

# FILLERS IN DENTISTRY

## Comprehensive Hands – On Course Adapted For Dentists

IN COMPLIANCE WITH RCDSO TRAINING REQUIREMENTS

***Created and Presented by  
Sky Naslenas***

# **Course Introduction**

## **Fillers Module**

# About the Speaker:

## *Dr. Sky Naslenas*

- Orthodontic certification in 2005 from the University of Toronto
- Masters Degree in 2005 (Hospital for Sick Kids Craniofacial Department)
- A presenter and invited speaker at several of the industry's top events: the Canadian Association of Orthodontists, the American Association of Orthodontists, and the American Cleft Lip and Palate Association
- Associate Staff at the Hospital for Sick Children
- Creator of Botox and Filler Training Centre for Dentists
- Owner of Orthodontic Studio @ Royal York and @Roncy



Royal College of  
Dental Surgeons of Ontario

*Ensuring Continued Trust*



## **COUNCIL MEETING – DENTISTS USE OF BOTOX AND DERMAL FILLERS**

Council approved the use of botulinum toxin and dermal fillers by dentists within the scope of practice of dentistry provided the injection of botulinum toxin or dermal fillers is **given intra-orally for a therapeutic or cosmetic purpose** or the injection of botulinum toxin is given **extra-orally for a therapeutic purpose**. All other use of botulinum toxin and dermal fillers are considered not within the scope of practice of dentistry in Ontario.

**MAY 9, 2013**



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**“dermal fillers is given intra-orally for a therapeutic or cosmetic purpose”\***

**\*NB: the “intra oral” boundary is defined as the vermilion border of the lips**

# Course Overview

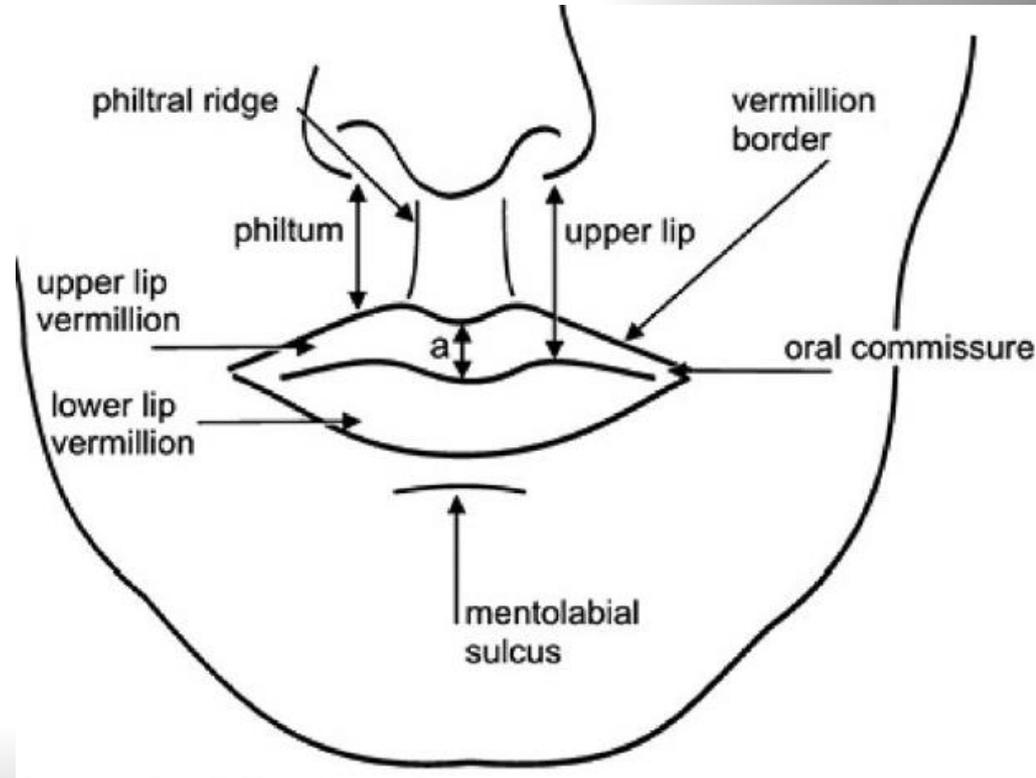
- Defining the “Perfect” Lip – aesthetic landmarks
- Patient selection and evaluation
- Pharmacology, Physiology and Mechanisms of Action of Fillers
- Pertinent Anatomy
- Injection Techniques
- Pre and post treatment considerations
  - Managing adverse reactions
- “Before and After” Gallery
- Additional Applications of Fillers
- Final steps to certification – Hands on Component

# **(Re)Establishing a Perfect Lip**

Definitions and Landmarks of the Lips

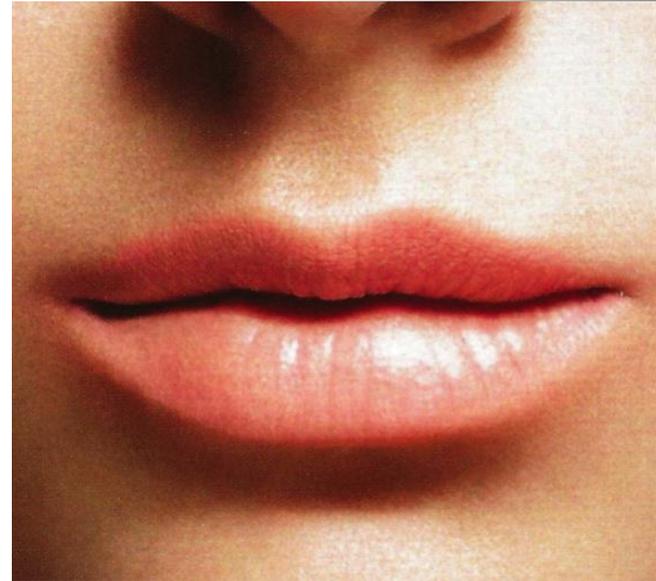
# Landmarks of Surface Lip Anatomy

- The upper lip: from the base of the nose superiorly to the nasolabial folds laterally and to the free edge of the vermilion border inferiorly.
- The lower lip: from the superior free vermilion edge superiorly, to the commissures laterally, and to the mandible inferiorly.



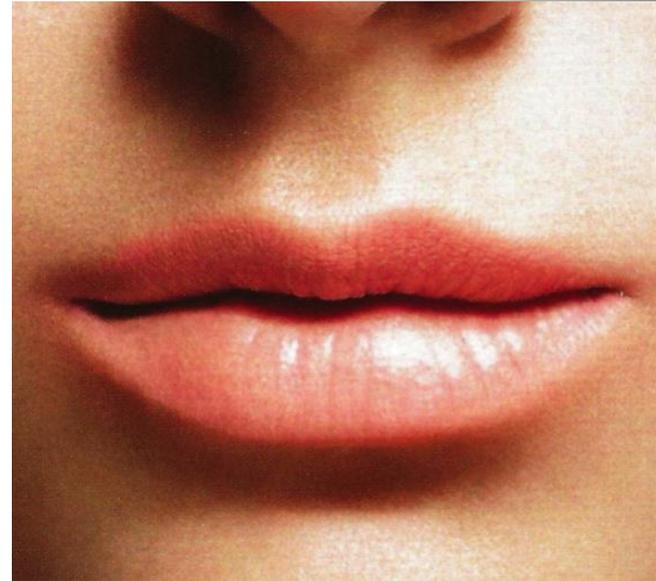
# Landmarks of Surface Lip Anatomy

- Around the circumferential **vermilion**/skin border, a fine line of pale skin accentuates the color difference between the vermilion and normal skin (aka the “**white roll**”).



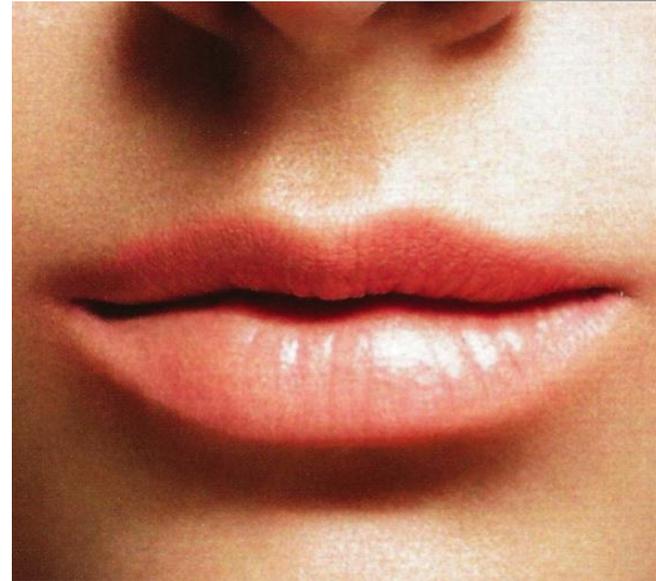
# Landmarks of Surface Lip Anatomy

- Along the upper vermilion/skin border, two paramedian elevations of the vermilion with a depression in the middle form the ***Cupid's bow***.



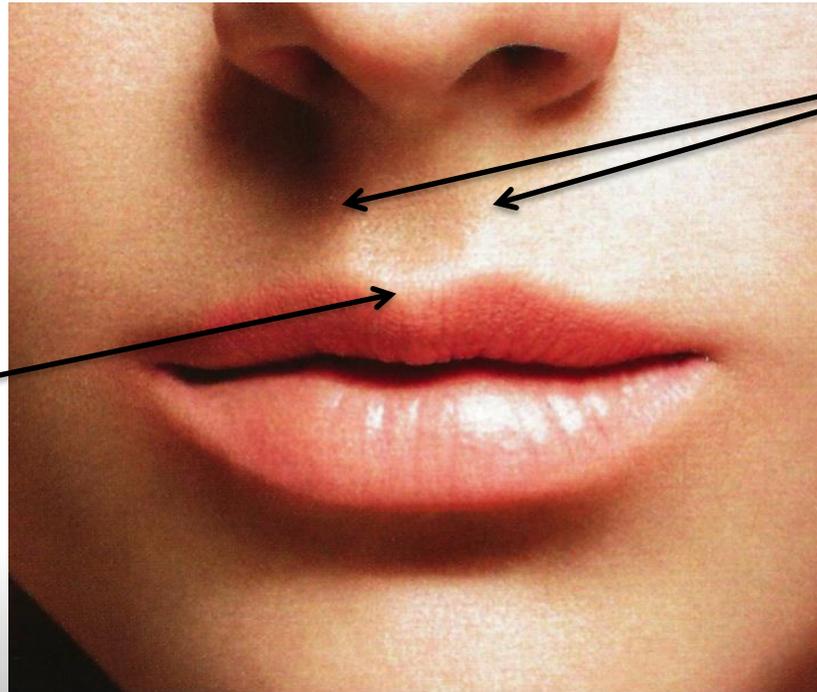
# Landmarks of Surface Lip Anatomy

- Two raised vertical columns of tissue form a midline depression called the ***Philtrum or Philtral Columns***



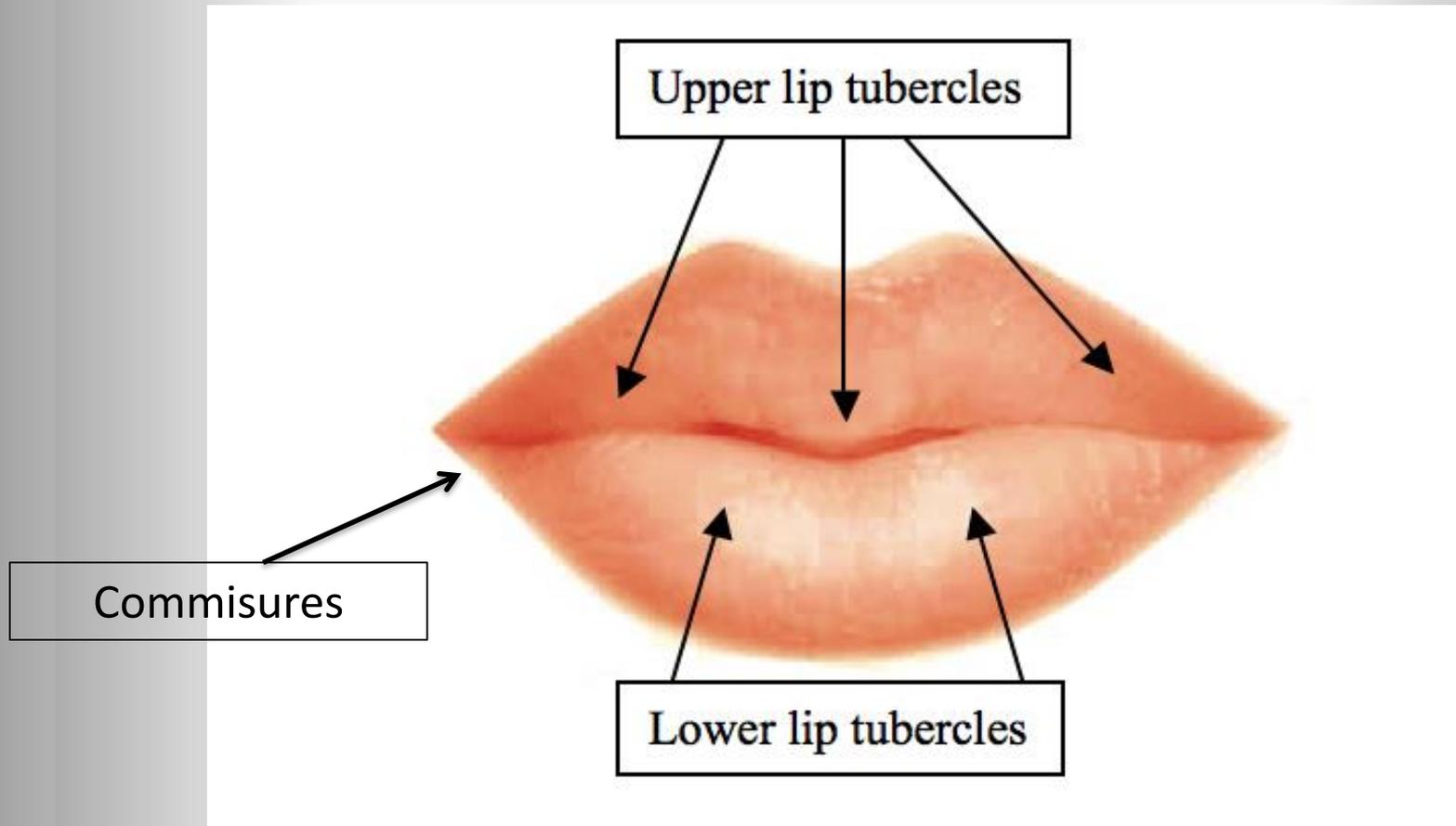
# Landmarks of Surface Lip Anatomy

Cupid's bow –  
Depression  
between the  
base of the  
Philtral  
Columns



Philtral columns –  
Vertical lines  
extending to the  
base of the nose;  
**NOT** parallel, slightly  
convergent

# Landmarks of Surface Lip Anatomy



*J Drugs Dermatol.*  
2012;11(9):1081-1088.

# What to treat?

- A deflating vermilion (the red part) is the most common complaint
- The second most common concern is the drooping angles of the mouth
- These two together complete the picture of a sorry face.

# What to treat?

- Lips that have good volume can be highlighted by defining them and injecting into the white margins (the vermilion border)
- Pouts can be created by injecting the filler below the muscle
- For genetically thin lips, structural augmentation with a deeper-placed filler followed by volume correction with a superficial filler is ideal.
- For pure cosmetic enhancement of lips, a superficially placed filler with emphasis on the white roll and expansion of the vermilion is ideal.

# **Aesthetic Assessment of Lips**

# Guidelines to the “PERFECT” LIP

- To be used as a template
- Not “one fits all” recipe

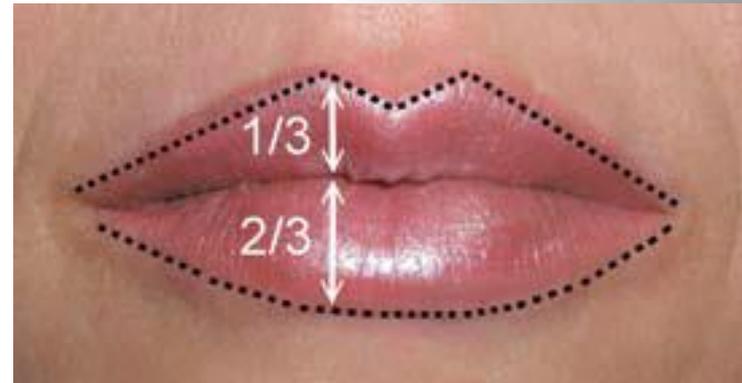
# Aesthetic assessment - YOUTH

- Frontal plane assessment:
  - Facial thirds



# Aesthetic assessment - YOUTH

- Frontal plane assessment:
  - the ideal vertical height ratio of the upper lip to the lower lip is 1:1.6



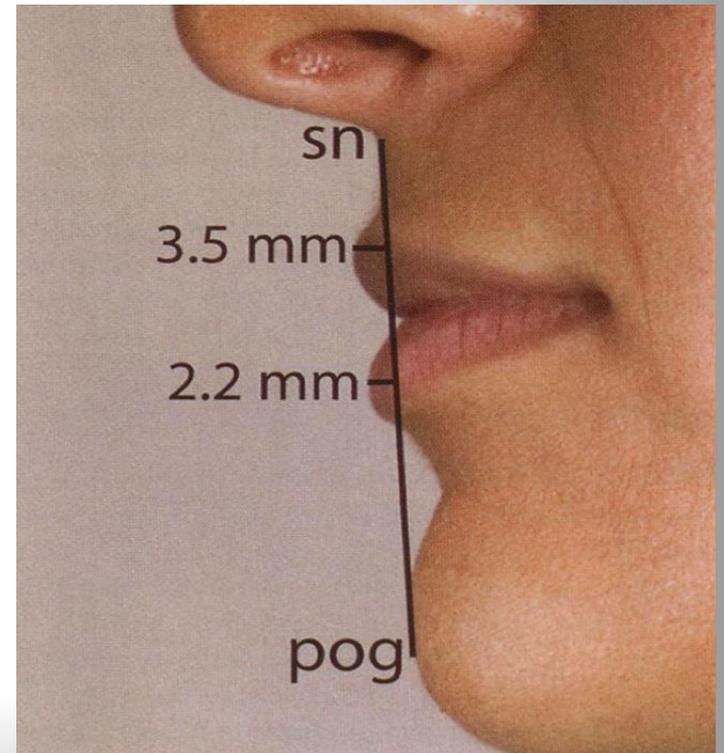
# Aesthetic assessment - YOUTH

- Frontal plane assessment:
  - Inverted ratio of the upper lip to the lower lip



# Aesthetic assessment - YOUTH

- Lateral plane assessment:
  - the ideal vertical height ratio of the upper lip to the lower lip is 1:1.6



*J Drugs Dermatol.*  
2012;11(9):1081-1088.

# Aesthetic assessment - YOUTH

- Lateral plane assessment:
- Exaggeration of the correct AP proportions may lead to “duck-like” appearance



# Aesthetic assessment - AGING

- lengthening of the cutaneous portion of the upper lip and volume loss and thinning of the upper lip vermilion

\*\* If upper lip is too long, upper lip shortening procedure may be required



# Factors that accelerate AGING

- Genetics
- Intrinsic aging
- Sun exposure
- Smoking
- Repetative pursing of the orbicularis oris



Angular, radial, and vertical rhytides

# Factors that contribute to AGING

- Gravity
- Osteoporosis
- Dental changes
- Maxillomandibular bony resorption
- Soft tissue volume loss at the oral commissures



Downward Commissures cause a  
“perpetual frown”

*J Drugs Dermatol.*  
2012;11(9):1081-1088.

# AGING of Lips and Lower Face

- Formation of jowls and vertical geniomandibular
- The lip margin may become blunted
- Flattening of the philtrum columns



“Marionette” lines extend downward from the oral commissures to the mandible

# AGING of Lips and Lower Face

- Loss of projection of the Cupid's bow
- pallor of the vermilion
- loss of sharp vermilion-cutaneous junction demarcation.



Upper lip margin flattens, loss of philtral columns and loss of projection of cupid's bow

# AGING of Lips in Men and Women

- Men generally do not develop rhytides of the upper and lower lips:
  - men have thicker skin
  - more subcutaneous fat surrounding terminal hair follicles (as opposed to the fine vellus hairs in women)

# AGING of Lips in Men and Women

- Female lips are, on average, a little fuller than male lips.
- Female lips are not noticeably bigger when you see them from the front but they do bulge forward more as seen from the side. In other words, they are slightly more “pouty.”
- Beware of Overvolumization of the male lip can result in feminization of the area.

# AGING of Lips in difference Racial Groups

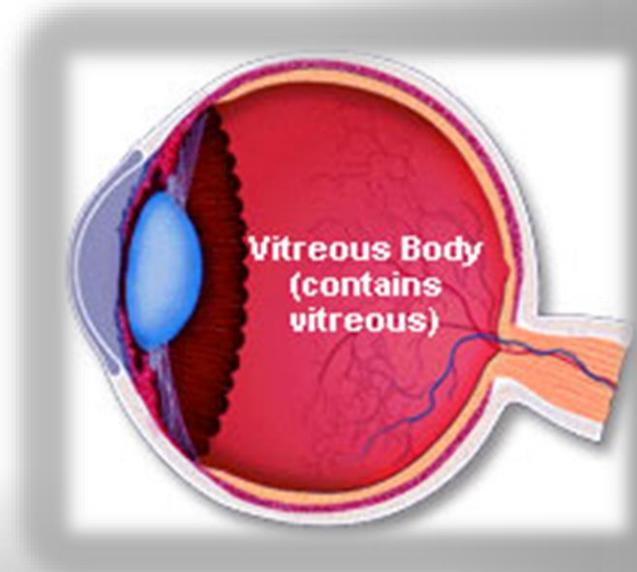
- Certain ethnic groups, such as Blacks, genetically have greater volume in their lips:
  - increased melanin in their skin is protective throughout their lives
  - their skin is less prone to solar elastosis
  - radial rhytides do not develop
  - vermilion tends to retain its volume throughout their lives

# **Pharmacology and Physiology of Fillers**

# What is HA?

- HA was discovered in 1934 from cow's eye (vitreous humor\*) by Karl Meyer and John Plamer.

\*It is a clear **gel-like substance that occupies the space behind the lens and in front of the retina at the back of the eye. Because the eye must process visual data, this liquid must be clear enough for light to easily pass through it.**



# What is HA?

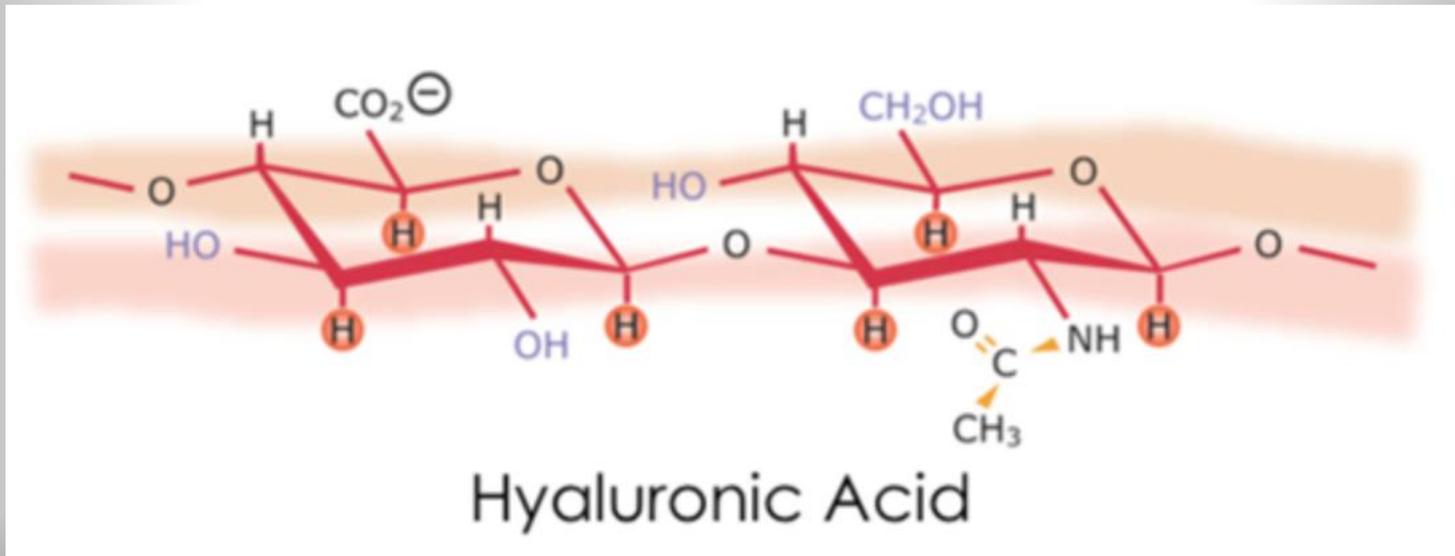
- It was first used in 1942 by Endre Balazs as a substitute for egg white in bakery products
- It has been given this name as “hyalos” means “glassy” and “uronic” because it is rich in glucuronic acid.
- Hyaluronic acid is present in the synovial fluid (joint) and is the main molecule of the extracellular matrix of the skin.

# What is HA?

- Its non-immunogenic
- It is a highly biocompatible polysaccharide molecule with anti-edematous and bacteriostatic properties
- HA acts as an antioxidant by scavenging reactive oxygen species, which helps in the regulation of immune response implying its anti-inflammatory properties
- Hyaluronic acid is easily reversible with hyaluronidase and, therefore, has an excellent safety profile.

# How is it produced in our body?

- Hyaluronic acid is a polymer (polymer = big molecule made of repeated smaller molecules), composed of two sugars that our cells produce throughout their lives (N-acetylglucosamine-6-phosphate and glucuronic acid).



# How is it produced in our body?

- Hyaluronic acid is present in the synovial fluid (joint) and is the main molecule of the extracellular matrix of the skin.
- Our cells assemble these two sugars like a pearl necklace alternating each of these sugar molecules to produce hyaluronic acid.
- As we age the production rate becomes lower than the rate of degradation, partially explaining some of the problems of skin sagging and painful joints.

# What happens to HA upon aging?

- HAs are very sensitive to free radicals, and hydrolyzing enzymes (hyaluronidase).
- An estimated one third of HA in our body is produced and degraded every day.
- In conditions, stimulating the abnormal production of free radicals in our skin (such as UVs exposure, pollutants, chemical stresses), HA degrades even more quickly, leading to the appearance of premature signs of aging.

# HA Fillers

- It brings water to the surface of skin to keep it looking fresh and supple
- In the last few decades, various synthetic forms of hyaluronic acid have been developed and used to correct disorders in the fields of rheumatology, ophthalmology and wound repair
- Pharmacologically, the content of HA in the tissues is broken down by the blood stream or by lymphatic drainage and is removed by the liver

# Two Generations of HA Fillers

- ***High molecular weight hyaluronic acid:***
  - is used in aesthetic medicine (sub-dermal injections) in its natural form or cross-linked one, to fill wrinkles
  - In cosmetics, this grade of hyaluronic acid is used as a moisturizer because it has the main property of retaining water on the skin surface
  - This grade of hyaluronic acid has no biological activity on the skin (no collagen induction of collagen formation)
- The smaller fragments of LMW HA can no longer form a gel with water like the large molecules, but they can penetrate the skin much easier and have actually a better anti-irritant and regenerating effect once absorbed by skin

# Two Generations of HA Fillers

- ***Low molecular weigh (fragmented) HA:***
  - is madeup of small pieces of high molecular weight hyaluronic acid.
  - This grade is mainly used in cosmetics, as these pieces have been shown to activate some biological pathways, leading to anti-aging effects.
- low molecular weight hyaluronic acid (LMWHA) is a smooth consistency gel that is uniquely composed of a mix of low and high molecular weight HA. Compared to HA fillers with 100% high molecular weight, the LMWHA allows a combination of high cohesivity and viscosity. This property makes it particularly well suited for facial volumizing and contouring

# Classification of Fillers

Fillers can be classified either based on their:

**SOURCE**    or    **LONGEVITY**

in tissues

# Classification of Fillers

## Based on the origin:

- » Human
- » Animal
- » Synthetic\*\*

# Classification of Fillers

## **Based on longevity:**

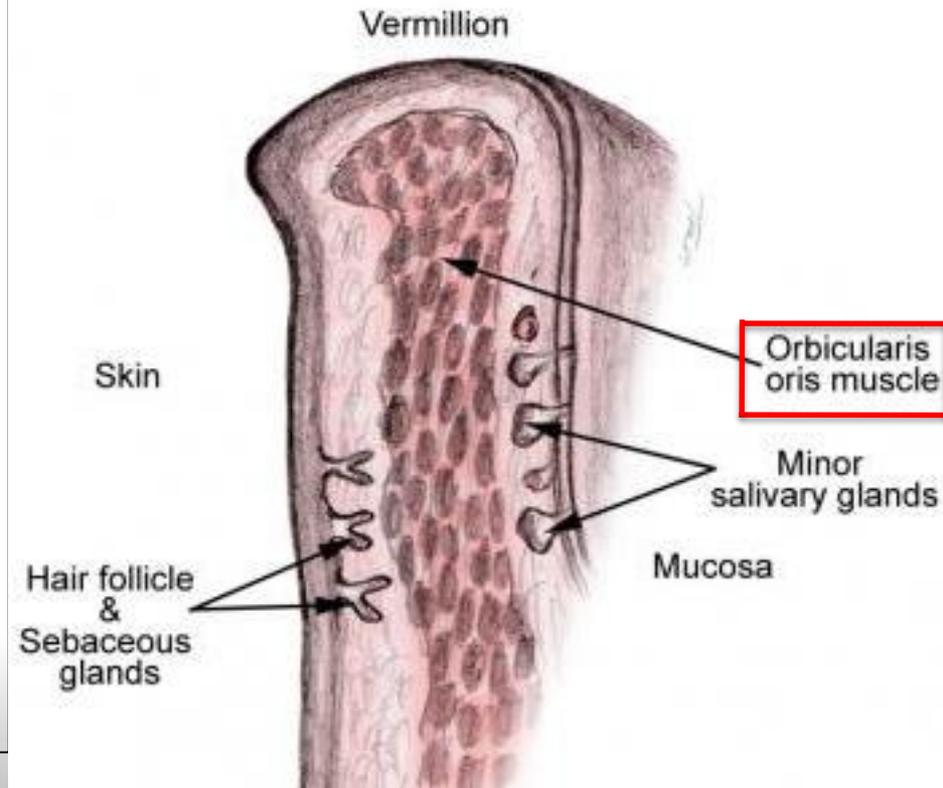
- » Temporary
- » Semipermanent
- » Permanent

Temporary fillers stay in the tissue for less than a year, semipermanent fillers for up to 1–2 years, whereas permanent fillers are substances that remain in the tissue more than two years.

**Pertinent Anatomy and  
Associated Structures of  
the Lips**

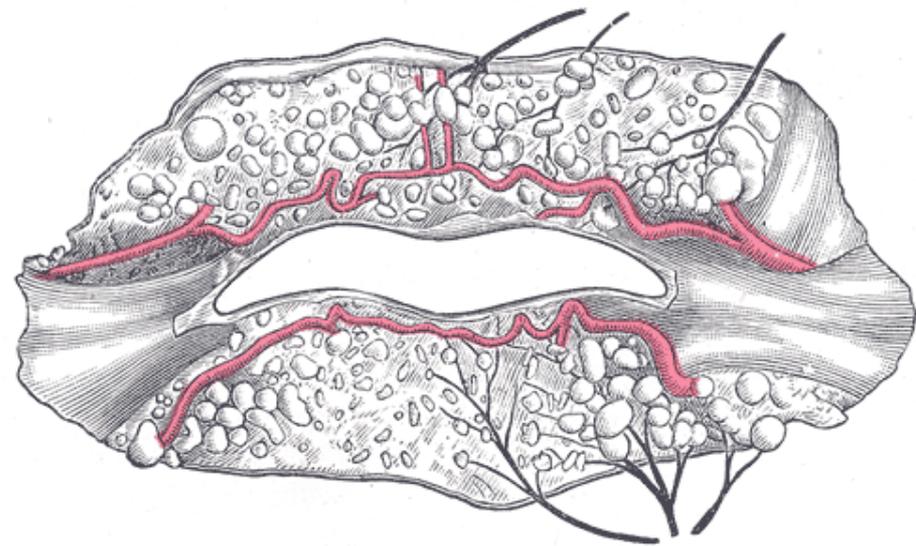
# Landmarks of Sub-Surface Lip Anatomy - *Arteries*

- The ***facial artery*** is a branch of the external carotid artery
- It supplies the lips by its superior and inferior labial branches, each of which bifurcate and anastomose with their companion artery from the other side.



# Landmarks of Sub-Surface Lip Anatomy - *Arteries*

- The superior and inferior labial arteries, both branches of the facial artery, supply the upper and lower lip, respectively.
- The ***anastomotic arch*** of the superior labial artery is susceptible to injury from deep injection of the upper lip caution must be exercised in this area.



# Landmarks of Sub-Surface Lip Anatomy - *Muscles*

## The muscles acting on the lips:

- Buccinator
- Orbicularis oris
- Modiolus – an “anchor point” for several muscles-  
Modiolus

## Lip elevation:

- Levator labii superioris
- Levator labii superioris alaeque nasi
- Levator anguli oris
- Zygomaticus minor
- Zygomaticus major

## Lip depression:

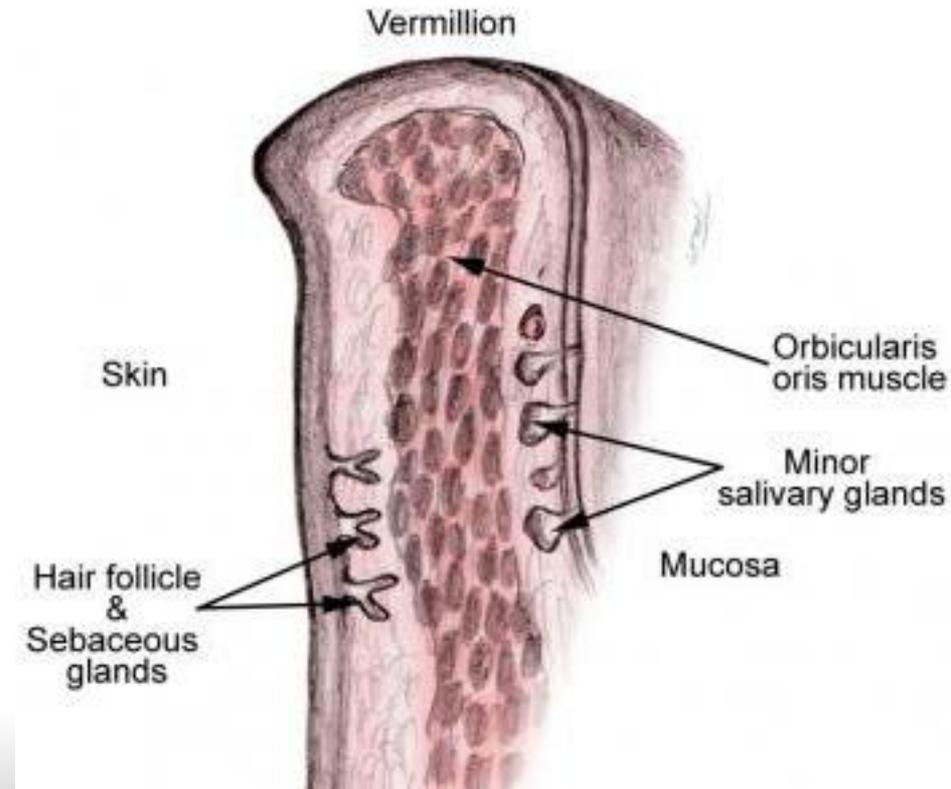
- Risorius
- Depressor anguli oris
- Depressor labii inferioris
- Mentalis

# Clinical Implications of Lip Vascularization

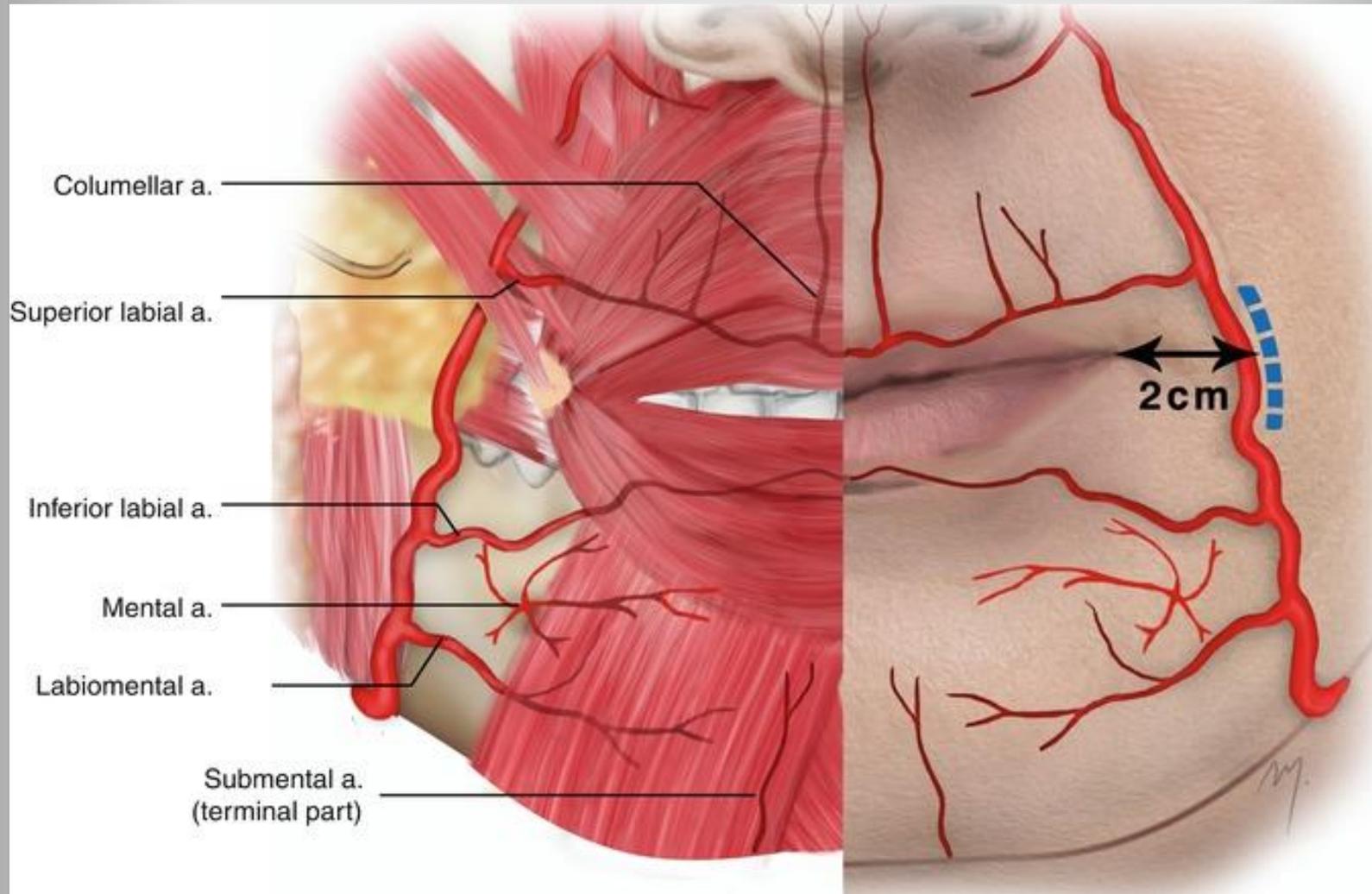
- Injections into the vermilion and lower lip can be safely performed with less concern for vascular compromise.
- The vermilion derives its red color from the translucency of capillaries in the superficial papillae.
- The capillary plexus at the papillae and rich sensory nerve network render the lip a highly vascular and sensitive structure.

# Clinical Implications of Lip Vascularization

- To achieve a full upper lip, filler should be injected into the middle body of the lip, thereby avoiding deep injection between the muscle layer and the mucosa, minimizing the risk of injury to the anastomotic arch of the superior labial arteries.



# Vascularization of Lips



# **Filler Injection Techniques**

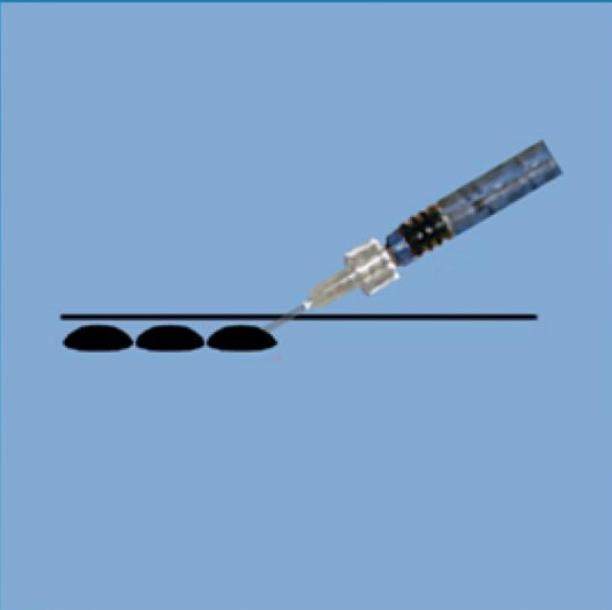
# Injection Terminology

- The techniques for injection of HA for lip augmentation have included serial puncture and linear threading, which may be antegrade or retrograde.
- The choice of one technique over another or a combination of techniques may be influenced by aesthetic goals and patient factors.

# Numbing before Injections

- No numbing
- Topical anaesthetic cream with 5% Lidocaine
- Administration of Infraorbital block

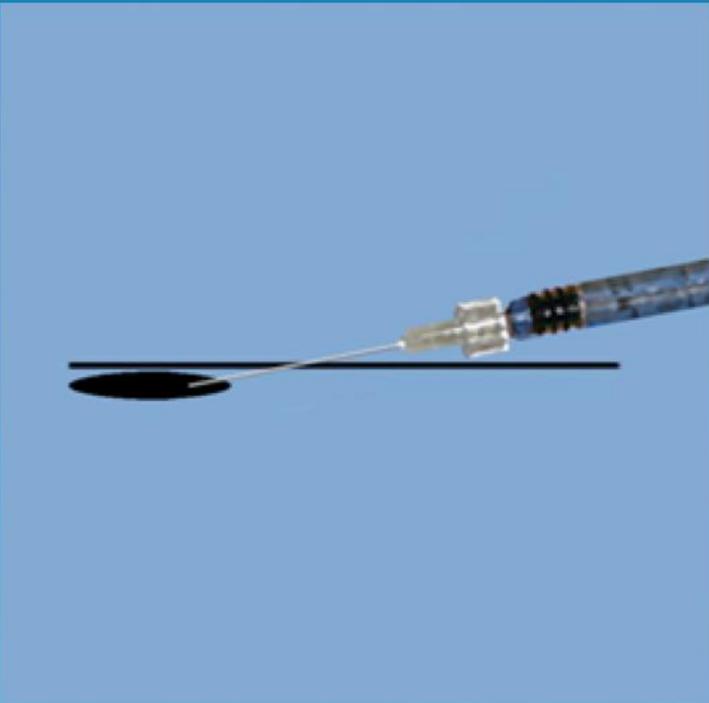
# Basic Injection Techniques – *Serial Puncture*



- Closely spaced punctures along fine lines, wrinkles, folds

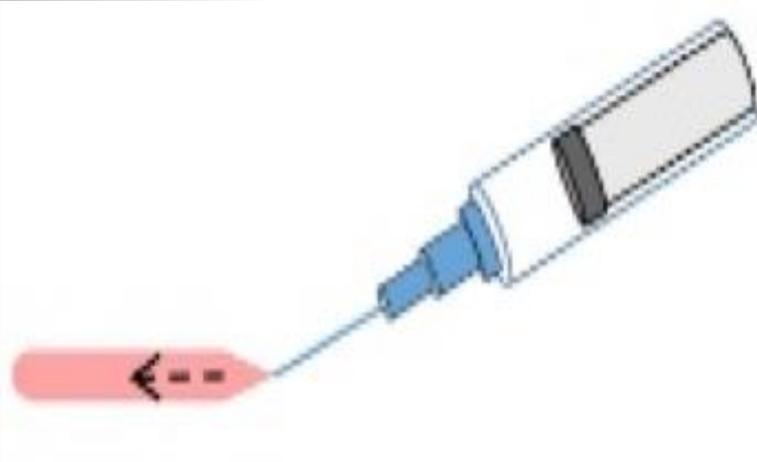
# Basic Injection Techniques-

## *Linear Threading*

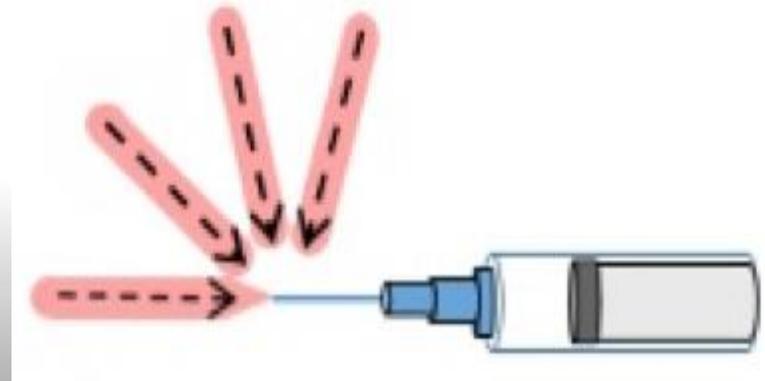


- Filler injected as “threads” during needle withdrawal along length of defect or area of desired enhancement
- Injection during needle insertion may reduce bruising

# Basic Injection Techniques- *Antrograde vs. Retrograde*



*Fanning*



# Advanced Injection Techniques – *Cannulation*

- The use of cannulae has cut down the downtime involved in this procedure and increased the percentage of patients returning for repeat augmentations
- Only one point each on either side at the oral commissure is utilized to reach both the upper and the lower lip.



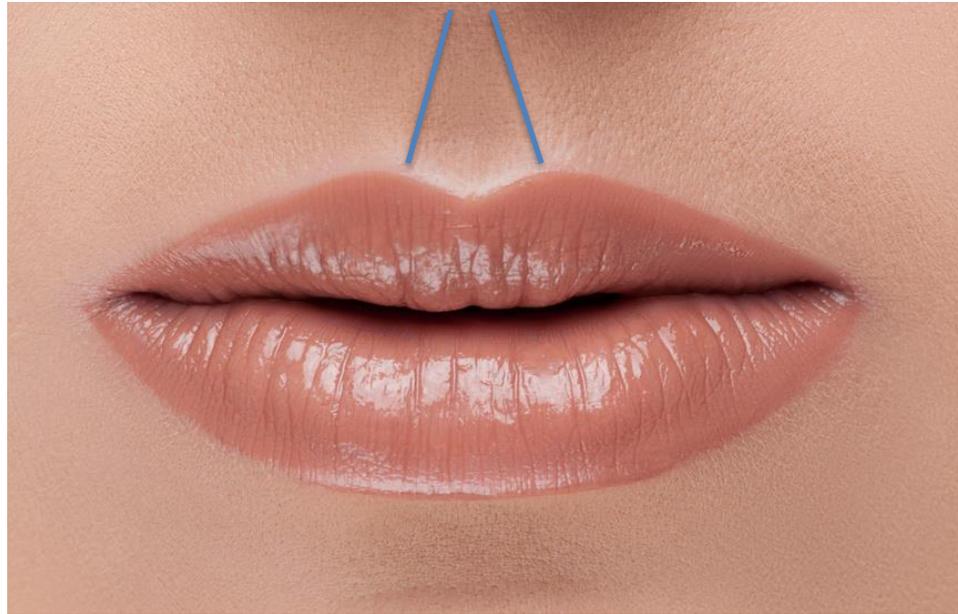
# LIP INJECTION TECHNIQUES

1. Philtral Columns
2. Cupids bow
3. Vermillion Border
4. Lower lip Tubercles
5. Oral Commisures\*

# INJECTION TECHNIQUE – *Philtral Columns*

1. Superficial injection of filler into each Philtral Colum
2. Note the inverted V-convergence
3. Deposit 0.1cc in a linear retrograde fashion

# INJECTION TECHNIQUE – *Philtral Columns*



Tip: pinch the column with non-dominant hand;  
retrograde filling to avoid lateral spillage

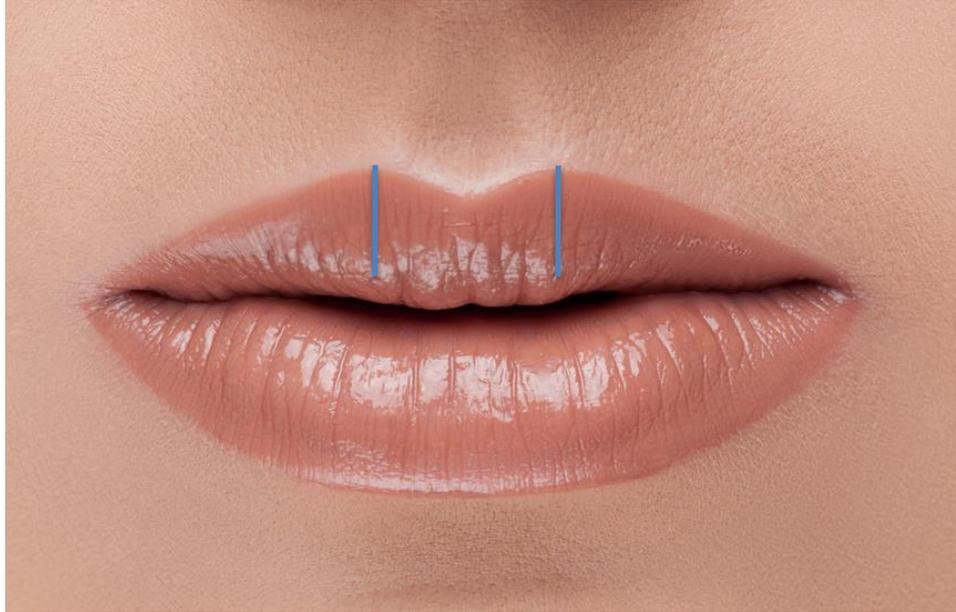
# INJECTION TECHNIQUE – *Philtral Columns*



# INJECTION TECHNIQUE – *Cupid's Bow*

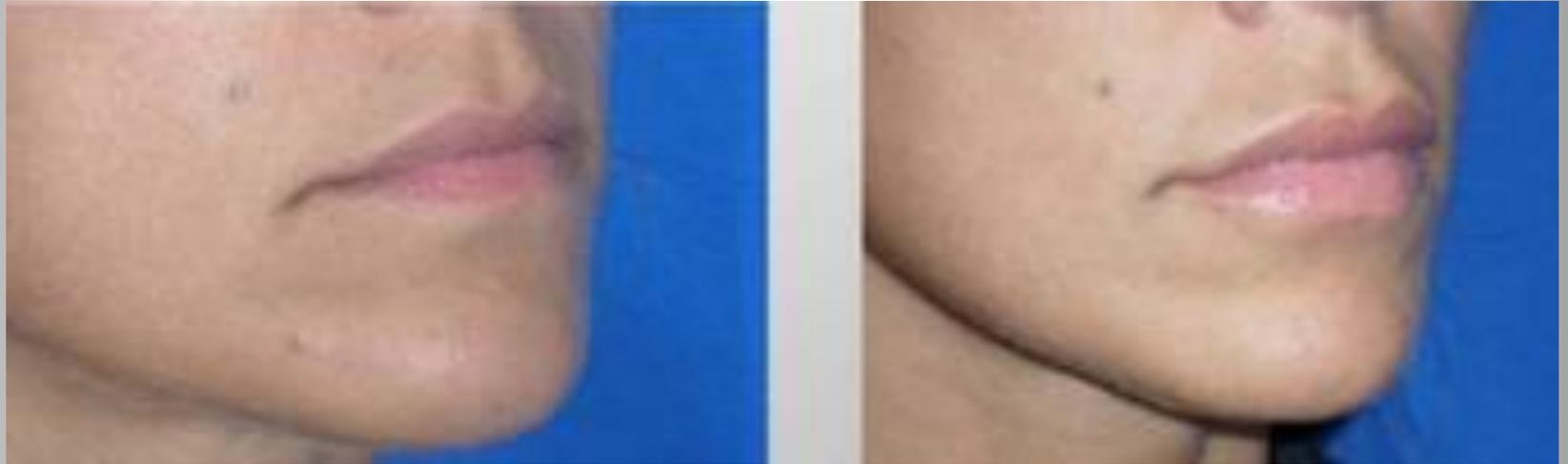
1. Place the tip of the needle at the base of each Philtral column and advance the the wet- dry border
1. Deposit 0.1cc in a retrograde fashion

# INJECTION TECHNIQUE – *Cupid's Bow*



These threads of filler act as AP strut for the upper lip projection

# INJECTION TECHNIQUE – *Cupid's Bow*



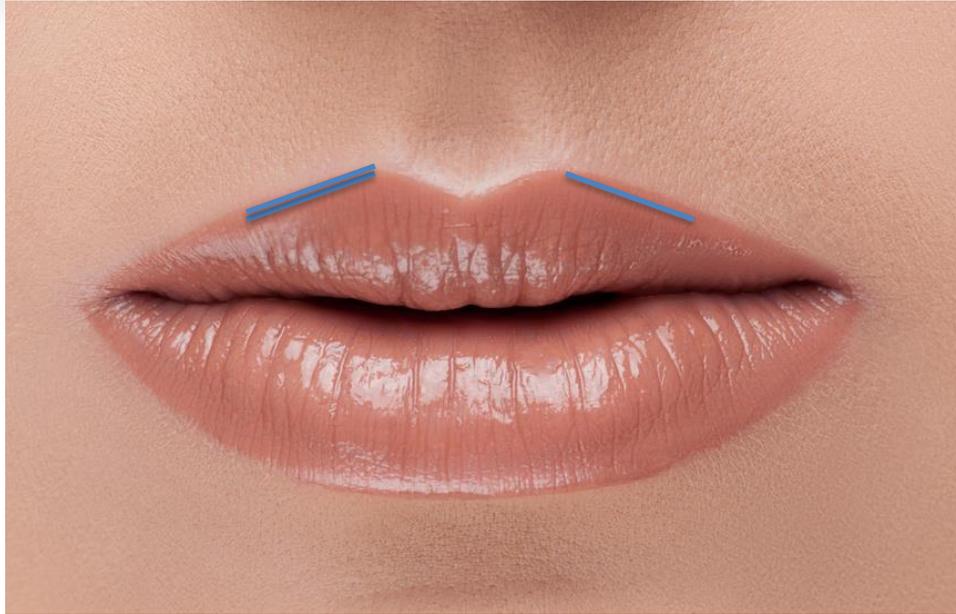
# INJECTION TECHNIQUE –

## *Vermillion Border*

1. Inject from the base of the philtrum laterally about half way to the oral commissure
2. Deposit 0.1cc per side along vermilion cutaneous border
3. Do not augment the entire lateral subunit not the medial subunit to avoid “sausage-like” appearance

# INJECTION TECHNIQUE –

## *Vermillion Border*



Tip: Pinch the vermilion border, watch the blanching of the lip to avoid compression of the labial artery which can lead to ischemia or necrosis

# INJECTION TECHNIQUE –

## *Vermillion Border*



Do not inject the entire lateral subunit, only the medial subunit to avoid “sausage-like” appearance

# INJECTION TECHNIQUE –

## *Body of the Vermillion*

- when the body of the lips is the targeted treatment area, the suggested injection technique is to inject at the wet-dry line;
- preserve natural lip protuberances (3 tubercles on upper lip, 2 tubercles on lower lip)



# INJECTION TECHNIQUE –

## *Lower Lip Tubercles*

1. Ask pt to evert lower lip
2. Deposit 0.1cc into each tubercle as a bolus  
(filler will be placed into the orbicularis oris muscle at the vermillion-mucosal junction)
3. The bolus should be placed about  $1/3^{\text{rd}}$  the distance from the midline to the oral commissures

# INJECTION TECHNIQUE –

## *Lower Lip Tubercles*



Massage to avoid lumpiness\*

# INJECTION TECHNIQUE – *Lower Lip Tubercles*



# INJECTION TECHNIQUE –

## *Oral Commisures\**

1. Ideally, inject 0.1cc into the cutaneous lower lip to bolster oral commissures
2. Neuromodulator injections into the depressor anguli oris muscles further help to neutralize downward facing oral commissures

# Injection Considerations-

## *Radial Lines\**

- radial “lipstick bleed lines” in the cutaneous portion of the upper lip:
  - Treat these lines with caution : do not use a robust, high viscosity filler
  - the orbicularis oris muscle is a sphincter muscle and its constant “milking” action may cause clumping of robust fillers. This can result in nodules, lumpiness and migration of product
  - “spackle” with a less viscous filler, such as Belotero Soft very superficially

# Injection Considerations-

## *Radial Lines*

-  A unique complication resulting from superficial implantation of most HA fillers is a bluish discoloration of the skin known as the ***Tyndall effect***.
- One advantage of using Belotero in this area is the reported absence of the Tyndall effect when implanted superficially.

# **Before and After Care**

Clinical Integration of Fillers  
into your Office

# Pre-Treatment Considerations

## *Patient related*

- The consultation is a time when you can discuss your goals. These can include:
  - Enhancing overall fullness in your upper, lower or both lips
  - Reducing wrinkling around the lips due to a loss of lip volume over time
  - Slightly altering the shape of your lips, such as increasing the volume at the top or “bow” of your lips

# Pre-Treatment Considerations

## *Patient related*

- Consent
- Review side effects such as edema and echymosis, post-op asymmetry
- Antivirals, such as Acyclovir, for pts prone to HSV-1
- Take photos
- Ensure that Nitrous paste and Hyaluronidase are available
- Discuss anaesthesia, topical or nerve block

# Pre-Treatment Considerations

## *Doctor related*

- Hyaluronic acid (HA) the predominant filler used today
- Commonly used fillers for lips:
  - **Juvederm** *Volbella*
  - **Prolenium** *Kiss*
  - **Merz** *Belotero (Balance or Soft)\**
    - Virtual absence of \*Tyndall effect
    - Smoothness of the material

# Pre-Treatment Considerations

## *Doctor related*

- Worldwide usage and published reports clearly confirm the efficacy and safety of HA fillers
- Hyaluronic acid currently in clinical use, is not derived from animal sources
- When injected into tissues, it acts like an inflated cushion to support facial structures and tissues that may have lost volume or elasticity due to normal aging

# Pre-Treatment Considerations

## *Doctor related*

### Filler Costs

<b>Prolenium Kiss</b>	<b>Allergan Volbella</b>	<b>Merz Belotero (Balance)</b>
\$415 2X1ml syringes	\$695.00 2X1ml syringes	\$175.00 1ml syringe

# POST Injection Care

- edema, bruising, and ecchymosis
- complications are extremely rare and include nodules and lumps, which can be massaged in or dissolved with hyaluronidase injections
- Intravascular injections may result in immediate blanching, but the collateral circulation of the lips is highly forgiving
- Warm compresses, use of hyaluronidase, and topical nitroglycerin help

# POST Injection Care

- cool compresses and ice packs can be used to minimize swelling and bruising
- avoid ASA, NSAIDs, and other medications associated with an increased risk of bleeding
- anti-HSV I medication (acyclovir, famciclovir or valaciclovir) can be prescribed



Herpetic reactivation after fillers

# POST Injection Care

- HA's are hydrophilic, they attract water from the surrounding tissues and further augment the soft tissue volume beyond that expected from mere implantation. The significant swelling of the vermilion in the immediate post-operative period is to be expected.
- Suggest slightly altered make up application to cover up bruising and de-emphasize swelling

# **Training your Eye**

Discussion of Before and After Photos

# Before and After Photos



# Before and After Photos



# Before and After Photos



# Before and After Photos



# Before and After Photos



# Before and After Photos



# Before and After Photos



# Before and After Photos

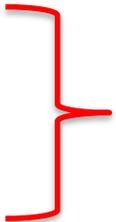


# Before and After Photos



# **Additional Applications of Fillers in Dentistry**

# HA in Wound Regeneration

- Hyaluronic acid (HA) has been proven to modulate:
  - Inflammation
  - Cellular migration
  - Angiogenesis

Key components  
of wound healing
- Studies have revealed that most HA properties depend on its molecular size:
  - High molecular weight HA displays anti-inflammatory and immunosuppressive properties
  - Low molecular weight HA is a potent proinflammatory molecule

# HA in Joint Regeneration

- Hyaluronic acid (HA) has been widely used for viscosupplementation of diseased or aged articular joints
- Recent investigations have revealed the active anti-inflammatory or chondroprotective effect of HA, suggesting its potential role in attenuation of joint damage.

Wounds. 2016 Mar;28(3):78-88.Hyaluronic Acid in Inflammation and Tissue Regeneration.Litwiniuk M, Krejner A, Speyrer MS, Gauto AR, Grzela T.

# Periodontal applications

- HA forms a major and critical component of connective tissue.
- It contributes in tissue hydrodynamics, cell migration, and proliferation, and improves healing properties of the tissue.
- It acts as barrier to various gram negative bacteria.
- Its physiological, structural, and biochemical properties are critically beneficial in tissue regeneration.

# HA Periodontal Applications

- HA topically applied in subgingival regions reduces microbial activity, bone regeneration in deep periodontal bony defects, guided bone regeneration, nonsurgical treatment of peri-implantitis pockets, peri-implant maintenance of immediately placed implants, and gingival augmentation in mucogingival surgery.
- HA may act as a scaffold for other molecules such as Bone morphogenic protein-2 and platelet derived growth factor-BB, used in guided bone regeneration techniques and tissue engineering research.

# HA Periodontal Applications

- HA when applied to patients with chronic periodontitis showed reduction in bleeding on probing (BOP), probing pocket depth (PPD), and clinical attachment level, and hence, can be used as an adjunct to scaling and root planning.
- HA is biocompatible and intrinsically safe to use, with no evidence of cytotoxicity.

# HA Periodontal Applications

- It has also been reported that HA shows osteoinductive properties, which is useful for treatment of periodontal disease.
- Other beneficial effects have also been seen for the treatment of recurrent aphthous ulcer, for treating gingival lesions, and promote healing in extraction socket.

# HA Periodontal Applications



J Int Soc Prev Community Dent. 2016 Sep-Oct;  
6(5): 497–500.

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# **Hands on Clinical Component**

Required by RCDSO to be certified to  
administer Botox

# Final step to Your Certification:

- Find an appropriate patient
- Contact our office for a convenient time to come in with your patient
- Complete a 30 minute one-on-one hands on session (combined with Botox Administration if Botox Module is taken concurrently):
  - You will inject up to 1cc of filler
  - Your theory questions from the webinar material will be answered
  - A formal evaluation of your knowledge will be conducted in a form of a QUIZ
  - You will be awarded a certificate of completion qualifying you to inject Intra Oral Filler in your clinic

# THANK YOU!

BOTOX AND FILLER   
TRAINING FOR DENTISTS  
DR. SKY NASLENAS

[BotoxTrainingCentre.ca](http://BotoxTrainingCentre.ca)