

Oral and Maxillofacial Surgery Review

A Review of Anatomy and Treatment Considerations for the Non-OMS Surgeon



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- No disclosures

Basic Overview for the Non-OMS Surgeon

- Facial Analysis
- Occlusion and Dental Classifications
- Skeletal Classification
- Cephalometric measurements
- Orthognathic Surgery Considerations
- Chin Implant vs Genioplasty
- Lip Lift

Facial Analysis

Vertical Thirds:

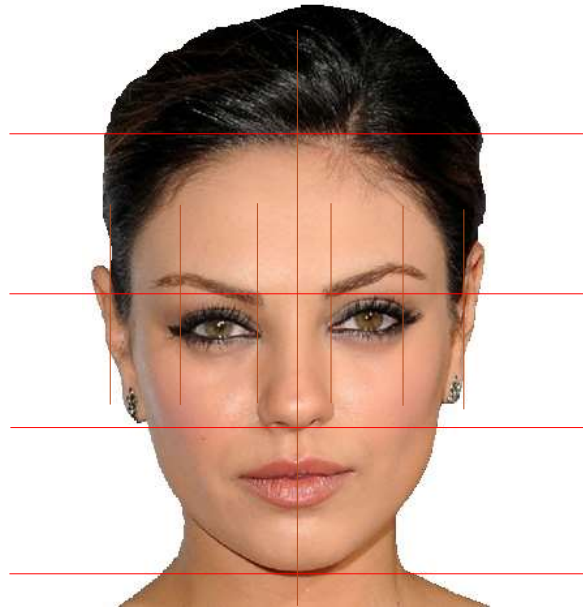
- Trichion to Glabella
- Glabella to Subnasale
- Subnasale to Menton

Transverse Facial Fifths:

- Inter-canthal Distance
- Medial Canthus to Lateral Canthus
- Lateral Canthus to Lateral projection of the Ear

Gross asymmetries:

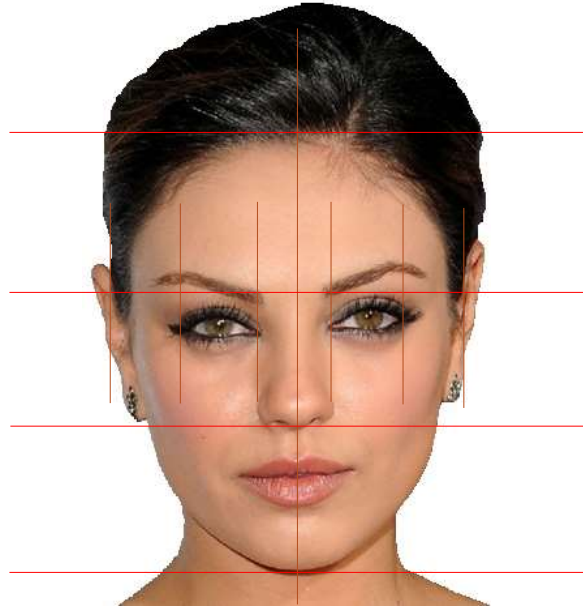
- Inferior border of mandible
- Dystopia
- Malar hypertrophy
- Long /short lower facial height



Facial Analysis

Upper Third:

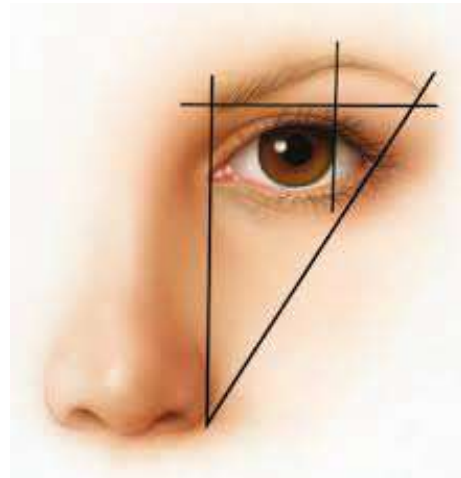
- Forehead communicates with scalp
 - S: Skin
 - C: Sub-Cutaneous Tissue
 - A: Aponeurosis
 - L: Loose Areolar Tissue
 - P: Pericranium
- 4 muscles contribute to motion
 - Frontalis
 - Procerus
 - Corrugated Supercilli
 - Obicularis Oculi



Facial Analysis

Upper Third:

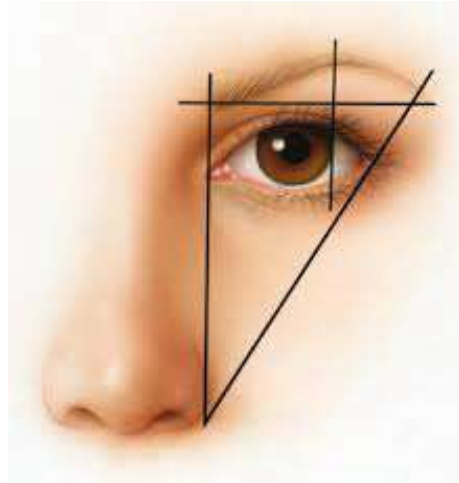
- Eyebrows
 - Female Brow:
 - Medial 1-2mm above superior orbital rim
 - Apex 8-10mm above superior orbital rim
 - 20-25mm above pupil in line with lateral limbus
 - Tail 10-15mm above superior orbital rim
 - Male Brow:
 - 1-2 mm above superior orbital rim



Facial Analysis

Middle Third:

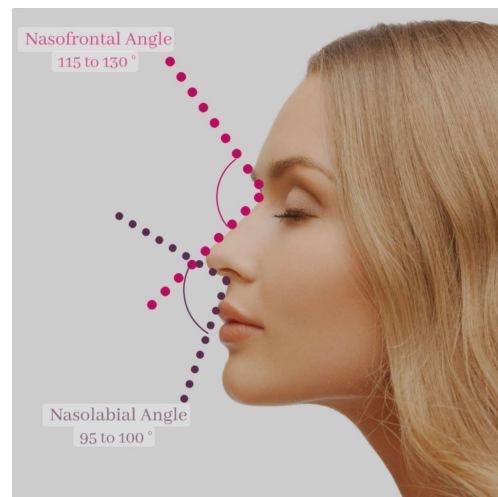
- Eyes
 - Upper eyelid should cover a small portion of the Iris
 - Lower eyelid should be within 1-2mm of the Iris in neutral gaze
 - Profile View: Cornea 12-16mm anterior to lateral orbital rim



Facial Analysis

Middle Third:

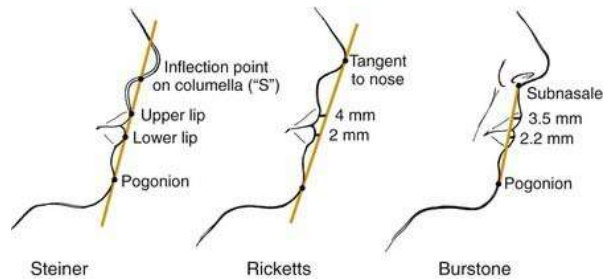
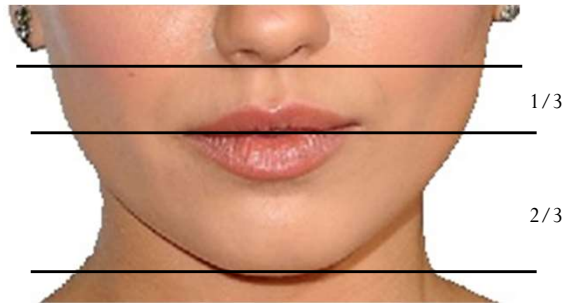
- Midface
 - Nasofrontal angle: 115-135
 - Nasolabial angle:
 - Female: 95-110
 - Male: 90-95
 - Radix: 4-9mm anterior to corneal plane
 - Malar eminence: 10mm lateral, 15mm inferior to lateral canthus



Facial Analysis

Lower Third:

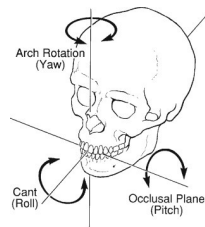
- Lip posture
 - Procumbent: pushed out
 - Recumbent: pushed in
- Lip position
 - Rickett's E-line: A line drawn between nasal tip and pogonion
 - Upper lip should be 4mm behind
 - Lower lip should be 2mm behind



Facial Analysis

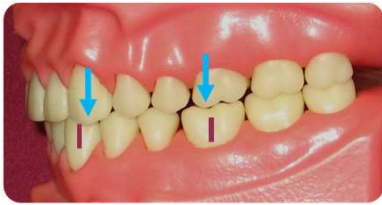
Lower Third:

- Tooth display in repose
 - Females: 3-4mm tooth show
 - Males: 2-3mm tooth show
- Gingival display in animation
 - Adequate
 - Excessive
 - Asymmetric
 - None
- Cants and yaws

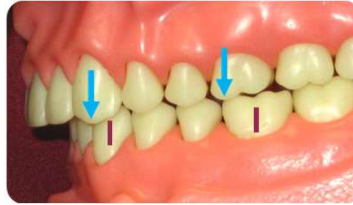


★ Angle's Classification of Occlusion

**Dental Class 1
Occlusion**



**Dental Class 2
Malocclusion**



**Dental Class 3
Malocclusion**



1. Find the Mesial Buccal cusp of the Maxillary first molar and the Buccal Groove of the Mandibular first molar

2. Find the cusp tip of the maxillary canine and the cusp tip of the mandibular canine

Angle's Classification of Occlusion

Class 2, Division 1



Class II - Division 1



Class II - Division 2

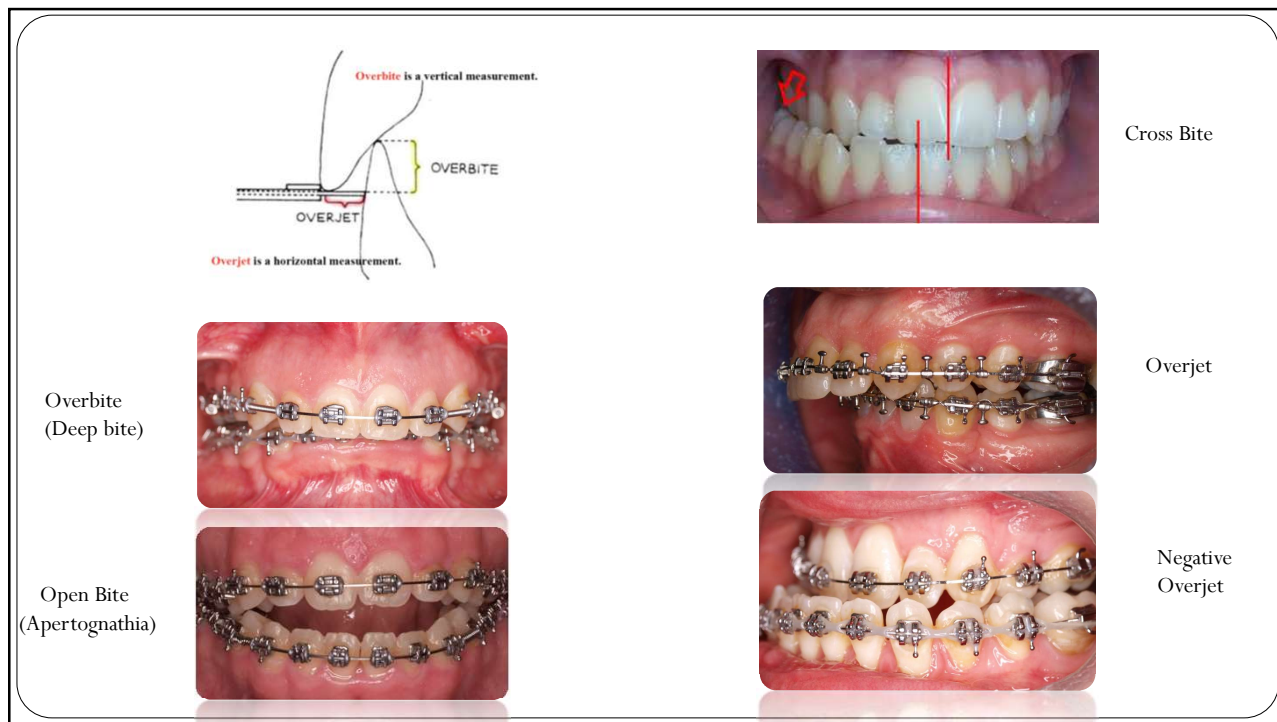


Class 2, Division 2

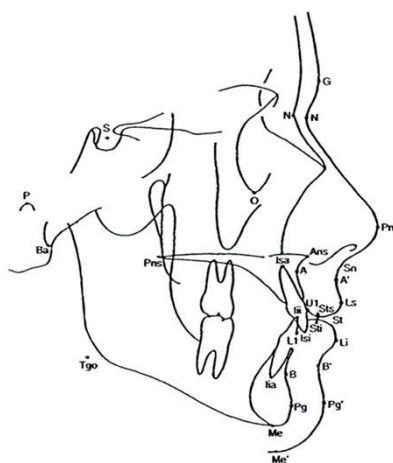


mohodherajy.com

B



Cephalometric Landmarks



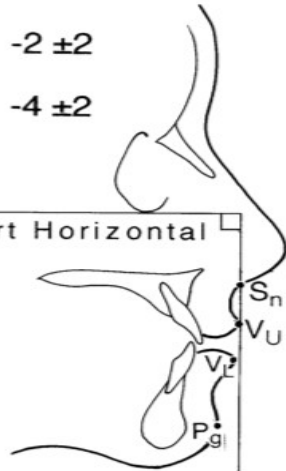
- Glabella (G):
 - the most anterior point of the forehead
- Nasion (N):
 - The deepest point of concavity in the midline btw the forehead and the nose
- Sella (S):
 - The center of the sella turcica
- Subnasale (Sn):
 - The point at which the columella of the nose merges with the upper lip
- A point (A):
 - The most posterior midline point in the concavity where the lower anterior edge of the anterior nasal spine meets the alveolar bone overlying the maxillary incisions
- B point (B):
 - The most posterior midline point in the concavity of the mandible btw the alveolar bone overlying the mandibular incisors and the pogonion
- ★ Pogonion (Pog):
 - The most anterior point of the chin in midsagittal
- Menton (Me):
 - The lowest point on the contour of the chin

$$S_n - V_U \quad 0 \pm 2$$

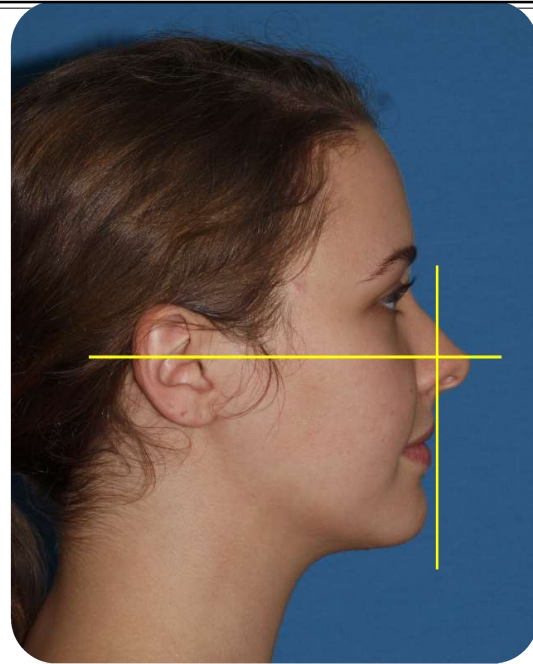
$$S_n - V_L \quad -2 \pm 2$$

$$S_n - P_g \quad -4 \pm 2$$

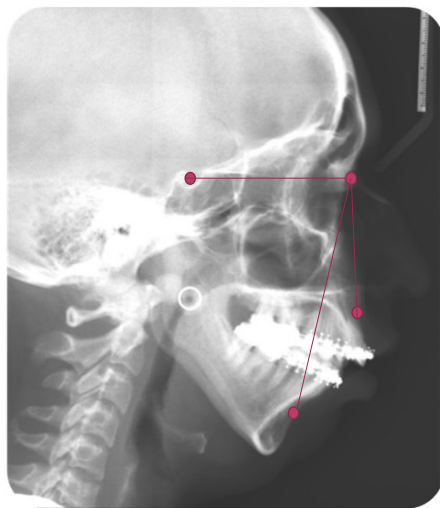
Frankfort Horizontal



Frankfort Horizontal: a plane from Orbitale (the most inferior point of the orbit) to Porion (the superior point of the external auditory meatus)



Skeletal Diagnoses

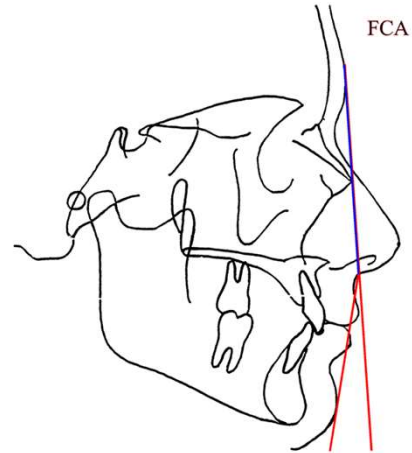


- SNA and SNB indicate the position of the maxilla and mandible in relation to the cranial base
 - High values indicate prognathism for that jaw
 - Low values indicate retrognathism for that jaw
- ANB indicates the position of the maxilla to the mandible

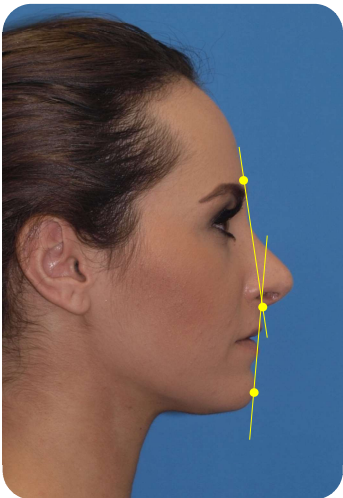
- SNA = 82 degrees
- SNB = 80 degrees
- ANB = 2 degrees (Most important!)

Skeletal and Associated Soft Tissue Diagnoses

- Facial Contour Angle (FCA)
 - Angle formed between (ideal -11 degrees +/- 4)
 - Line from Glabella to Subnasale extended down
 - Line from Subnasale to soft tissue Pogonion
- Convex Profile – More negative
 - Maxillary Excess
 - Mandibular Retrognathia
 - Skeletal Class 2
- Concave Profile – More Positive
 - Maxillary Deficiency
 - Mandibular Prognathism
 - Skeletal Class 3
- May be influenced by:
 - Fronal bossing
 - Shallow forehead slope
 - Abnormal soft tissue thickness or bony chin projections



Skeletal and Associated Soft Tissue Diagnoses

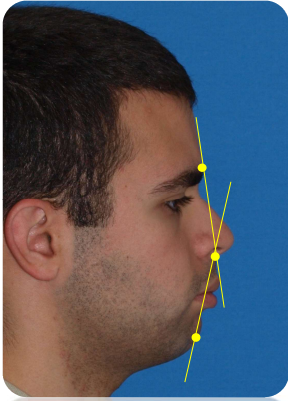


Skeletal Class I

Bony structures good. May be any other associated soft tissue defects

Skeletal and Associated Soft Tissue Diagnoses

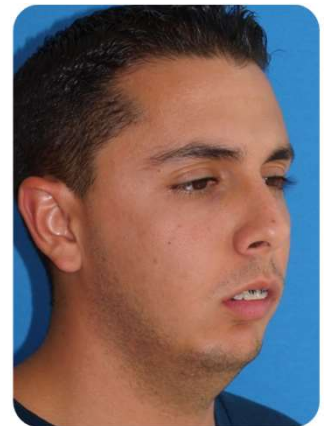
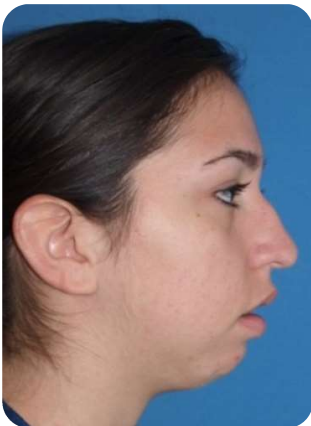
Skeletal Class II secondary to mandibular anterior-posterior deficiency (retrognathia)



Associated Hard/Soft Tissue Diagnoses

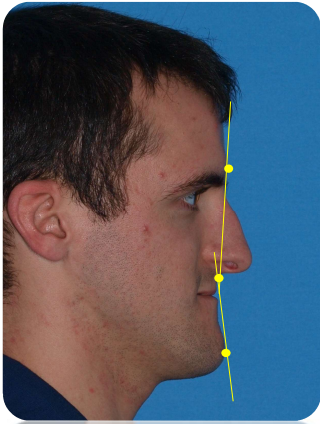
- Deficient genial projection
- Short lower facial 1/3
- Submental adiposity
- Poor cervicomental definition
- Short thyromental distance
- Deep labiomental sulcus

Skeletal Class 2



Skeletal and Associated Soft Tissue Diagnoses

Skeletal Class III secondary to maxillary anterior-posterior deficiency (maxillary hypoplasia)



Associated Hard/Soft Tissue Diagnoses

- Deficient malar/submalar projection
- Poor paranasal support
- Under-rotated nasal tip
- Pseudo-dorsal hump
- Tear trough deformity
- Orbital hollowing
- Poor upper lip support (volume and architecture)

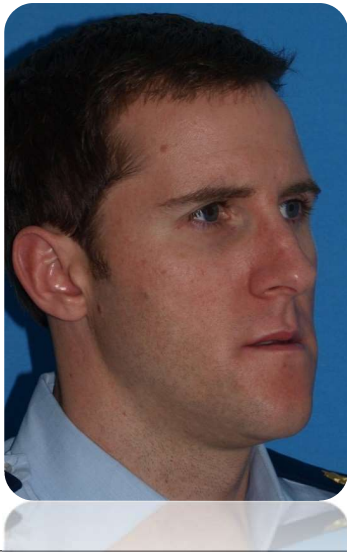
Skeletal and Associated Soft Tissue Diagnoses

Skeletal Class III secondary to mandibular anterior-posterior excess



- Excessive genial projection
- Concave Facial Profile

Skeletal and Associated Soft Tissue Diagnoses



Skeletal Class III secondary to Maxillary anterior-posterior deficiency and mandibular anterior-posterior excess

- Deficient malar/submalar projection
- Poor paranasal support
- Under-rotated nasal tip
- Pseudo-dorsal hump
- Tear trough deformity
- Orbital hollowing
- Poor upper lip support (volume and architecture)
- Excess genial projection
- Concave profile

Skeletal and Associated Soft Tissue Diagnoses



Vertical Maxillary Excess

- Excessive gingival display
- Excessive tooth to lip
- Poor lip architecture and definition
- Long lower facial 1/3

What can we do to help camouflaged a gummy smile without surgery?

- ★ Neurotoxin - Levator Labii Superioris
Alaeque Nasi

Skeletal and Associated Soft Tissue Diagnoses



Hemi-mandibular Elongation

- Significant facial asymmetry
- Mandibular boarder asymmetry
- Maxillary cant

If you question if the patient should have orthognathic surgery or not.....

- Look at the lips
- Look in the mouth at the occlusion
- Look at the smile

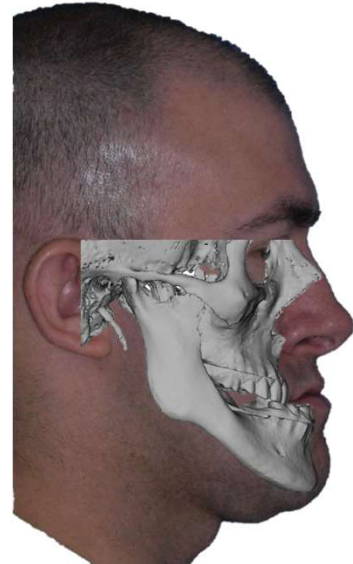
Orthognathic Surgery

Bony framework sets the foundation for facial aesthetics

Soft tissue envelope enhances substructure

Provides volume, expression, and protection

70-75% of patients presenting for orthognathic surgery are concerned with facial appearance



Goal of Orthognathic Surgery

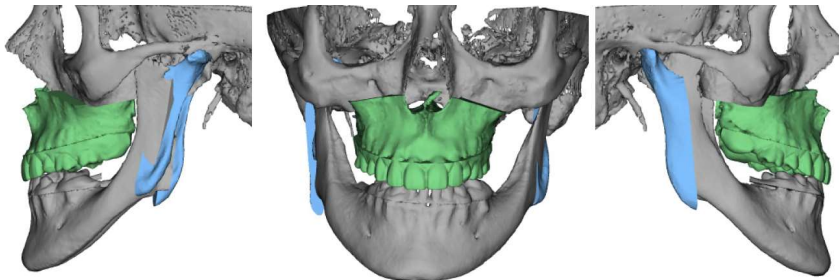
Surgical correction of facial skeletal deformities

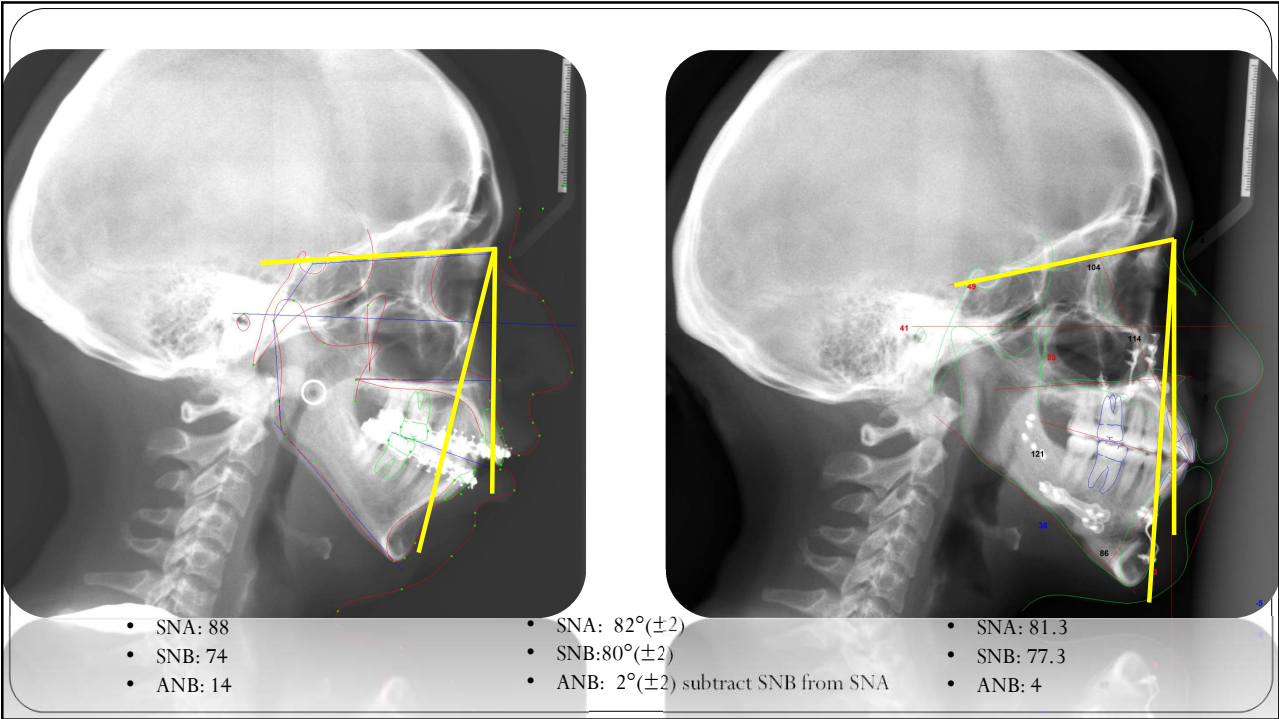
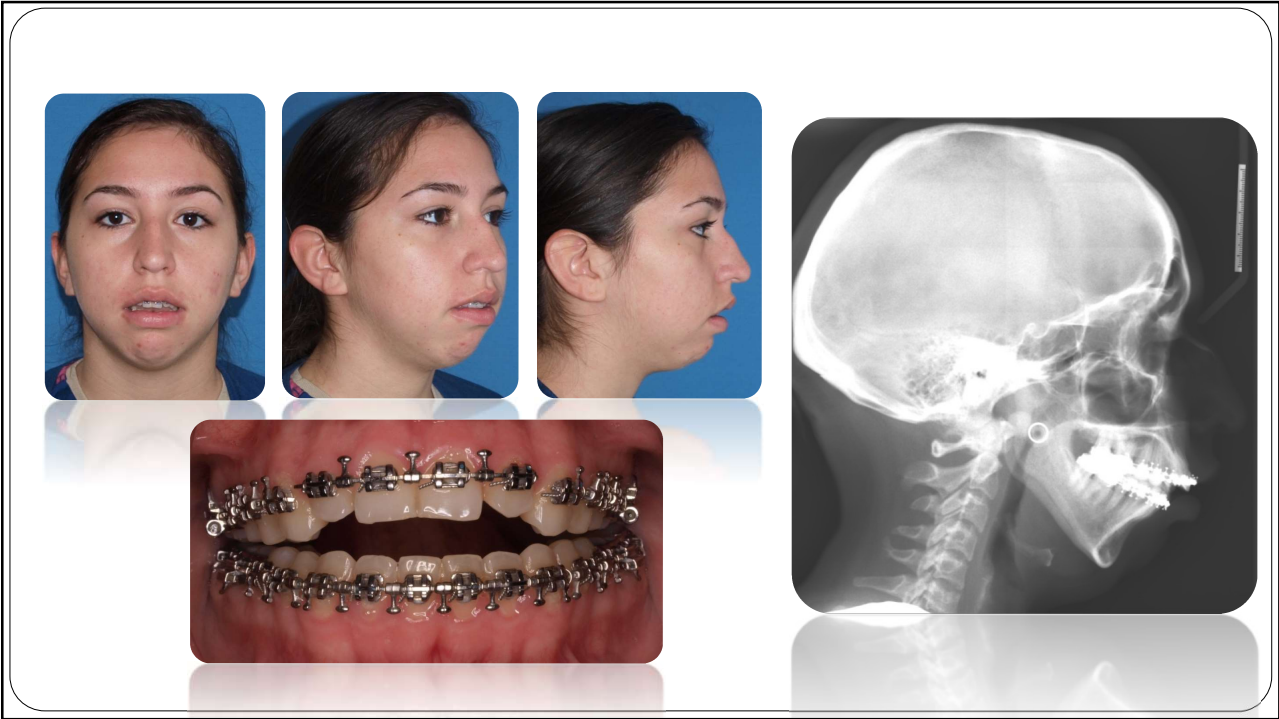
Primarily done for the correction of skeletal malocclusion

Correction of both form and function

- Malocclusion, sleep apnea, temporomandibular dysfunction, and poor aesthetics

Most dramatic functional and facial cosmetic surgical procedure







- Leveling of the occlusal plane and counterclockwise rotation of the mandible
- Counterclockwise rotation advanced chin.
- A simultaneous genioplasty provided lower facial 1/3 height and additional advancement of the chin.

Soft Tissue Changes with Orthognathic Surgery

Middle Facial 1/3

Maxillary impaction and advancement

- Widens alar base
- Increases tip projection
- Rotates nasal tip (counterclockwise)
- Accentuates supratip break
- Shortens upper lip

Maxillary downgrafting

- Decrease tip projection
- Under-rotates nasal tip (clockwise)
- Pseudo-hump formation (Polybeak appearance)

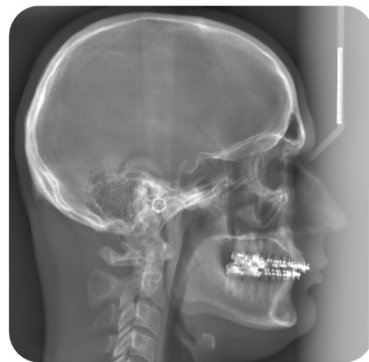


Soft Tissue Changes with Orthognathic Surgery:

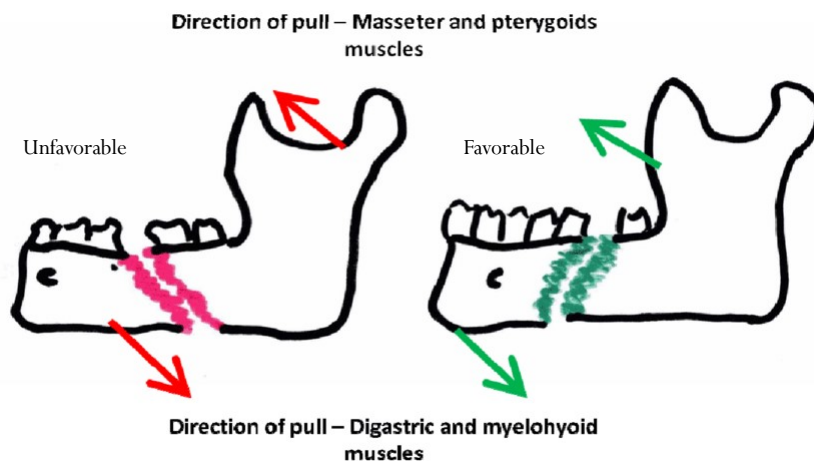
Effects of Orthognathic Procedures on Neck-Chin Angle

<i>Improved Aesthetics</i>	<i>Worsened Aesthetics</i>
Mandibular advancement	Mandibular setback
Genial advancement	Reduction genioplasty
Superior repositioning of the maxilla <ul style="list-style-type: none"> • Mandibular counter-clockwise autorotation 	Maxillary downgrafting <ul style="list-style-type: none"> • Mandibular clockwise autorotation
Combination of 1, 2, 3	Combination of 1,2,3

Adapted from Epker, Stella JOMS, 47:795-803, 1989



★ Favorable vs Unfavorable Mandibular Fracture

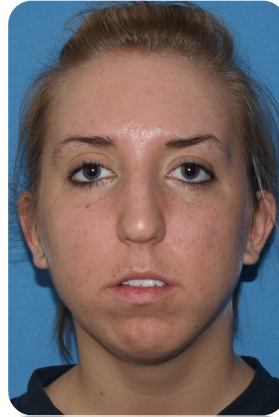


Should Have Done A Chin



Benefits of Chin Augmentation

- Increases thyromental distance
- Improved cervico-mental definition
- Improved lower facial 1/3 height and proportions



Implant vs. Genioplasty

Implant

- **Pros**
- Quicker
- Less of a learning curve
- Good for AP augmentation
- Decreased risk of paresthesia
- Easily reversible

Cons

- Lack of vertical height?
- Bony resorption
- Increased infection rate?
- Migration

Osteotomy

- **Pros**
- Control/increase vertical facial height
- Ability to flatten or smooth out labiomental sulcus
- Advances suprahyoid musculature (snoring)
- Correct midline discrepancies

Cons

- More involved surgery
- Greater risk for permanent paresthesia

Genial (Chin) Augmentation

Attempts to mask underlying skeletal deformity with soft tissue augmentation.

- Not always ideal treatment (masking skeletal deficits)
- Patients who don't want orthodontics and orthognathic surgery
- Want a "less involved" surgery
- Shorter recovery period
- Less expensive



Poor genioplasty candidate



A



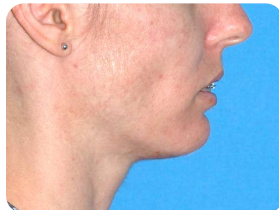
B

22 y/o male before (A) and 3 months after (B) sliding advancement genioplasty

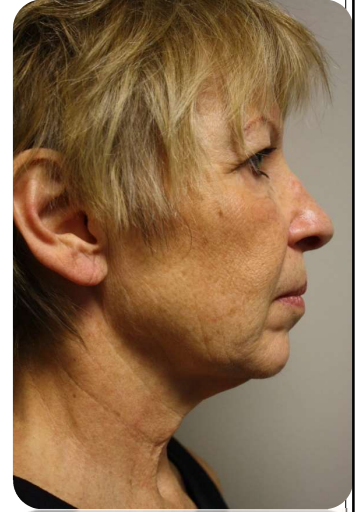
Osteotomy vs. Chin Implant

- Skeletal Class 2 relationship
- Class 2 dental relationship
- Deep bite
- Poor lip position/everted lower lip
- Deep labiomental sulcus
- Skeletal asymmetry
- Short lower facial 1/3 height

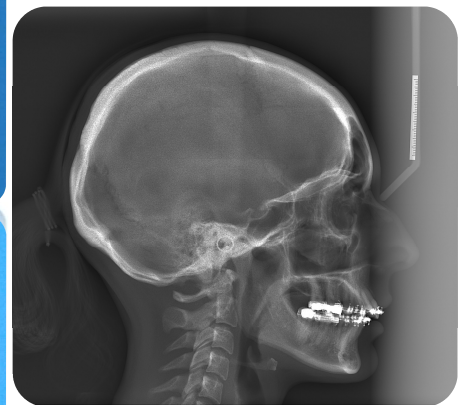
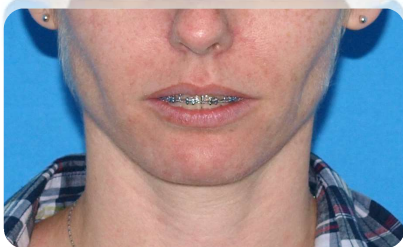
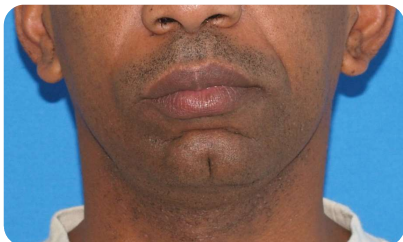
- Skeletal Class 1 relationship
- Microgenia
- Class I dental relationship
- Normal lip position
- Smooth or flattened labiomental sulcus
- Proportional lower facial 1/3 height

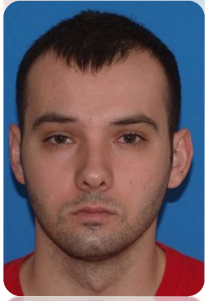
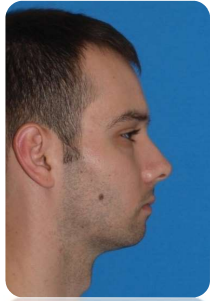


Good Genial Implant Candidates



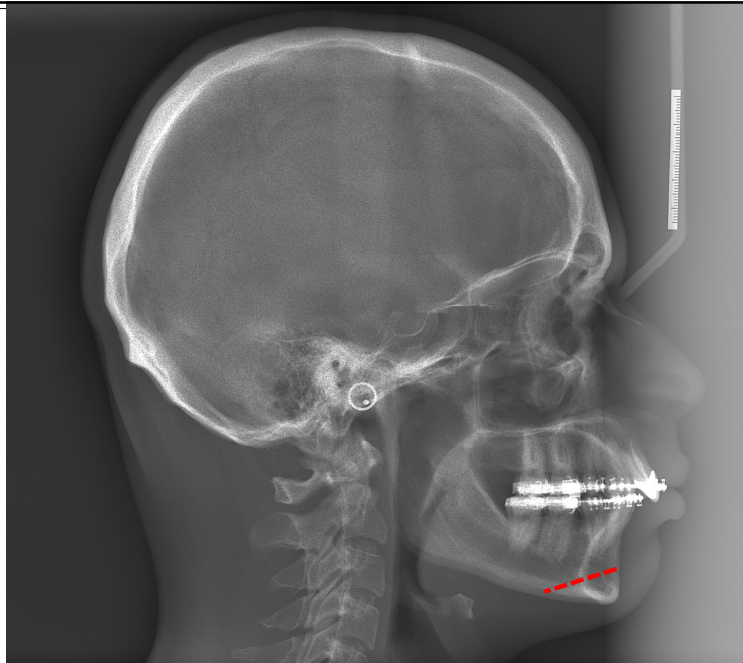
Poor Genial Implant Candidates

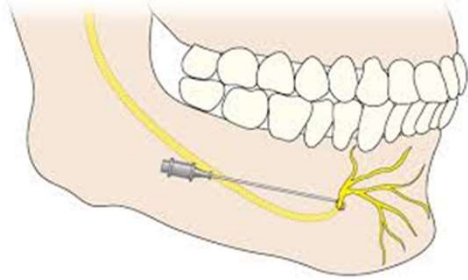




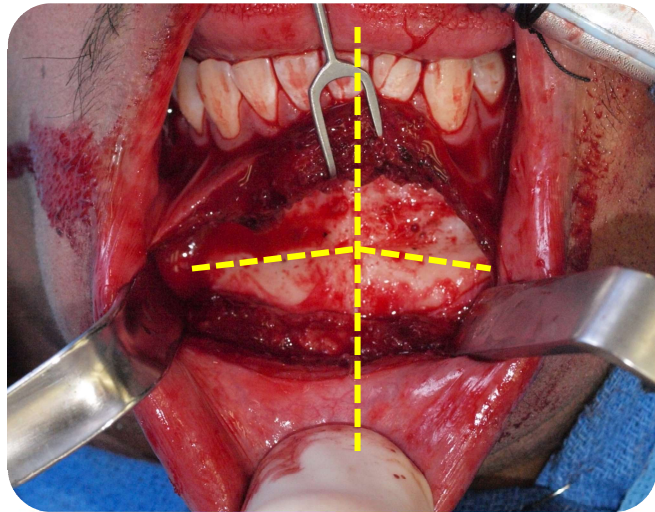
Genioplasty works here but when to watch out!

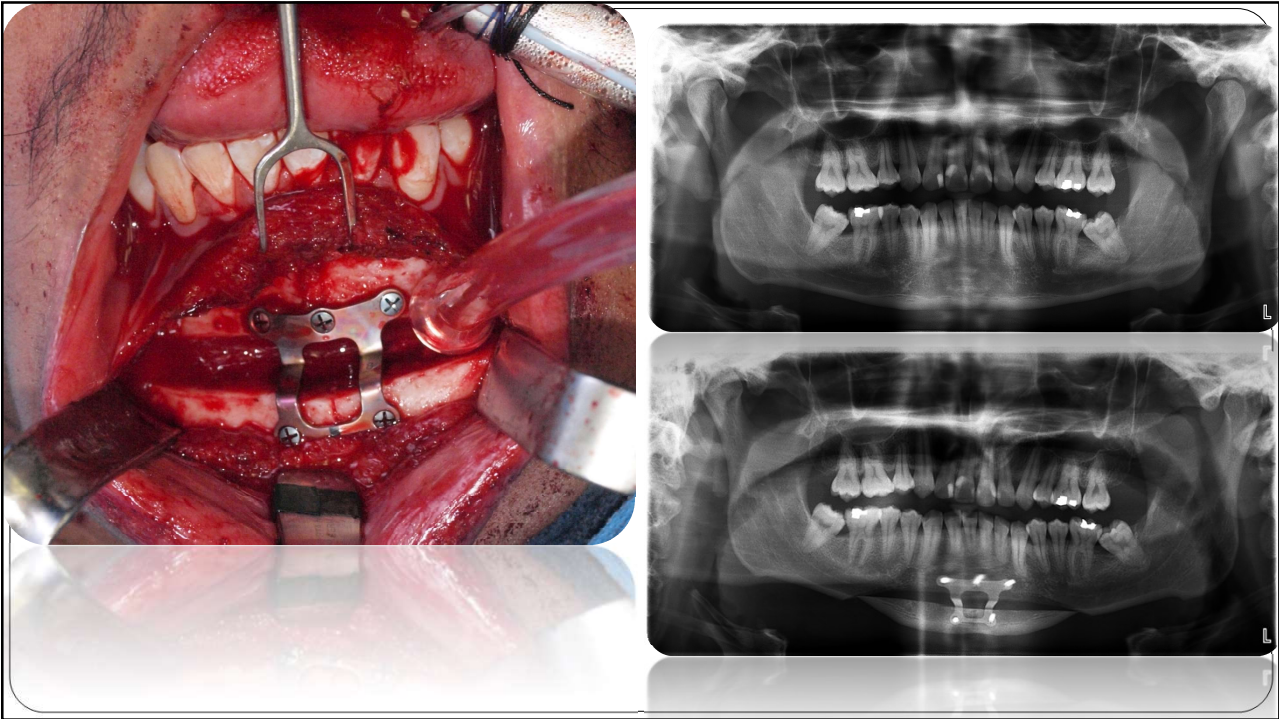
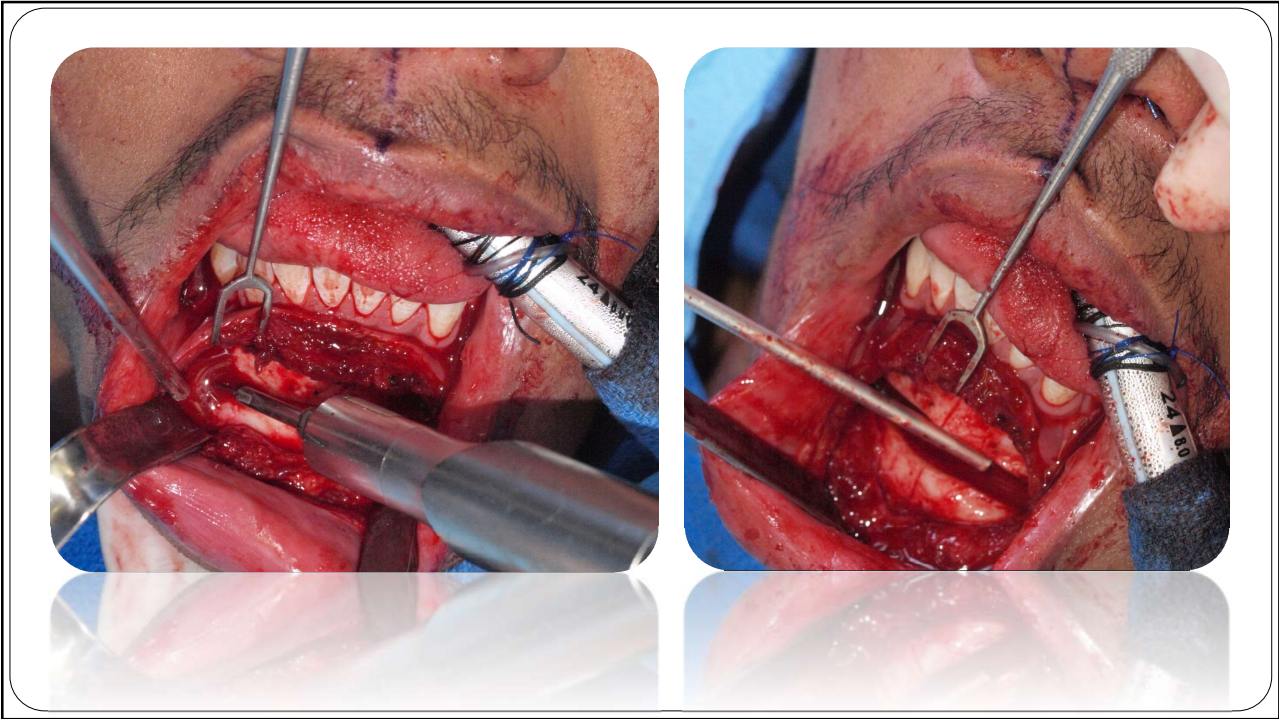
- Isolated genioplasties/implants poor choice for patients with deep labiomental sulci and lip incompetence
- Consider orthognathic surgery in this group





- Mental foramen is located in the vertical plane between first and second premolars.
- In its terminal portion of its course, the nerve ascends to the foramen.







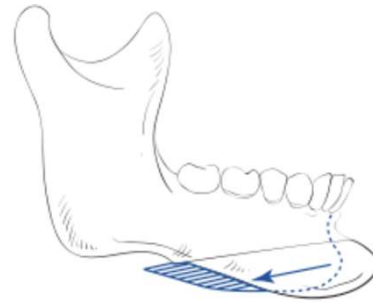
Genioplasty

- Chin is infiltrated with lidocaine containing 1:100,000 epinephrine.
- Incision made 1 cm below the level of the attached gingiva (leave cuff of muscle and mucosa for closure).
- Access can also be obtained through a 4 cm submental incision
- Angle incision to bone
- Extend incision from 1st premolar to 1st premolar
- Subperiosteal flap elevation for exposure of the mental foramen bilaterally and the inferior border of the mandible
- Only expose enough to perform the osteotomy. Maintain as much soft tissue pedicle to the distal segment as possible (blood supply)
- Mark the dental midline and two lateral reference lines on each side of the midline
- Perform the osteotomy with a reciprocating saw with the angulation according to the desired result
- The length and angle of the horizontal cut have profound effect on the final results
- Osteotomy should be 5mm below the apex of the teeth and the mental foramen
- Fixate with circum-mandibular wire, wire osteosynthesis, screws, or plates and screws

Genioplasty

Horizontal Excess

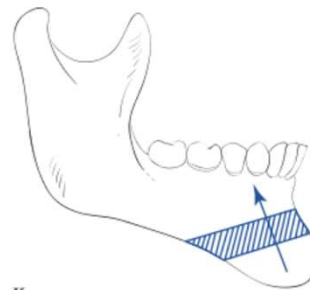
- Horizontal Chin excess is treated by moving the segment posteriorly.
 - This may increase facial height (depending on the vertical angulation of the osteotomy).
- ★ • Sliding Genioplasty to decrease the prominence of the chin



Reduction Genioplasty

Vertical Excess

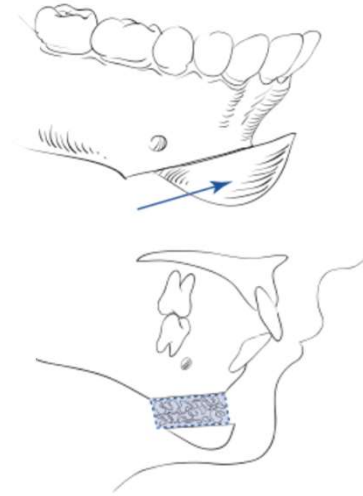
- A wedge of bone can be removed and the segment repositioned to decrease the vertical length



Genioplasty

Horizontal and Vertical Chin Deficiency

- When the inferior segment is advanced, the facial height can be decreased
- Bone graft may be placed between the superior and inferior segments to increase facial height
- Osteoplasty may be needed at the posterior aspect to remove unsightly protrusions



Complications of Osteoplastic Genioplasty

- Notching / pre-jowl sulcus accentuation 72 %
- Relapse - considered a stable procedure
- Wound dehiscence/ gingival/periodontal issues 3%
- Patient dissatisfaction <7%
- Hypoesthesia 15%
- Avascular necrosis of the chin
- Removal of hardware 5%

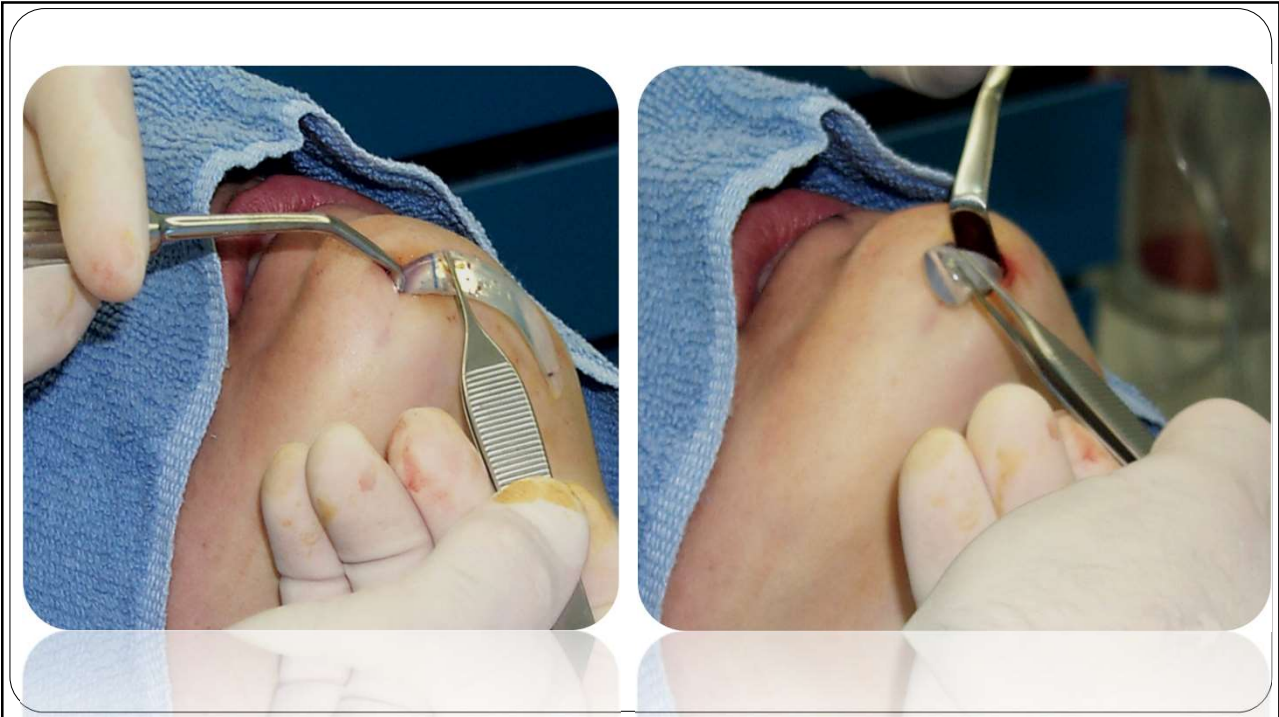
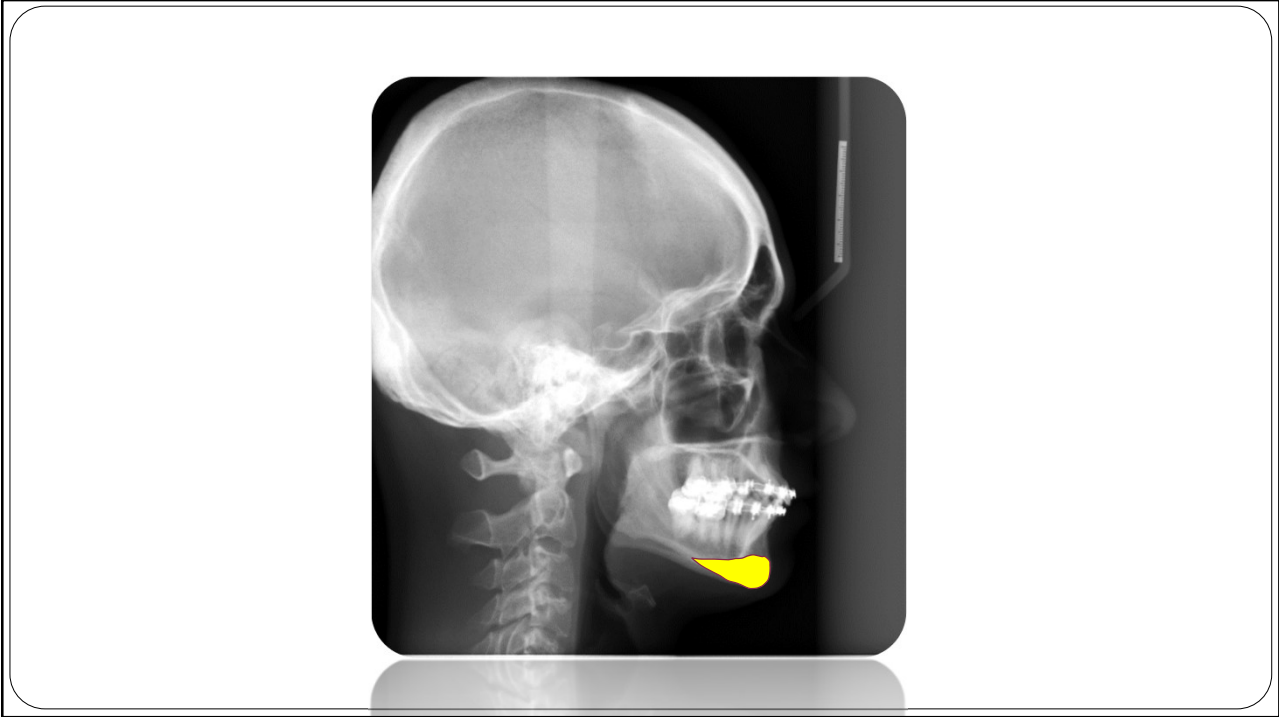
Implant Augmentation



Chin Implant Augmentation

- Useful to Improve
 - Thyromental distance
 - Lower facial 1/3 AP length
 - Cervical aesthetics
- Simple surgery
- Silicone, Gortex, Med-Por
- Anatomical, button, wing
- Secured with suture vs. screw
- Place at inferior border of the mandible





Chin Implant

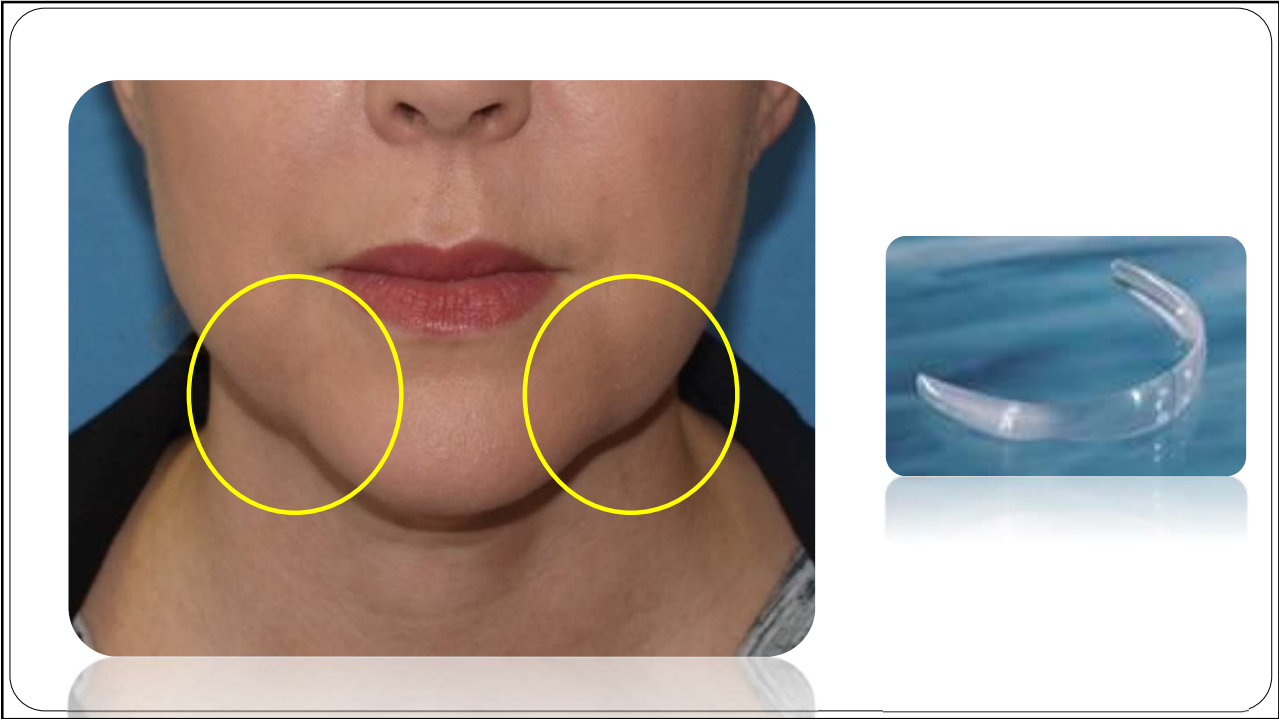


Chin implant/Submental Lipo/Fat Grafting

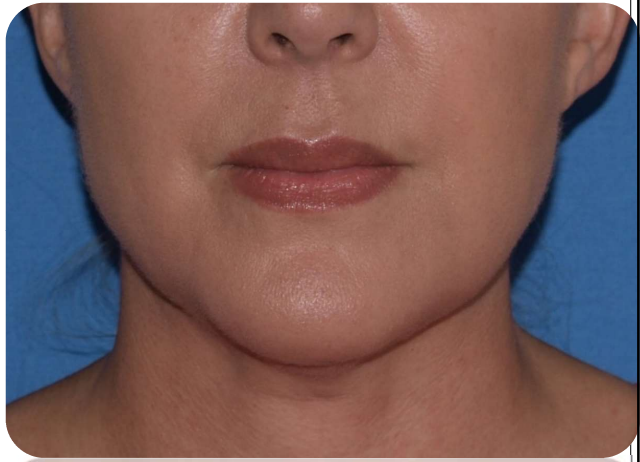
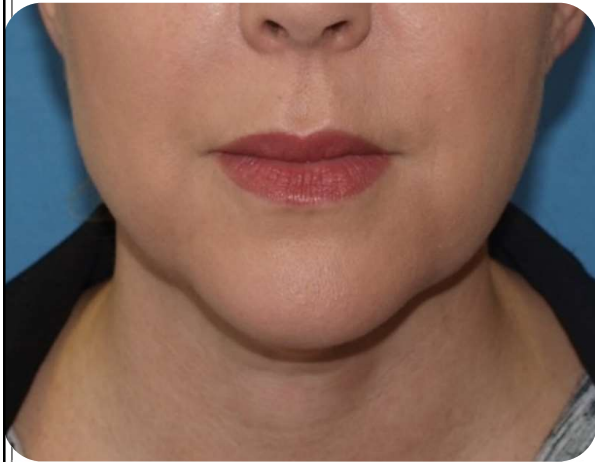


Chin implant/Submental Lipo (9 mos)





Case 5



Implant Complications

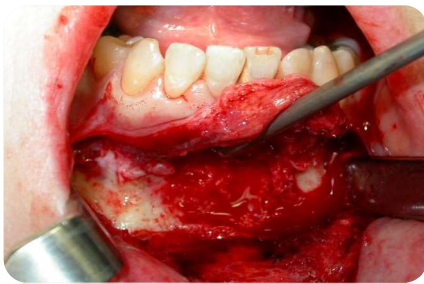
- Bone resorption
- Migration
- Infection
- Tooth damage
- Paresthesia
- Dehiscence
- Asymmetry
- Lip eversion
- Chin button
- Unaesthetic result



Implant Complications

Bone Resorption

- Avoid 'Button' Shape
- Place at Inferior Border & Avoid 'High' Position
- Proper Fixation
- Adequate Soft Tissue Coverage



Chin Implant

- Chin is infiltrated with lidocaine containing 1:100,000 epinephrine.
- A small sub-mental incision is made 1mm posterior to sub-mental crease with 15 blade.
- Dissect directly down to bone with electro-cautery.
- #9 periosteal elevator used to dissect a sub-periosteal pocket, with care not to over-dissect.
- Chin implant is placed to soak in betadine.
- An Alfricht elevator is used to retract the pocket and the implant is placed, one side at a time.
- May choose to secure at midline with suture (especially if concerned implant could migrate if pocket too large).
- Close incision

Lip Lift

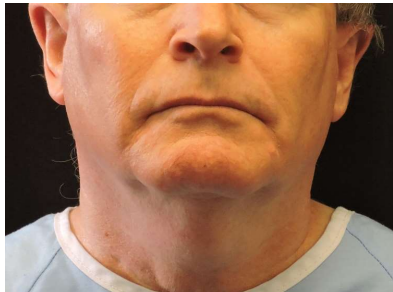
- Ideal for long maxillary lip
- Improve tooth show at rest
- Simple Surgery
- Can be done with local anesthesia only



Lip Lift



Lip, Brow, Face, Neck Lift



Lip Lift



Lip Lift



Lip Lift



Lip Lift

Technique:

- Administer Local Anesthetic (+/- IV sedation)
- Markings: Use calipers to measure upper lip length.
 - Curvilinear bullhorn design
 - Typically remove 6-10mm of tissue
 - Care not to decrease lip length <10-15mm
- Incision with 15 blade through skin and sub-c tissue, leaving orbicularis oris intact
- Re-approximate tissue with interrupted buried 4-0 vicryl
- Running 6-0 FAST on skin or running 6-0 Prolene and remove at one week

Thank you!

Good Luck!

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