluronic acid fillers
- Calcium hydroxylapatite fillers (Radiesse)
- Poly-L-Lactic acid (Sculptra)
- Polymethylmethacrylate
- Liquid Silicone
Collagen Fillers

- Bovine collagen (Zyderm) - Knapp in 1977
- Indication: superficial wrinkles
- 1-4 months persistence – limitation
- Zyplast = Bovine collagen + glutaldehyde (cross-linking)
- Other limitations:
  - Immunogenicity/antigenicity
    - Type IV hypersensitivity - 1.5-3% incidence.
  - Skin test x 2; inspected in 48-72 hours and at 1 month.
  - Treatment is essentially delayed until 2-4 weeks AFTER a second negative test.
Alternatives:

- Autologous injectable collagen (Autologen)
- Porcine collagen (Evolence)

Complications of Collagen Fillers

- Transient erythema
- Edema
- Ecchymosis
- Local skin necrosis
- Local granulomatous reaction
- Abscess formation.
- Complications are rare (4/100,000) but can last for up to two years.

Source:
Hyaluronans (Hyaluronic acid/HA)

- De-throwned collagen fillers
- Persistence: 6-18 months or even more
- Key characteristics:
  - GAG; natural and ubiquitous
  - Hydrophilic
  - Can be manipulated to increase persistence:
    - Crosslinking -% and type
    - Concentration
    - H₂O binding capacity
  - De novo collagen synthesis
  - Hyaluronidase
• Level I = multicenter, double-masked, RCT

• Methods:
  ▫ N = 439 patients all with moderate to severe and symmetrical NLF.
  ▫ Bovine collagen on one side and an HA filler (J30, 24HV, and 30HV) on the other side.
  ▫ Double blinded: evaluating investigator and the patients.
  ▫ Evaluated at ≤24 weeks with WAS score and review of patient diary
Wrinkle Assessment Score
Comparison of Smooth-Gel Hyaluronic Acid Dermal Fillers with Cross-linked Bovine Collagen: A Multicenter, Double-Masked, Randomized, Within-Subject Study

Leslie S. Baumann, MD,* Awa T. Shamban, MD,1 Mary P. Lupo, MD,2 Gary D. Monheit, MD,3 Jane A. Thomas, AAS, CCRA,4 Diane K. Murphy, MBA,5 and Patricia S. Walker, MD, PhD,6 for the Juvederm vs. Zyplast Nasolabial Fold Study Group

Figure 1. Mean improvement (i.e., reduction) from baseline in nasolabial fold (NLF) severity score based on assessments by evaluating investigators. At baseline, the mean NLF severity score was 2.5 to 2.6 across all groups. *p ≤ .001 versus baseline.

Figure 2. Mean improvement (i.e., reduction) from baseline in nasolabial fold (NLF) severity score based on assessments by subjects. At baseline, the mean NLF severity score was 2.3 to 2.4 across all groups. *p ≤ .001 versus baseline.
**Figure 3.** Proportion of nasolabial folds (NLFs) maintaining a clinically significant improvement in NLF severity score (i.e., ≥1-point reduction from baseline) as assessed by the evaluating investigators. †p ≤ .05, ‡p ≤ .01, *p ≤ .001 versus baseline.

**TABLE 1. Results of Effectiveness Assessments**

<table>
<thead>
<tr>
<th>Assessment</th>
<th>J30</th>
<th>Bovine collagen</th>
<th>24HV</th>
<th>Bovine collagen</th>
<th>30HV</th>
<th>Bovine collagen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean improvement (i.e., reduction) from baseline in NLF score</td>
<td>1.2* (1.0–1.3)</td>
<td>0.5* (0.3–0.6)</td>
<td>1.3* (1.2–1.5)</td>
<td>0.3* (0.2–0.4)</td>
<td>1.4* (1.3–1.6)</td>
<td>0.4* (0.3–0.6)</td>
</tr>
<tr>
<td>24 weeks after last treatment (evaluating investigator assessment), mean (95% CI)</td>
<td>1.1* (0.9–1.3)</td>
<td>0.4* (0.3–0.6)</td>
<td>1.3* (1.1–1.5)</td>
<td>0.4* (0.2–0.5)</td>
<td>1.3* (1.1–1.4)</td>
<td>0.4* (0.2–0.5)</td>
</tr>
<tr>
<td>Mean improvement (i.e., reduction) from baseline in NLF score</td>
<td>81%* (116/143)</td>
<td>45% (65/143)</td>
<td>88%* (121/138)</td>
<td>36% (50/138)</td>
<td>90%* (125/139)</td>
<td>40% (55/139)</td>
</tr>
<tr>
<td>24 weeks after last treatment (subject assessment), mean (95% CI)</td>
<td></td>
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</tr>
<tr>
<td>Proportion of NLFs maintaining a clinically significant improvement (≥1-point reduction) from baseline in severity score 24 weeks after last treatment, % (n/N)</td>
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</tbody>
</table>

* p ≤ .001 versus baseline.
Figure 4. Photographic documentation of the longer-lasting clinical improvement with the smooth-gel HA dermal fillers relative to bovine collagen, the good local tolerability of these HA dermal fillers, and the smooth natural look attainable.
Restylane (NASHA = Non Animal Source HA)

- First HA filler on the market; FDA approved 2003
- Source: equine streptococci
- Cross-linked with BDDA; 80% cross-linked with 2% degree of cross-linking.
- Concentration: 20mg/mL
- Indicated for: mid-dermal applications for deep wrinkles, lip augmentation, NLF correction, and for glabellar creases. (6 mos)
- Perlane (part of the Restylane family) boasts larger particles (delays degradation) and allows for deeper injections.

Source: http://www.permanentcosmeticnurse.com/images/beforeAfters/restylaneBA.jpg
Juvéderm

- Competitor to Restylane - Possibly the longest persisting HA filler. FDA approval June 2006.

- Source: equine streptococci

- Cross-link: Cross-linked with BDDE; 90% cross-linked with at least 6% (highest 11%) degree of cross-linking.

- Concentration: 24mg/mL; other formulations range from 18-30mg/mL

- Water binding capacity: Higher hydrophilic properties than Restylane.

- Indicated for: deep wrinkles and furrows, lip augmentation, nasolabial fold correction and nasojugal area.
**Hydrelle (formerly Elevess)**

- Newest. FDA approved (2009)

- **Contains 0.3% lidocaine**

- Source: equine streptococci

- Cross-link: Cross-linked with BCDI (novel linker)

- Concentration: 28mg/mL.

- There have been case reports of allergic reactions.
Hydrelle? Is it Worth it?

Warning: Hydrelle Complications
Charles Lee, MD, Plastic Surgery and Aesthetic Medicine, 05:01PM Apr 27, 2010
Chief of Plastic Surgery, St.Mary's Medical Center, SF

I have had Restylane injected in my upper lip twice before with no complications, by the end of the day the swelling and soreness was gone and I had great results. After moving I had to find a new Dr and he offered a newer product that had the lidocaine mixed in to make it

I am issuing a personal warning about the soft tissue filler, Hydrelle, made by Anika Therapeutics and distributed
Complications of Hyaluronic Acid

- RARE
- Tyndall effect
Calcium hydroxylapatite (CaHA) fillers (Radiesse)

- Emerging semi-permanent dermal filler
- First dermal filler to receive two FDA indications:
  - Facial rejuvenation
  - Facial wasting of HIV lipoatrophy
- 30% CaHA microspheres & 70% carboxymethylcellulose gel
- Neocollagenesis
- Indicated for: mod-severe wrinkles, folds such as nasolabial grooves; not recommended for lip augmentation

Figure 5 Histologic photomicrograph of calcium hydroxylapatite with neocollagenesis at 16 months in a canine model.

Source: http://www.permanentcosmeticnurse.com/images/beforeAfters/restylaneBA.jpg
How Ideal is Radiesse?

• *Persistence*? longevity of over one and up to two years
• *Immunogenicity*? No immunologic responses
• *Biocompatible*? Yes
• *Reversibility*? Yes, but...
• Potential to de-thrown HA fillers?
Complications

- Nodule formation (but NOT granulomas)
- Ecchymosis
- Hematoma.
Poly-L-Lactic acid (PLLA; Sculptra)

- Semi-permanent filler
  - FDA 2004 – HIV lipoatrophy
  - FDA 2009 – Facial rejuvenation

- Controlled inflammation → fibroblasts leave collagen as the PLLA degrades

- Last upwards of 2 years.

- Crosshatching method of injection

- Indicated for: shallow to deep nasolabial fold contour deficiencies and other facial wrinkles of cheeks, temples, and lateral face.

http://www.sculptraesthetic.com/
Poly-L-Lactic acid (PLLA; Sculptra)

Wrinkle Assessment Score 2 – 4 contour deficiencies - SCULPTRA
Complications

- Nodules at the injection site
- Delayed granulomas
- Erythema
- Pain
- Inflammation and swelling
- Hypersensitivity and itching.
Polymethylmethacrylate (PMMA, Artecoll, & Artefill)

• FDA approved 2006

• Permanent

• Synthetic filler with large particles (30-50 microns) that make it difficult to be phagocytized

• CONTROVERSIAL PAST
  ▫ Fibrous capsule at 7 months.
  ▫ It has limited reversibility.

• Further studies are being carried out over this filler.
Subcutaneous volume enhancers (fillers)

- Autologous fat
- Autologous SMAS fascia
- Allo-Derm
- Alloplastic material – ePFTE
Autologous fat

- Fundamental mode of facial volume filling for surgeons in the operative room.
- Outcome is variable – technique dependent
  - Microlipoinjection
- It is indicated for: nasolabial grooves, marionette lines, midface, lips, glabellar furrows, and hemifacial atrophy.
- Overcorrection by 30–50% is recommended given its average loss of weight.
Complications

- Mild swelling and slight ecchymosis at the treatment sight.
- Case report: blindness following injection of fat to the glabella.
Humologous (Alloderm) & Autologous fascia & Alloplastic material

• Not injectable; more like implants
• Tunneling technique
• Alloderm:
  ▫ Lip augmentation, nasolabial and melolabial folds, and glabellar frown lines
  ▫ Antibiotics and prophylactic acyclovir
  ▫ Harvested and rolled
• Autologous fascia (SMAS)
  ▫ Lip augmentation and nasolabial groove
  ▫ Harvested and rolled
Alloplastic material

- Expanded polytetrafluoroethylene (e-PFTE)
- Biocompatible, inert, carbon-based material
- Origin as a vascular graft
- Tunneled (trocar + cannula)
- Indications – same as Alloderm
- Criticism: tissue ingrowth → hardened implant
  ▫ Ultrasoft
  ▫ Fulfill
Tunneling Technique

**Figure 22-6** Ultrasoft delivery device. (A) After tunneling the device under the desired area of augmentation, the cannula is withdrawn, leaving the trocar-implant in place. (B) Gentle pinching of the skin surface is performed as the tip of the trocar is grasped and advanced.

**Figure 22-7** Sites amenable to augmentation with Ultrasoft. The entry and exit site incisions for the implantation are marked.

**Figure 22-8** Ultrasoft implanted in nasolabial groove, ensuring that both ends of the tube are open for tissue ingrowth. Note the S-shaped redundancy created by trimming the implant to leave 4 to 5 mm extra length for augmentation at the superior end of the nasolabial triangle.

e-PFTE Placement

Skeletal/Onlay Implants

- Reliable and safe option

- Considered when there are structural facial deficits.
  - indirect soft tissue augmentation.

- As ancestors of custom carved grafts, custom pre-formed implants are now manufactured from Silastic (silicone), ePFTE, and Porex.

- Chin, mandibular angle, malar complex, and nasal dorsum.

- Above or below the periosteum in a sterile surgical field

- Post op edema and anesthesia for three weeks.

- Capsule maturation occurs after six months.

- Reversible
Malar Augmentation

A 5-Year Retrospective Review of the Silastic Midfacial Malar Implant

Stephen E. Metzinger, MD, MSPH; E. Gaylon McCollough, MD; Jeffrey P. Campbell, MD; Daniel E. Rouso, MD

- 5 year retrospective review
- N = 60
- Follow up period = 24-60 mos.
- Hinderer, Powell et al, and Prediergast & Schoenrock techniques used.
- Appropriate size and shape implant chosen and outlined on the patient.
- Intraoral, canine fossa approach
- Patients compared on visual analog scale preop and at 1 year.
- Patient subjective assessment at 2 years.
Figure 1. The Hinderan crossed lines. The first line is drawn from the ala to the tragus, and the second line is drawn from the lateral canthus to the commissures. The implant is then placed in juxtaposition to the crossed lines in the upper outer quadrant.

Figure 2. Analysis by Powell et al. A. The vertical height of the cheek is at or slightly below the Frankfort horizontal plane. The line is parallel to the horizontal plane. B. The line is parallel to the Frankfort horizontal plane in the location of the malar prominence. C. A line drawn vertically through the lateral canthus divides the malar region into posterior lateral and anterior medial divisions.

Figure 3. Analysis by Freytag et al. Looking obliquely at the face, a line is drawn from commissura to lateral canthus. One third of the distance down this line, a perpendicular line will go through the most prominent point of the malar complex.
Figure 4. Left oblique view with preoperative maxilla molar implant (McKittrick Medical, Santa Barbara, Calif) in position. Careful outline of the site is given. Precision is key in preoperative markings.

Figure 5. Molar maxilla implant (McKittrick Medical, Santa Barbara, Calif) is in position without suture or screw fixation.

Results reveal that for the 60 patients:

- 51 (85.0%) reported an excellent result after at least a 2-year follow-up.
- Ten patients (16.7%) had some form of undesirable sequelae;
- Only 4 (3.4%) of 118 implants had to be revised.
- Photographically, all 60 patients graded postoperative improvement.
Botox

- Physiologically active agent
- Effect underlying muscle contractions.
- Clostridium botulinum
  - A – G formulations
  - BTX-A is the most potent at muscle paralysis in humans.
  - MOA: binding pre-synaptic cholinergic terminals and preventing the release of Ach; irreversible
  - Its effect lasts for 3-6 mos; initial effects in 2-3 days
  - Temporal brow lift
Complications

- Few
- Ptosis
- Temporary droop of the lower eyelid after treatment of crow’s feet.
- It does have immunogenic properties but is reversible.
Patient Selection

CRITICAL!
- Clear understanding of goals and limitations of surgery and nonsurgical procedures.

MULTIPLE CONSULTATIONS MAY BE NECESSARY TO FIND HIDDEN MOTIVATIONS AND CONFUSION OF GOALS.

- Motivated to support longevity
- Healthy
- Appropriate weight

Sources