Management of the Facial Hypoplasia

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What is Facial Hypoplasia?

- Any disproportionate growth of a part of the face when compared to the rest of the face
- Usually occurs due to hypoplasia of the facial skeleton

Which part of the facial skeleton is affected?

- Frontal Complex
- Maxillary Complex
- Mandibular Complex
- Naso-orbital Complex
- Ear

How do we manage Facial Hypoplasia?

- By repositioning the affected facial skeleton
- By adding grafts on the affected facial skeleton

Repositioning of Facial Skeleton

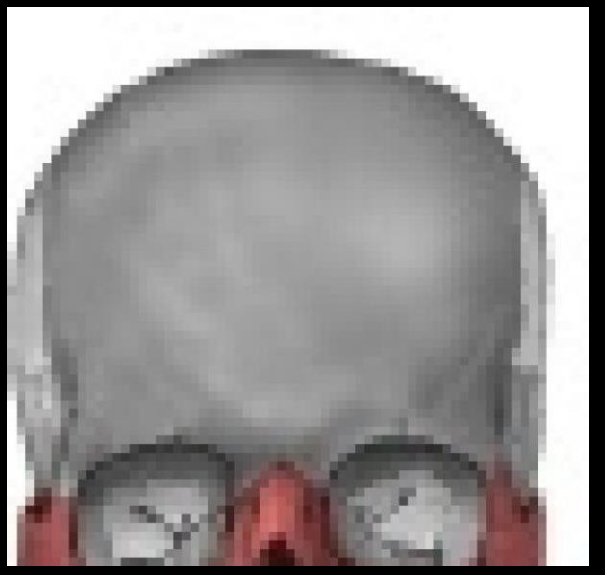
- Maxillary Complex
- Mandibular Complex
- Naso-orbital Complex
- Frontal Complex
- Ear

OSTEOTOMY OF THE MAXILLARY/NASAL COMPLEX ZYGOMATIC/MALAR COMPLEX

Osteotomy of the Maxillary Complex

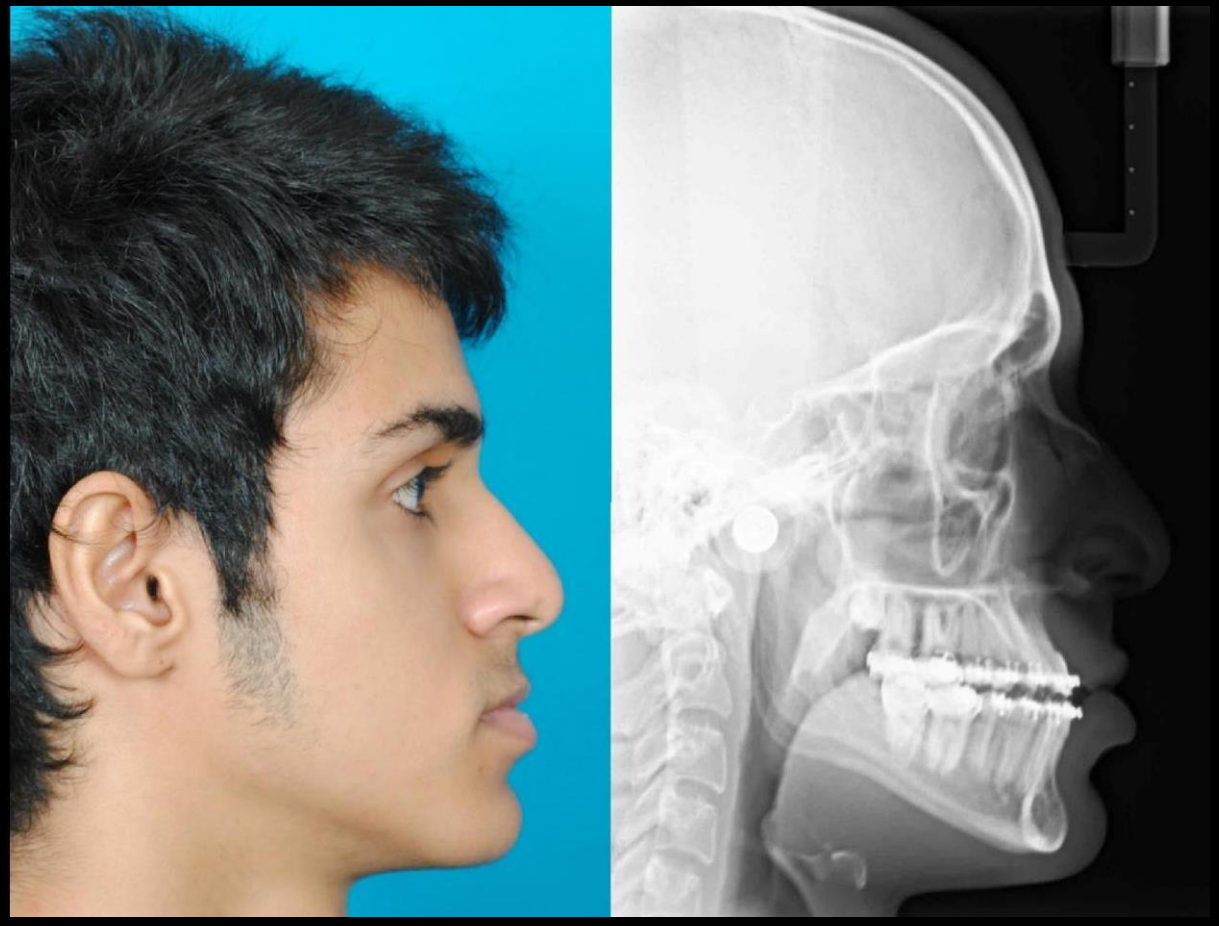
LeFort I Osteotomy

LeFort II Osteotomy



LeFort III Osteotomy

LeFort I osteotomy Indications

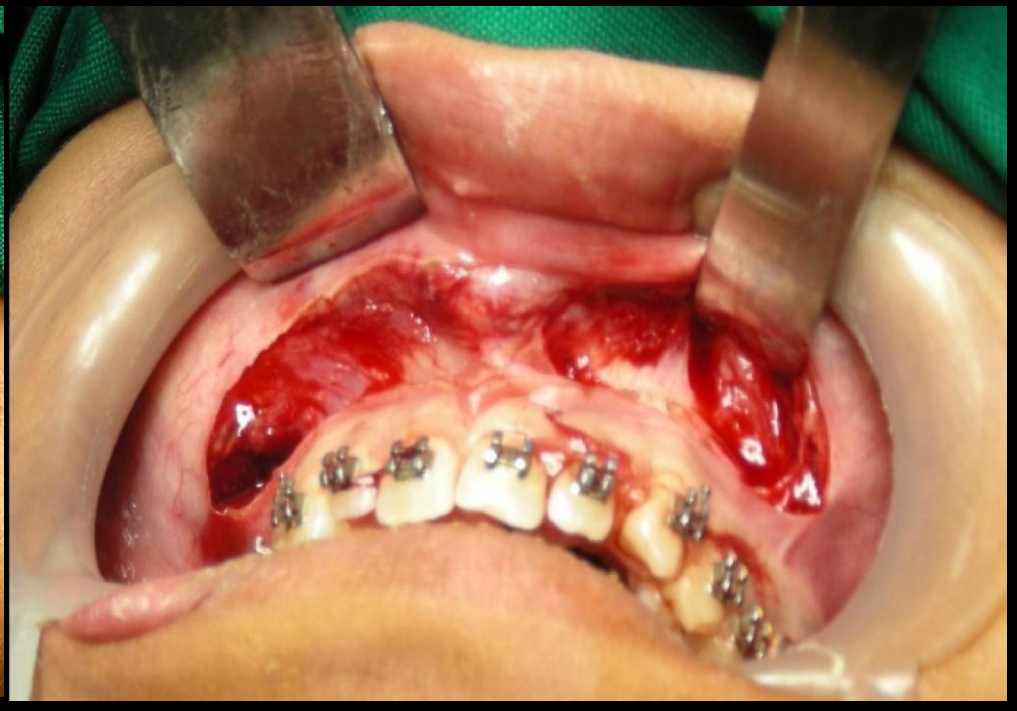


Deficiency of only the Maxillary/MalarComplex

Performing a LeFort I Osteotomy

Incision Design

- In the buccal sulcus about 6mm above the gingival margin.



Performing a LeFort I Osteotomy

Subperiosteal dissection

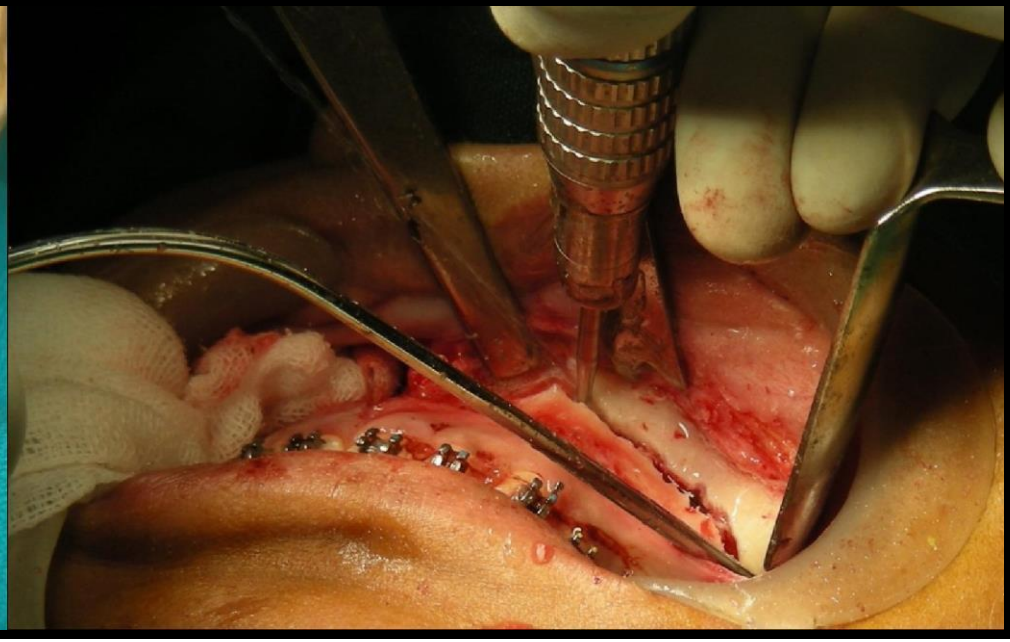
- Exposethe lateral aspect of nasal cavity and carefully elevate the nasal mucosa without perforatingit.
- Posteriorly, dissect around the tuberosity and tunnel up to the pterygoid.
- Superiorly, expose the anterior maxillary wall, identifying the inferiororbital foramen

Performing a LeFort I Osteotomy

Anterior buccal osteotomy

- Lateral wall of the maxilla is cut with the help of a Reciprocating Saw with copious irrigation.

- The Lateral wall osteotomy can have variations in the design

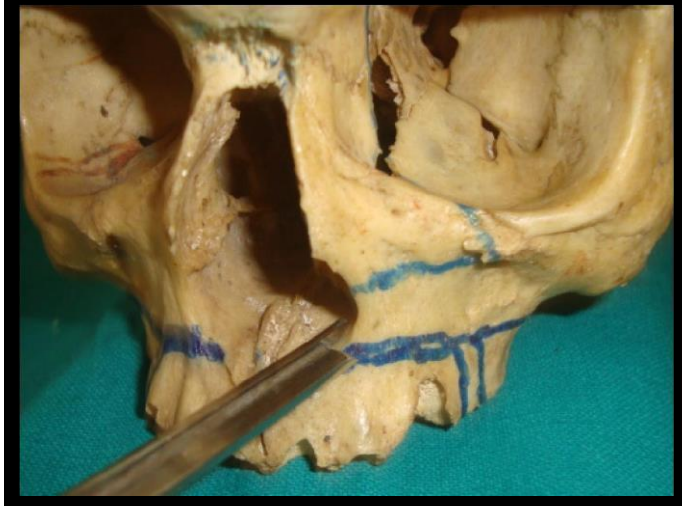


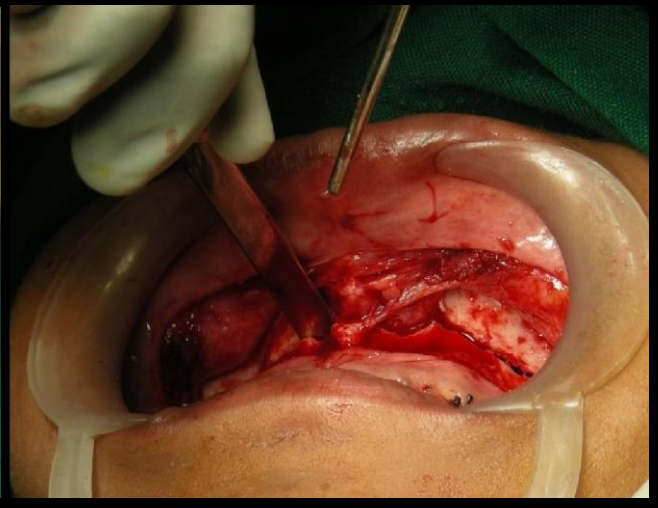
Performing a LeFort I Osteotomy

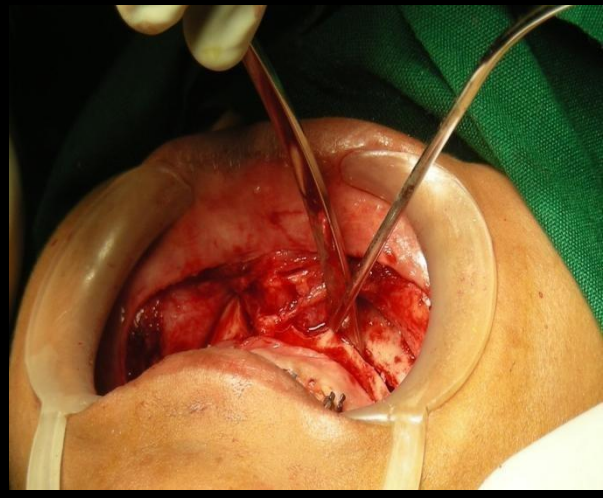
Medial and posterior wall osteotomy

- A thin guarded osteotome is used to and tap gently and carefully to fracture the medial (lateral nasal wall) and posterior wall of maxilla.

- The nasal mucosa is protected from injury with a periosteal elevator while completing the osteotomy.







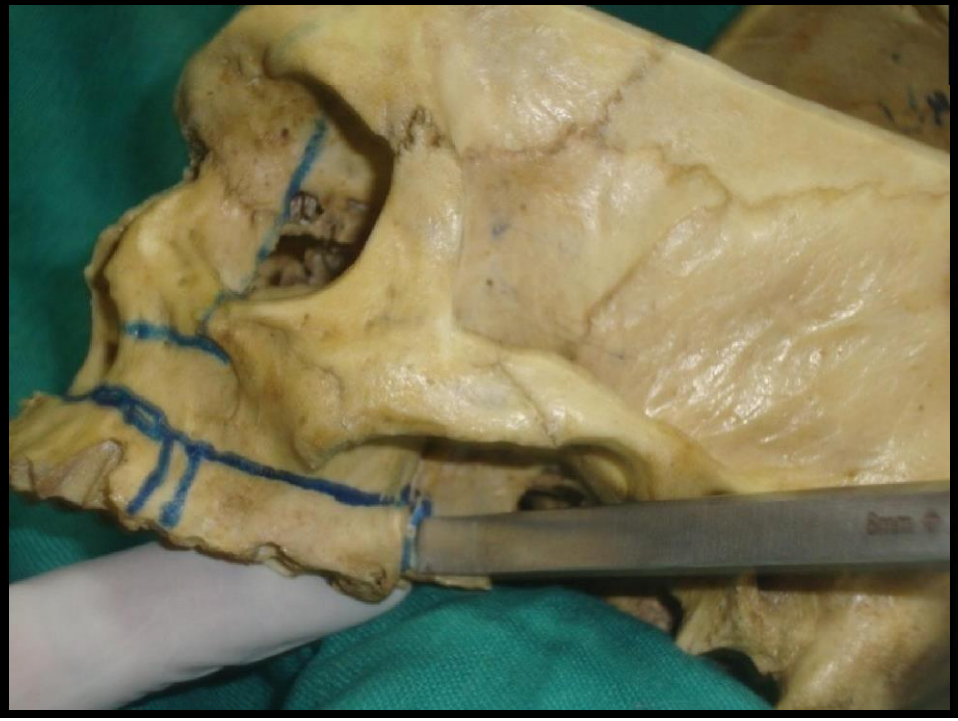
Performing a LeFort I Osteotomy

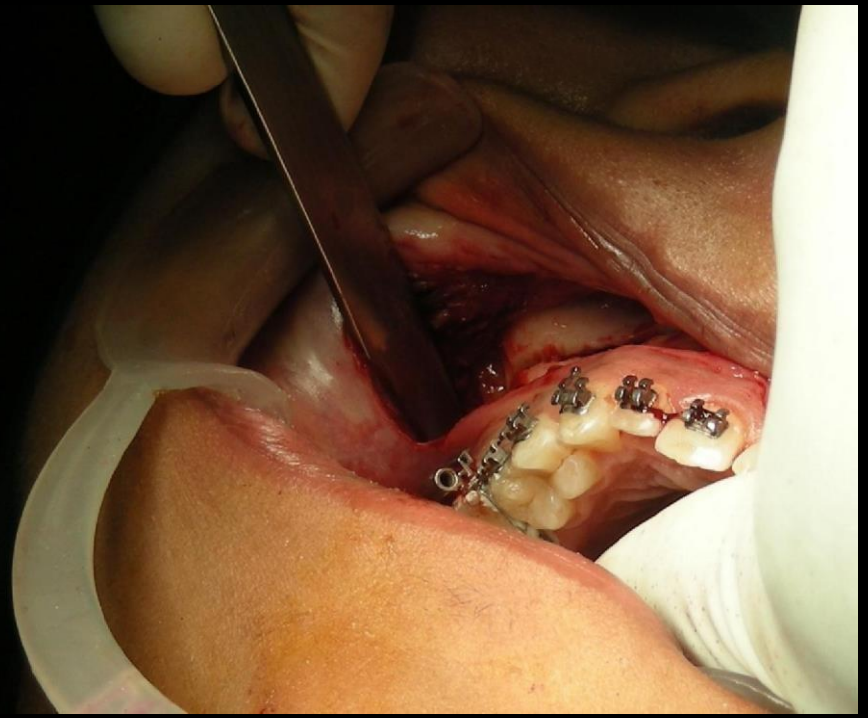
Pterygomaxillary osteotomy

- The pterygoid plate is separated fromthe maxilla using a pterygoid osteotome.

•The pterygoid hamulus is felt and palpated with the ball of the index finger to prevent excess in chiseling and damage to the soft tissues.

- Failure to separate the tuberosity from the pterygoid plates will causedifficulty in downfracture or an unfavorable fracture.

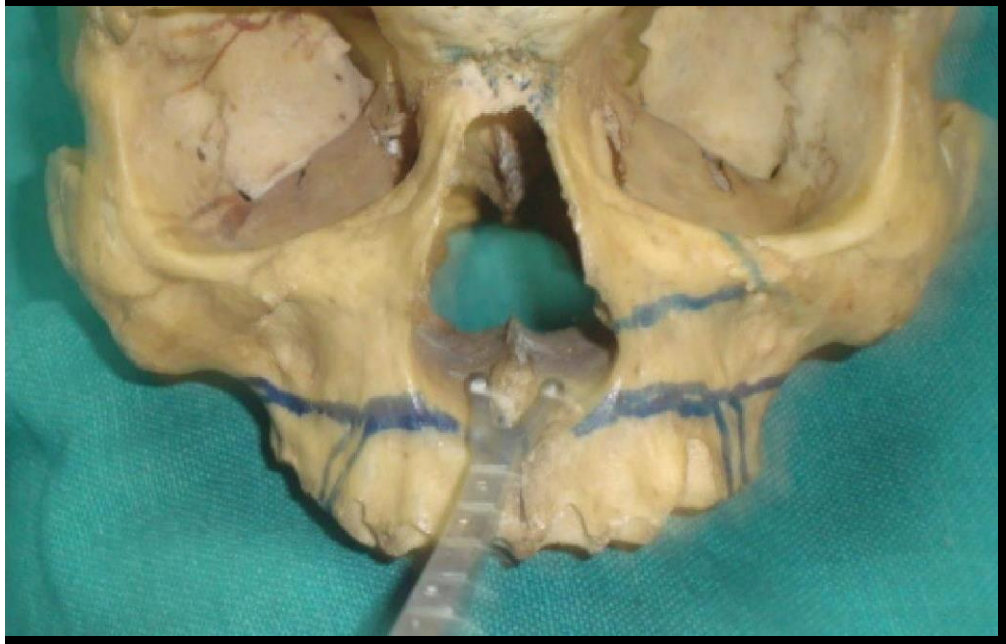


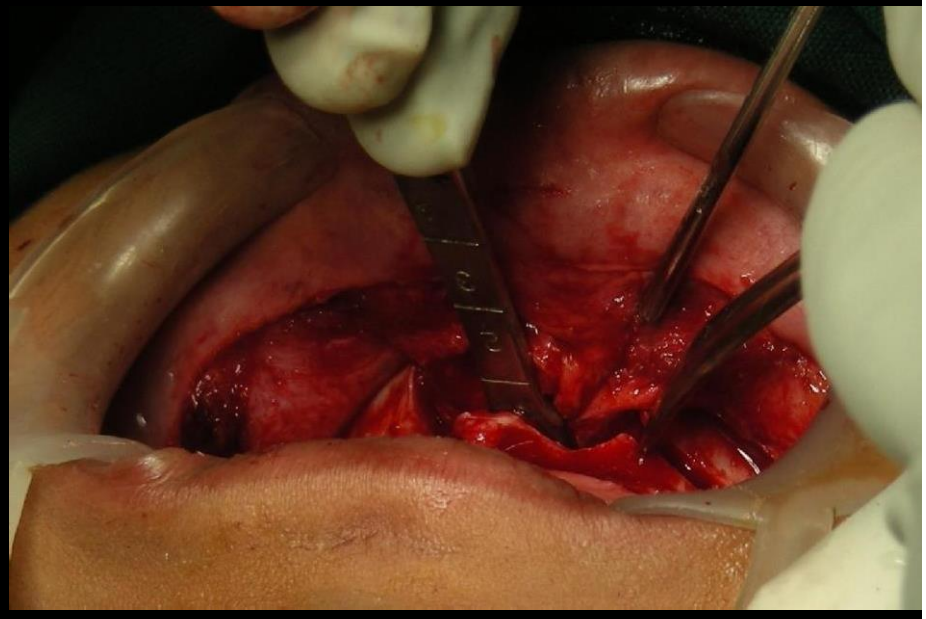


Performing a LeFort I Osteotomy

Nasal septum and vomer osteotomy

- The nasal septum cartilage and vomer is separated fromthe maxilla using a septal gouge or osteotome.



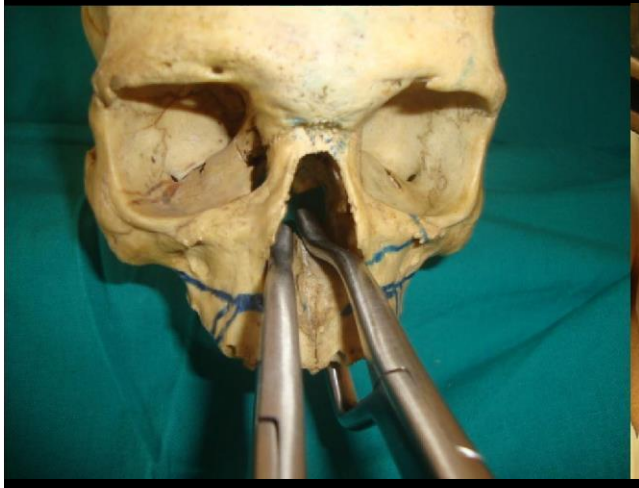
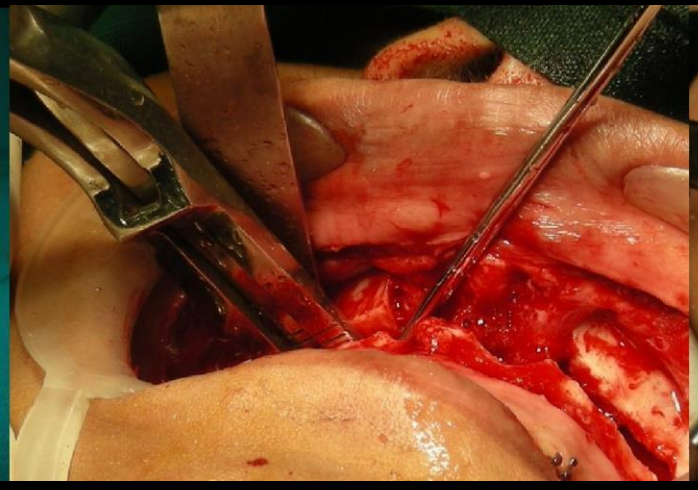
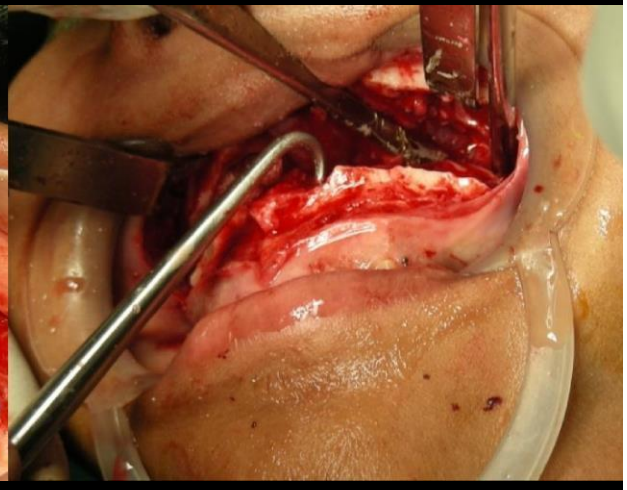


Performing a LeFort I Osteotomy

Maxillary downfracture and mobilization

- By using thumb pressure on the anterior aspect, the maxilla isdownfractured.
- Revise the osteotomies if there is difficulty in downfracturing.
- Mobilze the maxillawith the help of the Rowes dis-impaction forcepsif required.
- Make sure the maxilla is completely detached andmobile.
- Now any movement is possible with the maxilla.

  e.g. forward, downward, impaction etc

Fixation after performing a LeFort I Osteotomy

Fixation should be done after the occlusal splint is in place and inter maxillary fixation is done

Forward and/or downward movement

- 2mm "L" or straight bone plates at the zygomatic butress and piriform area

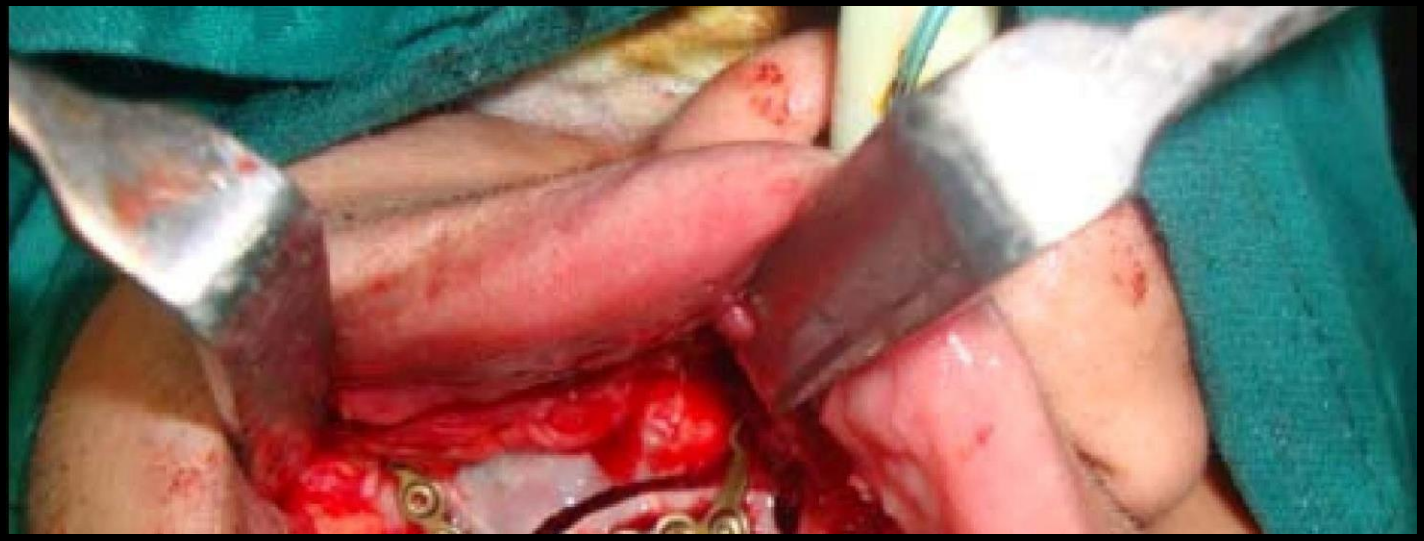
Forward and/or downward movement in high Lefort I osteotomy

- Same as previous in the zygomatic butress area with 2mm low profile bone plates at the piriform area

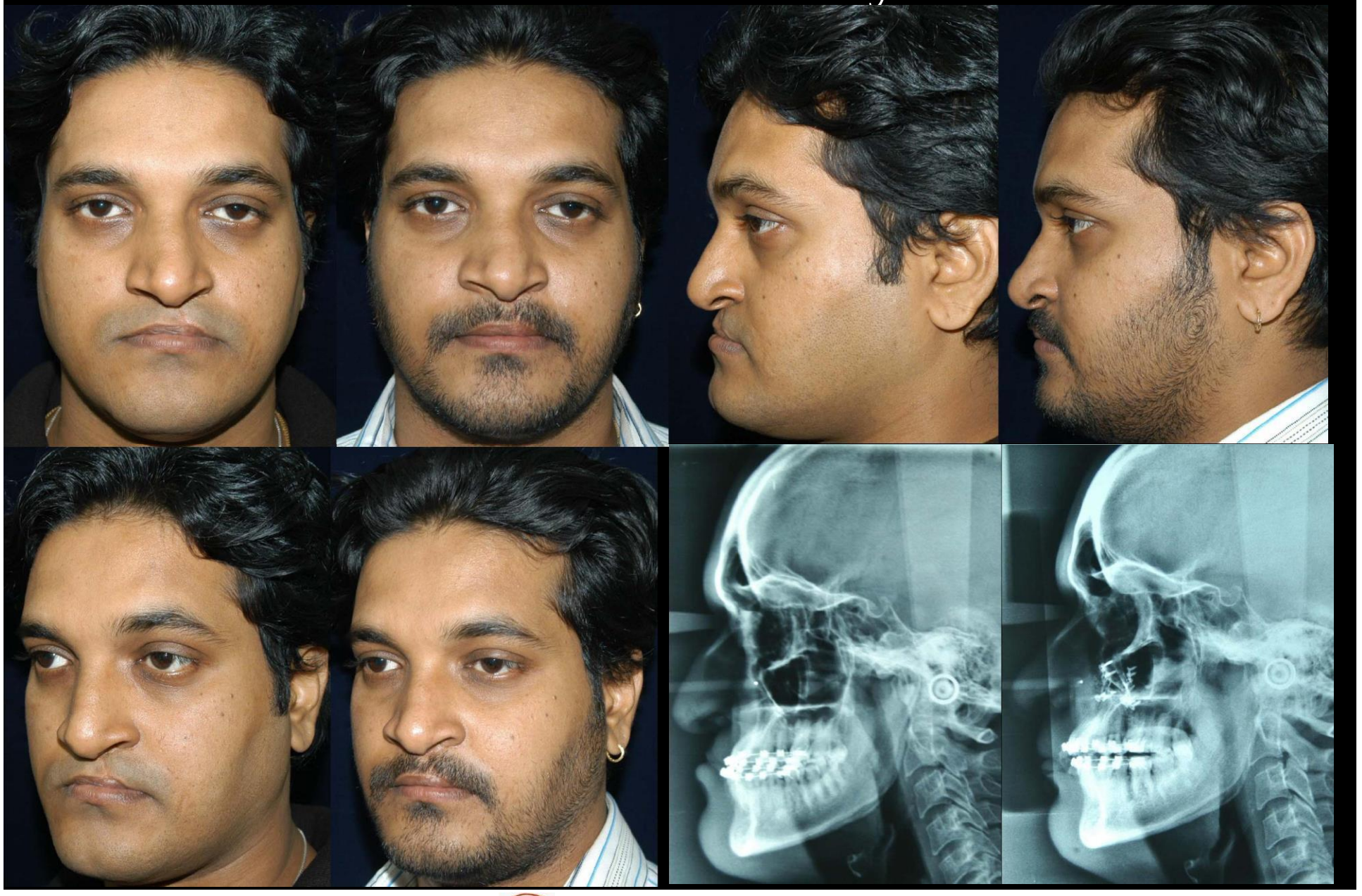
Impaction of maxilla

- Wire fixation at the zygomatic butress area because of telescoping of the maxilla and 2 mm bone plates at the piriform area

Fixation after performing a LeFort I Osteotomy



LeFort I Osteotomy



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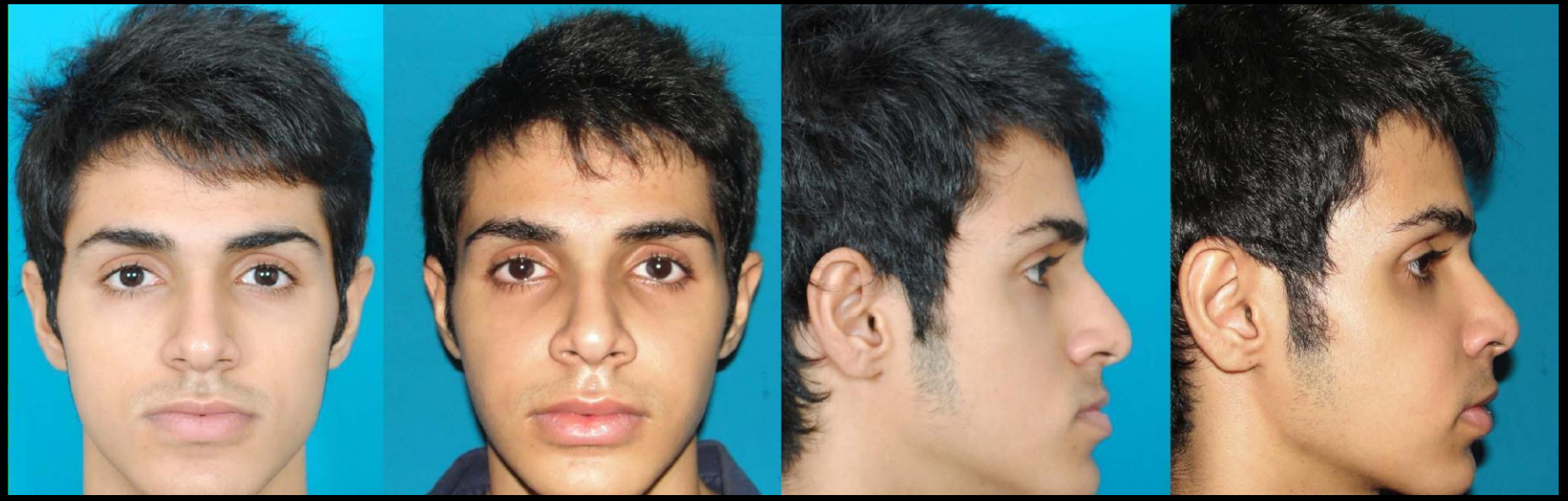
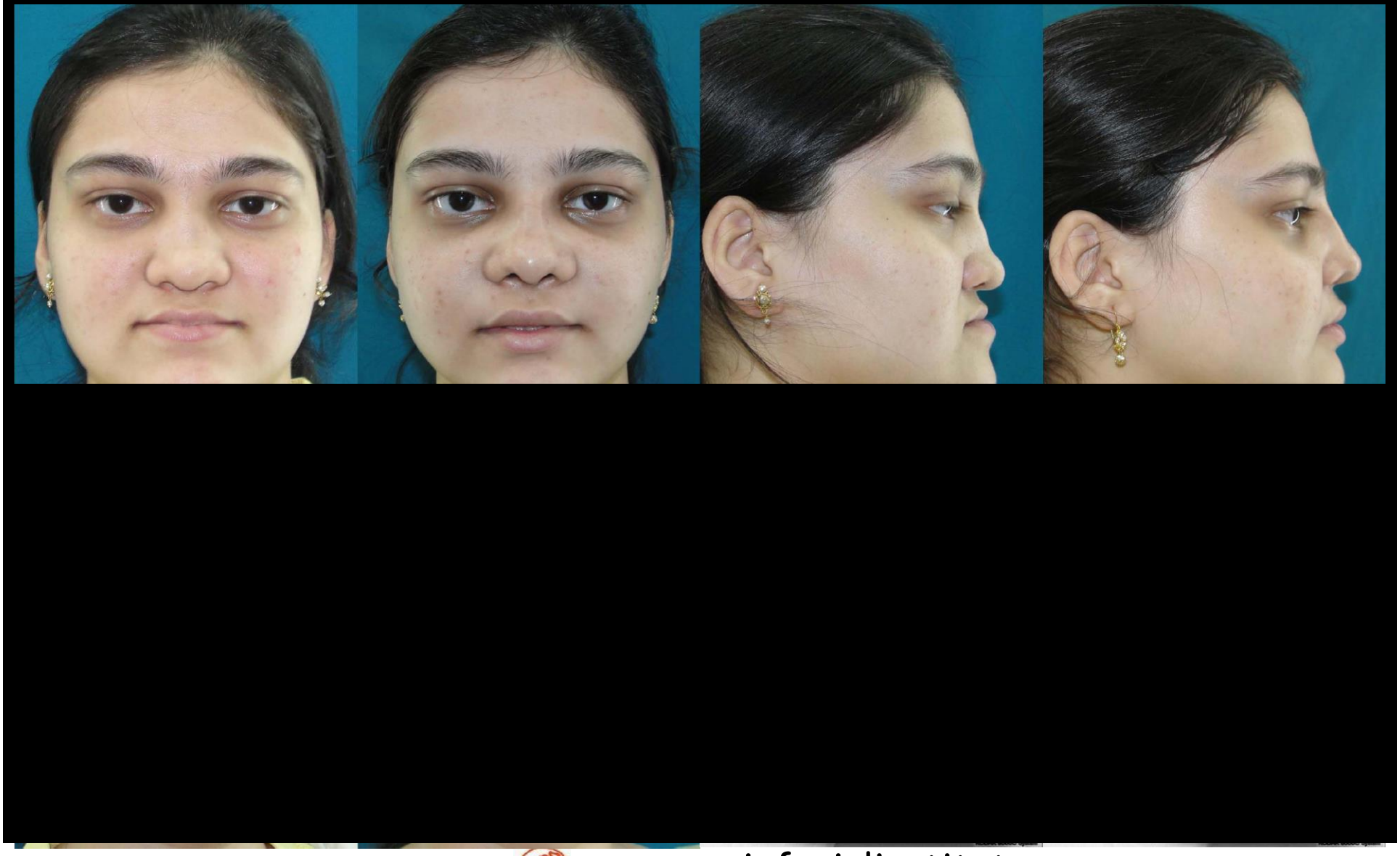
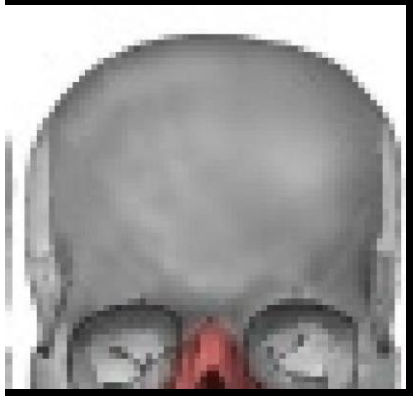
High LeFort I Osteotomy



High LeFort I Osteotomy with Rhinoplasty



LeFort II osteotomy



- A pyramidal maxillary osteotomy.
- The osteotomy line extends from
  - ptyerigoid region on one side,
  - underneath the zygomaticomaxillary buttress
  - up over the medial portion of the infraorbital rim,
  - behind the lacrimal bone
  - along the medial wall of the orbit
  - to the dorsum of the nose

Performing a LeFort II Osteotomy

Skin Incision

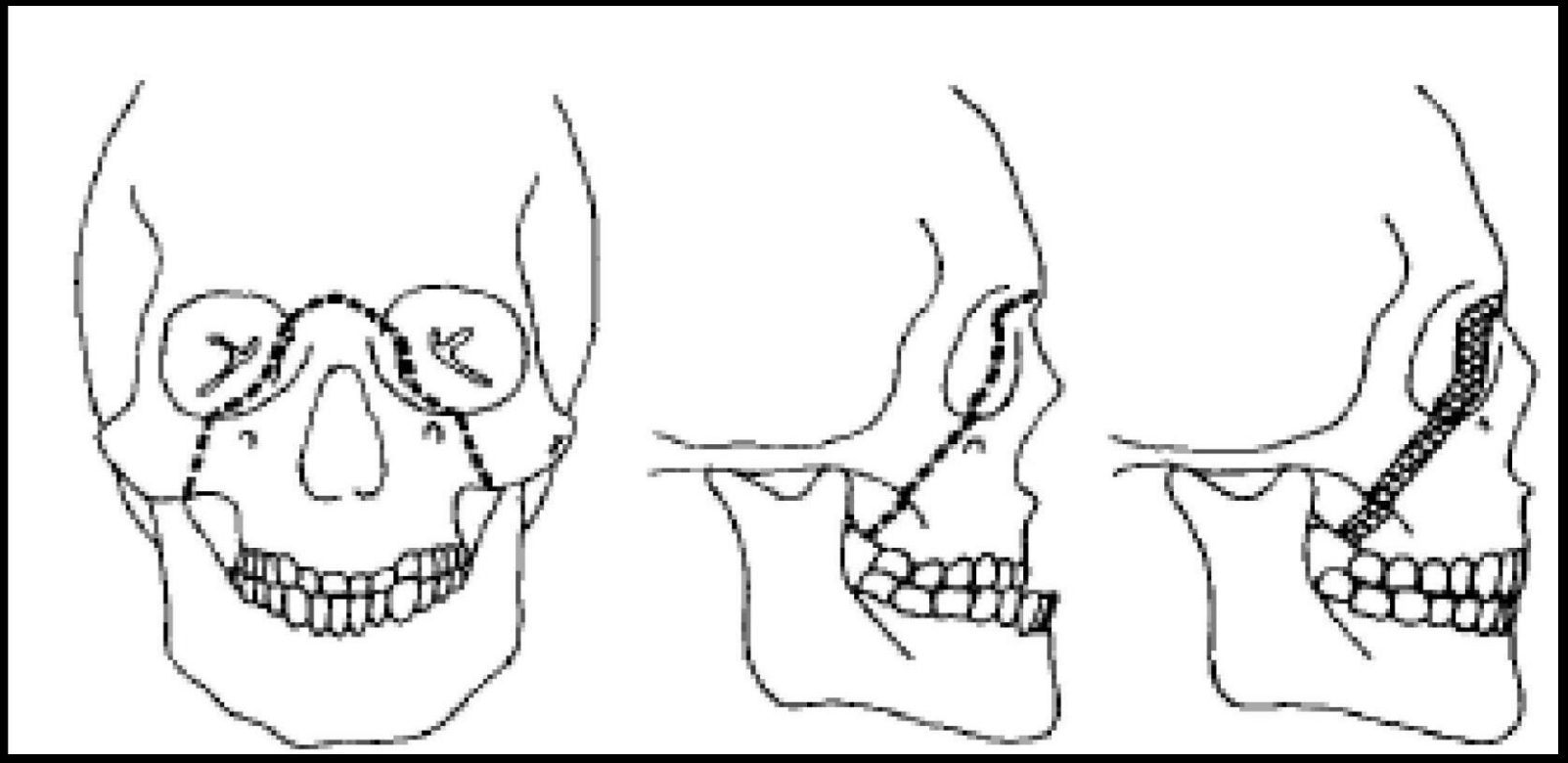
The skin incision consists of bicoronal incision with the dissection as far forward and anterior as possible and a labial sulcus incision

Courtesy

Emil W.STE1NHAUSER Variations of Le Fort II Osteotomies for Correction of Midfacial Deformities J. max.-fac. Surg. 8 (1980) 258-265

Performing a LeFort II Osteotomy

The osteotomy starts at pterygoid region and continues under the butress and over the infra orbital rim, medial wall of orbit and dorsum of nose



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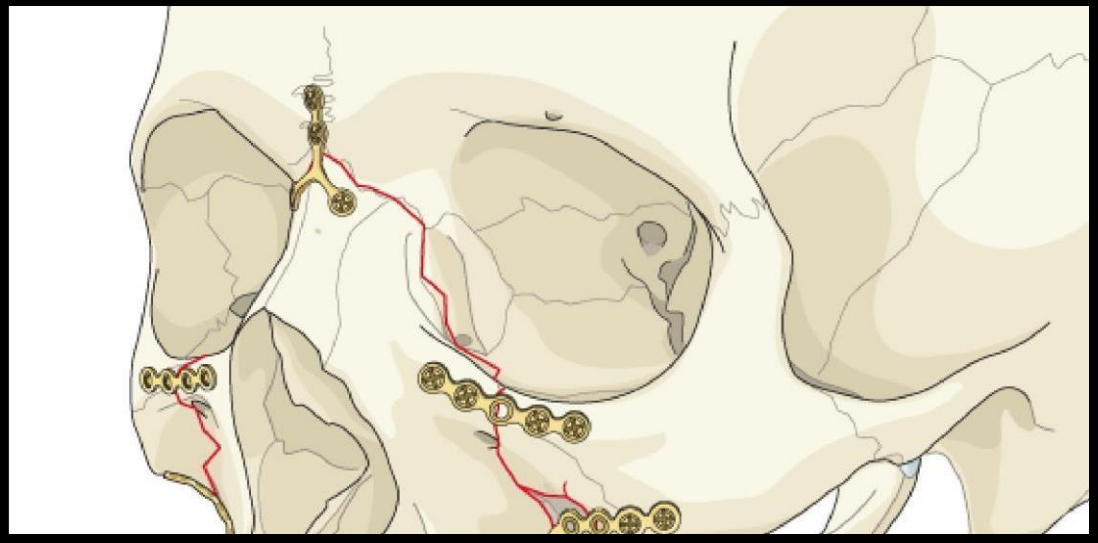
Fixation after performing a LeFort II Osteotomy



LeFort II osteotomy

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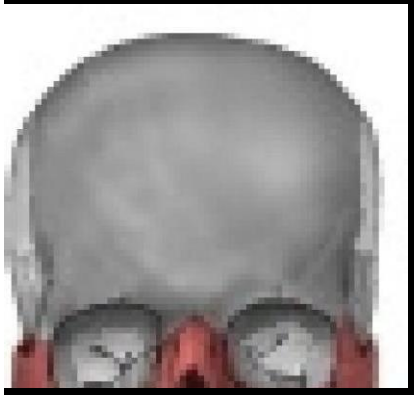
LeFort III osteotomy



- The osteotomy line extends from
  - frontozygomatic suture along the lateral aspect of the internal orbit
  - continues along the sphenozygomatic suture line to the inferior orbital fissure,
  - extends medially across the floor of the orbit up the medial wall of the orbit
  - to the dorsum of the nose

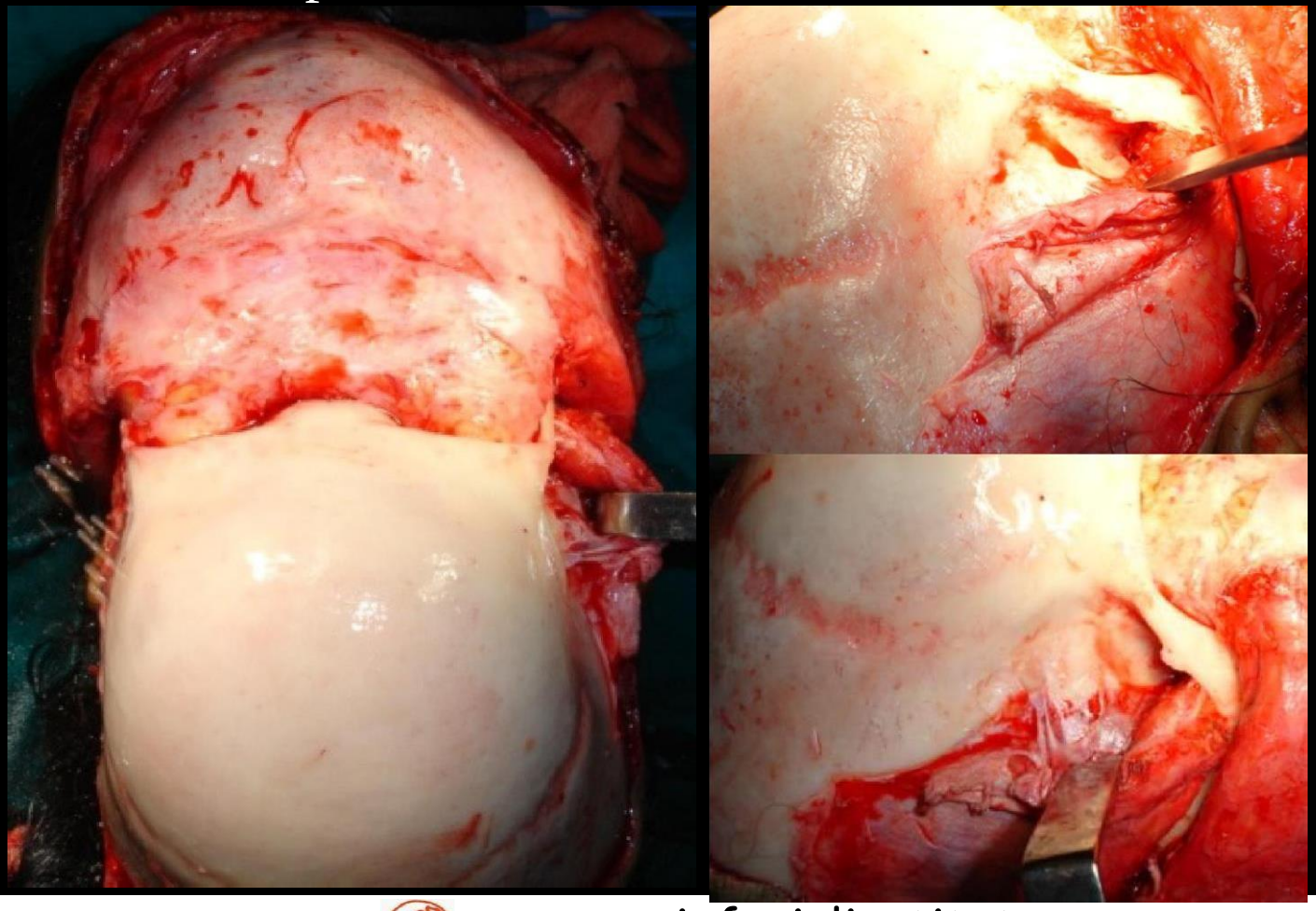
LeFort III osteotomy
Indications

Deficiency of only the Maxillary, Malar, Zygomatic and Nasal Complex

Performing a LeFort III Osteotomy

Skin Incision

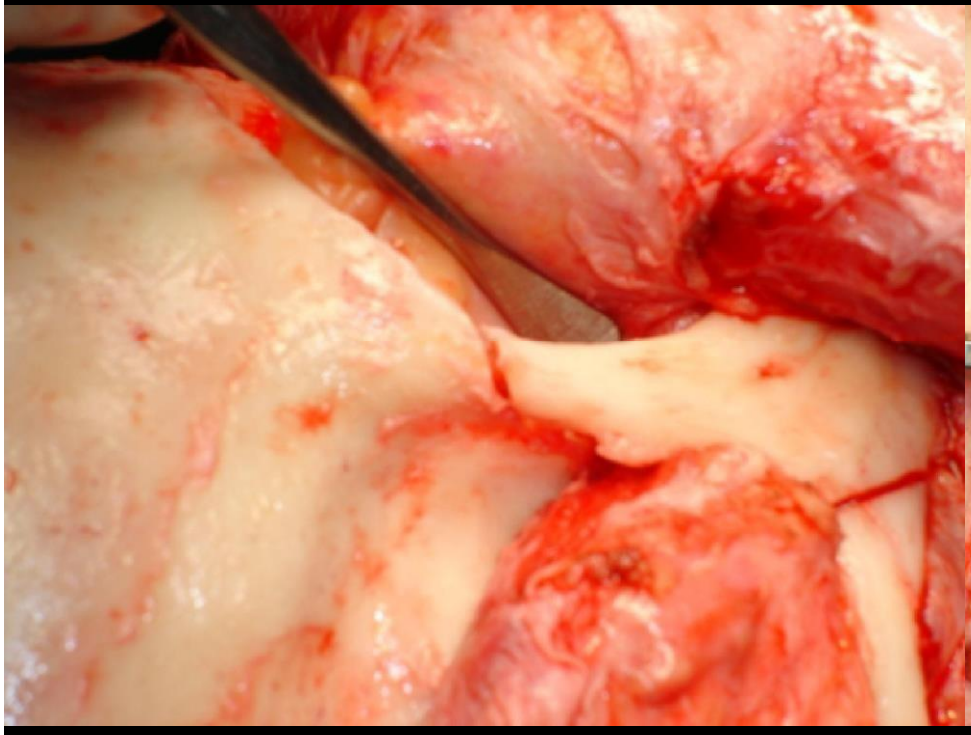
The skin incision consists of bicoronal incision with the dissection as far forward and anterior as possible.

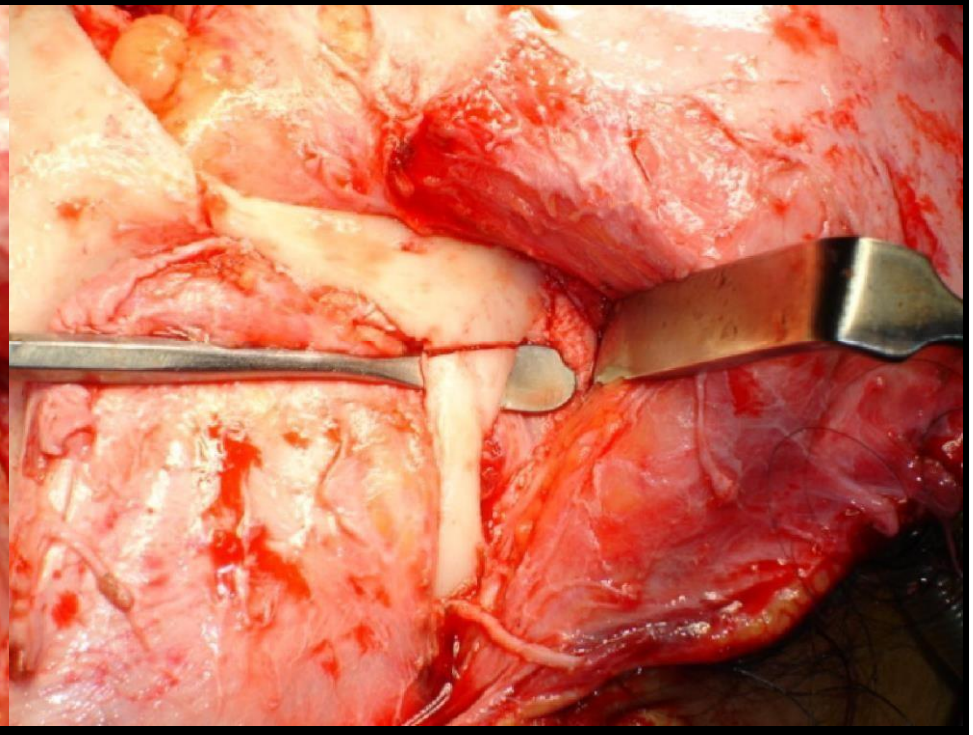


Performing a LeFort III Osteotomy

Frontozygomatic suture osteotomy and dysjunction of zygomatic arch is done

Orbital osteotomy along the lateral aspect of the internal orbit is done

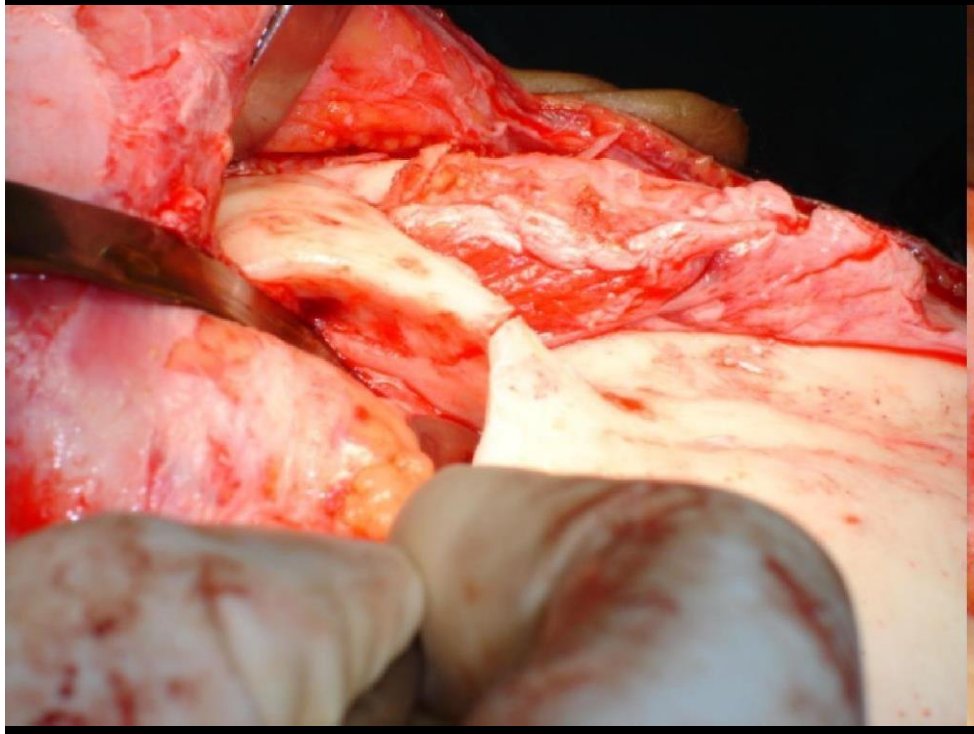


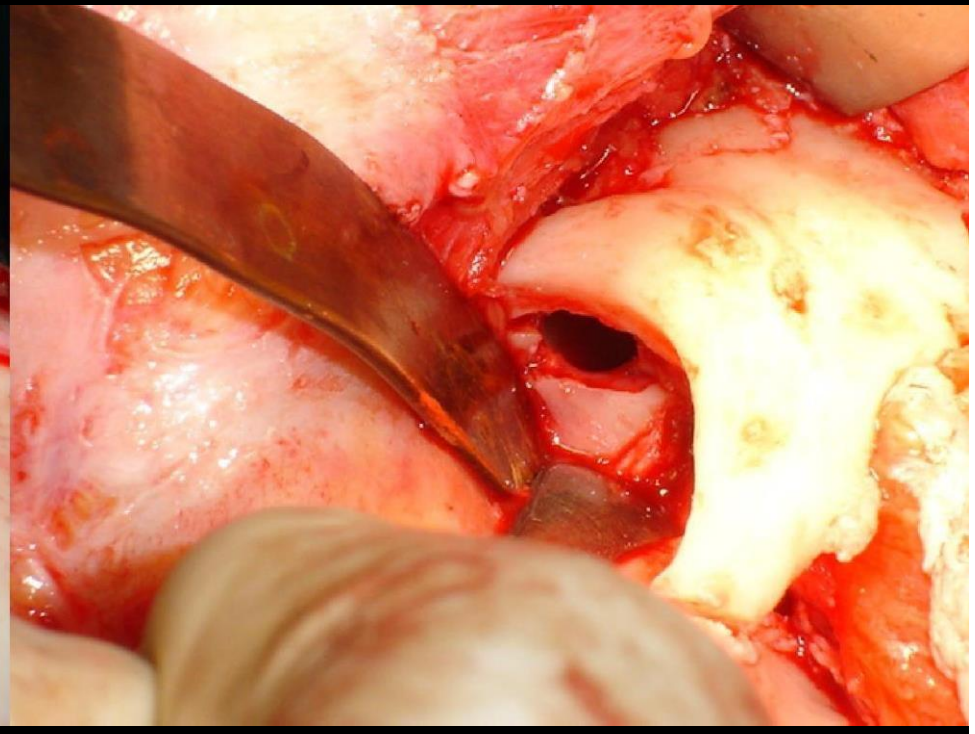


Performing a LeFort III Osteotomy

The osteotomy is continued along the sphenozygomatic suture line to the inferior orbital fissure.

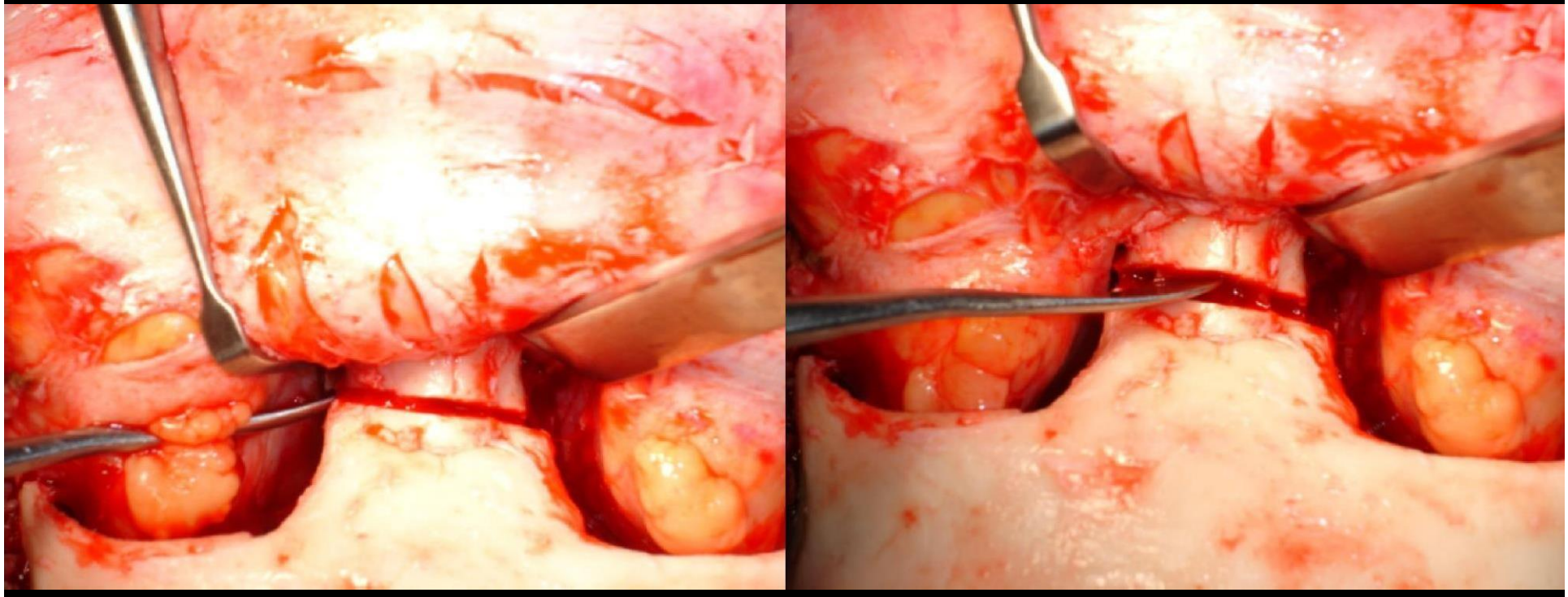
The osteotomy then extends medially across the floor of the orbit up the medial wall of the orbit





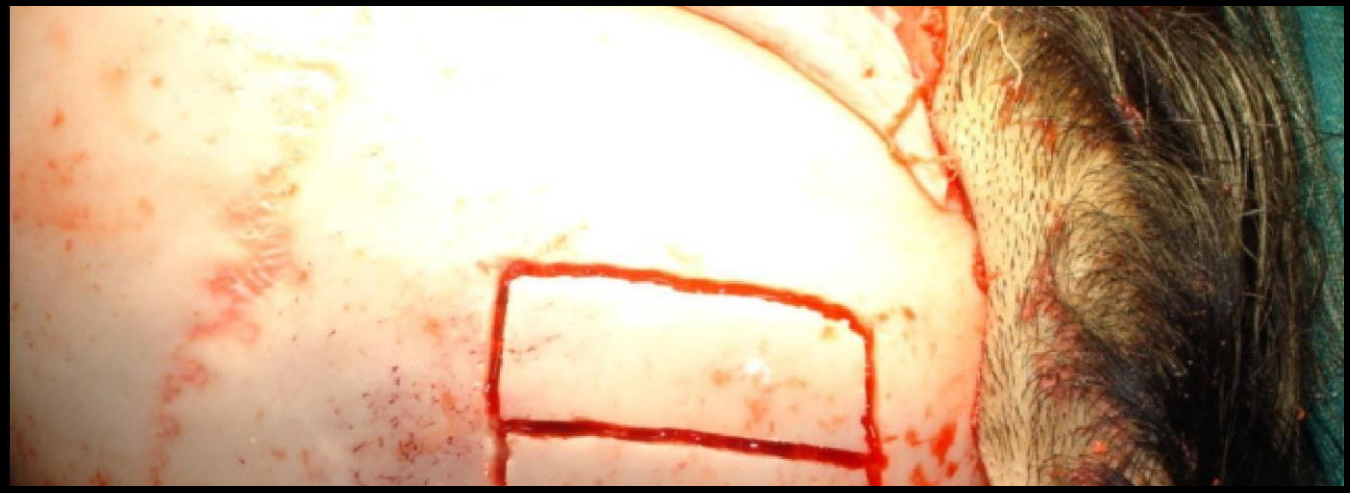
Performing a LeFort III Osteotomy

The osteotomy ends on the dorsum of the nose



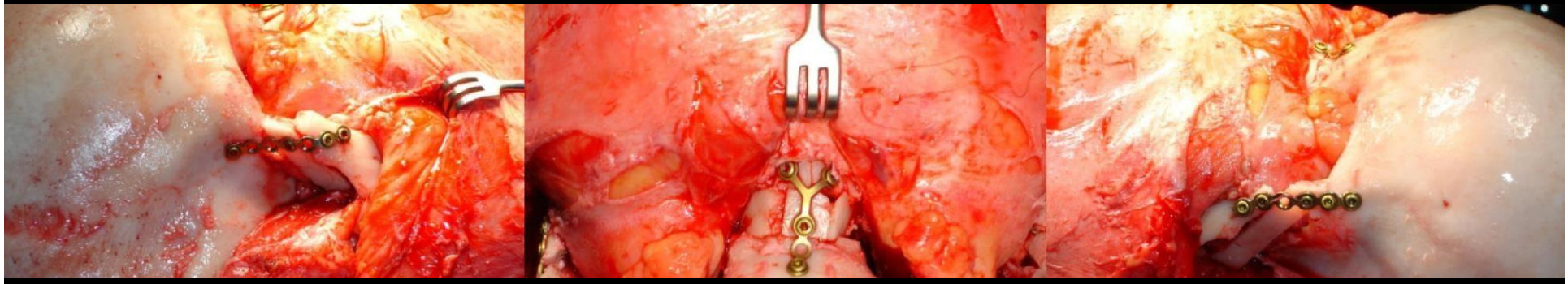
Performing a LeFort III Osteotomy

Calvarial bone graft is harveted



Fixation after performing a LeFort III Osteotomy

Fixation is done with 1.5 mm low profile plates at the nasal and frontozygomatic areas with interposition of bone grafts



LeFort III Osteotomy

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LeFort Osteotomy Complications

- Infraorbital nerve traction injury
- Unanticipated fractures (pterygoid plate, sphenoid bone, middle cranial fossa)
- Injury to the internal maxillary artery and its branches
- Ophthalmic and lacrimal duct injury
- Avascular necrosis
- Maxillary sinusitis
- Velopharyngeal insufficiency
- Nasal septal deviation and buckling
- Arteriovenous fistulas (carotid-cavernous sinus)

LeFort Osteotomy
Complications
Intra cerebral hemorrhage

DISTRACTION OF THE MAXILLARY/NASAL COMPLEX ZYGOMATIC/MALAR COMPLEX

LeFort I Distraction

LeFort I Distraction

Secondary Cleft Maxilla

SCM Discrepancy:

- Transverse dimension
- Anterio-posterior dimension

SCM Pathophysiology:

- Loss of the bony support anteriorly in the cleft alveolus and medially in the cleft maxilla.
- Scar in the midline of the palate and the maxillary tuberosity area.

Orthodontic Procedure:
Banding, Brackets and Archwire

Orthodontic Procedure: Arch form

Surgical Protocol

Surgery:

Traditional LeFort I osteotomy without complete disimpaction of maxilla

Latency period:

5 days following osteotomy and application of the device

Active distraction:

1 mm per day with over distraction of 15 to 20 percent

Rigid retention:

8 weeks from the date of stoppage of distraction

Elastic retention:

4 weeks from removal of rigid retention

Surgical Procedure Distraction

Surgical Procedure Distraction

Pre op **3 months post op** **2 year post op**

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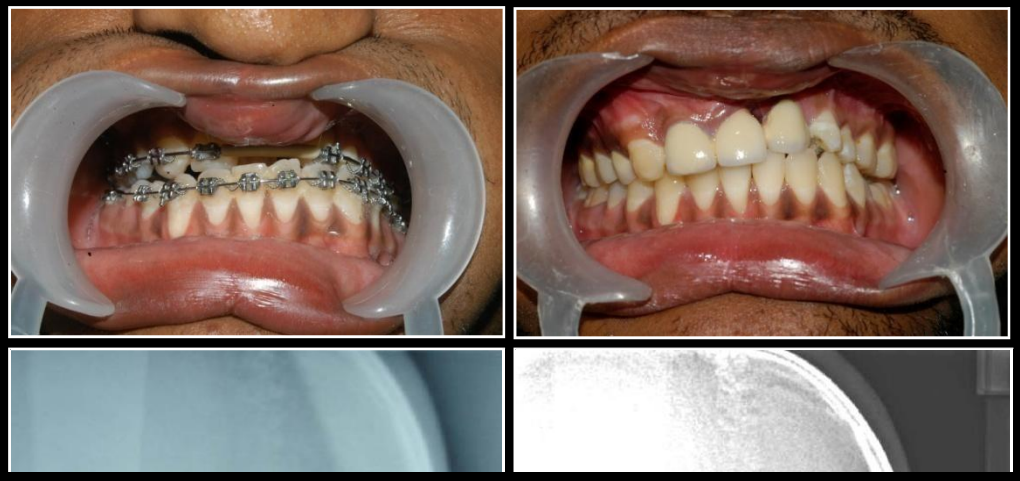
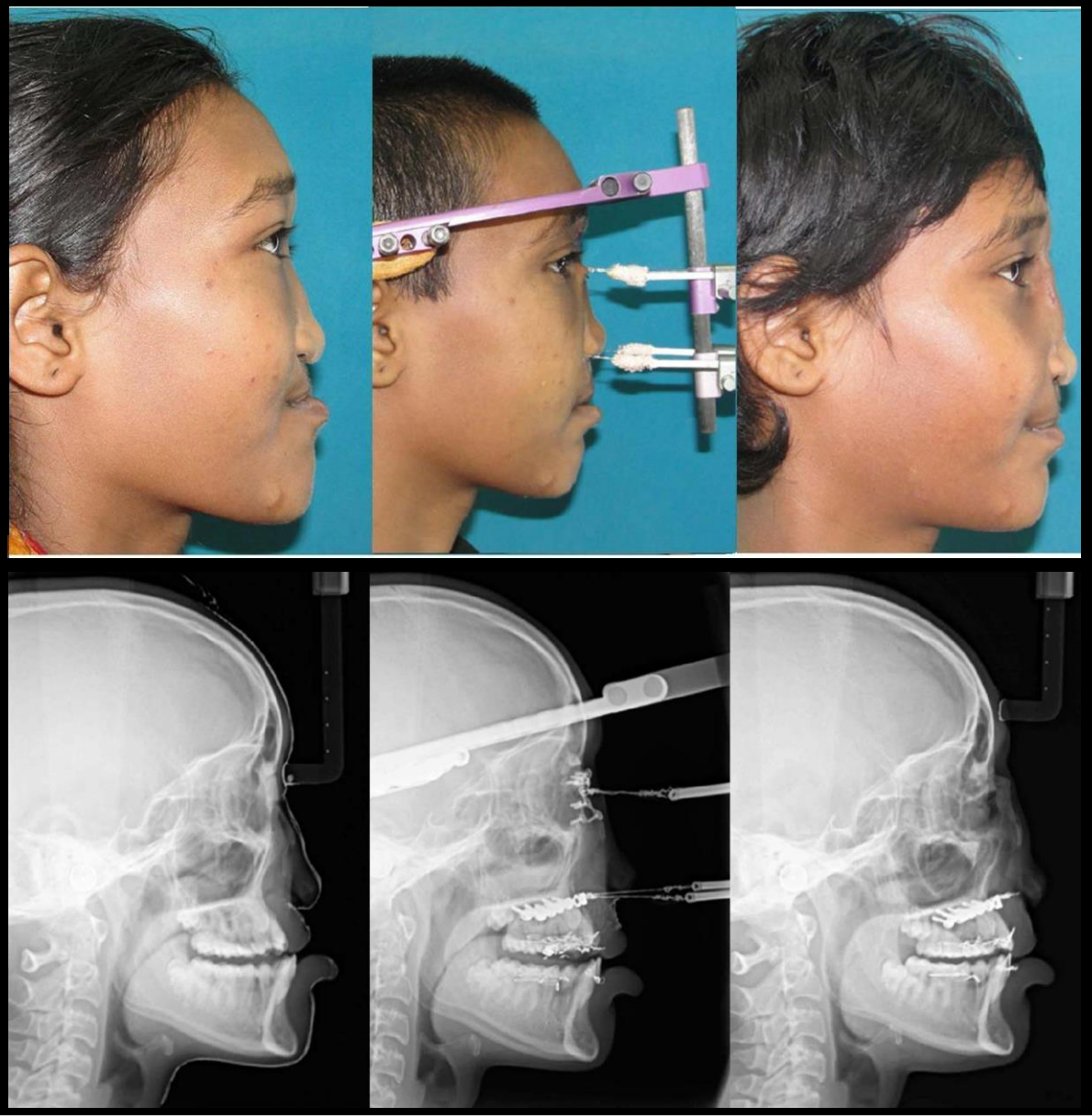
Surgical Procedure Distraction



Pre op **Post op**

LeFort II Distraction



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LeFort III Distraction

Repositioning of Facial Skeleton

- Maxillary Complex
- Mandibular Complex
- Naso-orbital Complex
- Frontal Complex

LeFort I + Bilateral Saggital Split Osteotomy

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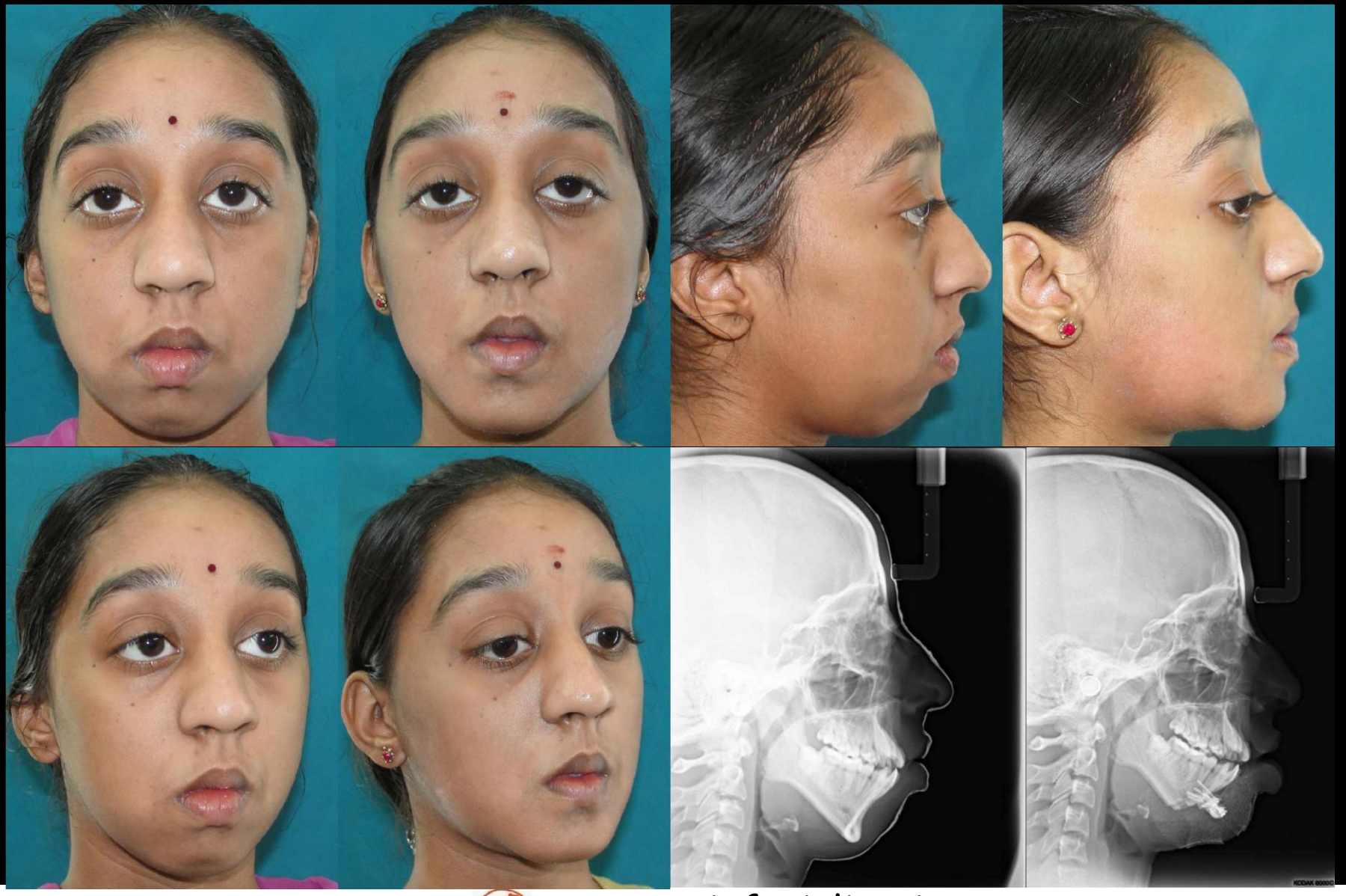
LeFort I Osteotomy + Genioplasty + Rhinoplasty

Repositioning of Facial Skeleton

- Maxillary Complex
- Mandibular Complex
- Naso-orbital Complex
- Frontal Complex
- Ear

Genioplasty



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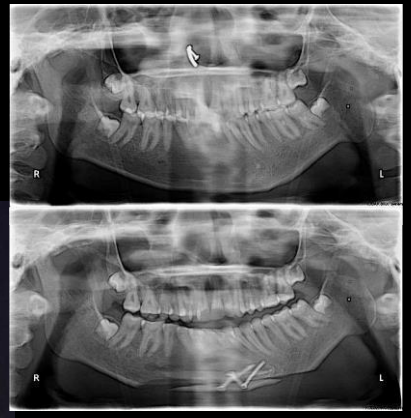
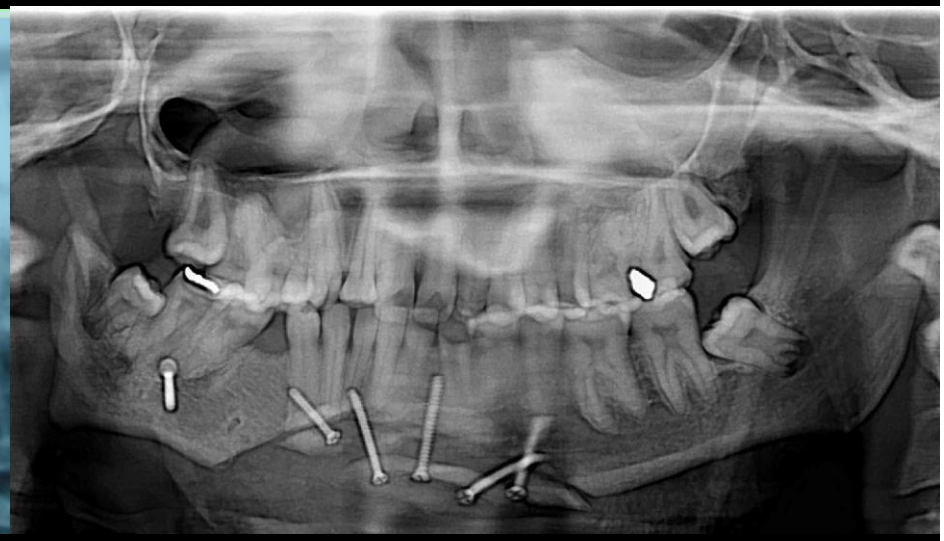
Propellar Genioplasty



Distraction in Correction of Hemifacial Microsomia

Pruzansky Type III Hemifacial Microsomia

Distraction in Correction of Hemifacial Microsomia



Distraction in Post TMJ Ankylosis Release

Distraction in Post TMJ Ankylosis Release

Distraction in Post TMJ Ankylosis Release

Repositioning of Facial Skeleton

- Maxillary Complex
- Mandibular Complex
- Naso-orbital Complex
- Frontal Complex
- Ear

Naso-orbital Complex

Severe Hypertelorism

- Caused by encephalocele, facial clefting or in Apert's and Cruzon's syndrome.

Indications for intracranial approach

- The absolute indication for the intra cranial approach are an encephalocele and a cribiform plate lower that the level of the nasofrontal suture.

Naso-orbital Complex

Tessier #14 Craniofacial Cleft

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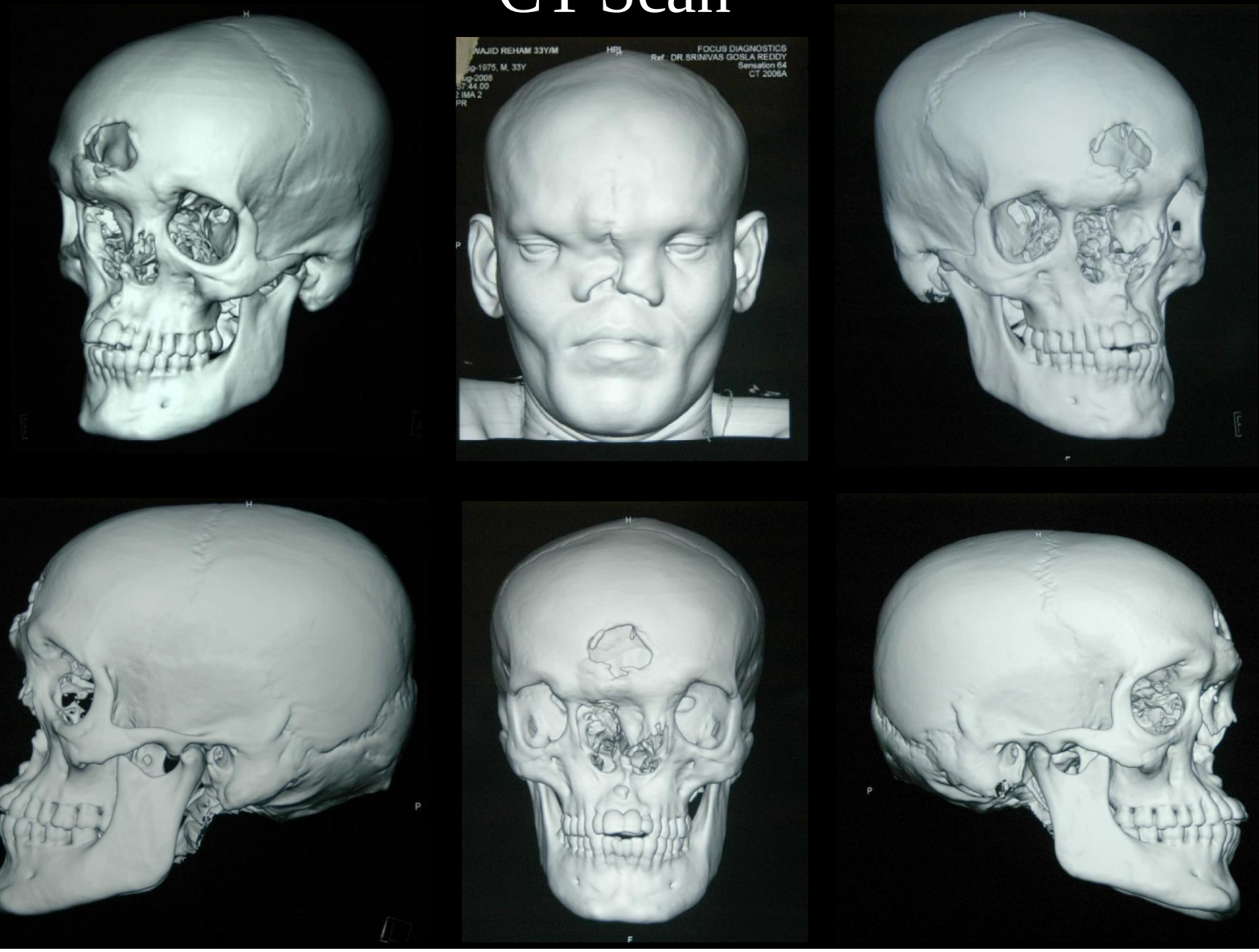
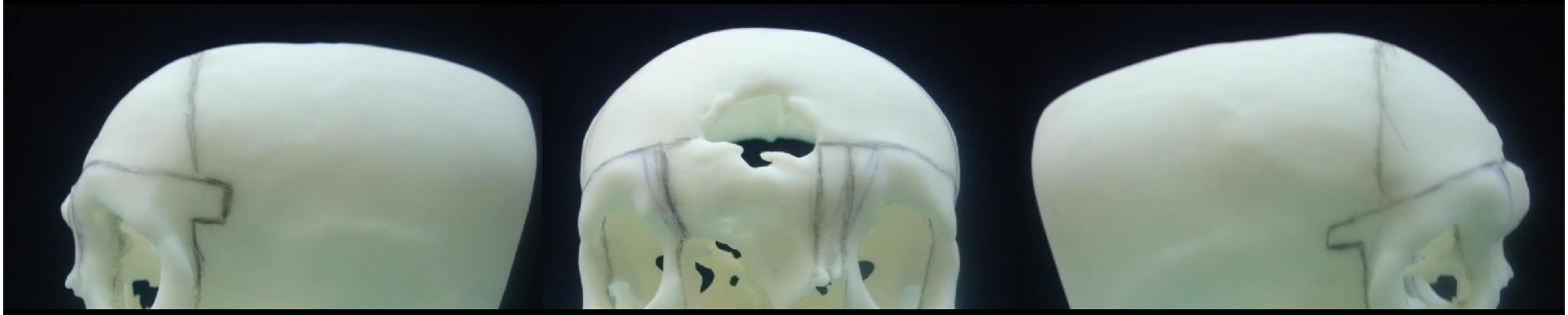
Naso-orbital Complex
CT Scan



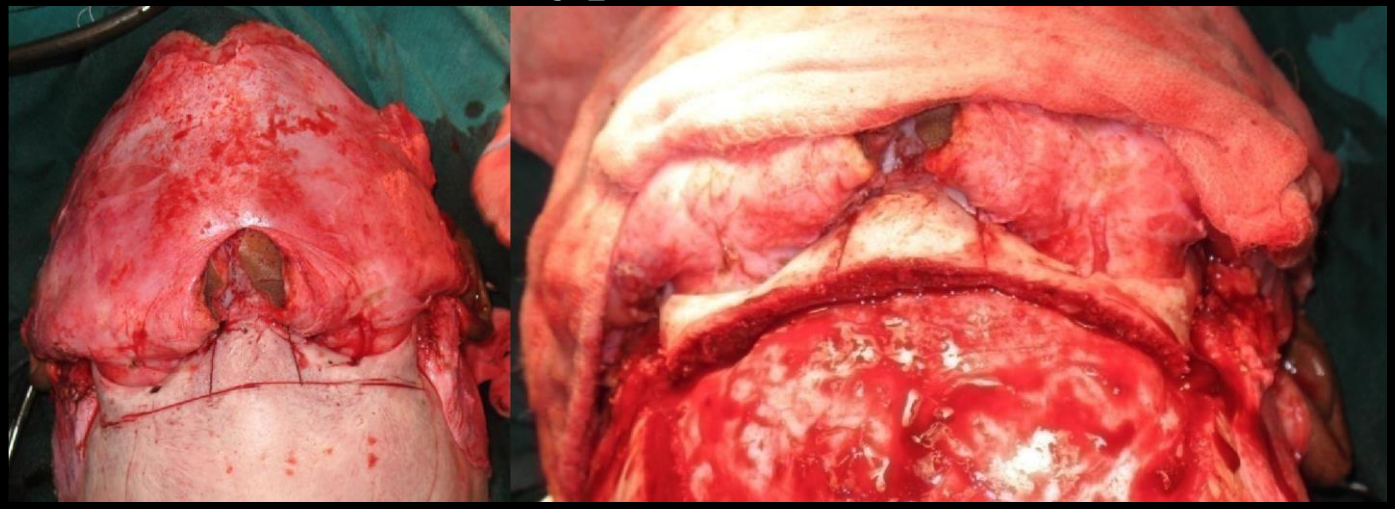
Naso-orbital Complex

Stereo Lithographic Models



Naso-orbital Complex

Hypertelorism



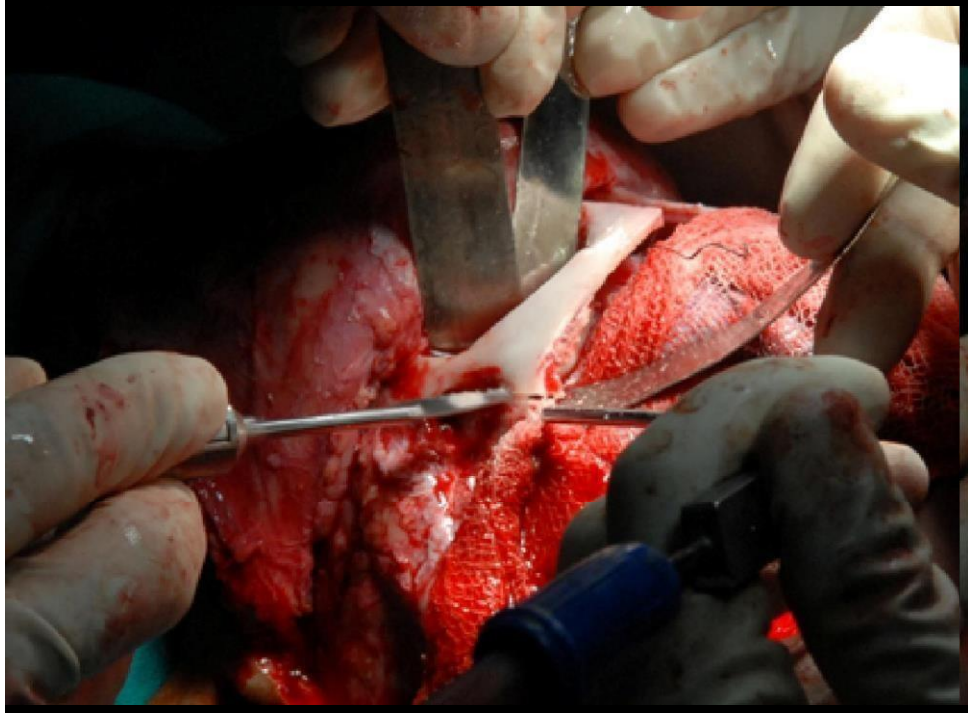
Transfrontal Craniotomy

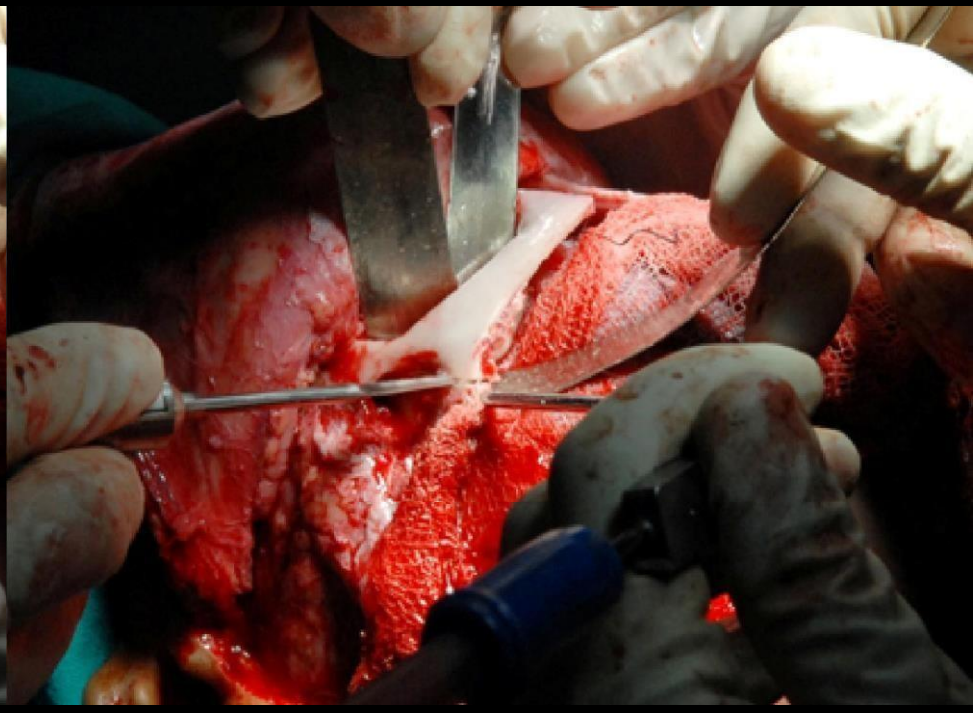
This includes a transfrontal craniotomy with an intervening frontal bar, which is left intact.

The frontal bar results from parallel osteotomies that are atleast 1 cm from the supraorbital rims and permits orientation of the orbits once they have been mobilized

Naso-orbital Complex

Hypertelorism





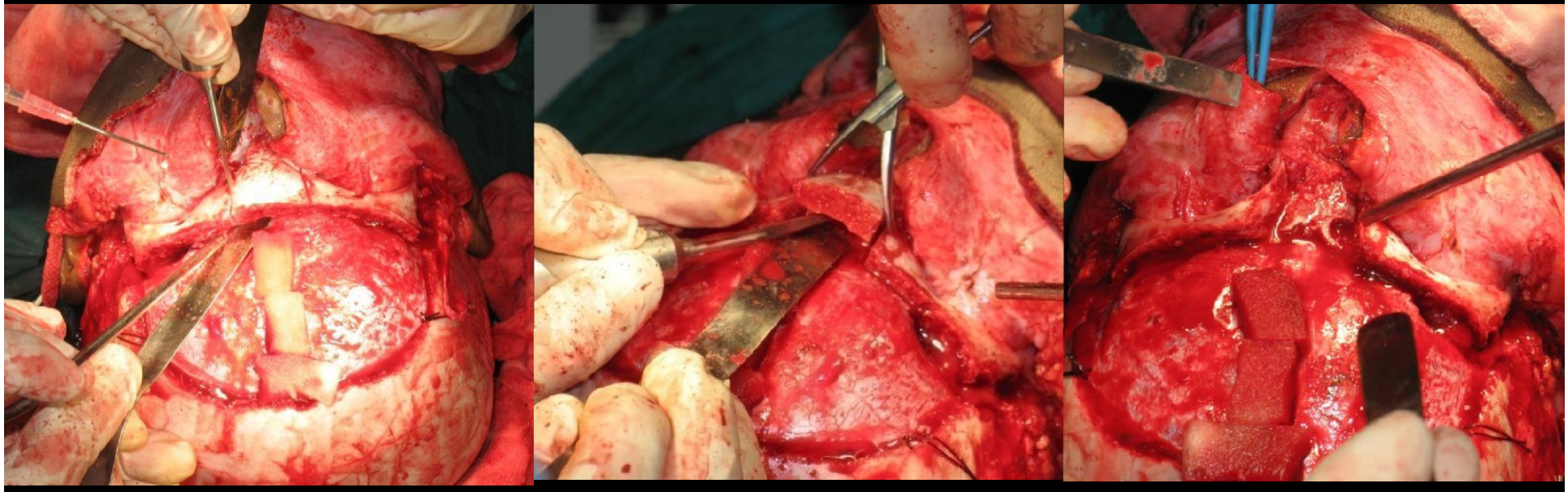
Periorbital Osteotomy

A periorbital osteotomy is completed initially extracranially, going parasagitally through the frontozygomatic region, the finally intracranially.

Lateral Orbital WallOsteotomy

Naso-orbital Complex

Hypertelorism



Orbital roof osteotomy

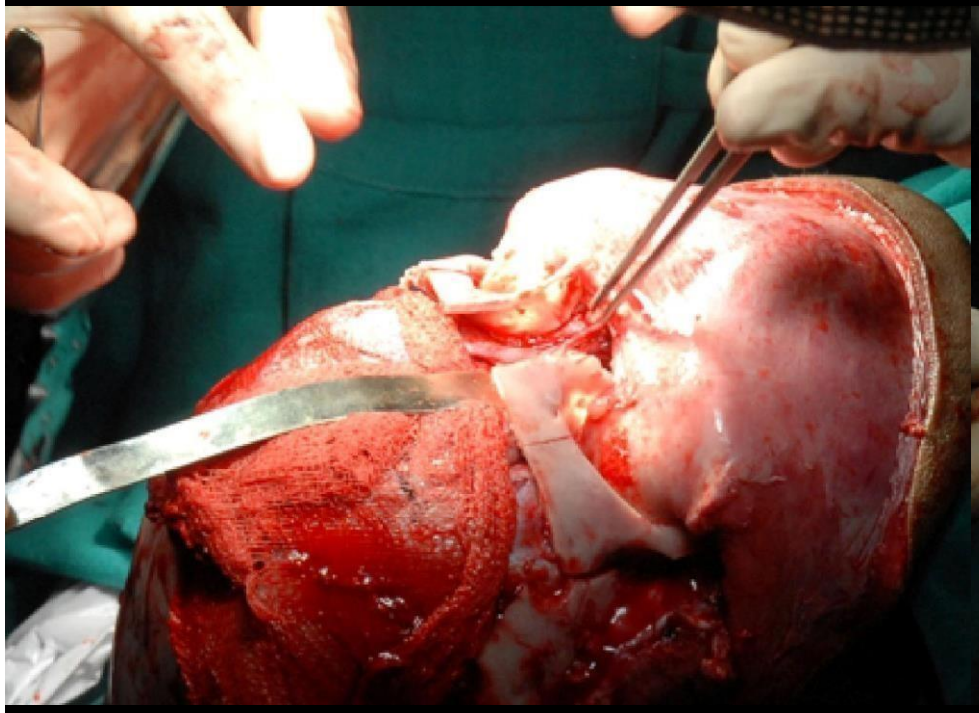
The bony cuts of the orbital roofs are performed with intracranial visualization

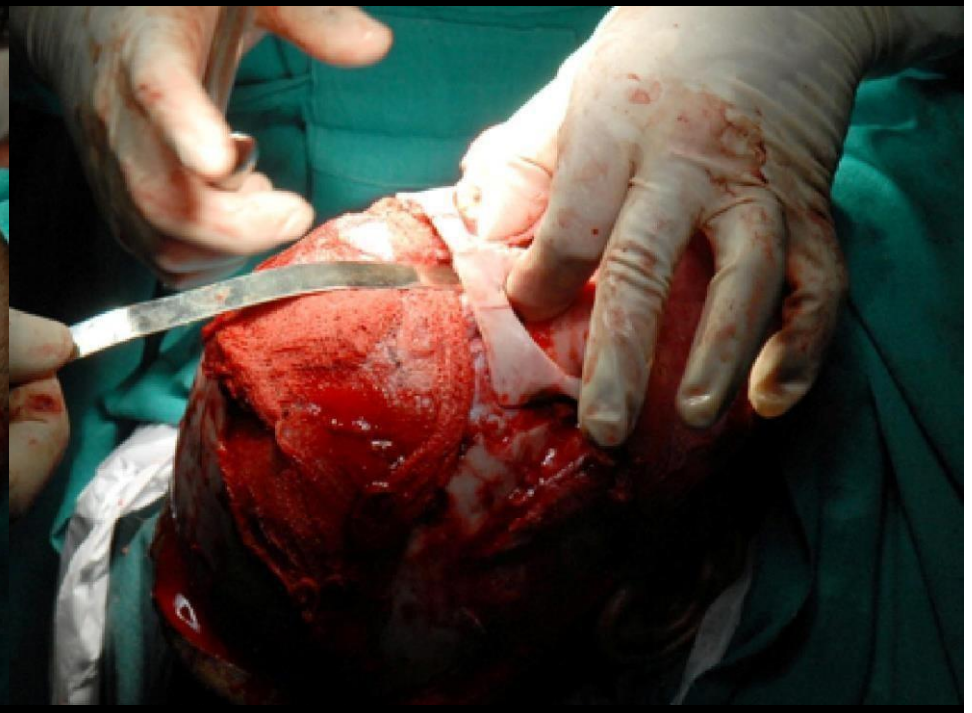
Orbital approximation

A central block of bone is removed between the orbits to allow their approximation in a medical direction.

Naso-orbital Complex

Hypertelorism





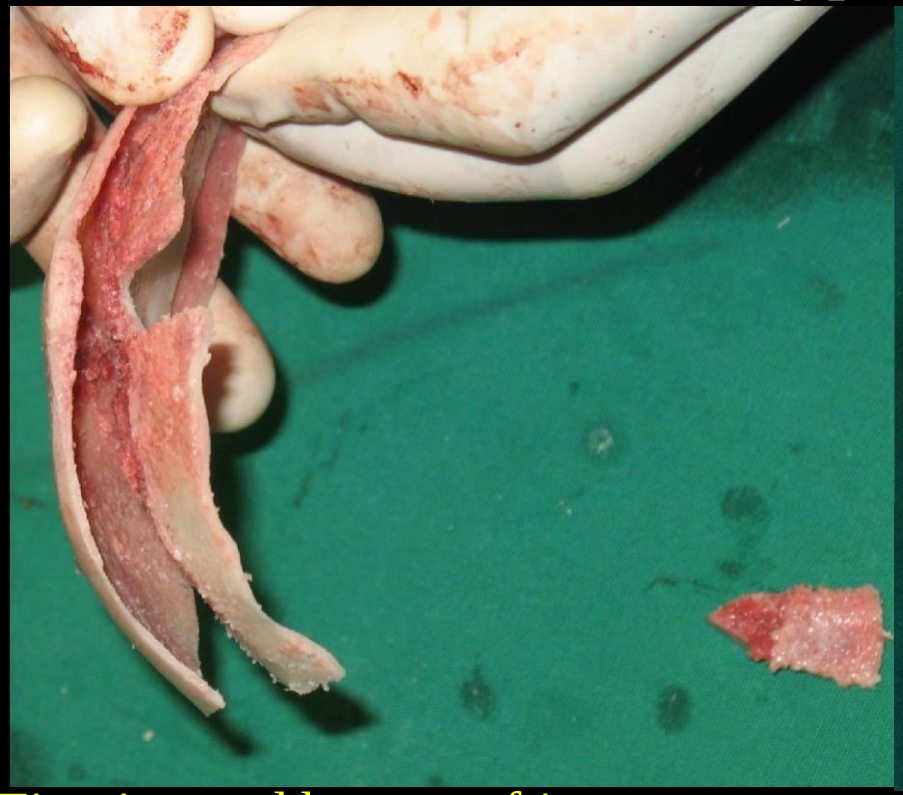
Finishing osteotomy

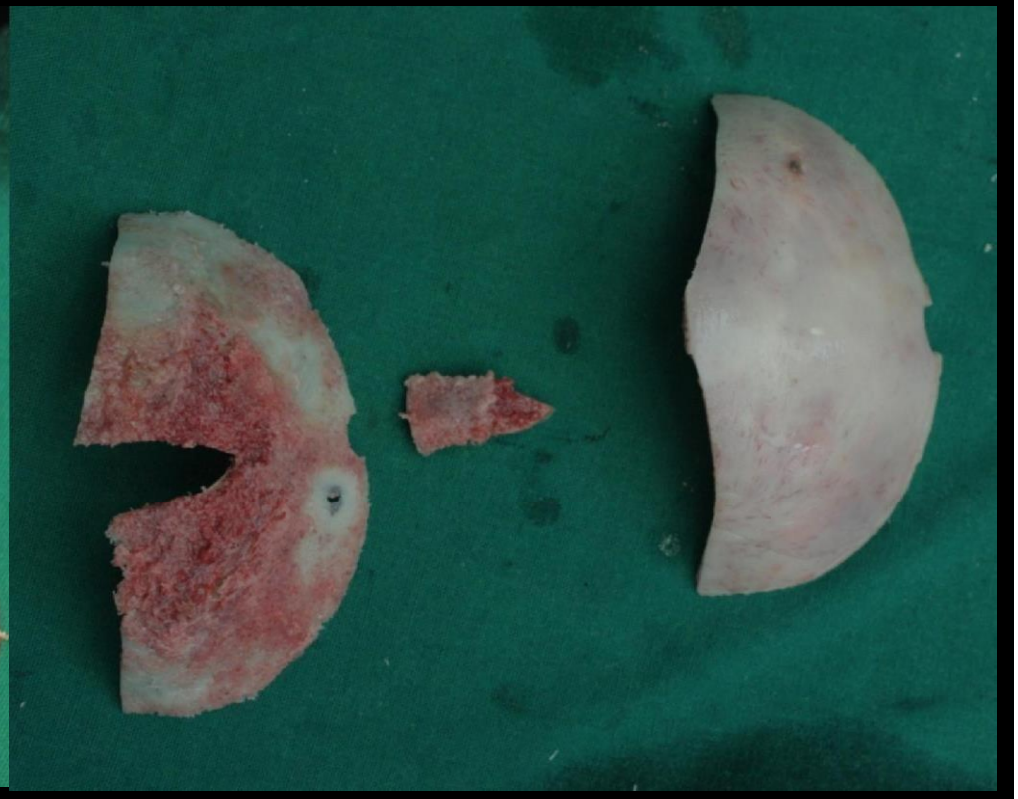
Finally, a wedge of bone is removed from either side of piriform fossa so that the nasal airways are not constricted when the orbits are moved medially.

If the osteotomies have been performed to their full depth, the orbits can be approximated by finger pressure alone

Naso-orbital Complex

Hypertelorism



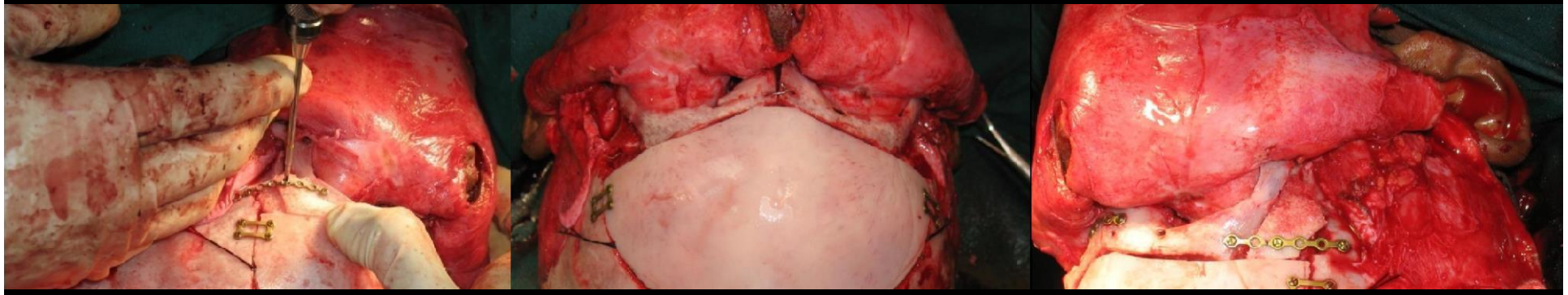


Fixation and bone grafting

Bone graft material harvested from the calvarium can be split into into the two cortices and one cortex can be used to graft bone in the defects and the other can be used to close the original defect

Naso-orbital Complex

Hypertelorism



Fixation and bone grafting

The orbits are positioned and held in place with wires or micro-or miniplates.

Bone graft material harvested from the clavarium, iliac crest, or rib is then used to fill in the resulting gap defects at the lateral orbital walls and zygomatic areas

Naso-orbital Complex

Tessier #14 Craniofacial Cleft

Grafting of Facial Skeleton

- Maxillary Complex
- Mandibular Complex
- Naso-orbital Complex
- Frontal Complex
- Ear

Grafting of Maxillary and Nasal Complex

Grafting of Maxillary and Nasal Complex

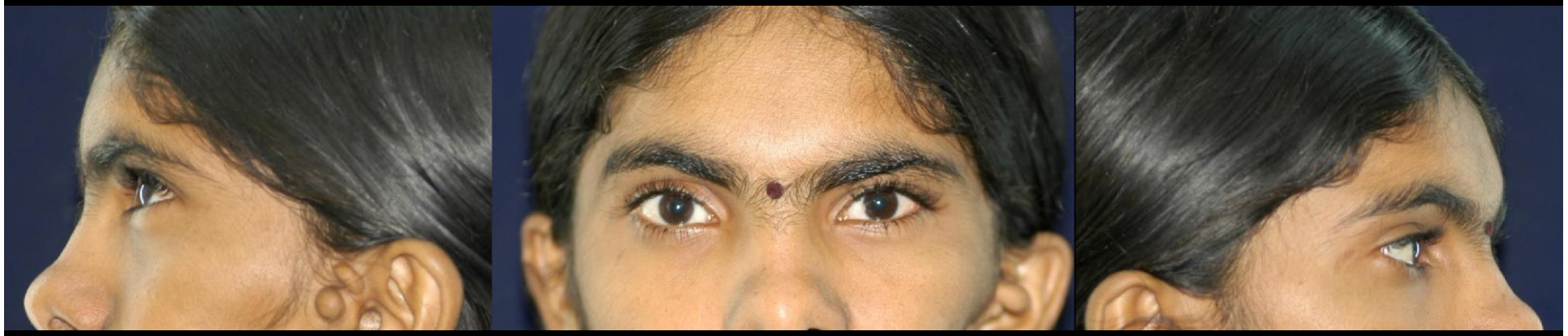
Grafting of Maxillary and Nasal Complex

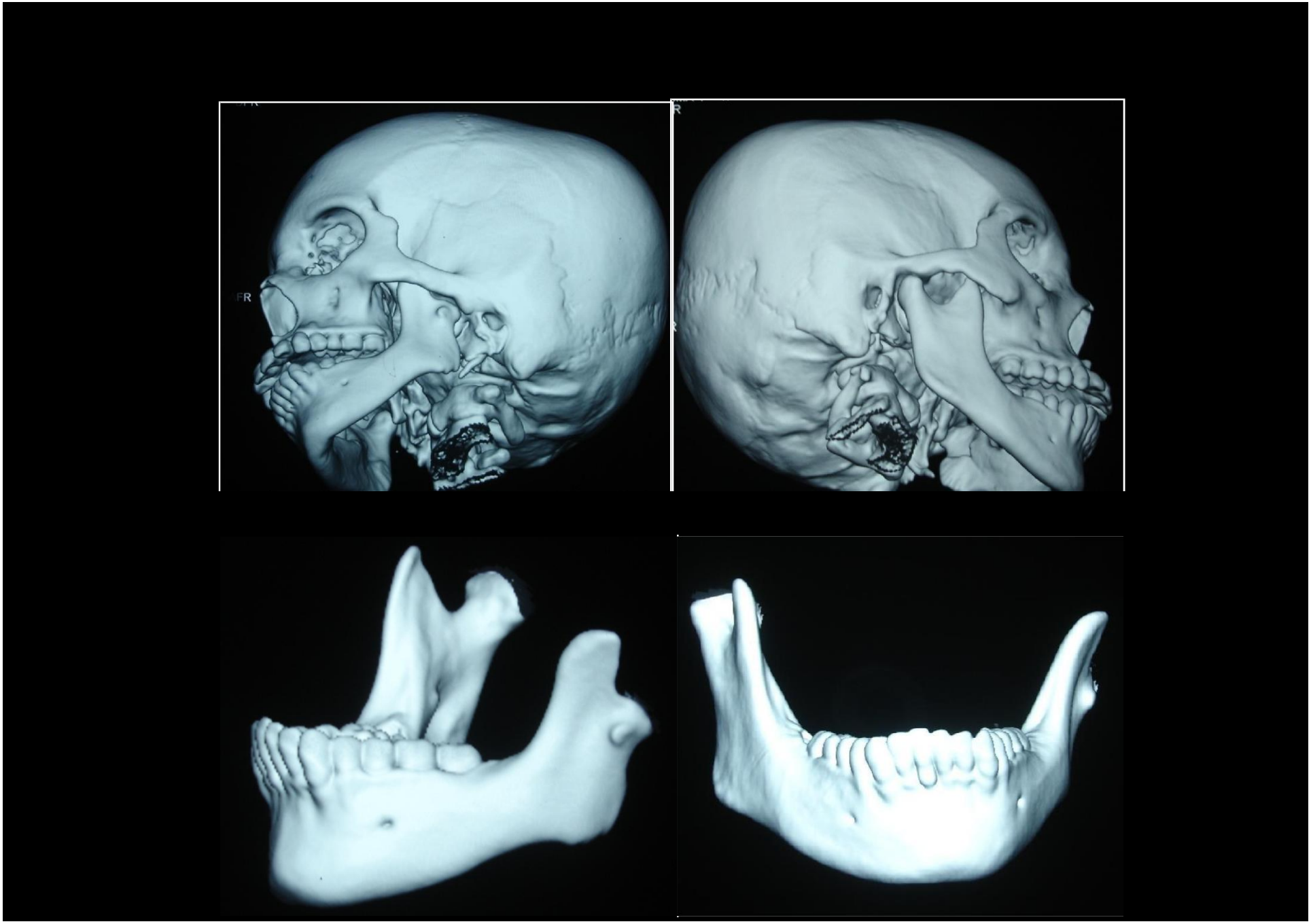
Grafting of Facial Skeleton

- Maxillary Complex
- Mandibular Complex
- Naso-orbital Complex
- Frontal Complex
- Ear

Grafting of Mandibular Complex

Type II a HFM





Grafting of Mandibular Complex

Grafting of Mandibular Complex

Grafting of Facial Skeleton

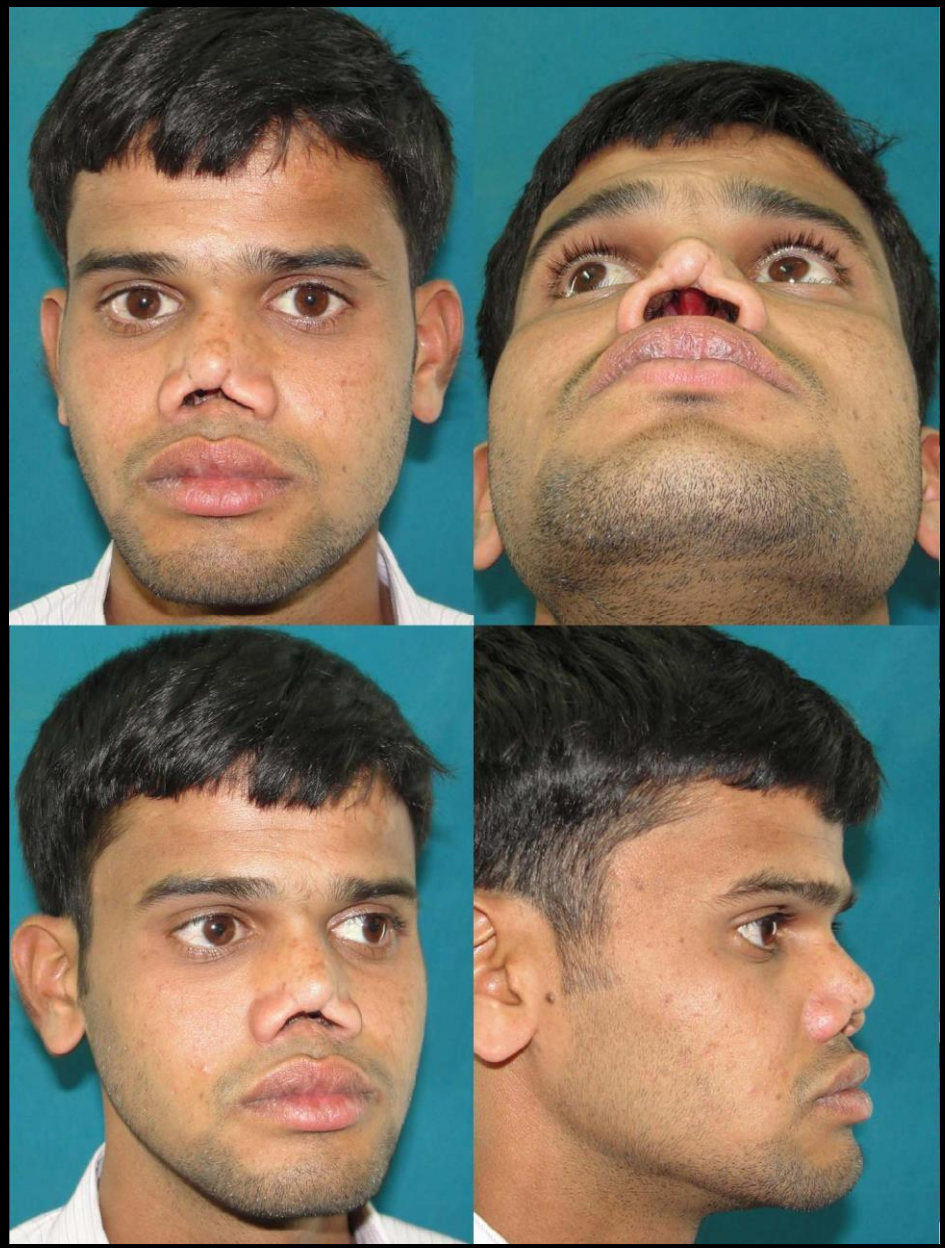
- Maxillary Complex
- Mandibular Complex
- Naso-orbital Complex
- Frontal Complex
- Ear

Heminasal Aplasia

Heminasal Aplasia

Heminasal Aplasia

Noma



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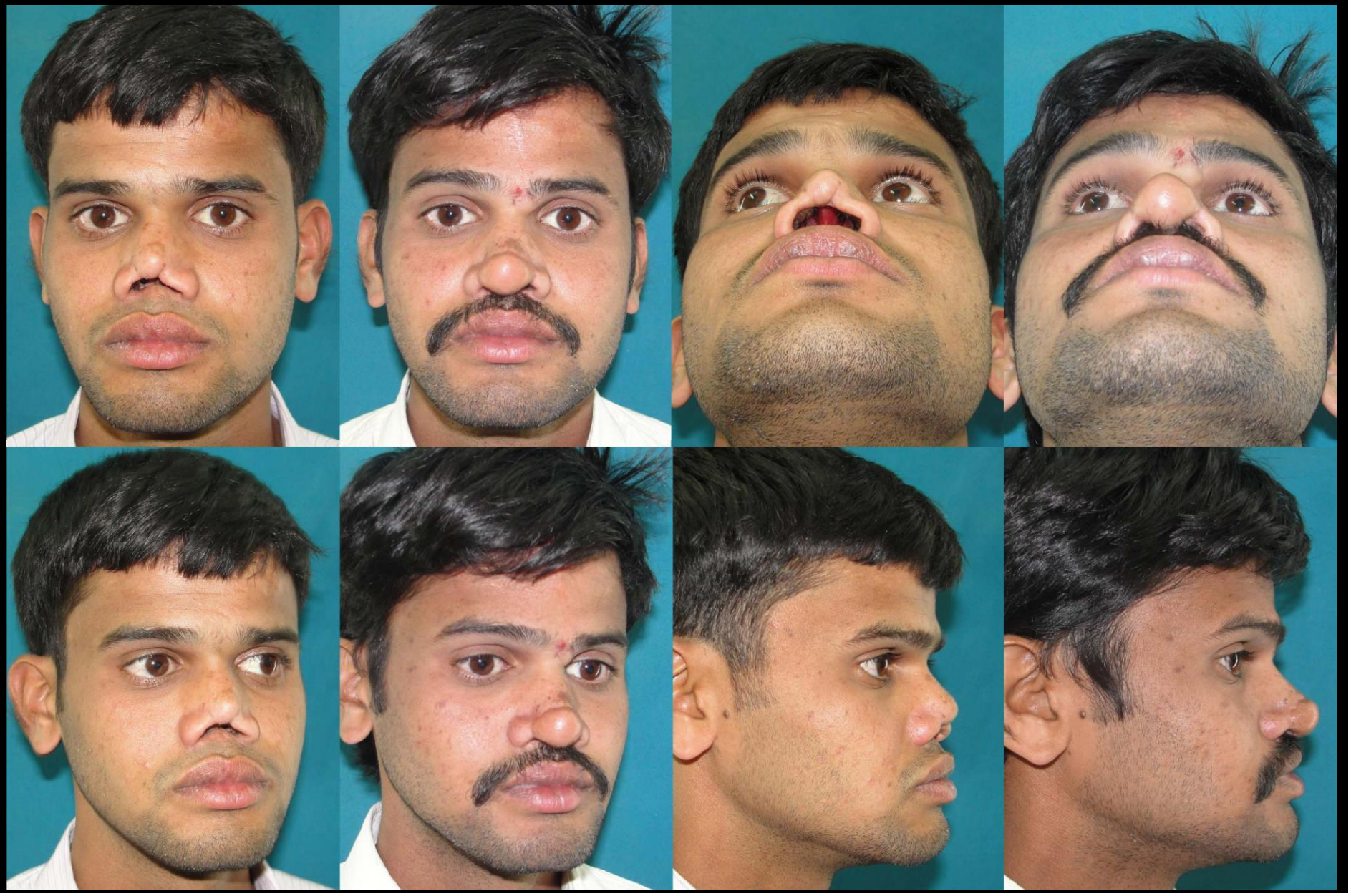
Noma

Noma



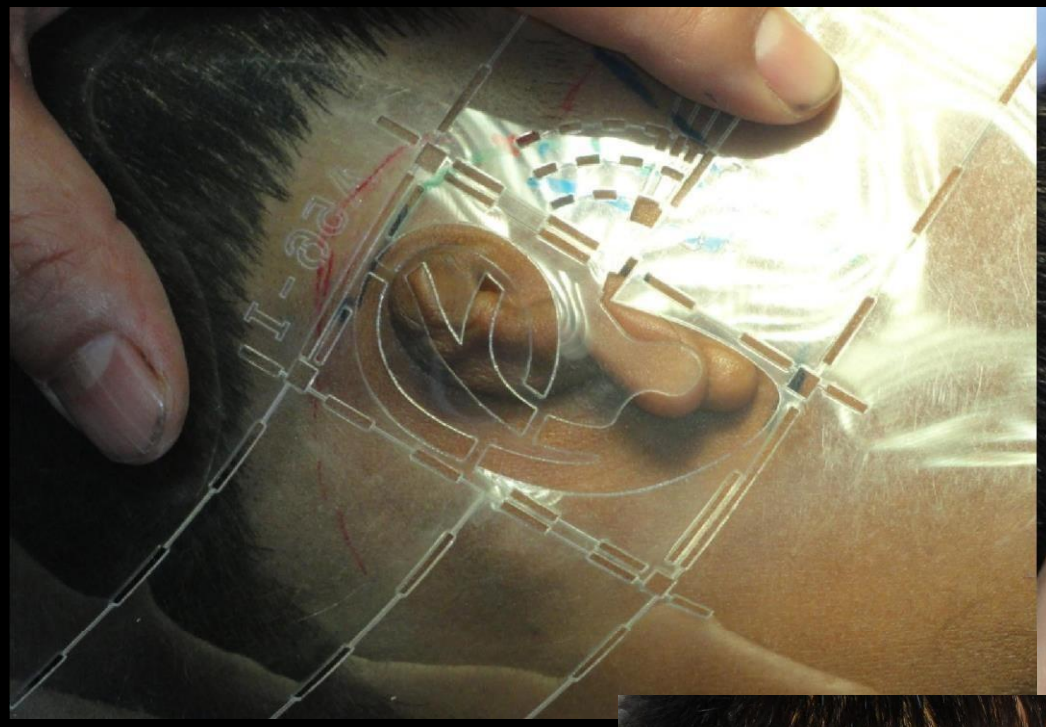
Grafting of Facial Skeleton

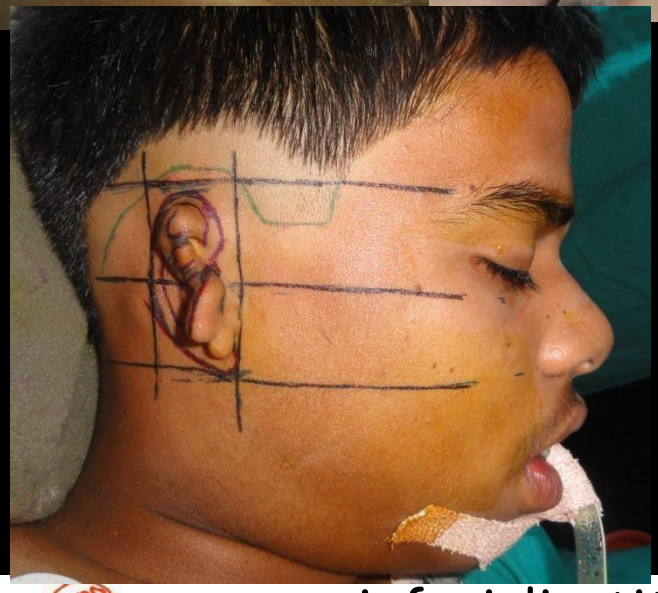
- Maxillary Complex
- Mandibular Complex
- Naso-orbital Complex
- Frontal Complex
- Ear

Grafting of Fronto-Nasal Complex

And the most challenging surgery of them all!!!

Ear Reconstruction





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Bring the Smile Back

ThankYou

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