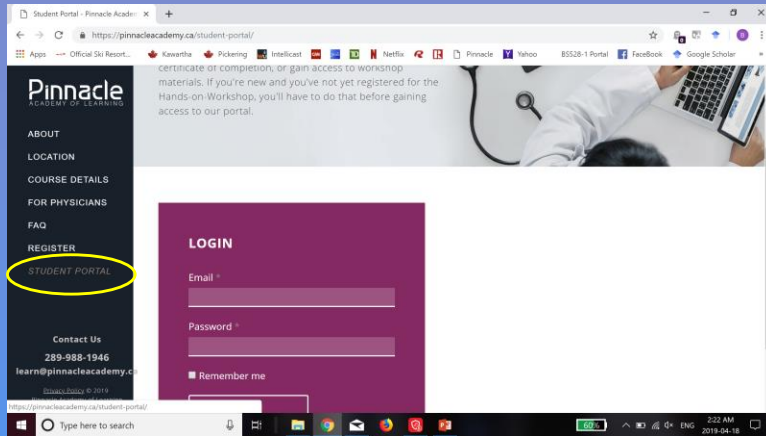


Introduction to Botulinum Toxins & Dermal Fillers



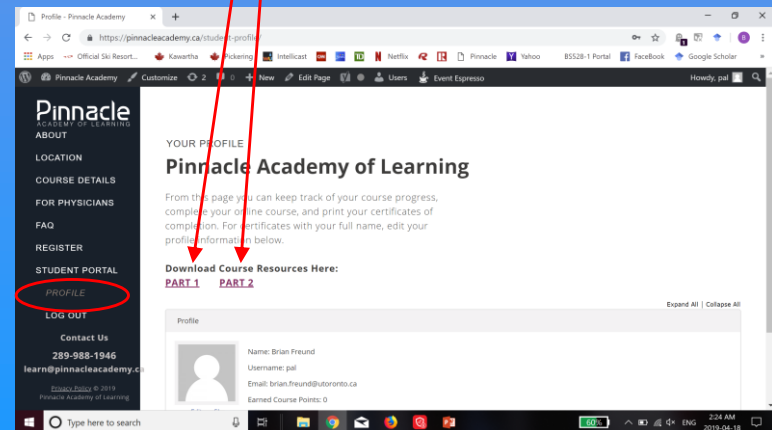
Pinnacle Academy of Learning

Resources: pinnaclecademy.ca



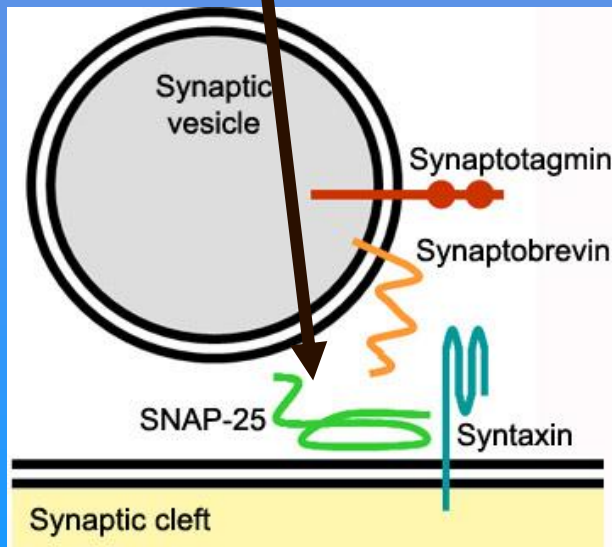
Download links

- Reference articles
- Consents
- Pre-op/post-op instructions
- Treatment Records

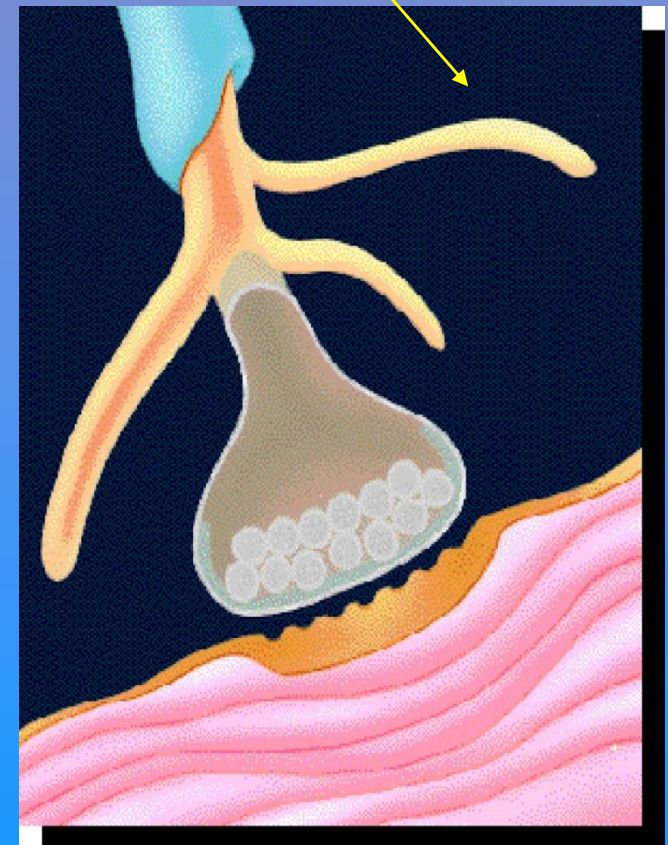


Mechanisms for Action & Reversal

Clipping/Regeneration of the docking proteins



Sprouting of accessory nerve terminals



Health Canada Approved Products

New kid on the block “Letybo” approved for
cosmetics June 2022



Products are not interchangeable, doses are not interconvertable !

Read the literature carefully, most studies are specific to a product.

There can be differences in toxin spread, onset and treatment longevity.



"Okay your father managed to get a mouse. Now how do we use it?"

Units of Measurement

- “Mouse Unit” - measure of potency
- 1 unit kills 50% of mice

- 1 BOTOX vial holds 50, 100 or 200U
- 1 XEOMIN vial hold 50 or 100U
- 1 DYSPORT vial holds 500U



Safety Comparison Therapeutic Index



TD_{50} / ED_{50}

3:1



TD_{50} / ED_{50}

15:1

Contraindications:

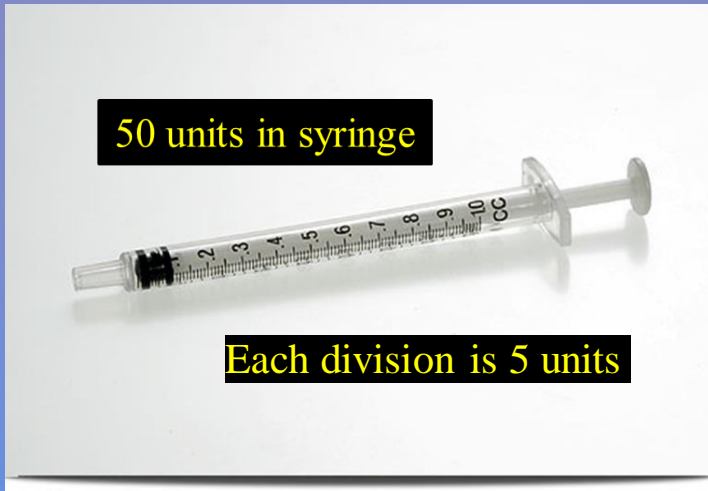
- **Pregnancy/Lactation**
- **Drugs affecting neuromuscular junction** (eg aminoglycosides 'mycins')
- **Neuromuscular Disorders**
(eg Myasthenia Gravis)

Local Side Effects based on needling and toxin drifting

- Bruising
- Swelling
- Pain
- Infection
- Adjacent paresis



Supplies

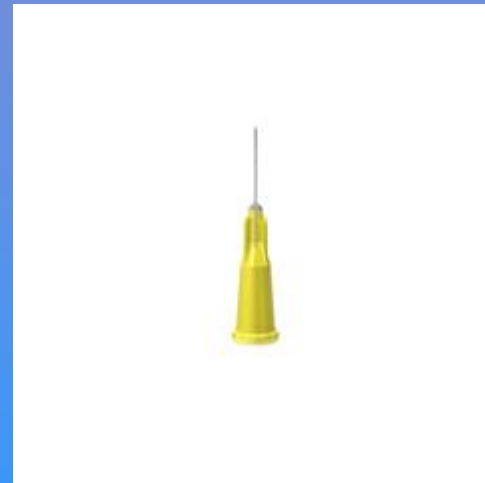


Reconstitution



18 - 20 gauge
(long enough to get to bottom of vial)

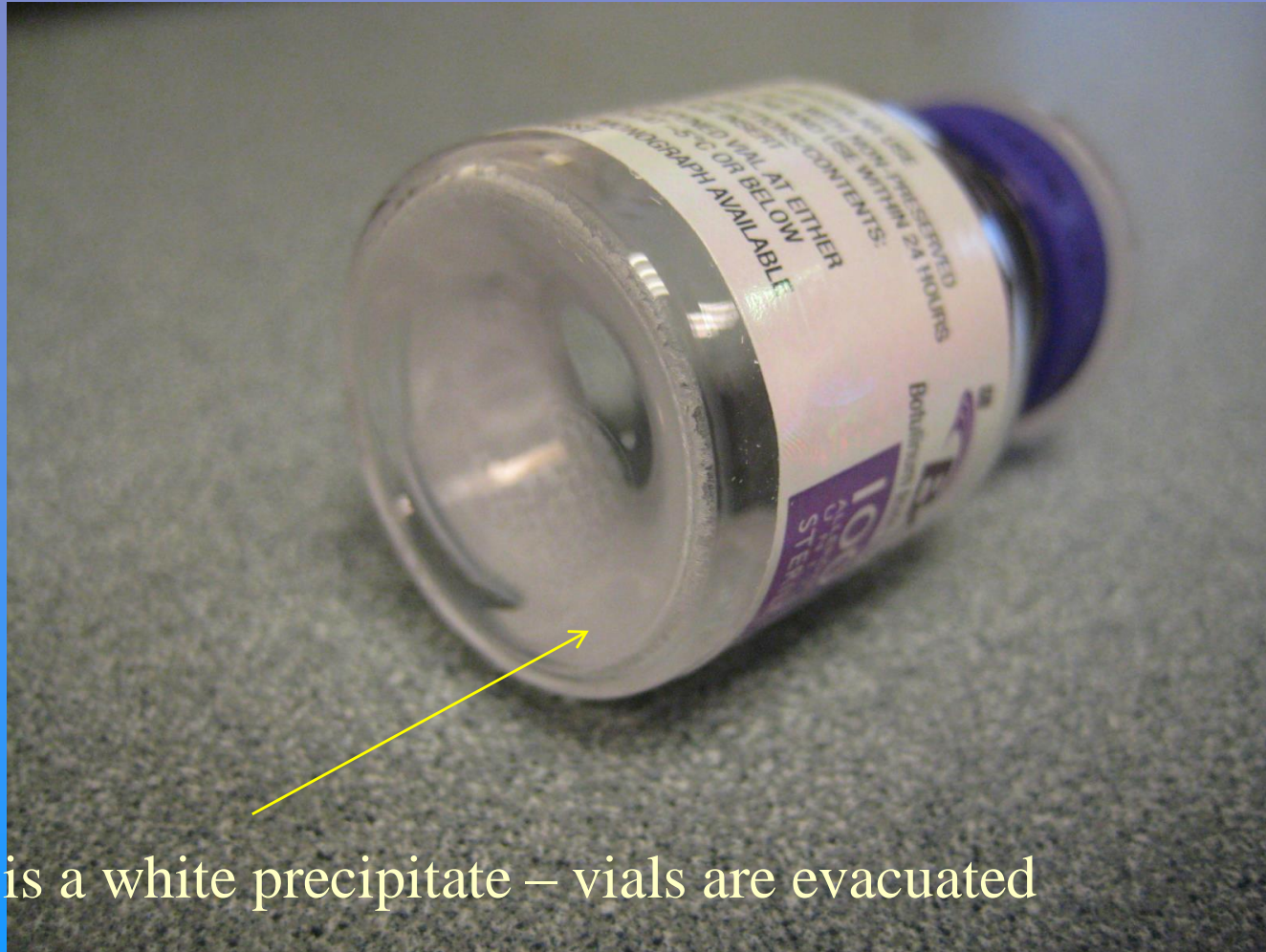
Injection



30 gauge 1/2 inch

(Supply list is downloadable via
Student Portal/Profile)

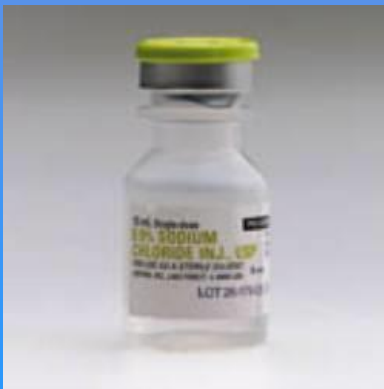
The vial looks empty



Drug is a white precipitate – vials are evacuated

BTX-A products are reconstituted with saline

Yellow top = non-preserved
Orange topped = preserved



Monograph says use non-preserved

Preserved saline hurts less when injected. (alcohol preservative has LA properties)

1 ml saline into 50U

2ml saline into 100 U

4 ml saline into 200U

Gives 5U/0.1ml

Un-reconstituted vials - freezer
Reconstituted vials - refrigerator

Best practice is to
order the smaller vials
and use it all at once

Use technique that will
not contaminate vial



Clinical Actions:

1) Inhibits Secretions

Salivary glands
Lacrimal glands
Sweat glands
Prostate



2) Relaxes Muscles

Striated & Smooth



3) Modulates Nerves

No anesthetic
effect



Longevity of therapy

Pain/Spasticity (2-4)

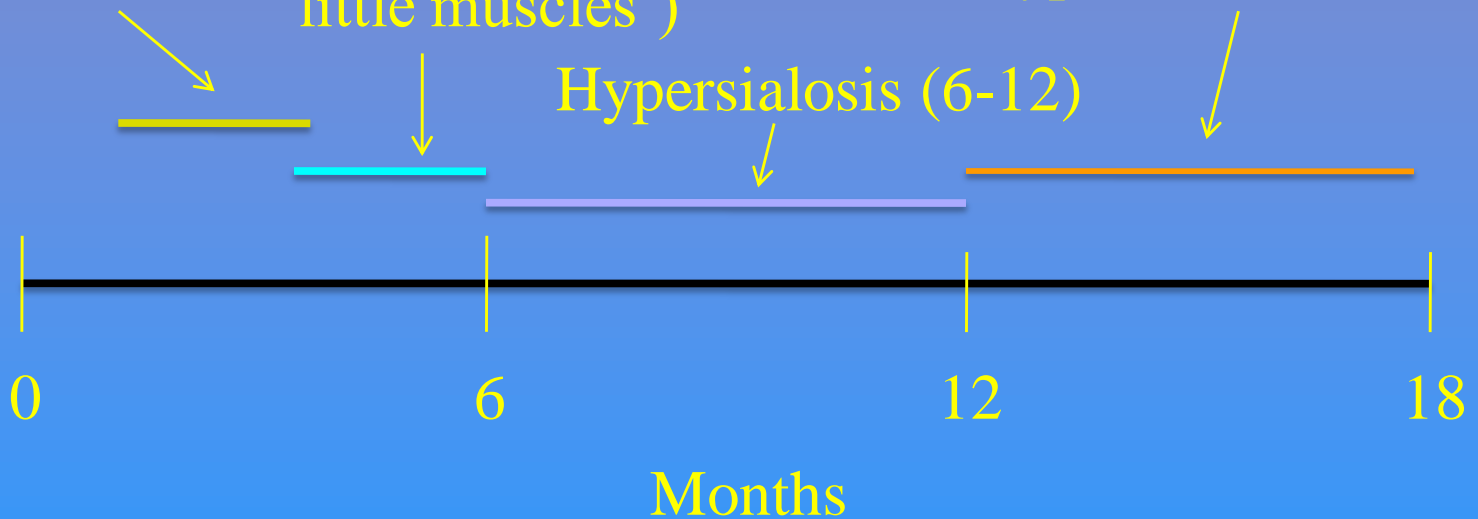
'big muscles'

Cosmetic (4-6

'little muscles')

Hyperhidrosis (12-18)

Hypersialosis (6-12)



Product Independent

Records

- Consent
- Treatment
- Pre & Post treatment patient instructions
- Pre & Post treatment photos (modify consent to allow use of pics on website or social media)



(these are all downloadable via Student Portal/Profile)

Botox: Post-Injection Instructions

- Some swelling or bruising is possible particularly around the eyes or forehead. If you tend to bruise easily apply ice to the injected areas (10 minutes on, 10 minutes off) intermittently for the **first** day.
- If there is bleeding from one of the needle punctures apply gentle pressure with gauze or a fresh wet wrung out tea bag.
- **Do not rub or massage the injected areas for at least 6 hours.**
- Use acetaminophen for pain as necessary.
- If you develop significant pain, swelling or redness in the surrounding tissue, call the office.
- If you develop unexpected weakness in the eyelids, voice changes or difficulty swallowing call the doctor.
- **Expect that the muscles that were injected will become weak and that the skin in some areas can feel 'numb' for a few days.**
- Schedule a follow-up appointment 2 week post-injection.
- No vigorous exercise for 24 hours

The Business of Botox & Fillers

- Both Botox & Fillers can represent new revenue streams
- Both are used to ‘differentiate’ practices and practitioners
- For practical purposes there are no billing codes – insurance will not cover these procedures



Billing for TMD

- Drug cost ~ \$200/50U (pt pays directly 'may' get insurance reimbursement)
- Average GTA injection fee \$250 (what you collect from pt)
- Consult billed separately

Billing Codes: NOT RECOMMENDED

- 79801 Muscular dysfunction (?specialist)
- 96201 Injection (~\$30)

Bottom Line Cost to Patient \$450 You earn \$250

Billing for Filler



- Juvéderm/Restylane cost ~ \$250/syringe
- 1 syringe is enough to fill both lips
- Average GTA injection fee ~ \$250
(includes consult/pics/consent)

Bottom Line: You bill \$500 (+HST), you earn \$250

Scope of Practice

Can I treat Migraines or wrinkles with Botox?



Not in Ontario:

- Diagnosis and treatment of primary headaches fall outside of the definition of 'Dentistry'
- Ontario dentists cannot use Botox for wrinkles

From RCDSO DISPATCH AUGUST/SEPTEMBER 2013:

“It is not within the scope of practice of dentistry and members are not authorized in Ontario to inject botulinum toxin or dermal fillers extra-orally for cosmetic purposes.”

Extra-oral is defined as anything beyond the vermilion border



Acquiring Product

Botox:

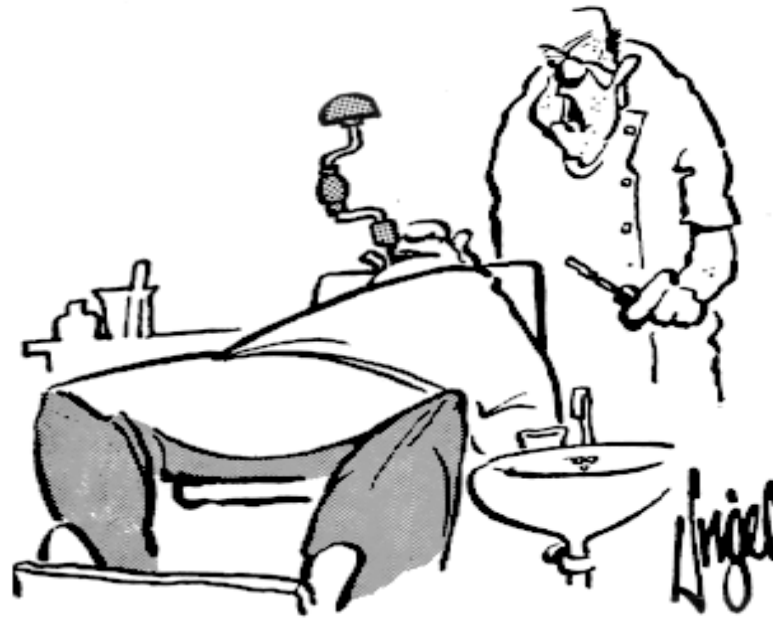
1. Write an Rx for the patient →
2. Open an account with Allergan, have it shipped to office

Rx: Botox 50U x 1 vial
DIN 01981501

Filler:

1. Open an account with Allergan, have it shipped to office (**this is the only way for dentists to get filler**)
2. Order hyaluronidase from a compounding pharmacy at the same time as filler

Clinical Applications Botulinum Toxins

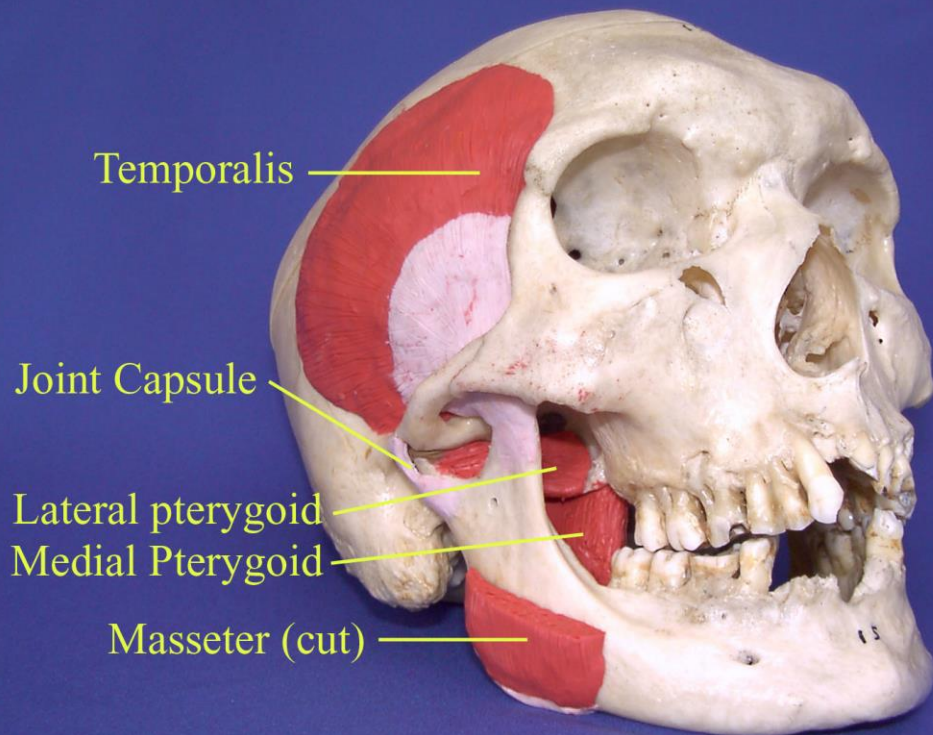


"The old methods are still the best."

Candidates for Botox therapy

- Bruxism
- TTH
- TMD
- Neuropathic pain disorders
- Atypical Odontalgia
- “Gummy” smiles
- Implants

TMJ & Masticatory Muscles



Temporalis

Joint Capsule

Lateral pterygoid

Medial Pterygoid

Masseter (cut)

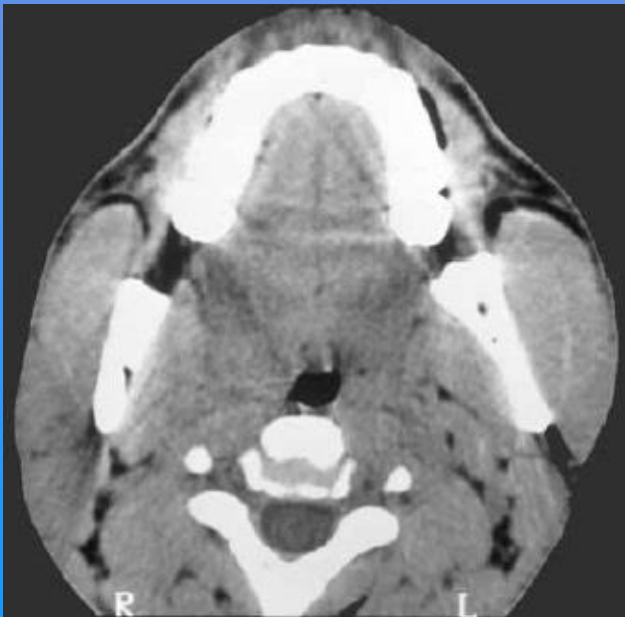
Focused Examination

Palpate Masseters

? Bulky/well defined

? Tender

? Unilateral/bilateral

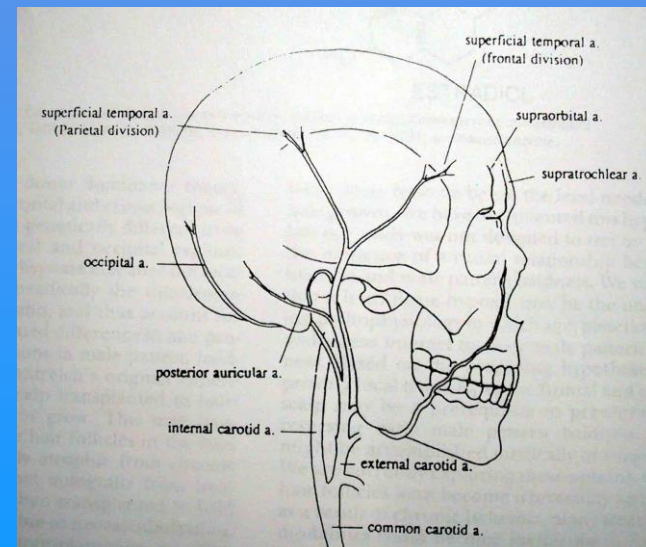
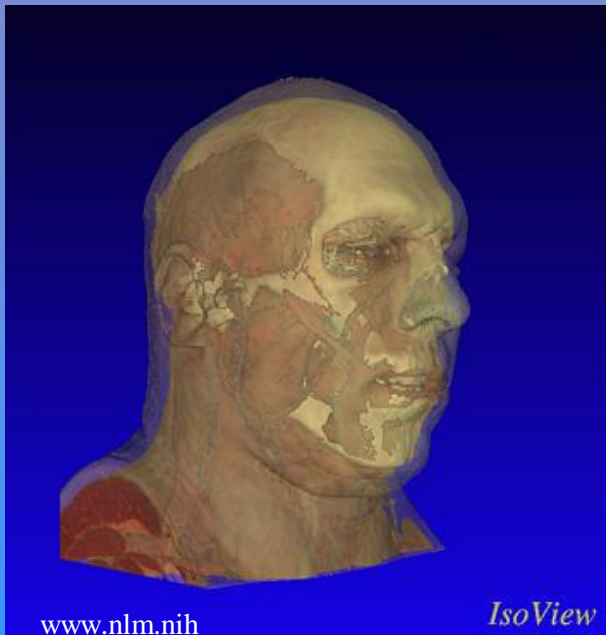


Palpate Temporalis

? Bulky/well defined

? Tender

? Unilateral/bilateral

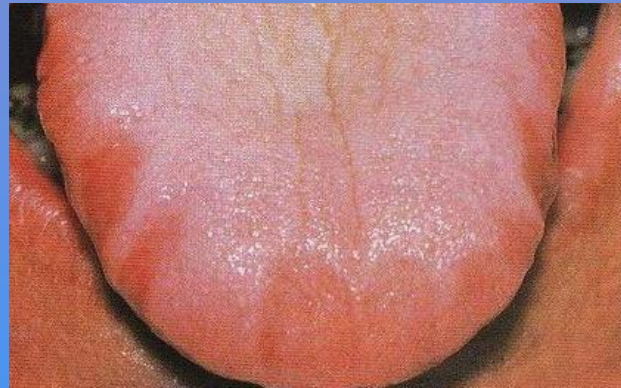


Palpate Temporal Artery

Clinical Predictors of Success



Linea Alba



Tongue Scalloping



Well Developed
Masseter

TECHNIQUE



"I'll give you something to ease the pain."

Areas to Inject: based on complaint complex and examination

In general -bilateral (mirror image) injection although dose can be modified
-for best functional results inject all major agonist muscles e.g. masseter & temporalis

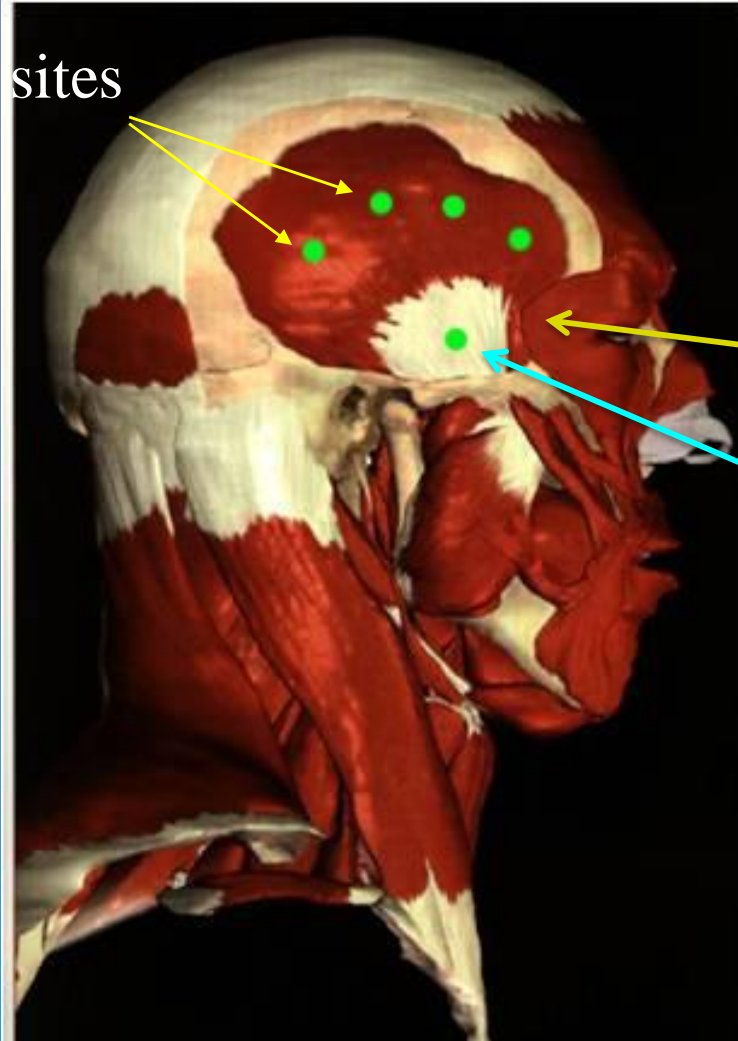


Injection Guidelines

- Safe vs. Un-safe areas:
 - Underlying vital structures, e.g.: blood vessels
- Injection depth:
 - In muscle (between dermis and periosteum)
- Syringe/Needle gauge:
 - 1 cc tuberculin syringe
 - 30 gauge
- Needle angle
 - 45 degree angle to surface for thin tissue (i.e. forehead) perpendicular elsewhere)

Distribution of Temporalis Injections

Optional sites

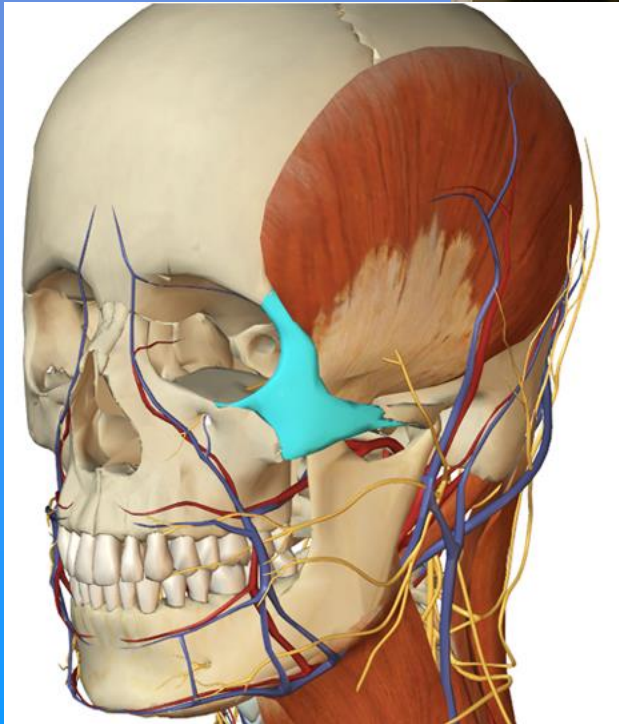


Inject 5 units/site (0.1 ml)
15 - 25 units total

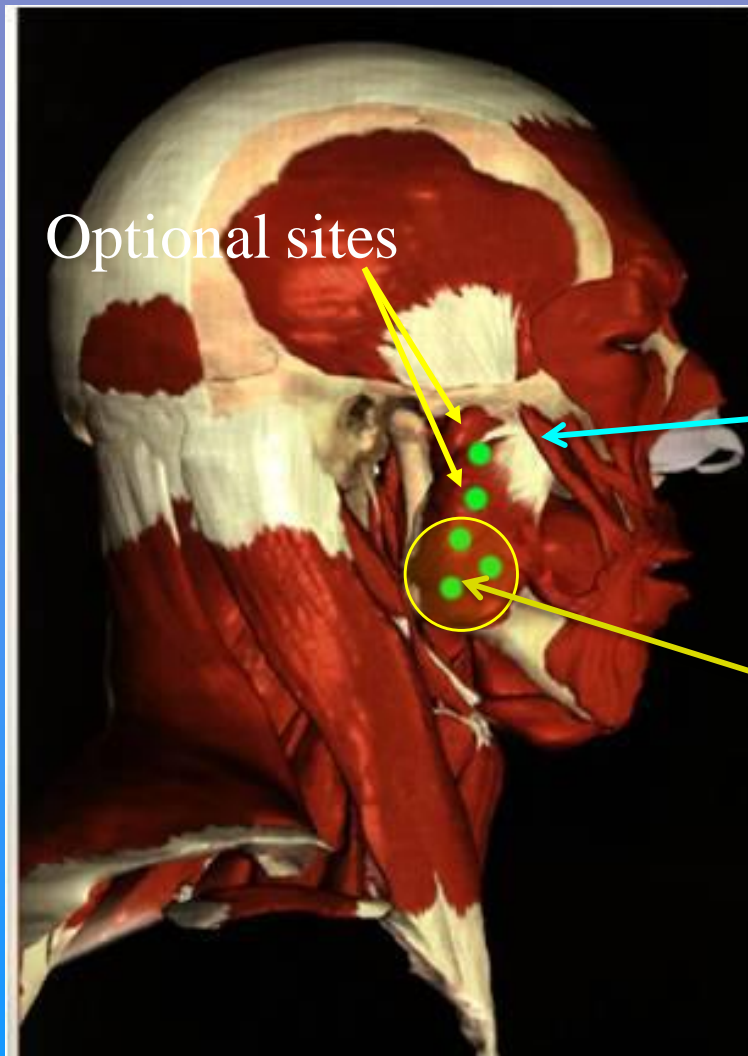
Stay at least I finger breadth
away from orbital rim

Deep injection

Deep Temporalis Injection



Distribution of masseter injections



Inject 5 - 10 units/site (0.1 - 0.2 ml)
15 - 50 units total

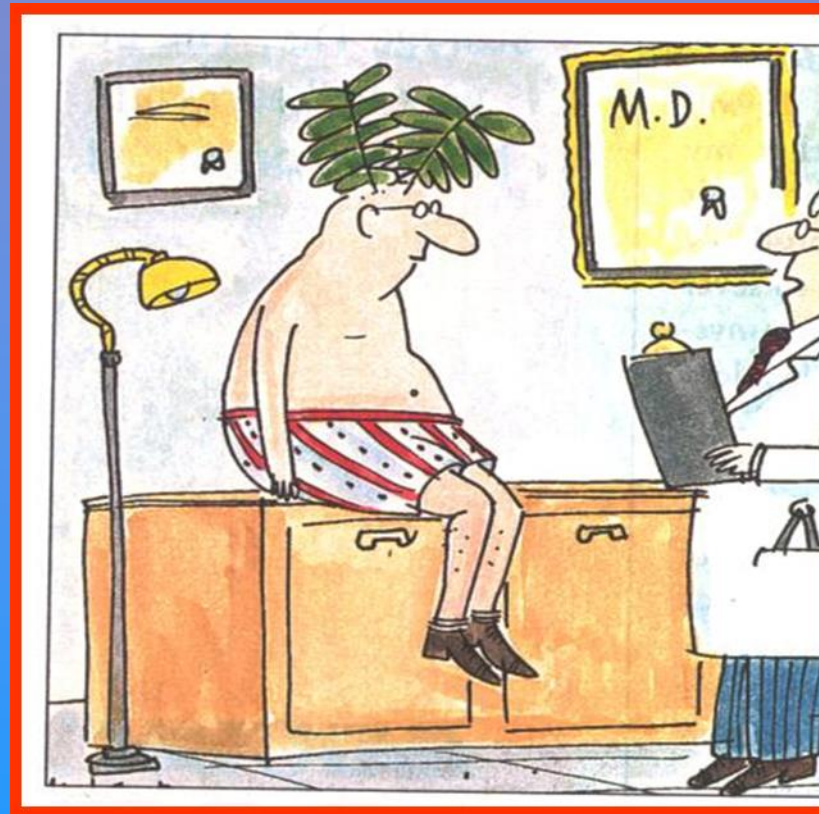
Avoid Zygomaticus origin

Inject most where
muscle is bulkiest

Masseter Injection



Other Applications in the Oro-facial Region



Were you messing around with anything off label?

Atypical Odontalgia

- Dental therapy (root canal treatment, tooth extraction, surgery, oral appliance)
- TCAs
- Phenothiazines
- Gabapentin, Lyrica
- Local anesthetic
- BTX-A



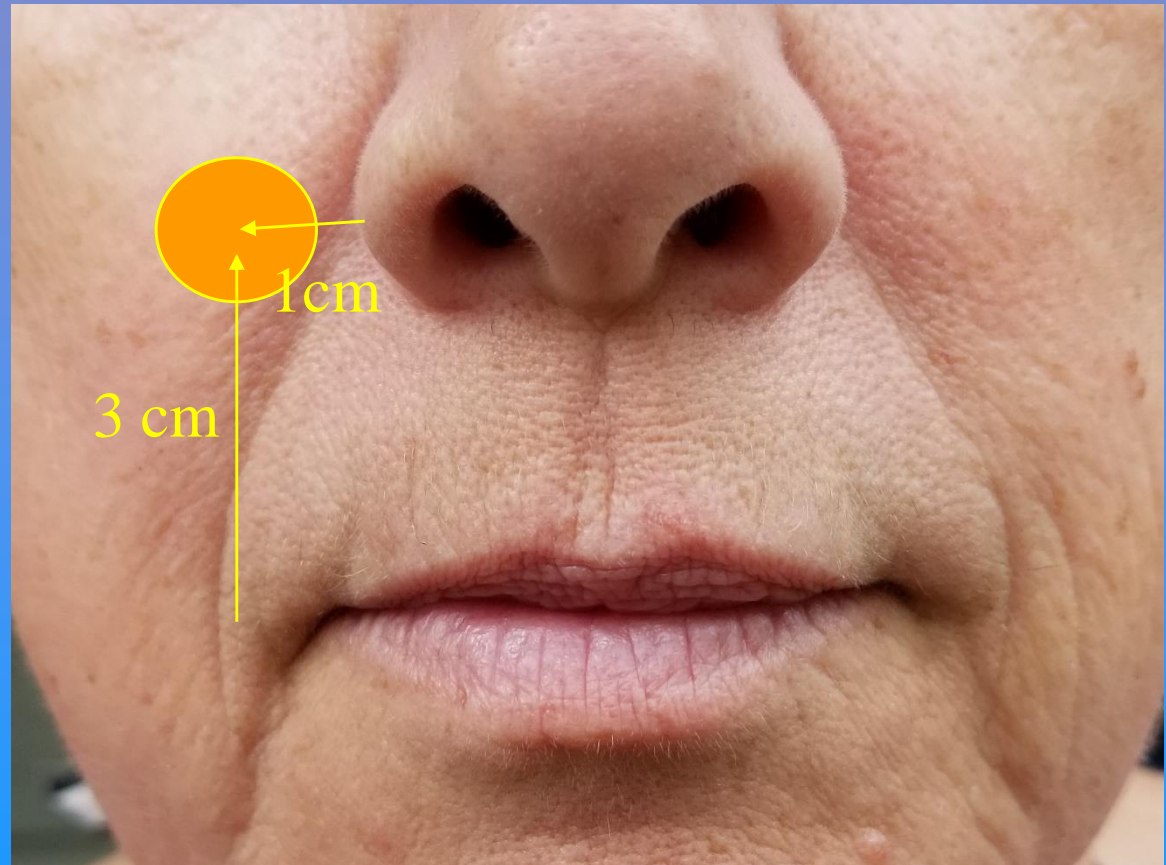
Treating the ‘Gummy Smile’

RCDSO considers this as ‘Cosmetic’
Must use intra-oral technique



Assess the patient – this procedure prevents the lip from rising fully

Yonsei Point:
Overlap region of
Levator labii sup
Levator alaeque nasi



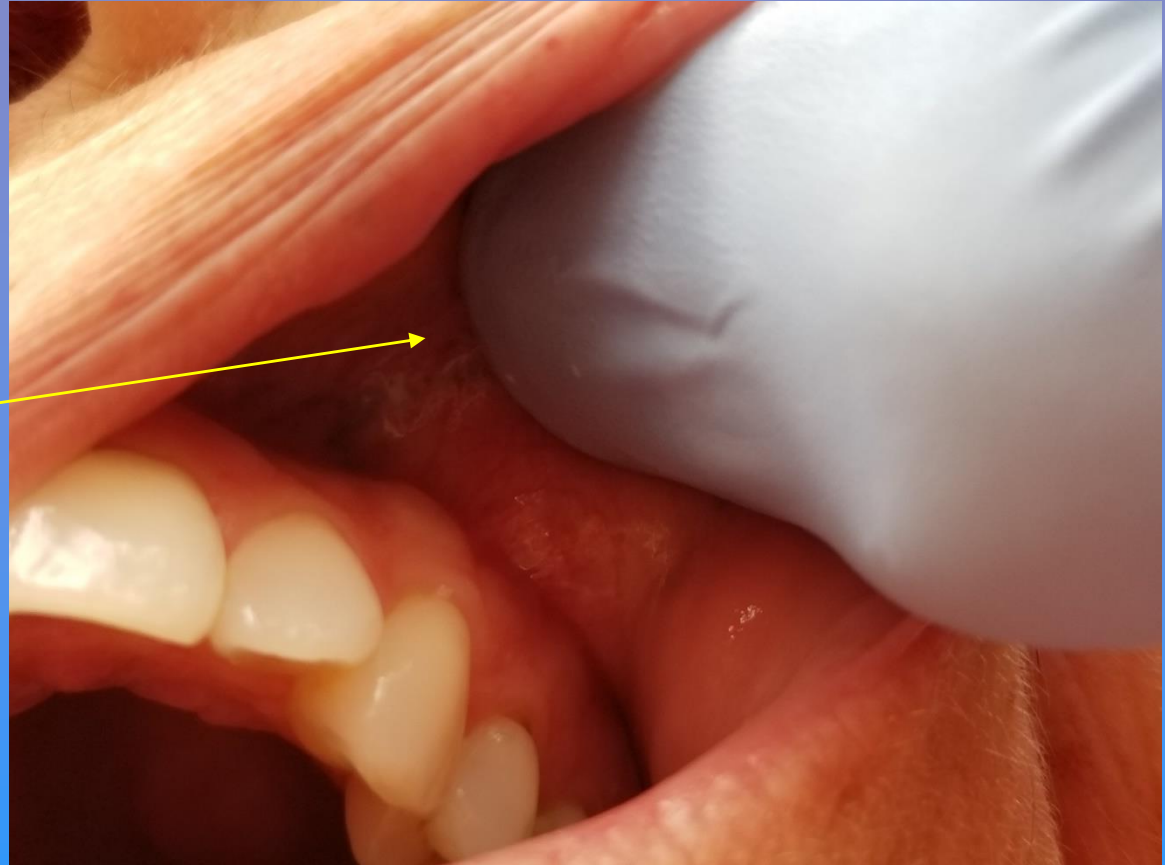
Intra oral technique



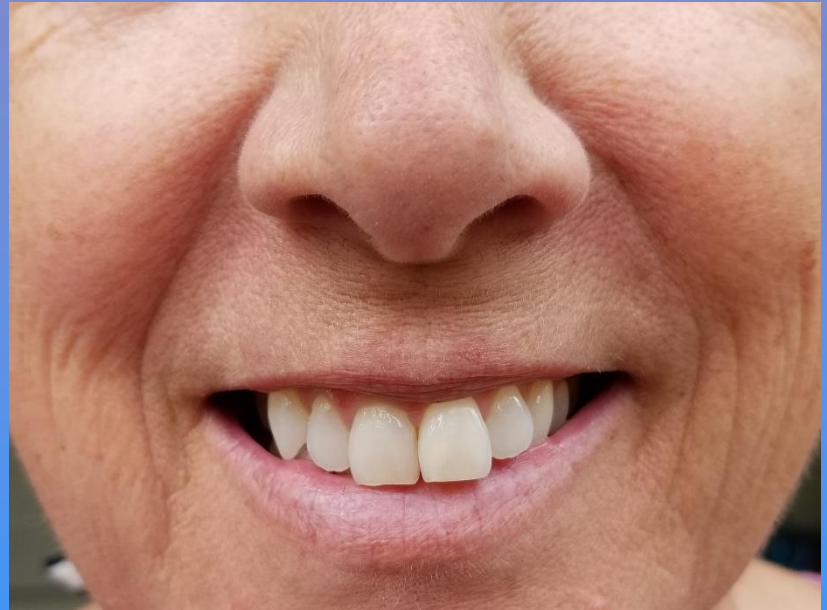
Place forefinger on the Yonsei point, slide thumb under lip
Grasp lip while pt elevates – readjust finger position to
exact point of muscle insertion.

Intra-oral technique

Roll lip up
inject 2u at end
of thumb just
submucosal



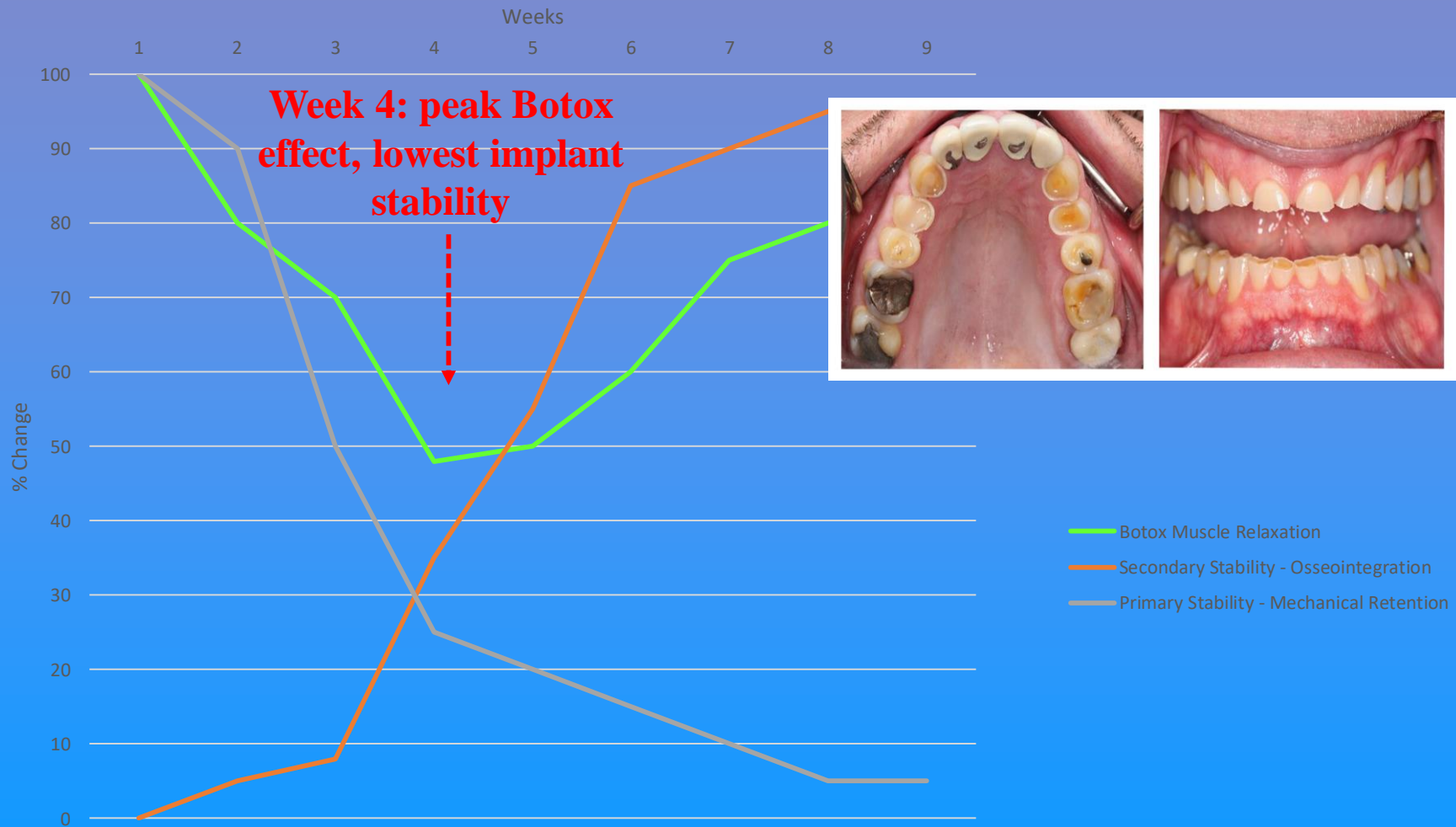
Before & After



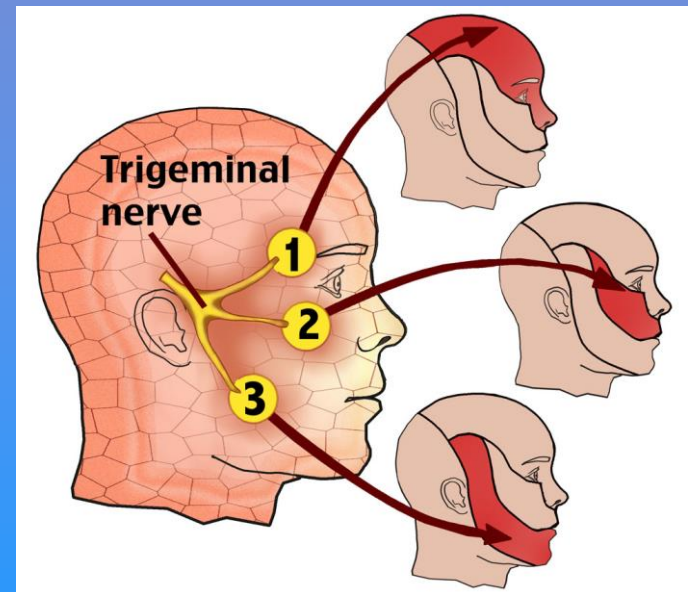
Can 'touch-up' with additional 1-2u after 1 week to get ideal height

Reduce Loading of Immediately Provisionalized Implants or Full Arches

Implant Stability & Botox Time Course

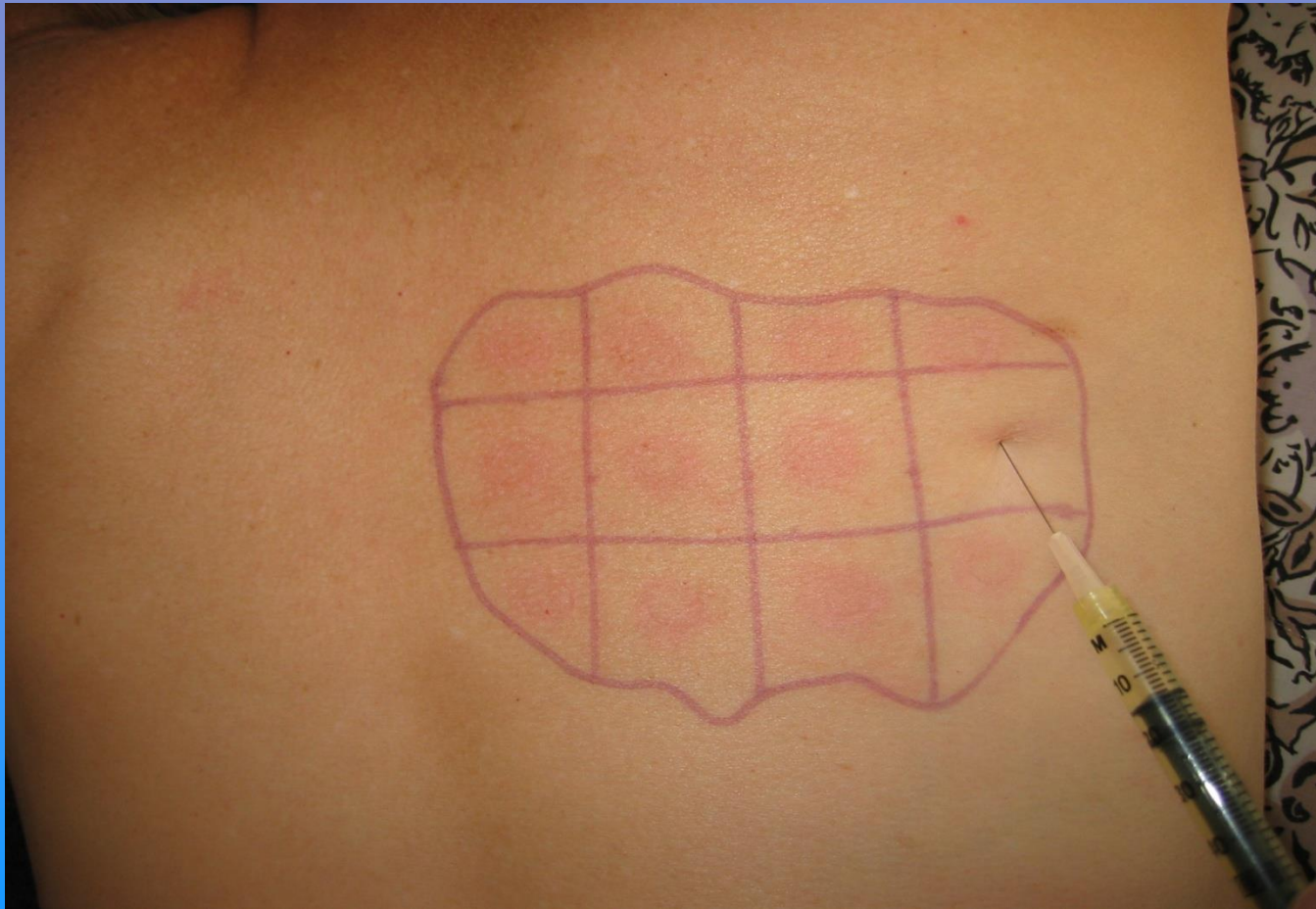


Neuropathic Pain

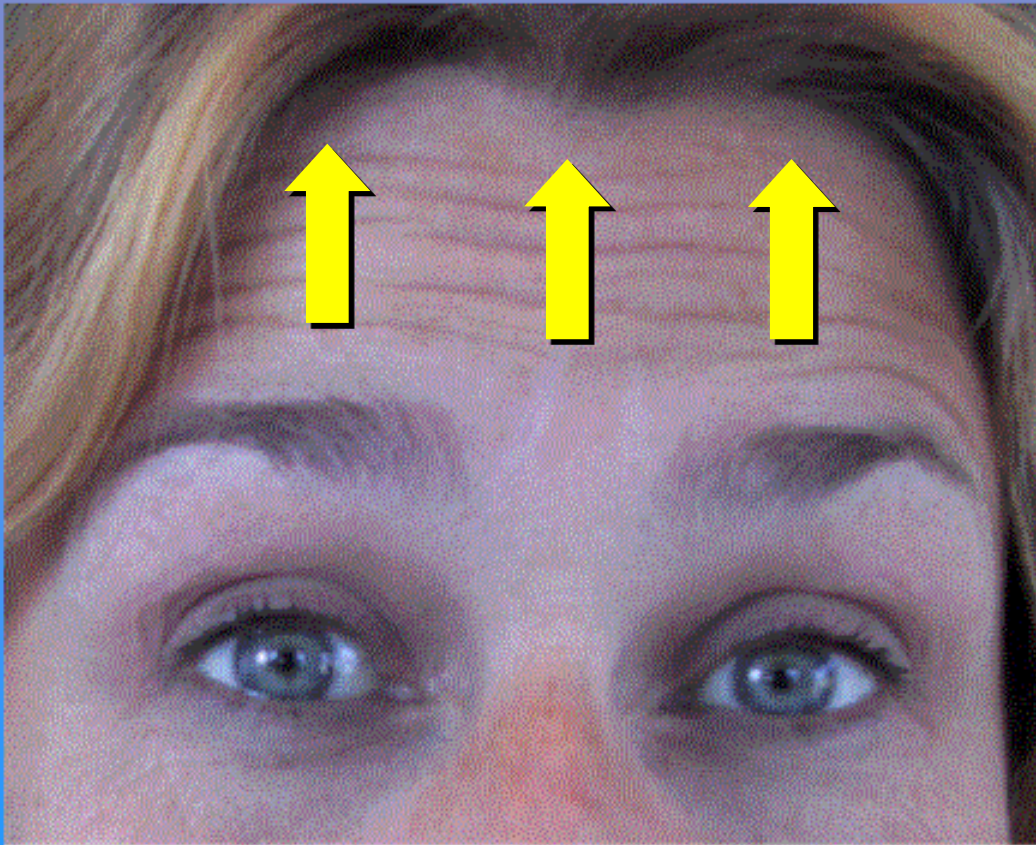


PHN/TN/DN Technique

Injections: 30 gauge needle, 5 U/sq cm intra-dermal



Muscles of Facial Expression



Forehead:
Frontalis

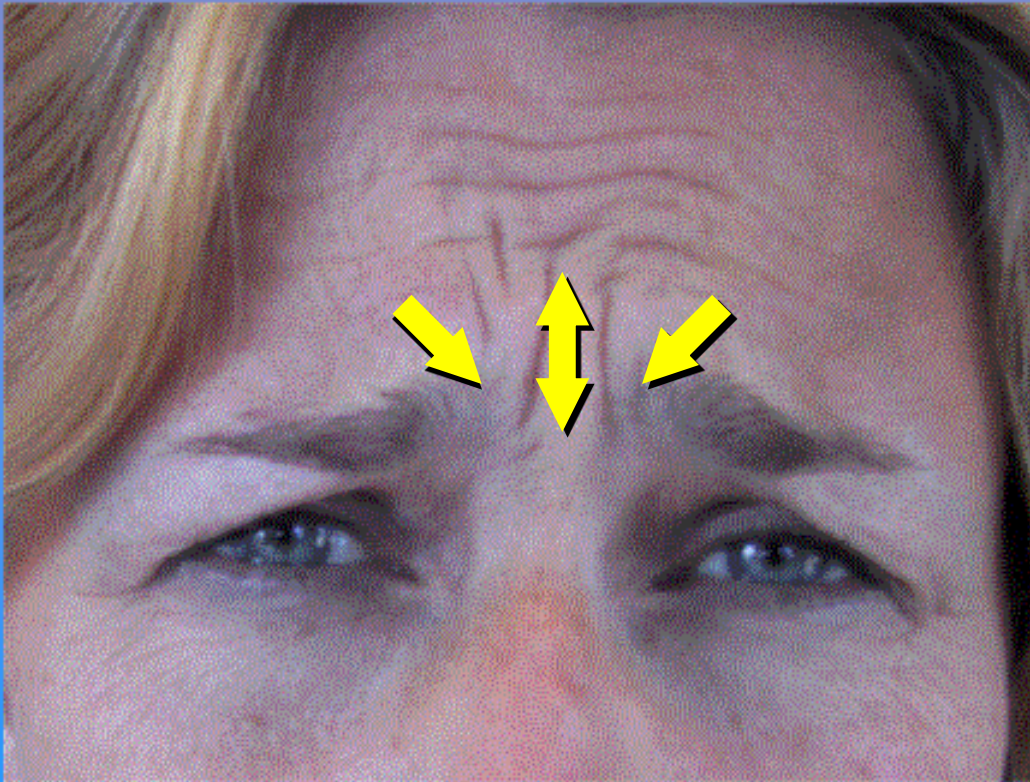
-

ONLY
brow
elevator

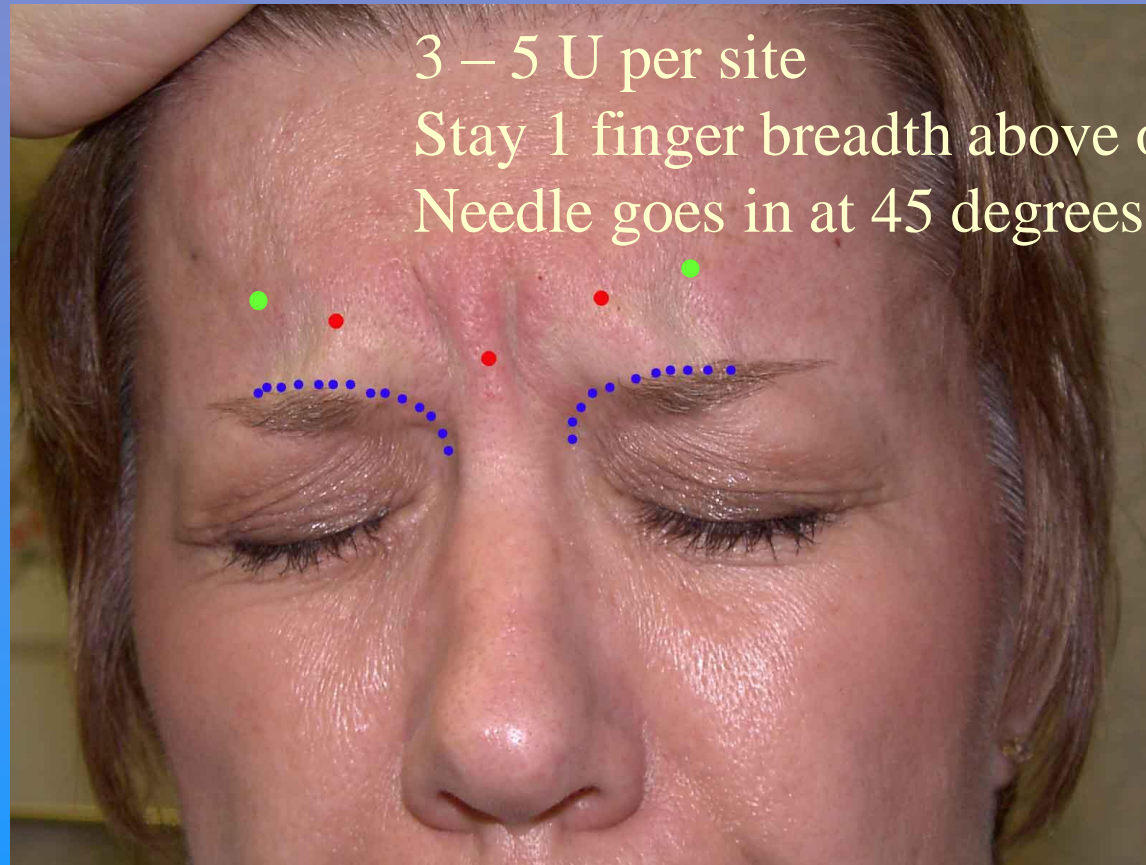
Glabella:
Procerus/
Corrugator

-

Brow
depressor/
adductors



Glabellar Injections

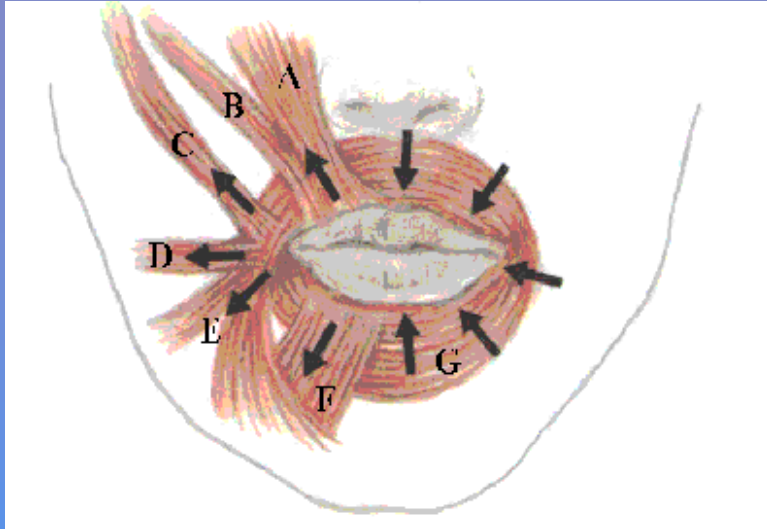


3 – 5 U per site

Stay 1 finger breadth above orbital rim

Needle goes in at 45 degrees, bevel up

Lower Face



Orbicularis oris:
generally avoid this area,
adynamic lip = inability
to pucker/ smiling
difficulty/speech
difficulty

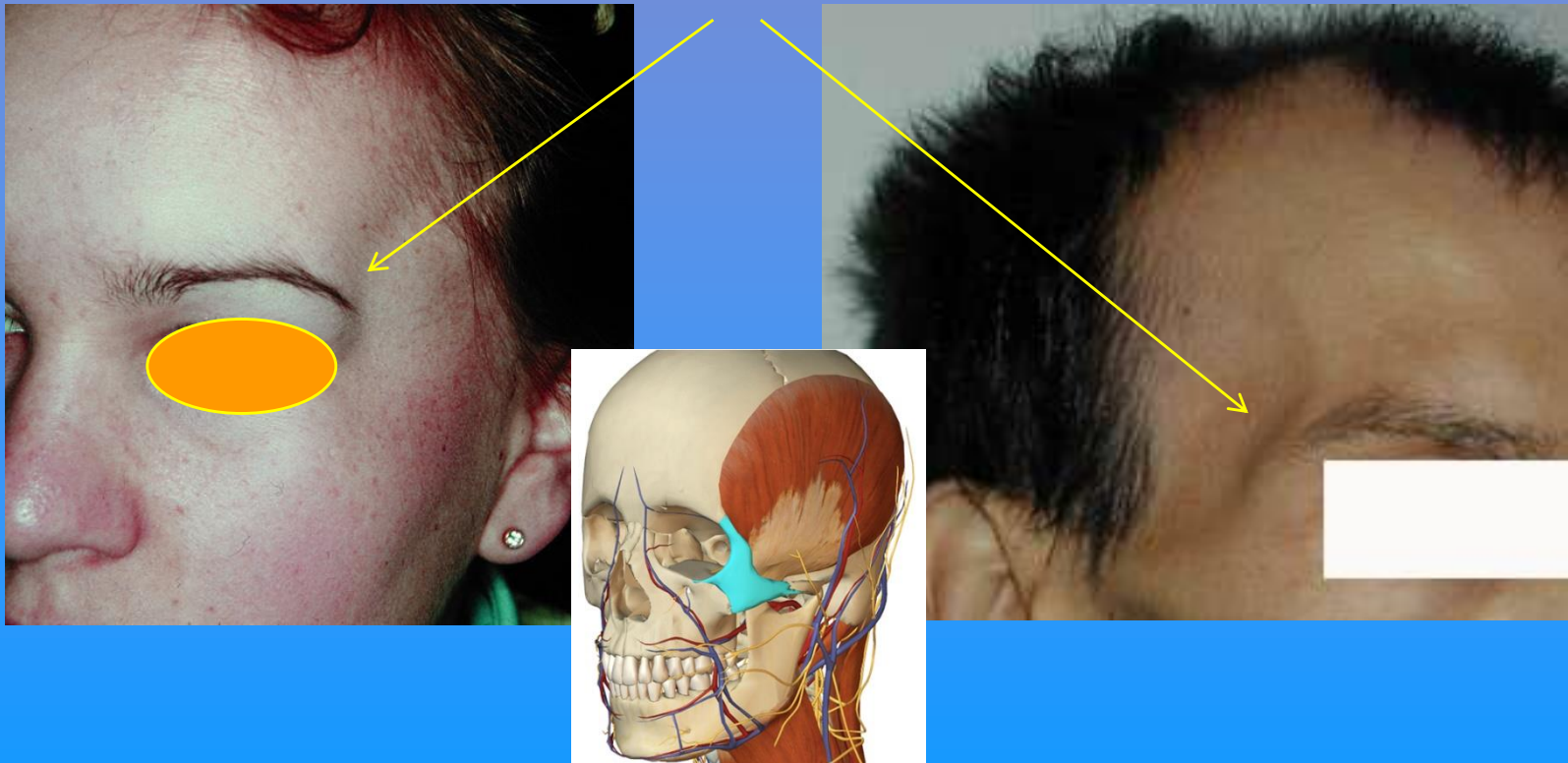


Common Complications or Sequelae



Common (Chronic Use) Complication: Temporalis Wasting

Muscle atrophy usually occurs after multiple rounds of injections and will generally reverse with cessation of treatment



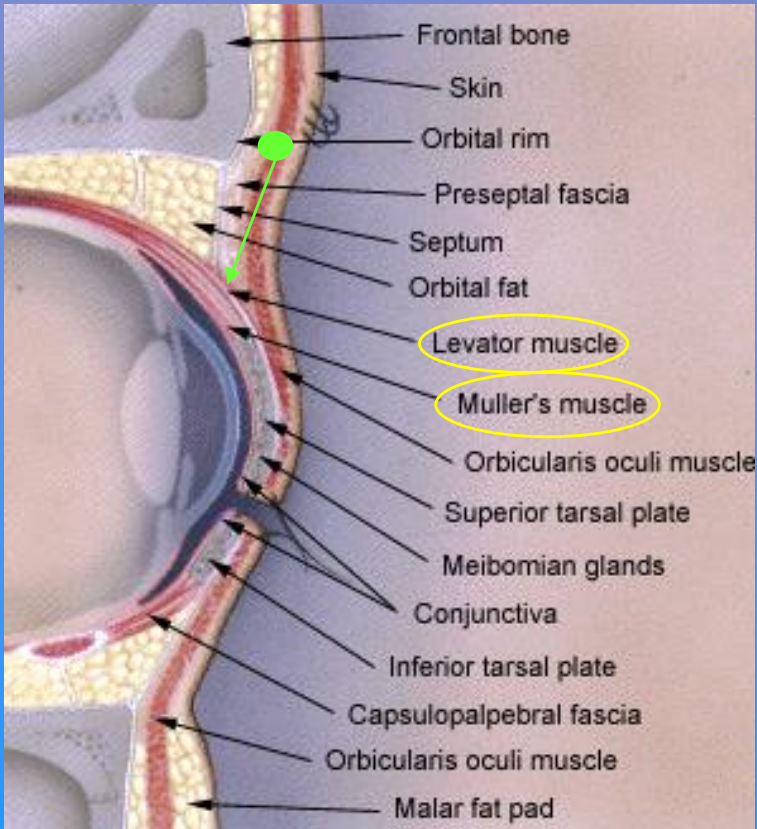
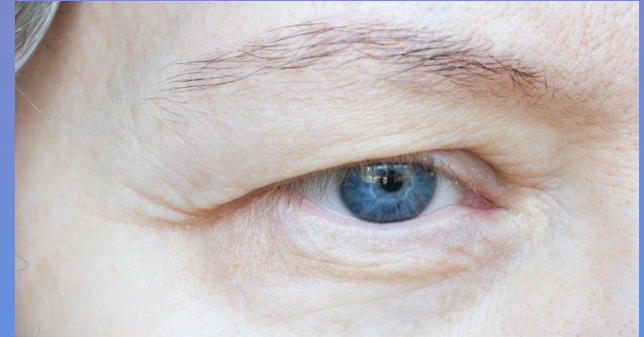
Common (Acute) Complication: Brow Droop

Disproportionate relaxation of frontalis with no relaxation of depressors



Eyelid Ptosis

Pseudo-ptosis



Ptosis



How To Fix Weak Eyelid

Apraclonidine (Iopidine) alpha adrenergic
receptor agonist 1 – 2 drops BID
strengthens Muller's muscle



“Spock Brow”

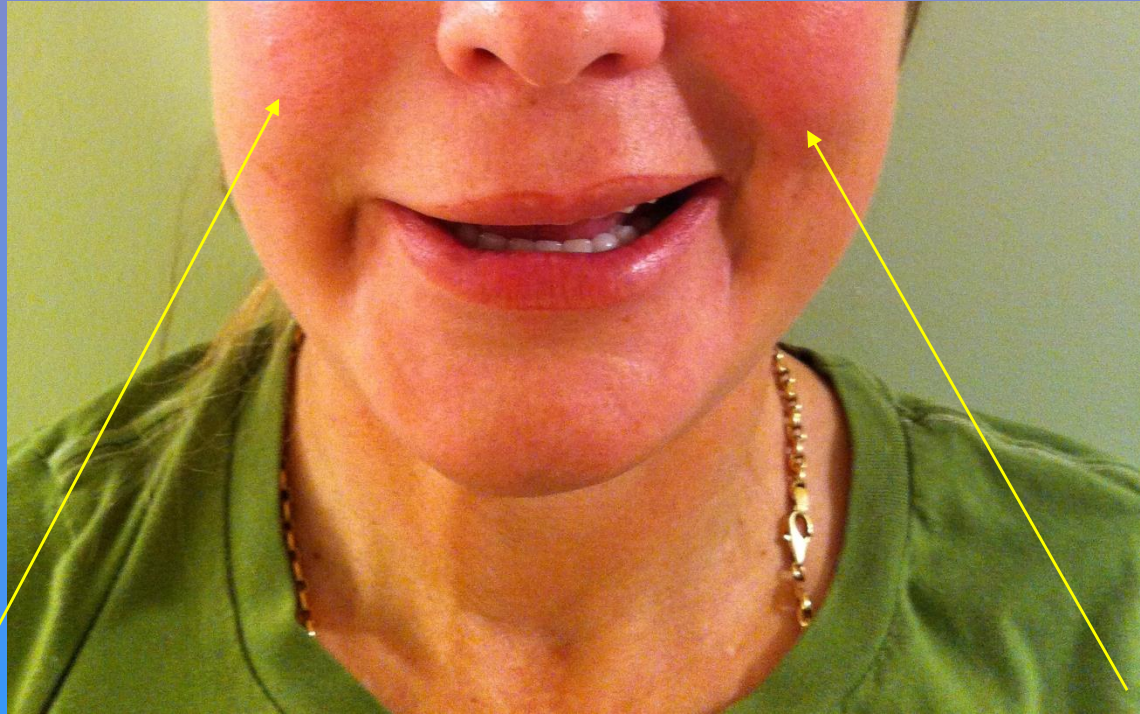
Frontalis only partially relaxed,
Outer edge still fully active
causing lateral brow to lift



To correct inject active
muscle fibres



Most Common Masseter Complication: Asymmetric Smile



Zygomaticus is weak on injected side giving the “I have had a stroke look”

Muscles on opposite side try to compensate

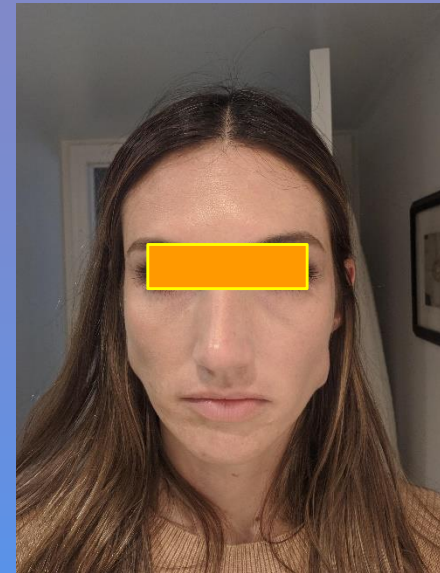
How To Fix It



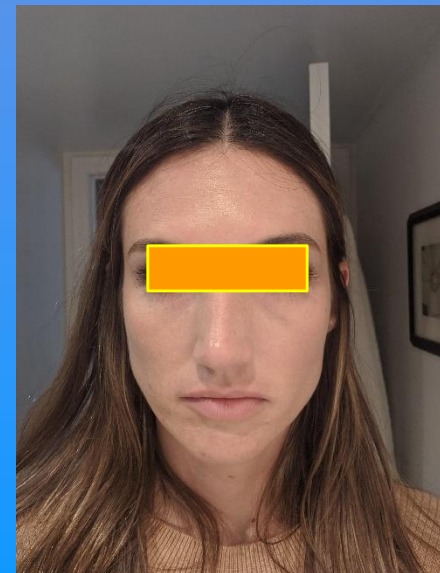
Inject here to balance the smile



Masseter injections: muscle spasm/over-compensation



Day 3



Day 4

When is it too much?

Pre-Botox



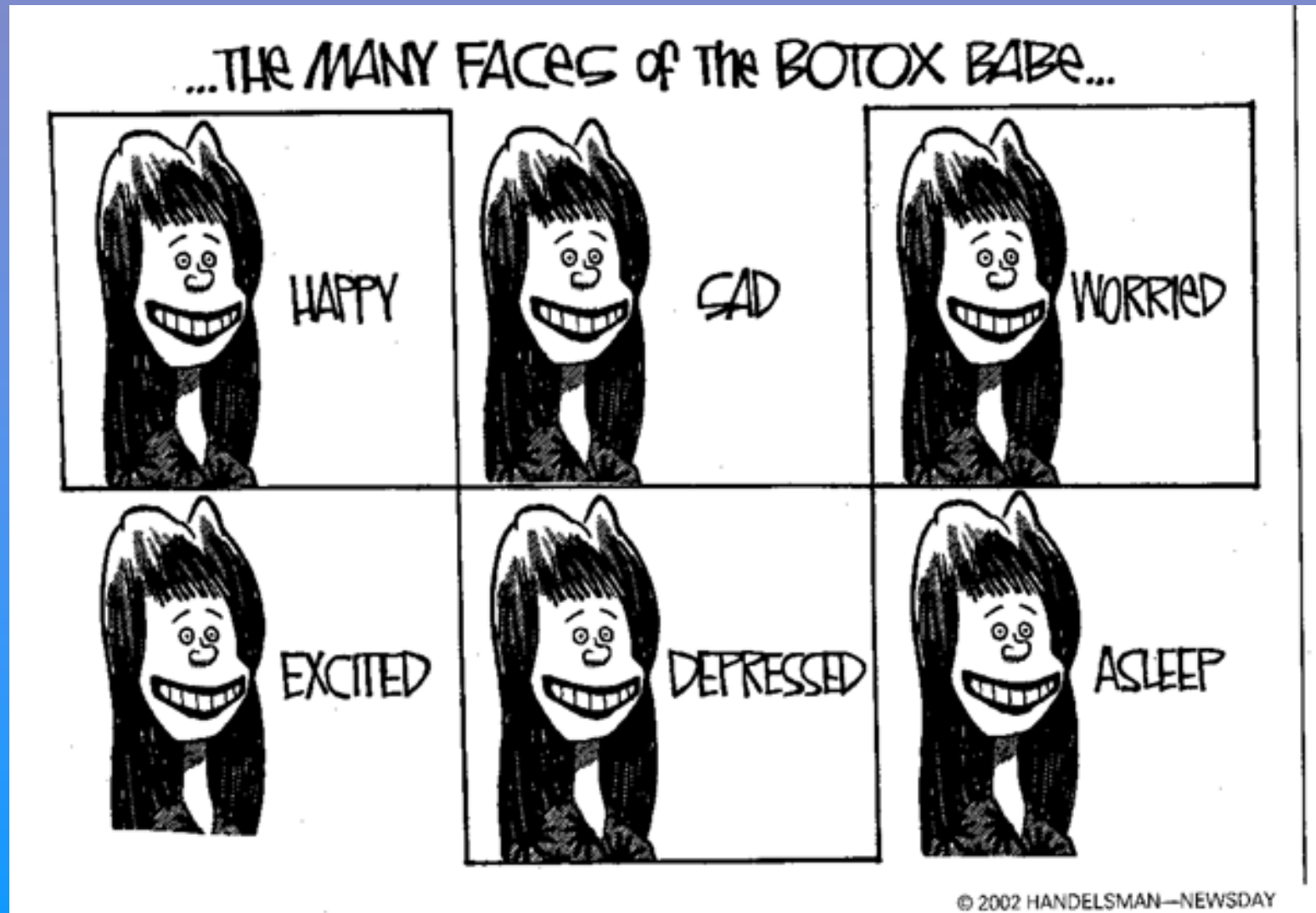
**Long-term, high-dose
Botox**



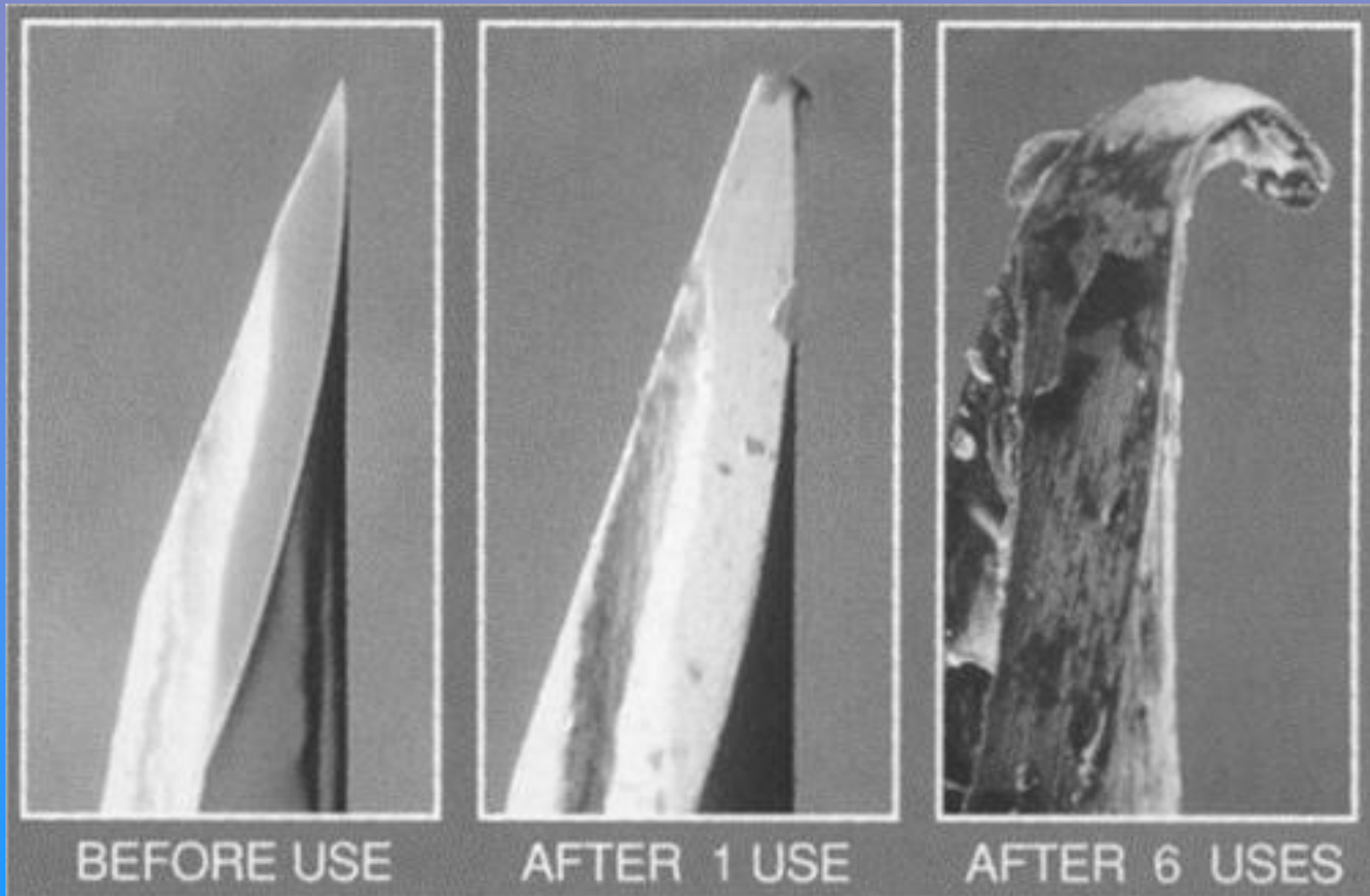
Clinical Pearls



Remember that injections in the muscles of facial expression have a much more profound effect than in the muscles of mastication



Change needles frequently



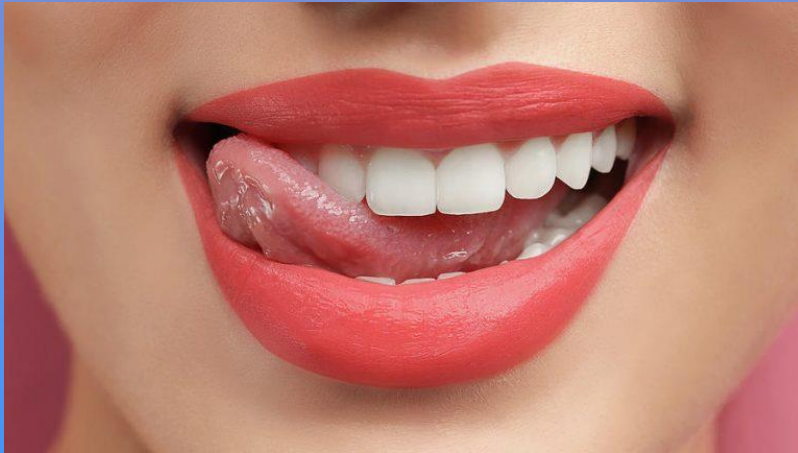
Gives a whole new meaning to ‘thick skinned’

Treatment is a two edged sword

All good things must come to an end
So do all complications!



Hyaluronic Acid Fillers for **LIPS**



Why Augment Lips?

- 1) Reverse Aging
- 2) Sex appeal
- 3) Social Pressure ('Jennerfication')



How Do Lips Change With Time?



20s

30s

40s

50s

Loss of collagen & elastin, thinning of peri-oral fat leads to lip flattening and increased surface wrinkling (remember Tyndall effect)

Contraindications

1) When active HSV is evident, treatment should be deferred, and a prophylactic agent (acyclovir, valaciclovir, or famciclovir) prescribed to prevent reactivation and spread of HSV because of injection trauma. When treating the perioral area and lips, prophylactic prescribing to patients with known history of HSV episodes should be considered to prevent virus reactivation.

- 2) Sores & skin/tissue infections
- 3) Active generalized infections
- 4) Collagen diseases
- 5) ?Anticoagulants



Why HA fillers?

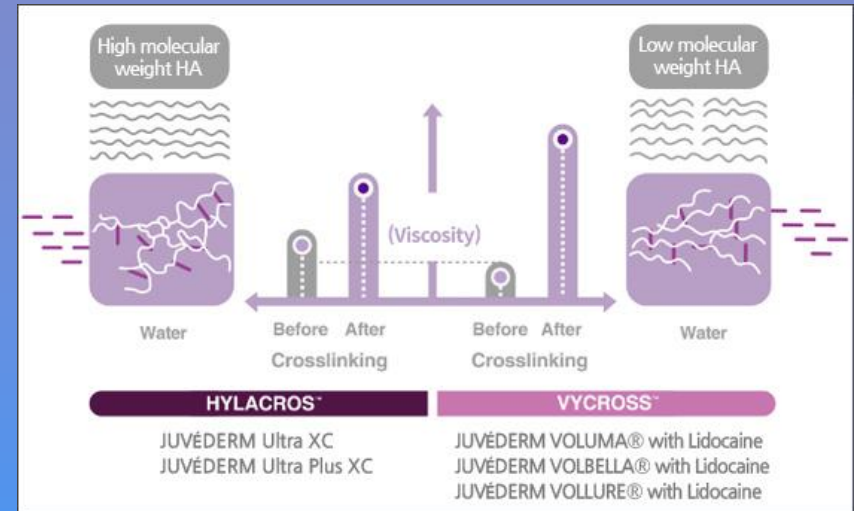
1) Ease of use:

- spectrum of viscosity
- tissue stability

2) Low immunogenicity

3) Reversible:

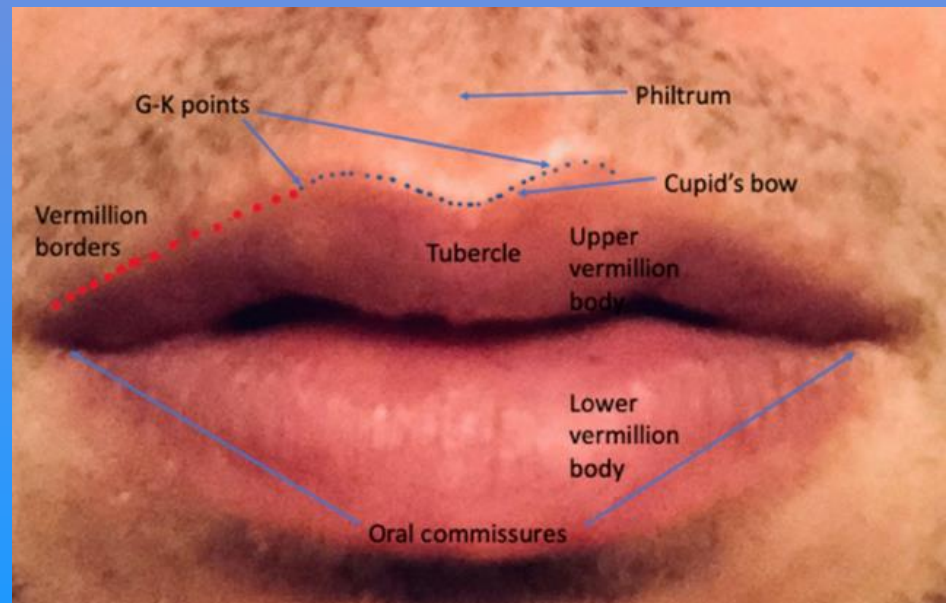
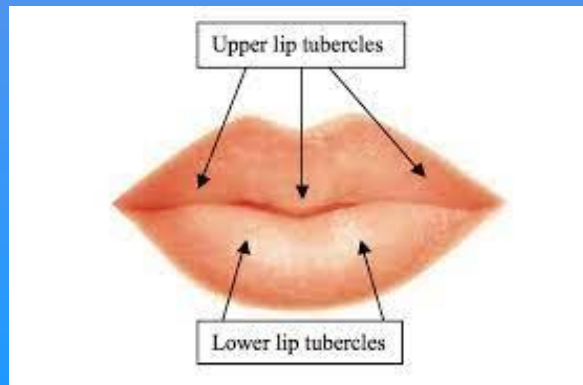
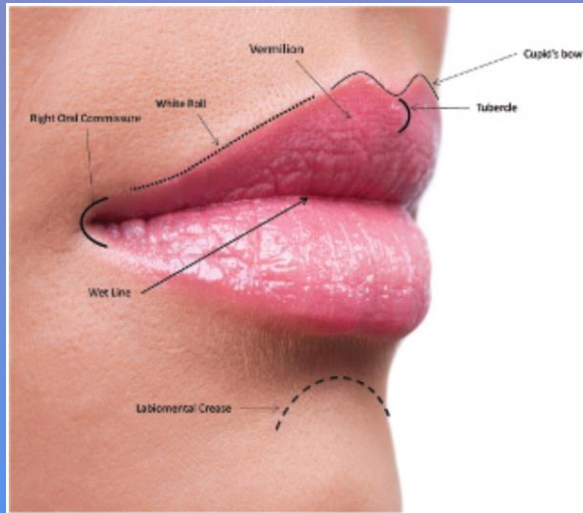
- hyaluronidase



Lip Anatomy

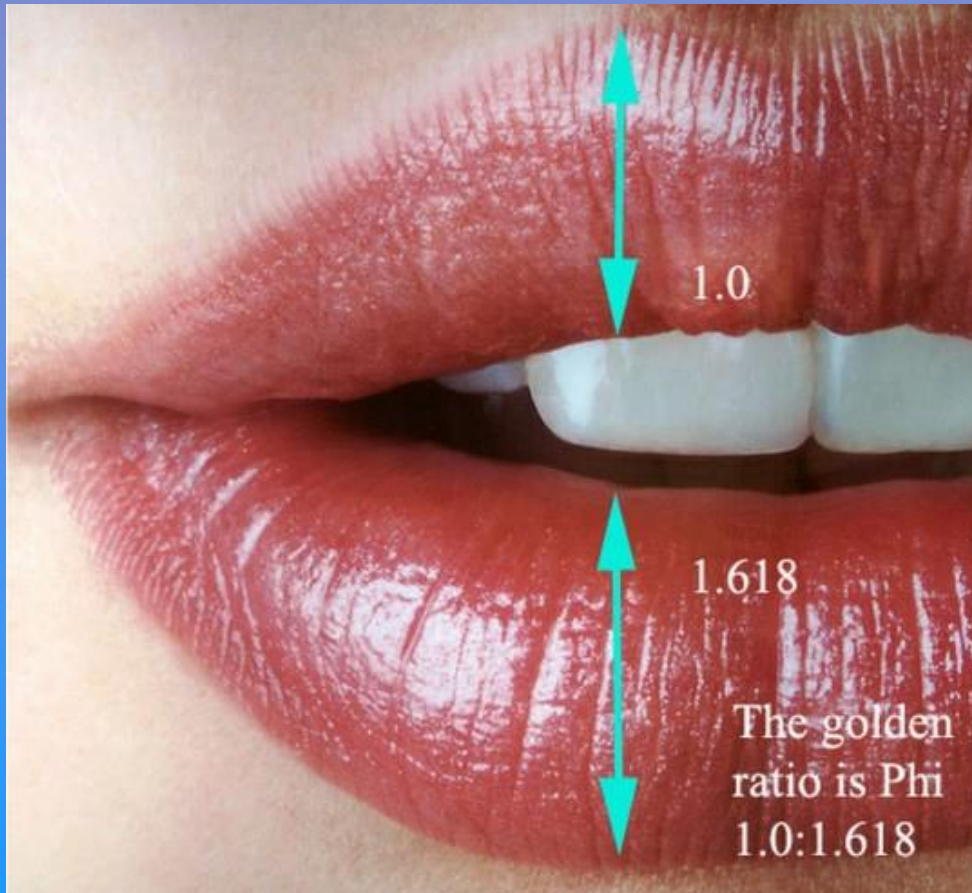


Lip Landmarks



Weinberg T, Solish M, Fayez I, Murray C. Surface anatomy of the lip for the dermatologist. *J Cutan Med Surg.* 2014 May-Jun;18(3):200-2. doi: 10.2310/7750.2013.13134. PMID: 24800709.

The Aesthetic Lip



The Golden Ratios

1.0:1.618

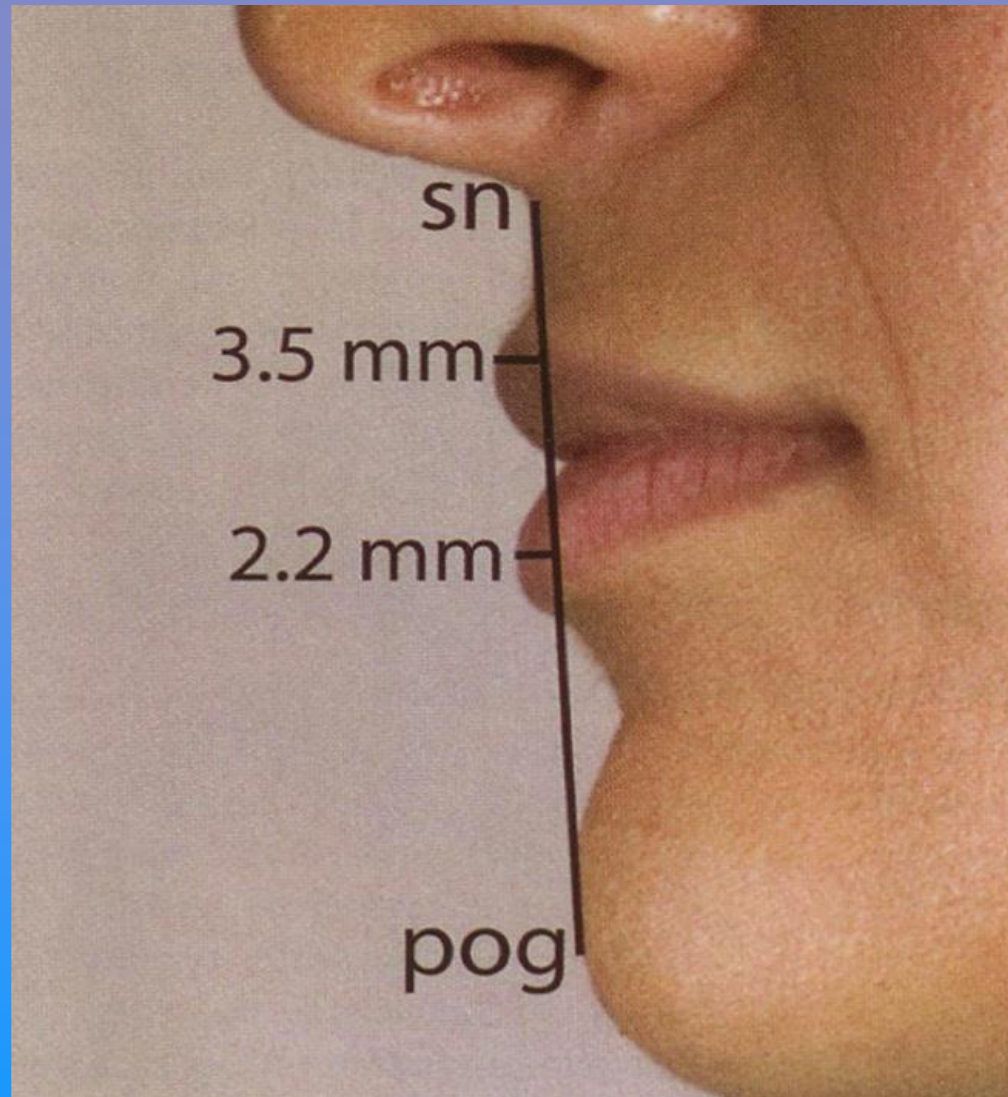
Beauty of a lip is

Enhanced by a slightly

Exaggerated Lower Lip

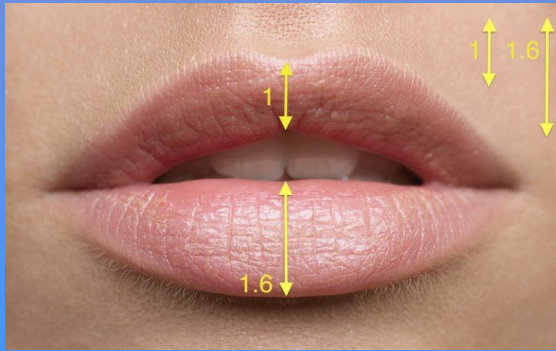
Lip Projection

Upper lip should project slightly more than lower



Take Home

- Upper lip should be smaller than lower lip
- Upper lip should project beyond lower
- Upper lip should roll up slightly upward



- Lower lip should be bigger than the upper
- Lower lip should not project as far
- Lower lip should roll down

Technique



"Nurse, get on the internet, go to SURGERY.COM, scroll down and click on the 'Are you totally lost?' icon."

Goals

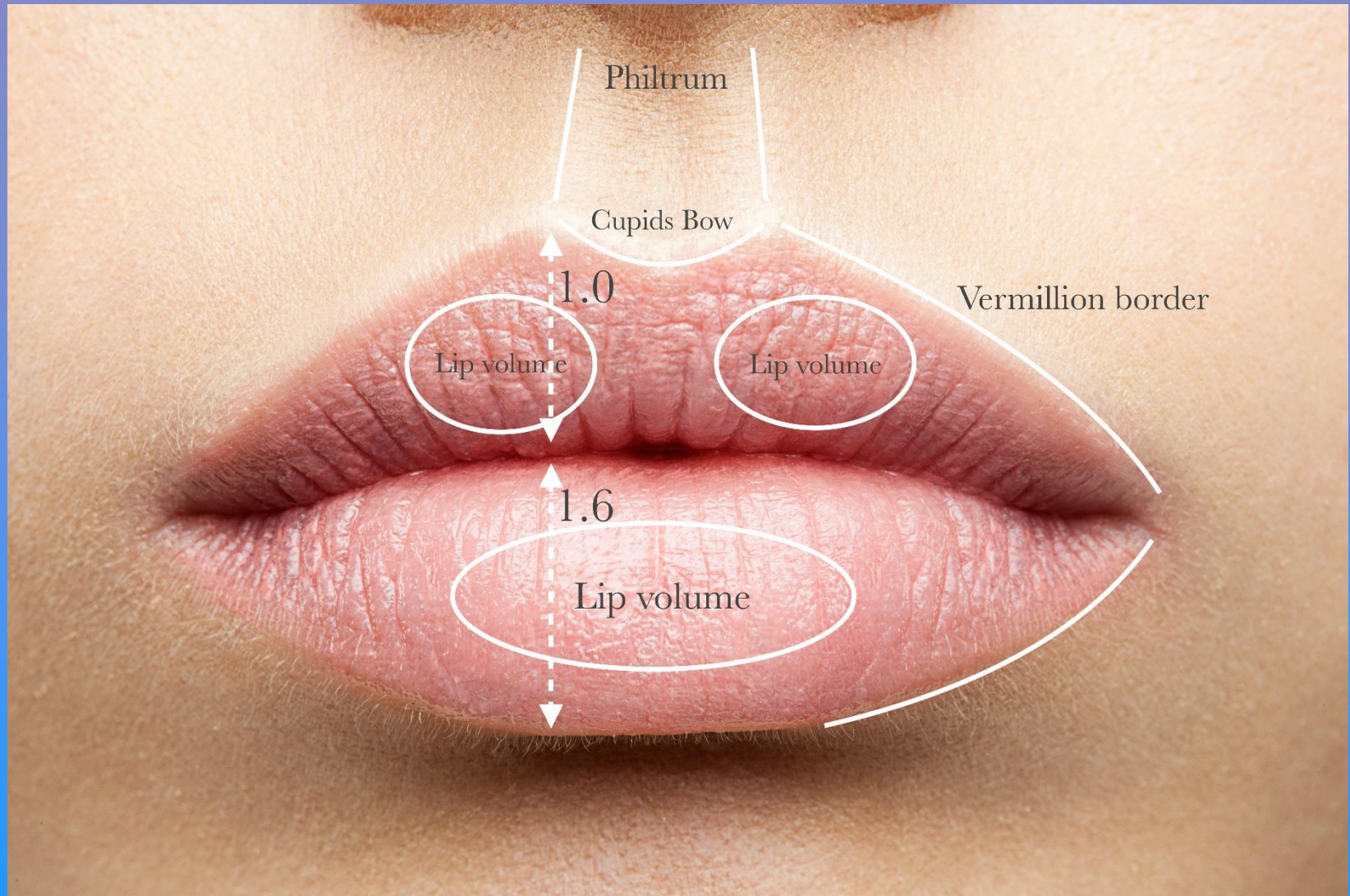
1) Well defined vermilion border

-provides definition to lips (frames the picture)

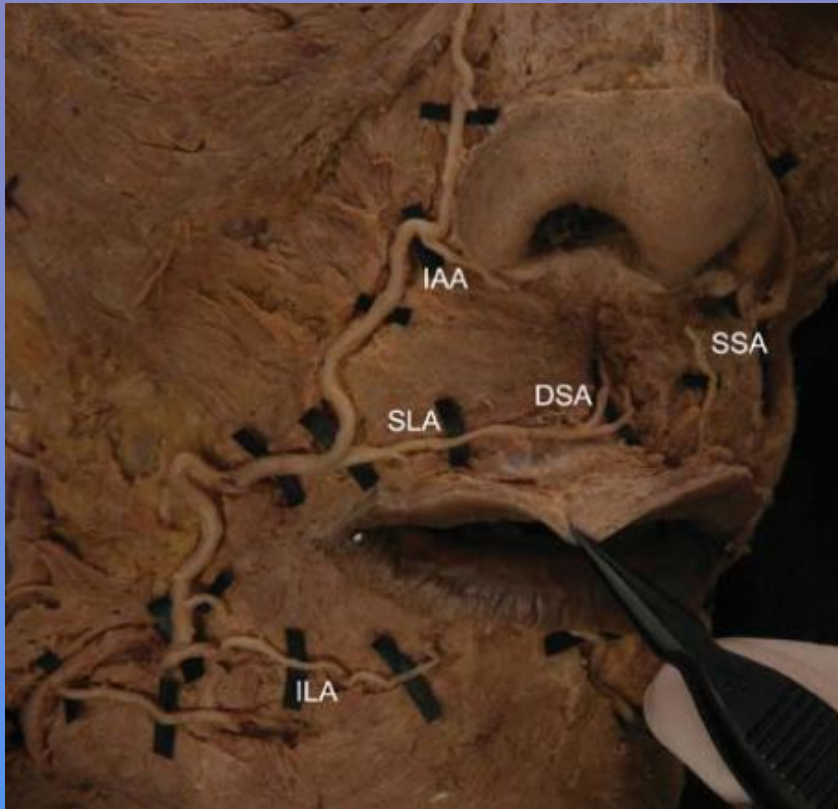
2) Volume enhancement

- improves contouring/shadowing which draws the eye

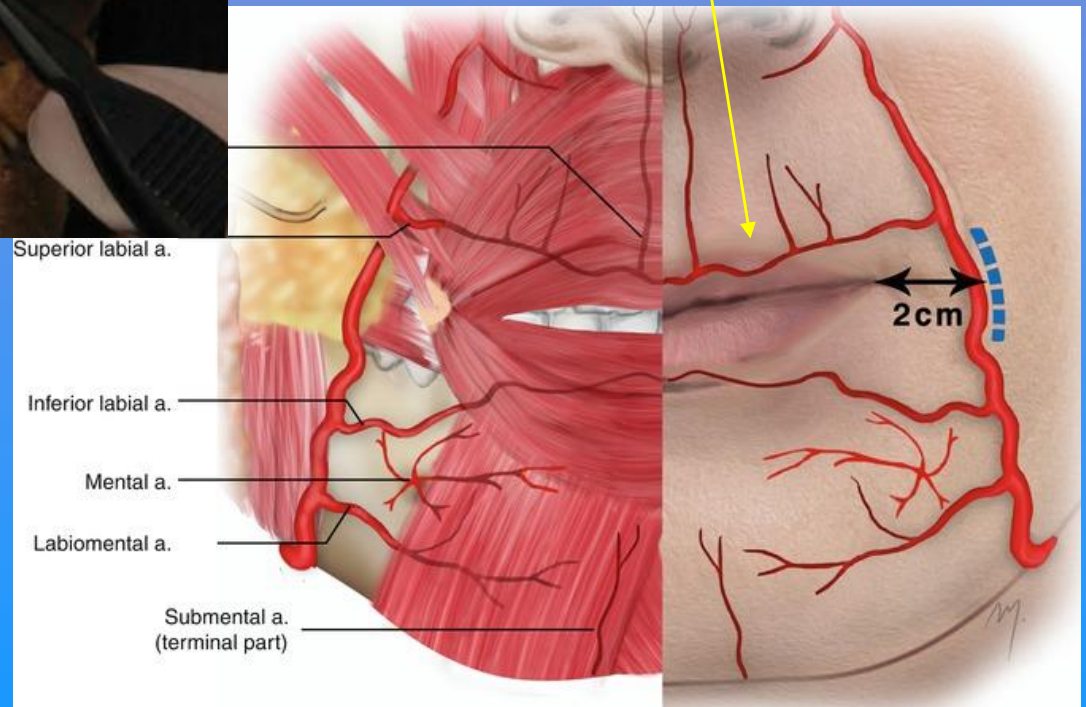
Placement of filler to achieve definition & volume



Vascular Supply to Lips



Superior labial artery dips as it gets close to the columella



Labial Arteries

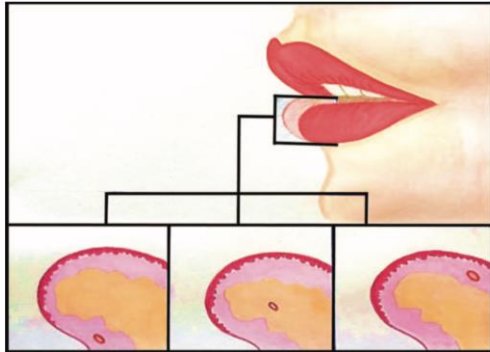
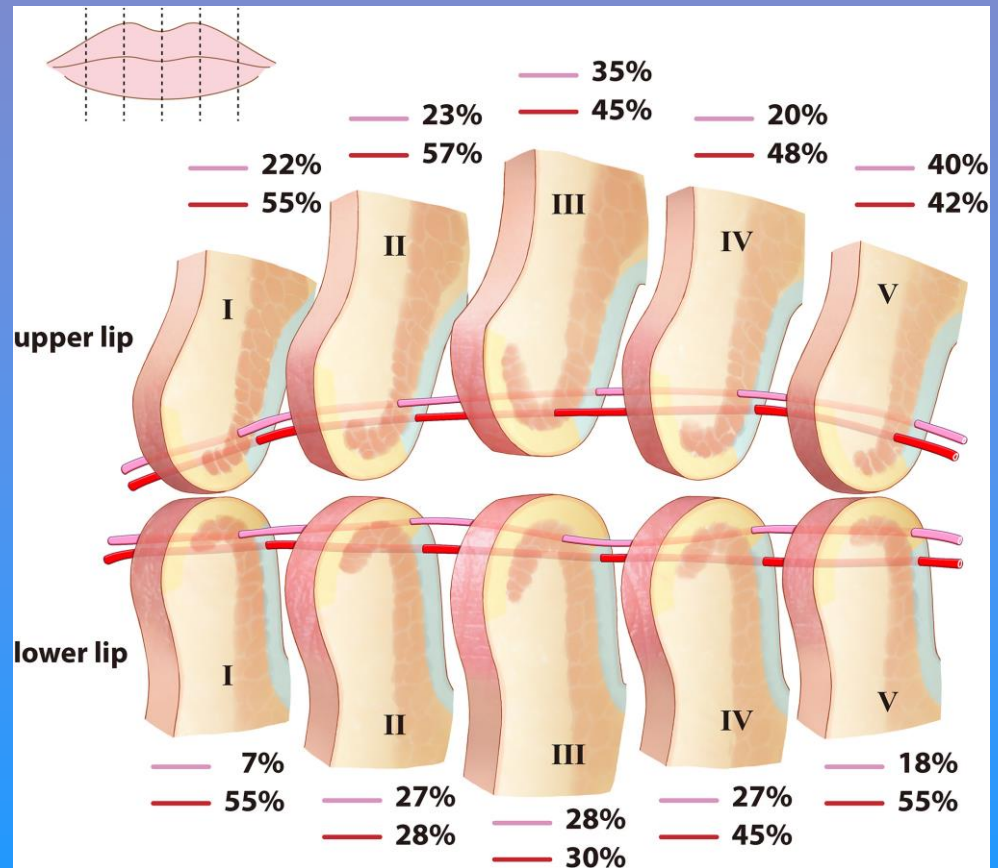
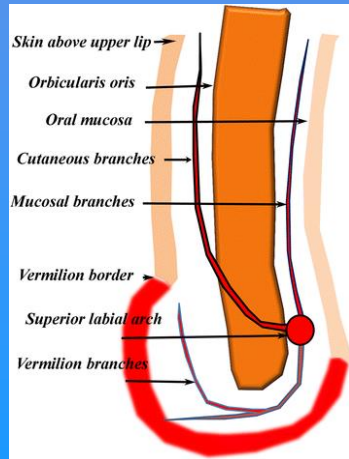


Fig. 2. Schematic drawings (exemplified for the lower lip) of the three identified positions of the superior and inferior labial arteries in the upper and lower lips: (right) submucosal (i.e., between the oral mucosa and the orbicularis oris muscle); (center) intramuscular (i.e., between the superficial and the deep layer of the orbicularis oris muscle); (left) subcutaneous (i.e., between the skin and the orbicularis oris muscle).

Cotofana S, et al. *Plast Reconstr Surg.* 2017. 139(5)_1075-1085. Distribution of superior & inferior labial arteries & impact on safe lip augmentation

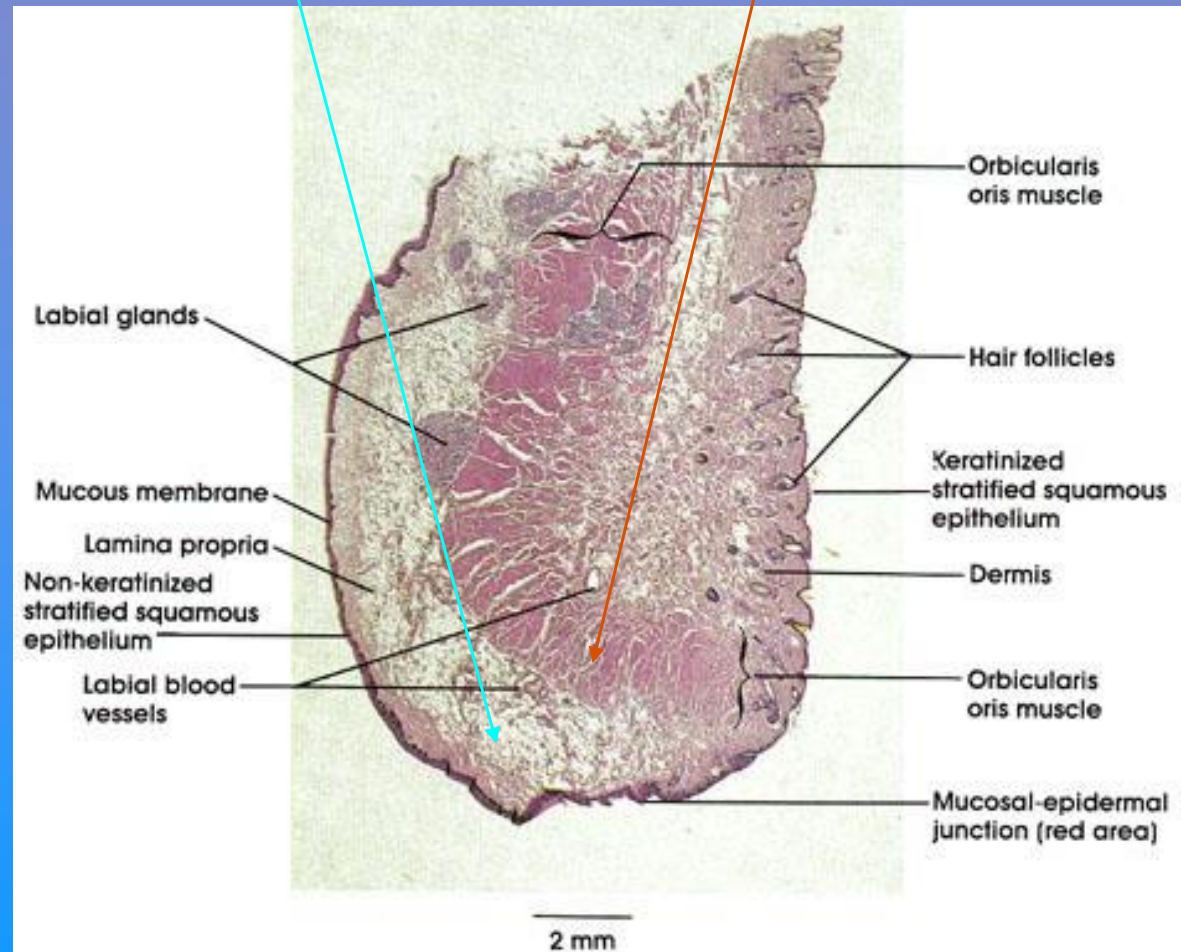


Lee, K.-L., Lee, H.-J., Youn, K.-H. and Kim, H.-J. (2020), Positional relationship of superior and inferior labial artery by ultrasonography image analysis for safe lip augmentation procedures. *Clin. Anat.*, 33: 158-164. <https://doi.org/10.1002/ca.23379>

Tansatit, T., Apinuntrum, P. & Phetudom, T. A Typical Pattern of the Labial Arteries with Implication for Lip Augmentation with Injectable Fillers. *Aesth Plast Surg* 38, 1083–1089 (2014). <https://doi.org/10.1007/s00266-014-1083-1089>

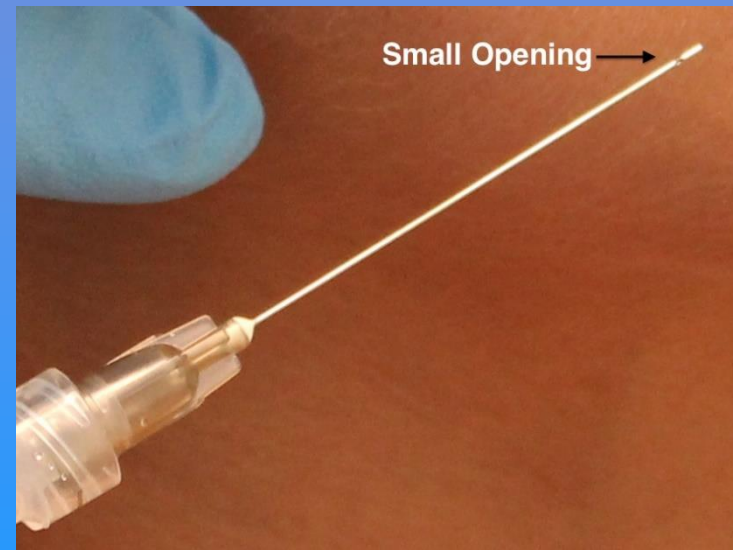
For “BIG LIPS” use higher viscosity products and inject deeper
(Voluma, Juvederm Ultra Plus)

Lower viscosity products can go more superficial
without clumping (Volbella, Juvederm Ultra)

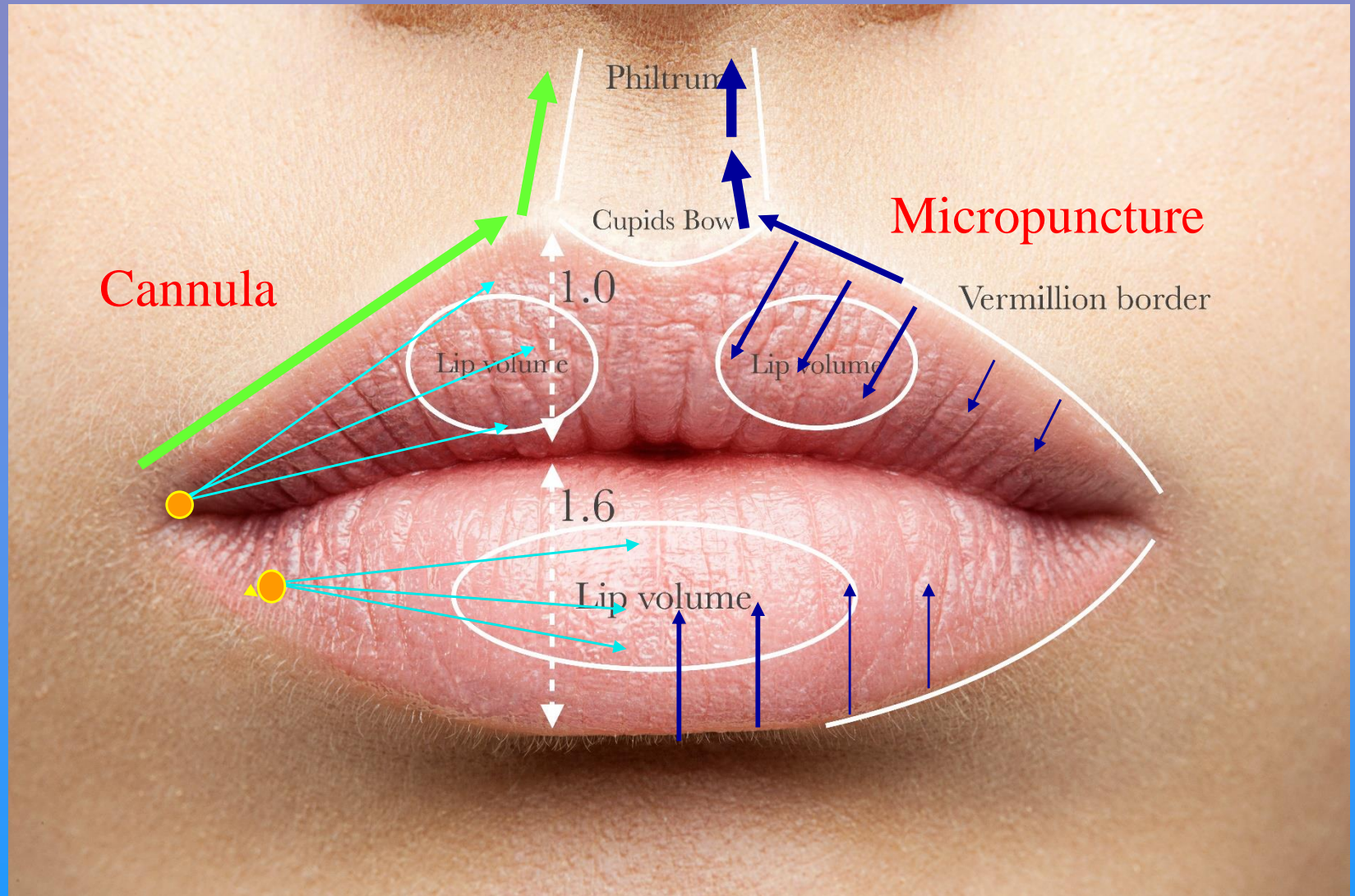


Lips: Needle or Cannula?

Short needles mean more punctures (possibly more bruising) but allow for more precise placement, a cannula is much more efficient



Placement of filler to achieve definition & volume

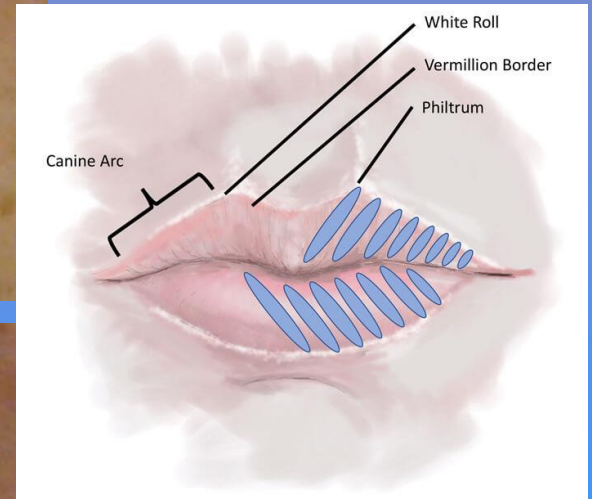


Lips are works in progress – adjust volume and placement as you go!

Before



During



<https://www.thepmfjournal.com/education/how-i-do-it/post/how-i-do-it-lip-augmentation-lip-tenting-technique>

Eijk - Tenting

Use gel and massage to smooth contours



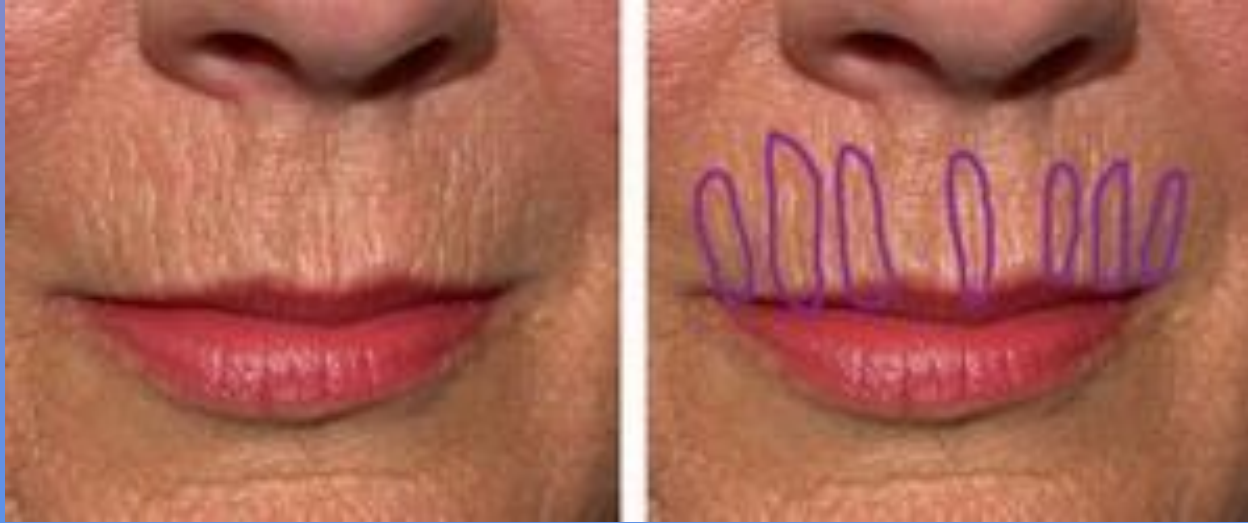
Lip Augmentation vs Lip Creation

“beauty is in the eye of the beholder”

Caution!



Smoker's Lines

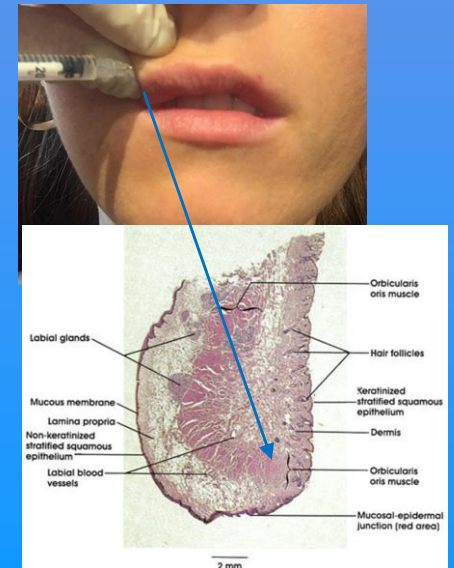


Try a little volume first, then inject the crease intra-dermally if necessary – beware the ‘Homer Simpson’ look!



What about Lip Flips?

- Does not add volume, can accentuate vermilion border (tilts it up)
- Can negatively effect lip dynamics
- SC 3-5U(total!) spread over 3 – 5 locations



Complications

Minor local complications are most common: **bleeding**

bruising

viral reactivation (cold sores)

bacterial infection

hypersensitivity reaction



Delayed hypersensitivity reaction:



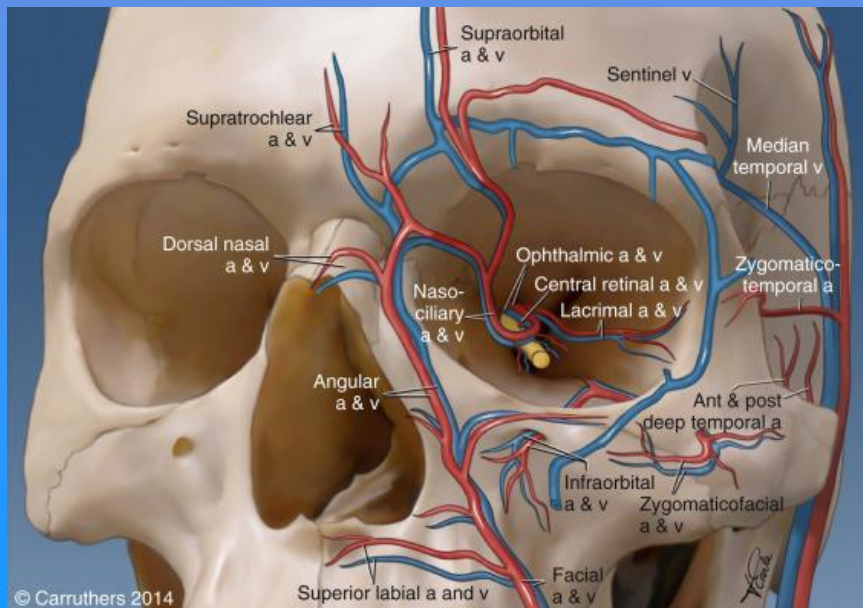
- uncommon but being seen more often
- can occur 1 week to years after injection
- pt may develop nodules
- no specific treatment (usually steroid +/- antibiotic)
- most common in patients with allergies
- use hygienic technique (biofilm implicated)
- smooth filler (no blobs)

Biggest problem novice injectors have is creating 'lumpy lips'



Major complications are rare but include: anaphylaxis/death stroke blindness skin necrosis

photograph: Dr. R. Sengelmann, Dr. J. Petersen; eMedicine, Dermal Fillers

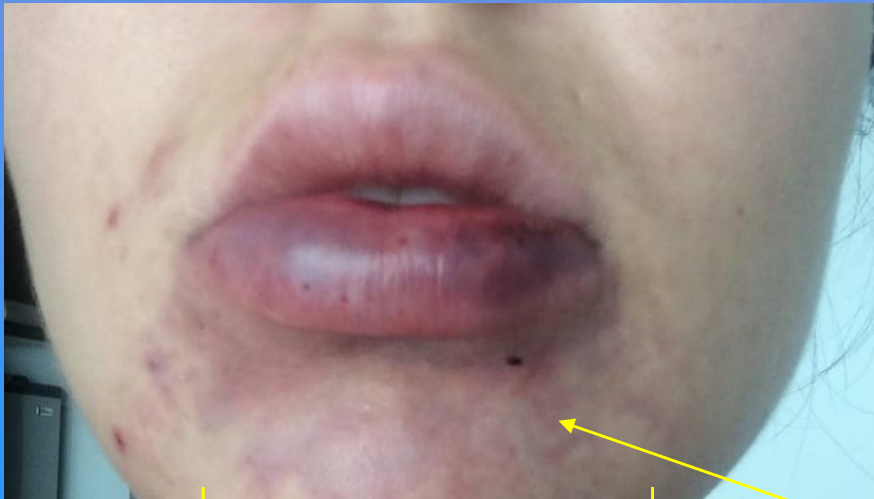
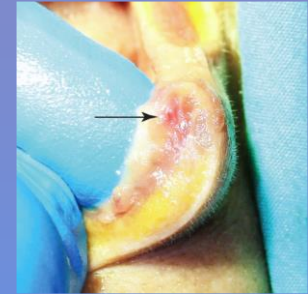


Vascular Occlusion

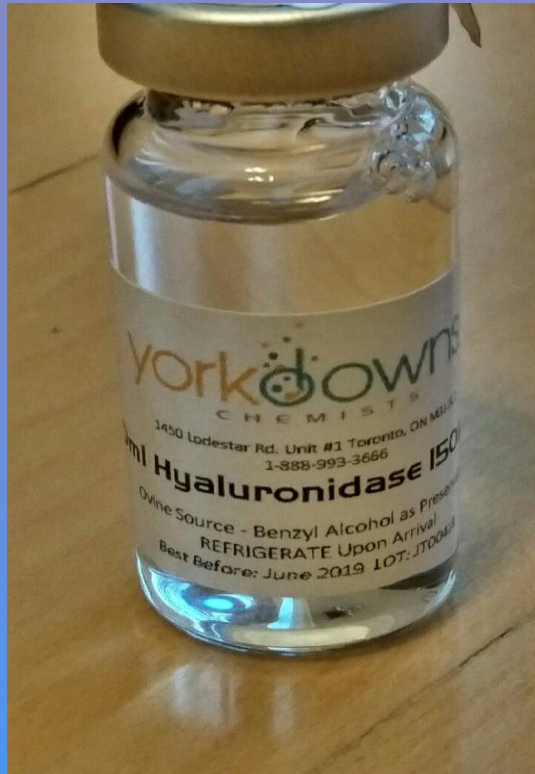
Labial artery



Area of vascular occlusion
Starts white turns blue/black in
1-12 hrs and hurts +++



Vascular territory compromised – reticular livedo



Hyaluronidase 150u/1ml 10ml



- Cost \$35 (tax & delivery included)
- Expires in 2 – 3 months
- Must be kept cold
- Available from most compounding pharmacies

Hyaluronidase

For emergency (vascular occlusion) 75 - 100 units injected into area of filler (multiple injection sites) then massage. Reassess and reinject in 1 hour.

For lumps (elective) 5 – 30 units around and into lump then massage. Hyaluronidase is a protein and can cause a reaction – skin test 5 units under skin of forearm. If there is a wheal & flare don't use it.



Black Triangles



A drop of HA filler is injected into the papilla 2 mm from tip



After 3 months papilla shows increased volume –believed to be due to collagen induction



Take Home Points

- Take pictures before and after
- Start small
- Watch for scars and lumps
- Use a 'thin' filler
- Use a micropuncture technique
- Inject superficially (~3mm)
- Inject slowly & smoothly
- Don't make promises you can't keep
- HAVE FUN!



That's all Folks!