Craniofacial Clefts and their Repair

Our Ideology

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GSR Institute of Facial Plastic Surgery

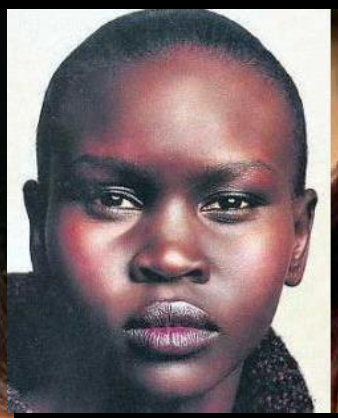
- Non-profit hospital established in 1996
- Dedicated Cleft & Craniofacial Centre of Excellence
- Presently 1,600 cleft and cranio-facial surgeries are done every year
- 3 surgeons and 4 fellows with full support team
- More than 30,000 documented cleft & craniofacial surgeries have been performed since 1996
- 600 primary new born cleft children are registered every year

Five Facial Ethnic Forms

Caucasian

Mongoloid

LatinAmerican



African

Asian

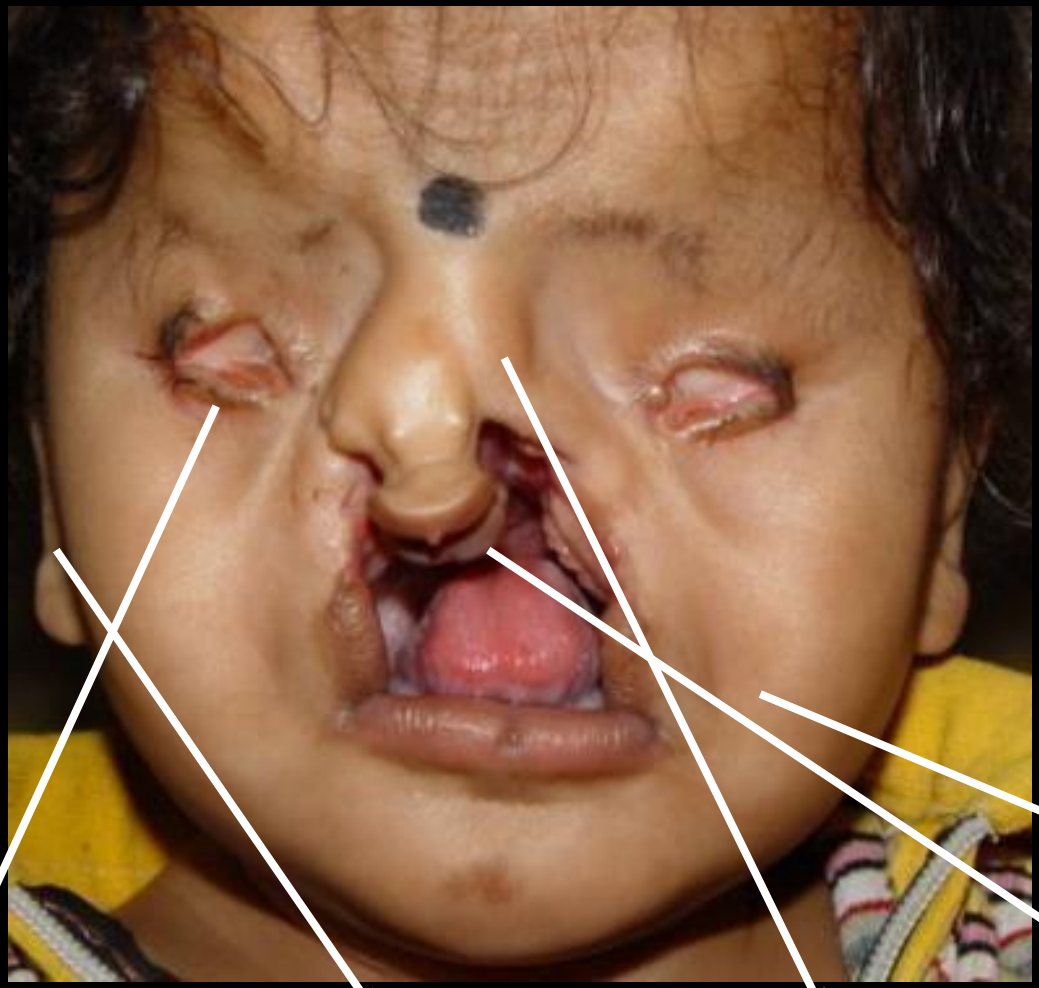
Irrespective of the ethnicity of an individual
"Facial Balance" and not "Facial Symmetry"
dictates our perception of beauty

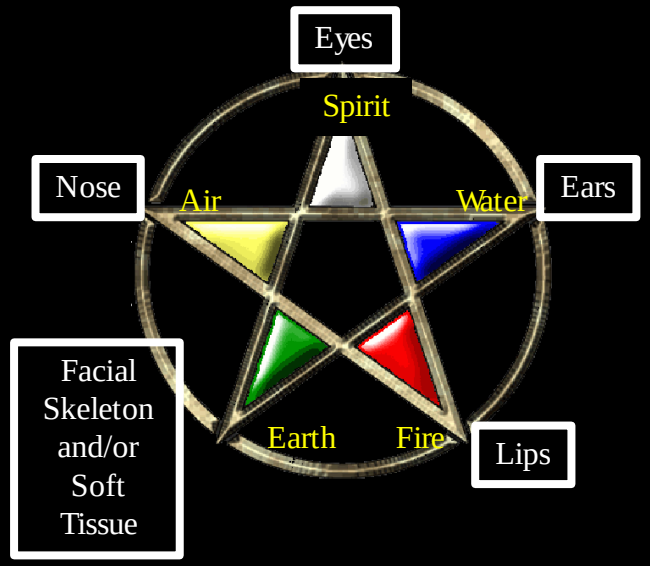
Five Congenital Facial Defects

Ears Eyes Nose Lips Facial Skeleton

Most of the above patients have
Facial Symmetry but lack Facial Balance

Five Congenital Facial Defects





Eyes Ears Nose Lips Facial Skeleton

Complete Facial Imbalance

DIAGNOSIS OF CRANIOFACIALCLEFTS

CLASSIFICATION OF CRANIOFACIAL ANOMALIES

Any classification should be an ideal diagnostic tool and further an agenda to find a common treatment protocol.

We have attempted to classify craniofacial anomalies into FOUR groups depending on the site and type of defects (Morphology)

This classification is made up of two steps.

Step I: Identification

Step II: Classification

We call this SAILER'S MORPHOLOGICAL CLASSIFICATION of craniofacial anomalies

SAILER'S MORPHOLOGICAL CLASSIFICATION

STEP I

RING I
Deformity evident on APPEARANCE

Eyes Forehead

Nose Ears

Mouth Chin

Malar region

Superior Skull

Posterior Skull

RING II
Deformity evident on EXAMINATION

Palate

Tongue

Nostril

Outer ear

Teeth

RING III
Deformity evident on INVESTIGATION

Craniofacial Sinuses

Facial Bones

Facial Muscles

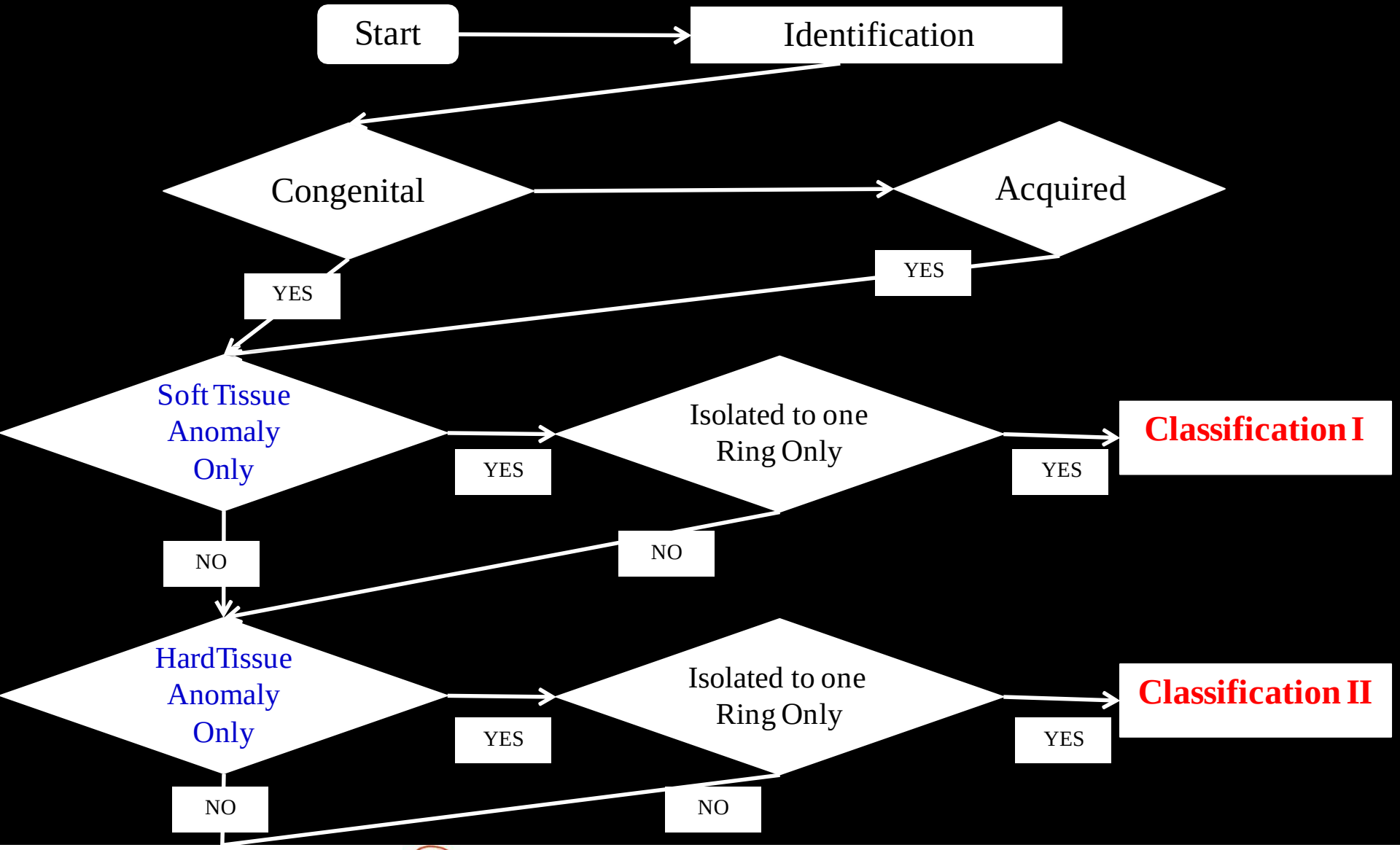
Facial Spaces

Brain

Spine

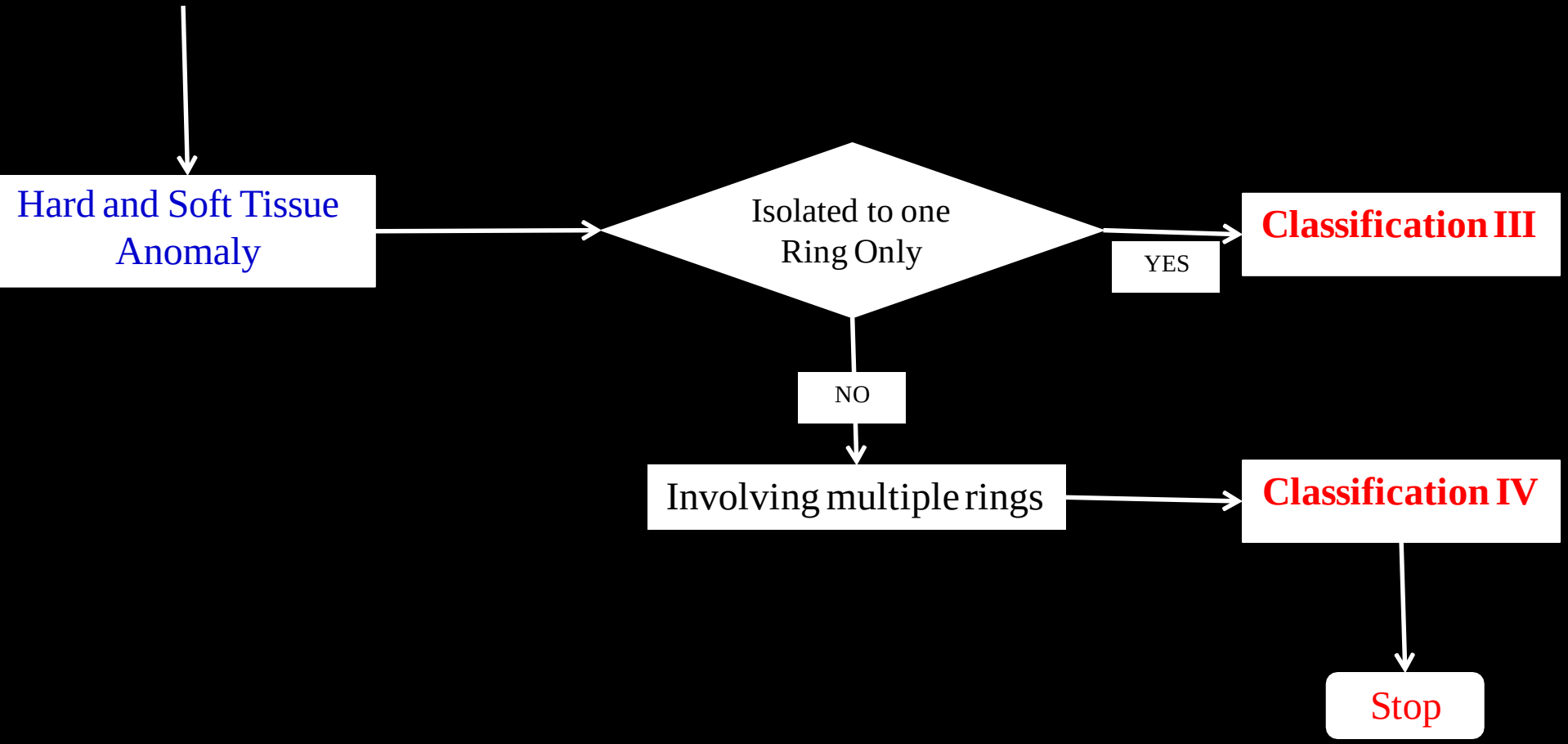
SAILER'S MORPHOLOGICAL CLASSIFICATION

STEP II



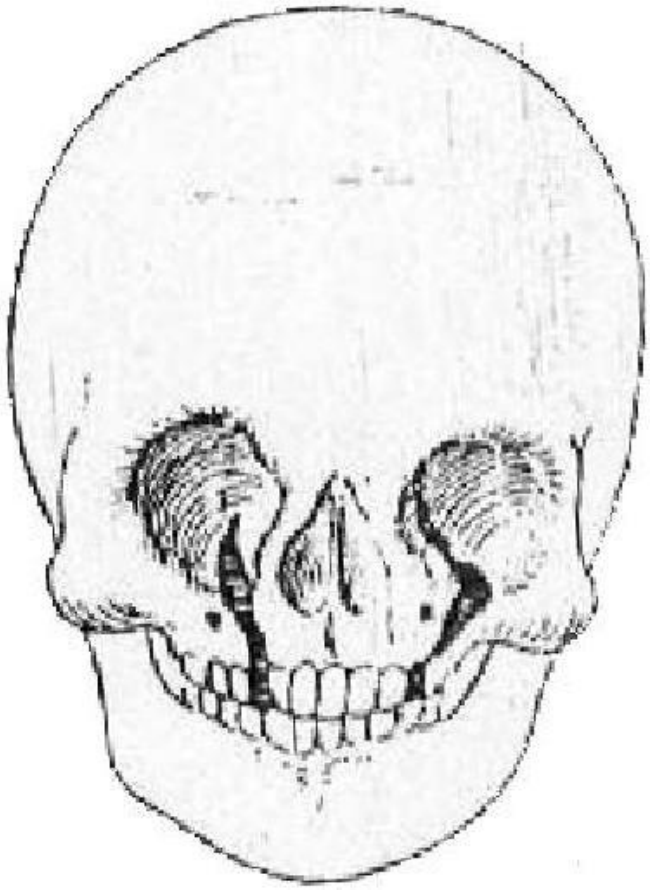
SAILER'S MORPHOLOGICAL CLASSIFICATION

STEP II



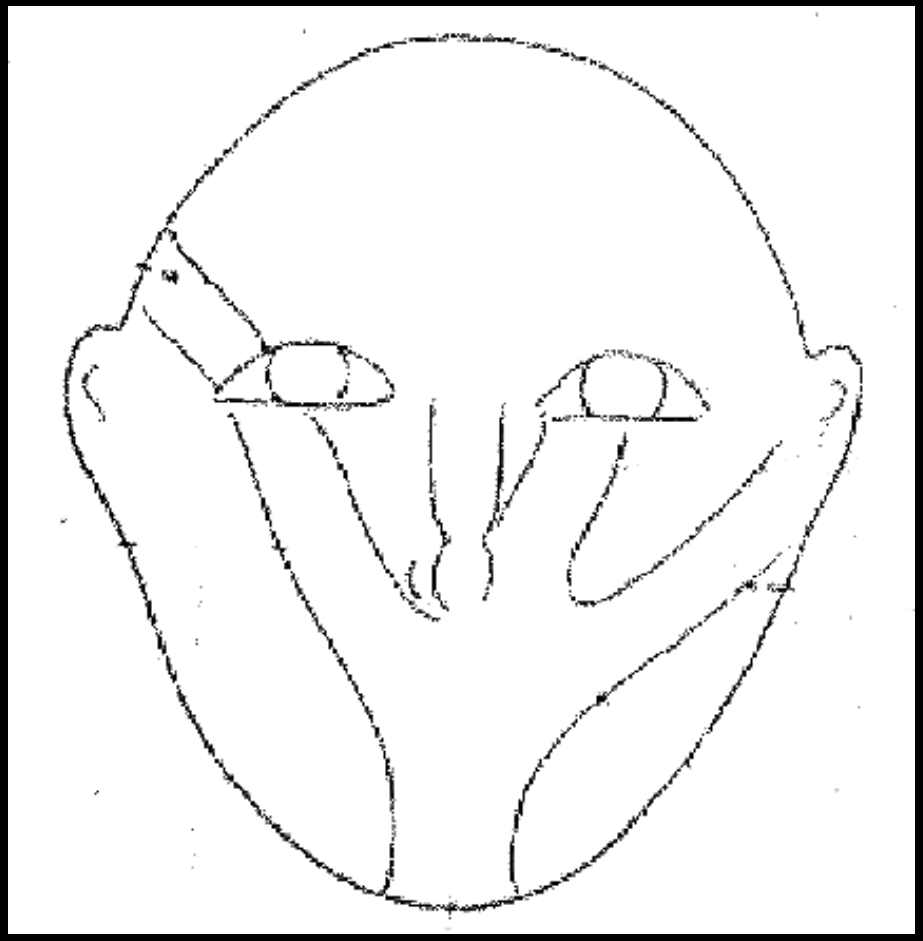
Craniofacial Clefts

Craniofacial Clefts



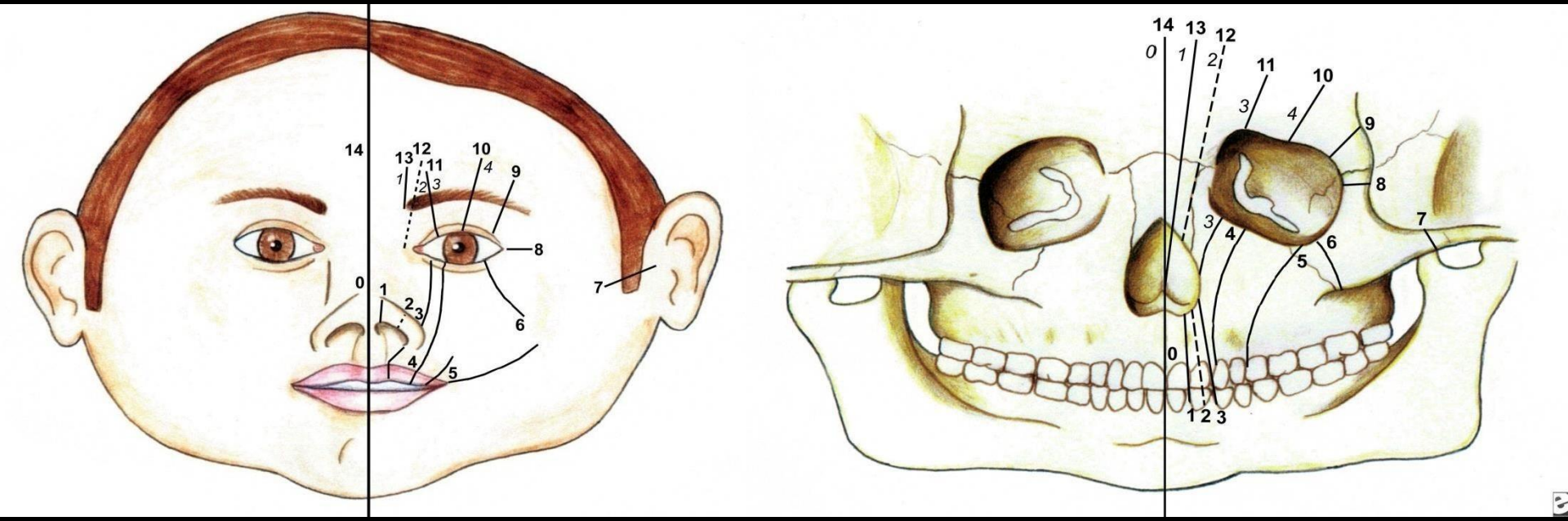
Boo - Chai Classification

Craniofacial Clefts



American Association of Cleft Palate Rehabilitation (AACPR) Classification of Facial Clefts

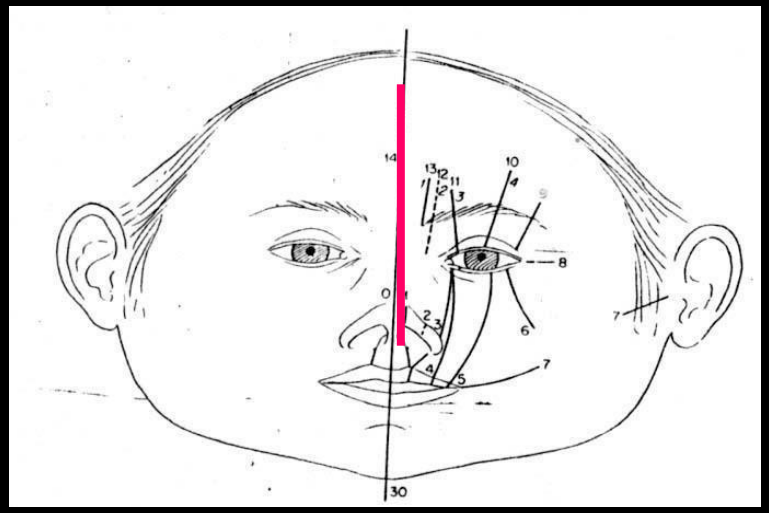
Craniofacial Clefts



TESSIER CLASSIFICATION

- Introduced by Paul Tessier
- It is the most comprehensive and popular classification of craniofacial clefts
- Divided into soft tissue and hard tissue defects

Craniofacial Clefts
Soft Tissue Defects



Craniofacial Clefts
Soft Tissue Defects

Tessier # 0 – 14 facial cleft

Craniofacial Clefts
Soft Tissue Defects

Tessier # 0 facial cleft

Type I
Involving only vermillion
not involving the white roll

TYPE II
Involving vermillion and
the white roll

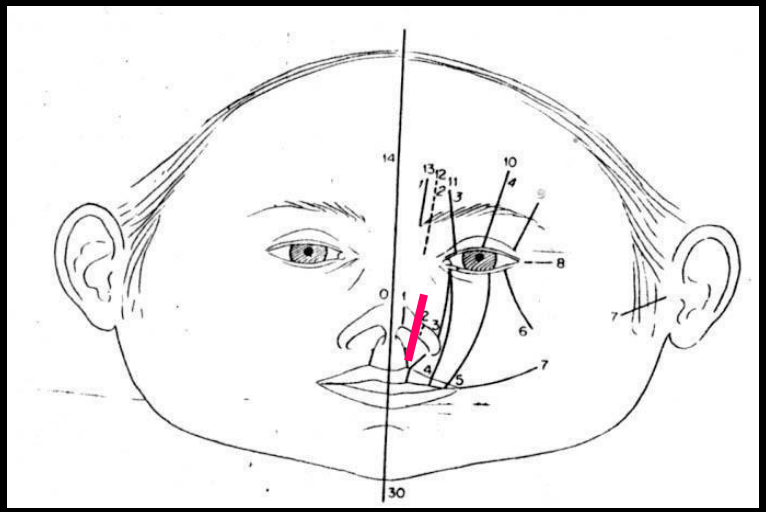
TYPE III
Involving vermillion,
white roll and philthrum

Craniofacial Clefts
Soft Tissue Defects

Tessier # 0 facial cleft

TYPE V
Involving collumella and tip, supratip and dorsum of the nose

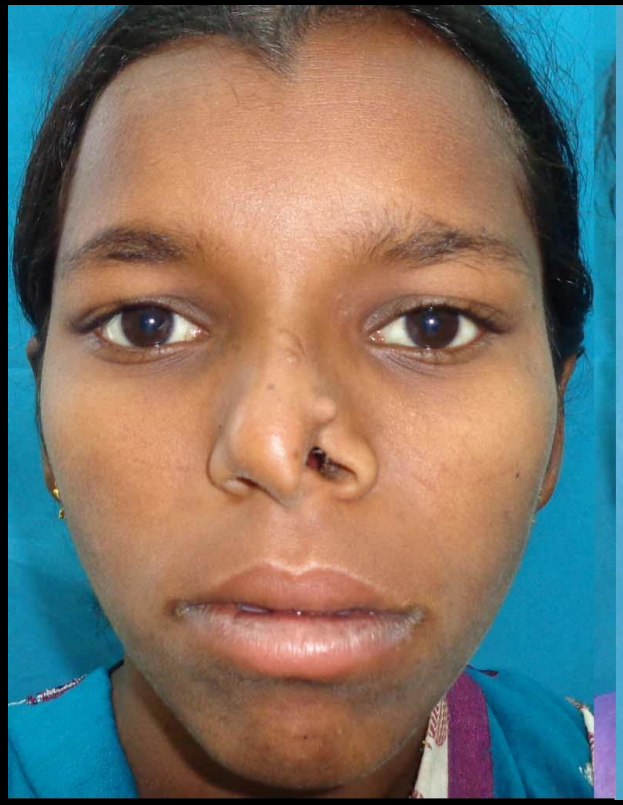
TYPE VI
Involving collumella, tip, supratip, dorsum of the nose and fronto nasal area

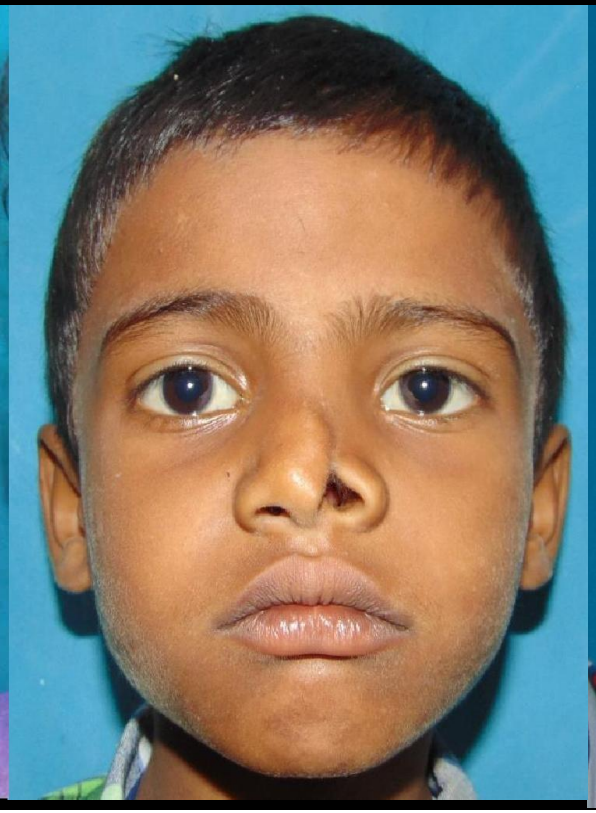


Craniofacial Clefts
Soft Tissue Defects

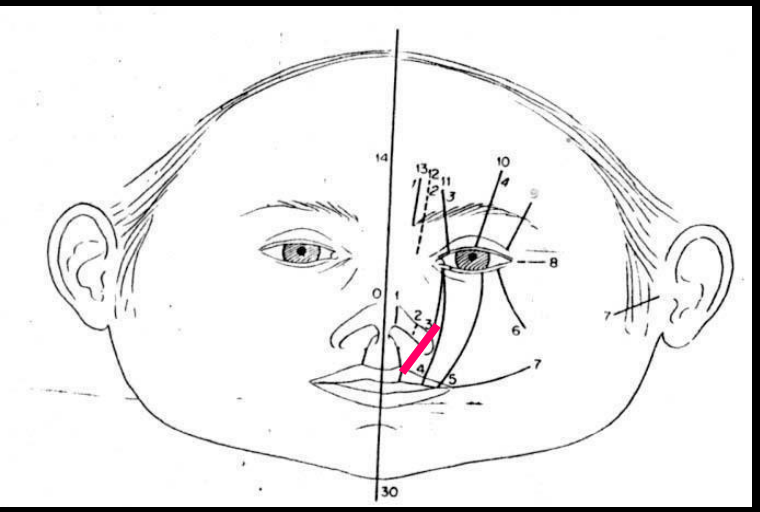
Tessier # 2 facial cleft

Minimal to severe notch





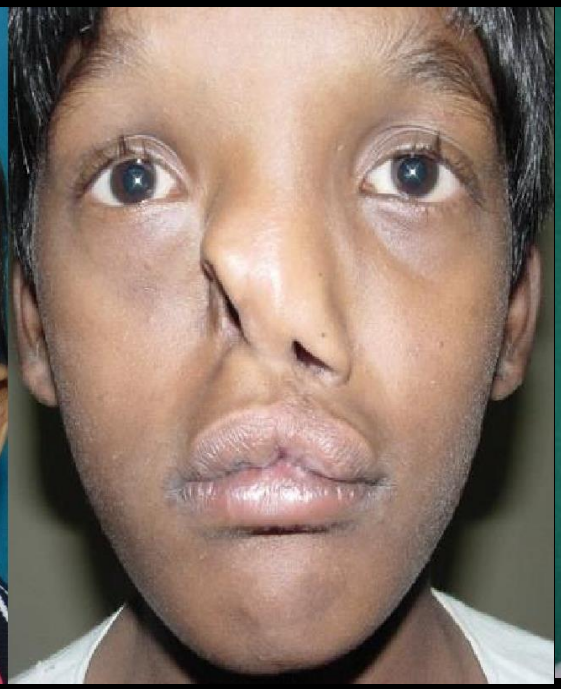
Craniofacial Clefts
Soft Tissue Defects



Tessier # 3 facial cleft

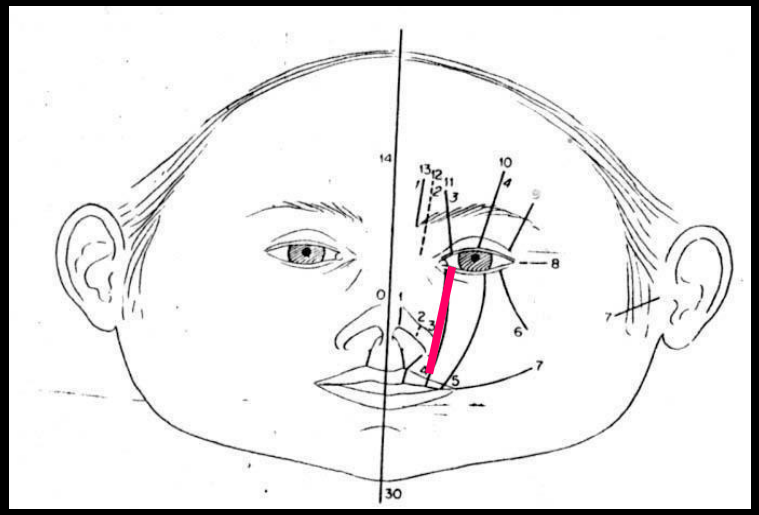
B/L Tessier # 3
with occular involvement

U/L Tessier # 3



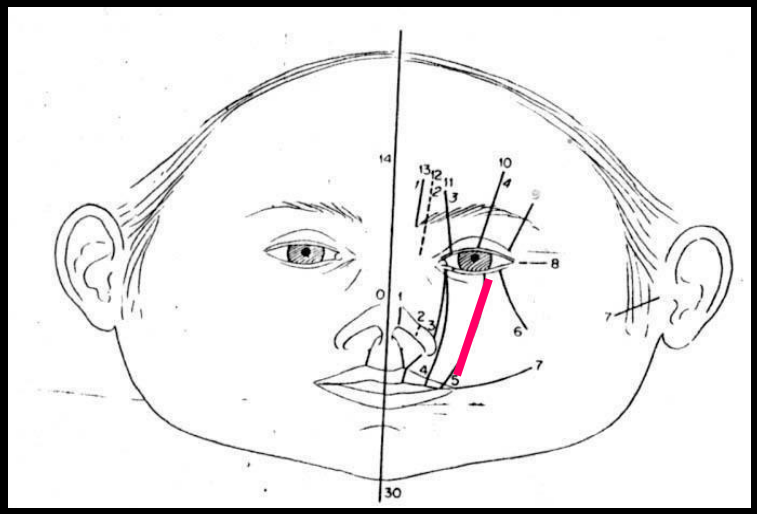
U/L Tessier # 3
With Oral Involvement

Craniofacial Clefts
Soft Tissue Defects



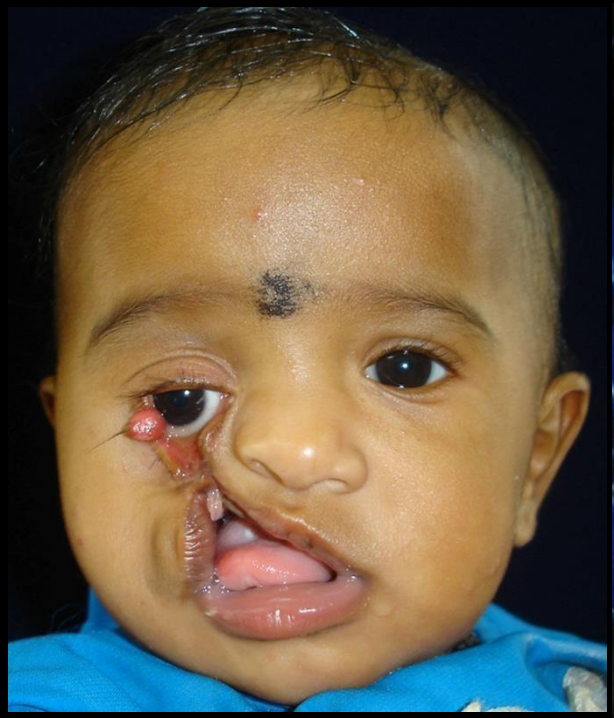
Unilateral Tessier #4 facial cleft

Bilateral Tessier #4 facial cleft

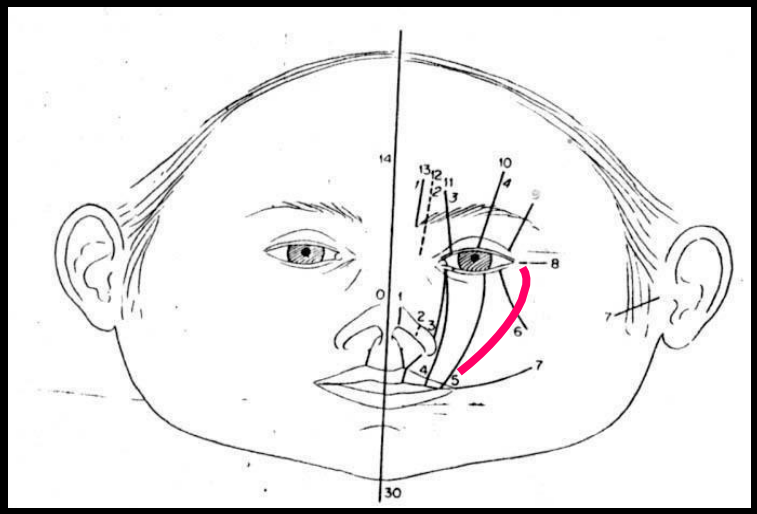


Craniofacial Clefts
Soft Tissue Defects

Tessier #5 facial cleft



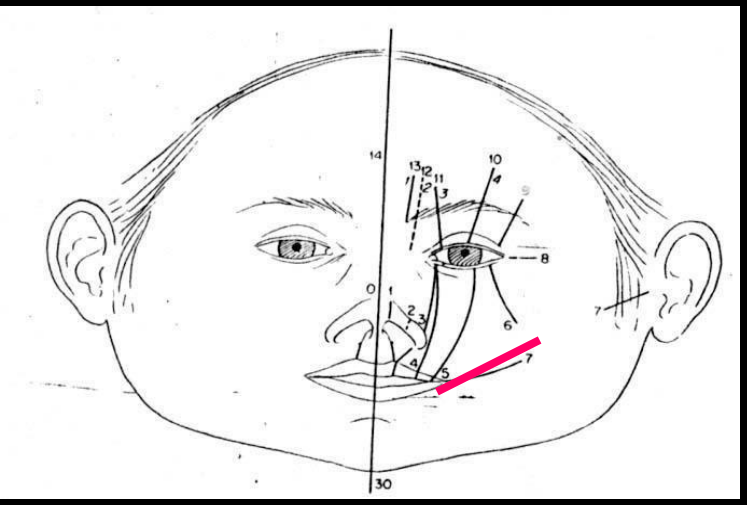
Craniofacial Clefts
Soft Tissue Defects



Tessier #6 facial cleft

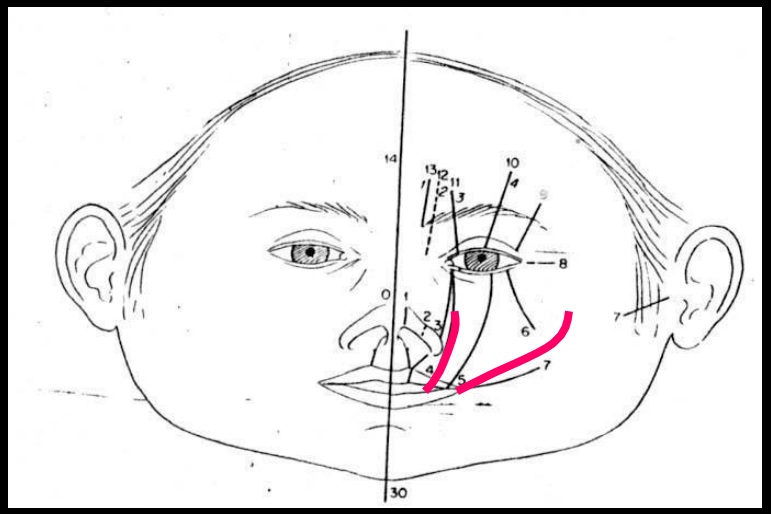
U/L Tessier # 6

B/L Tessier #5 & # 6



Craniofacial Clefts
Soft Tissue Defects

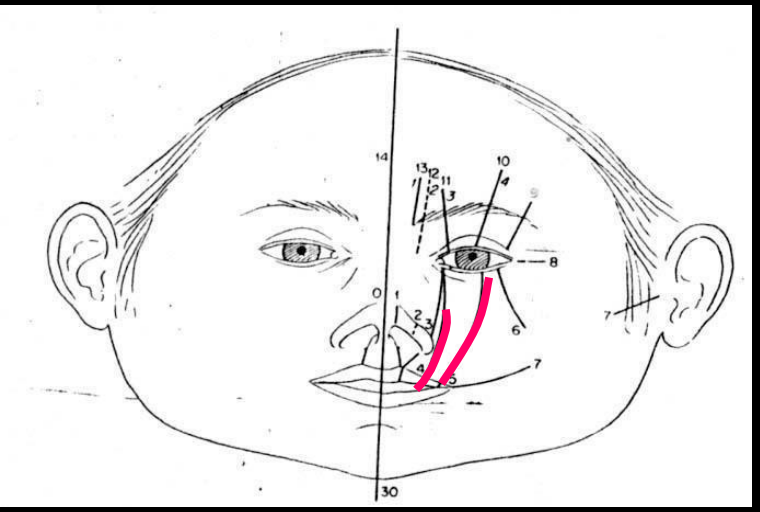
Tessier #7 facial cleft



Craniofacial Clefts
Soft Tissue Defects

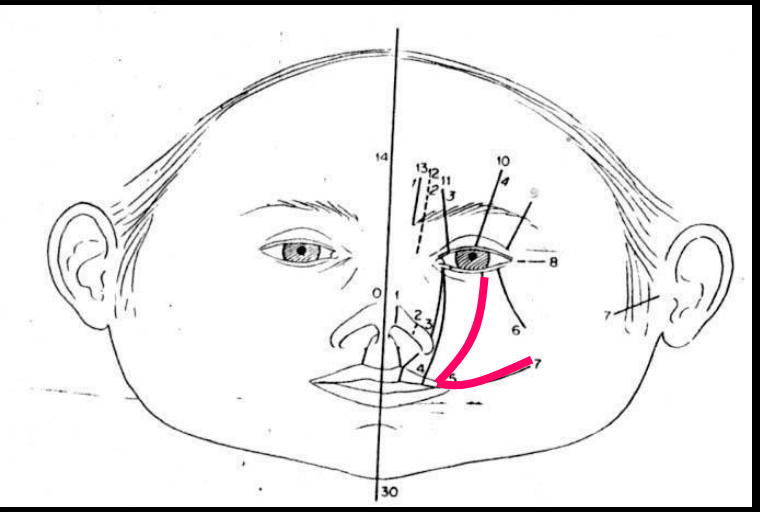
Tessier # 1, 4, 7 Facial Cleft

Craniofacial Clefts
Soft Tissue Defects



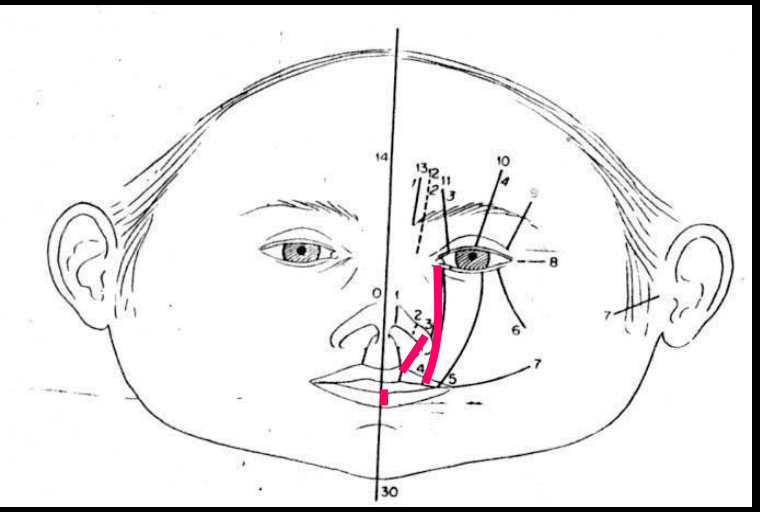
Tessier #4, #5 Facial Cleft

Craniofacial Clefts
Soft Tissue Defects



Tessier #5, #7 facial cleft

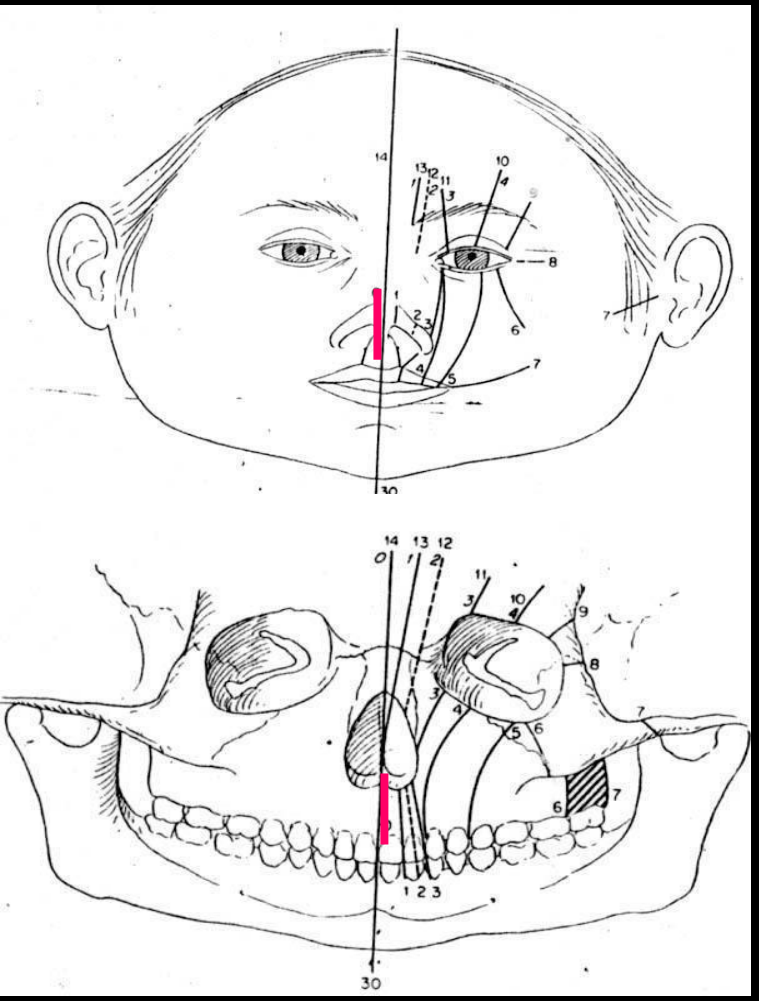
Craniofacial Clefts
Soft Tissue Defects



Bilateral Tessier # 3, # 4, # 30 Facial Cleft

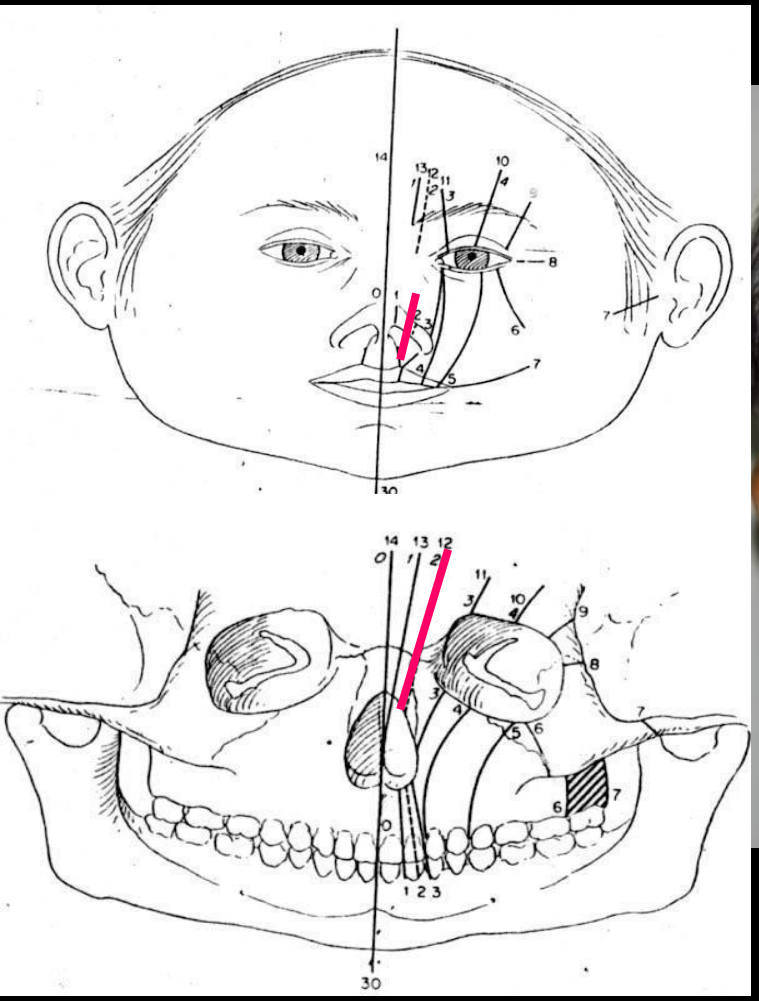
Craniofacial Clefts
Soft and Hard Tissue Defects

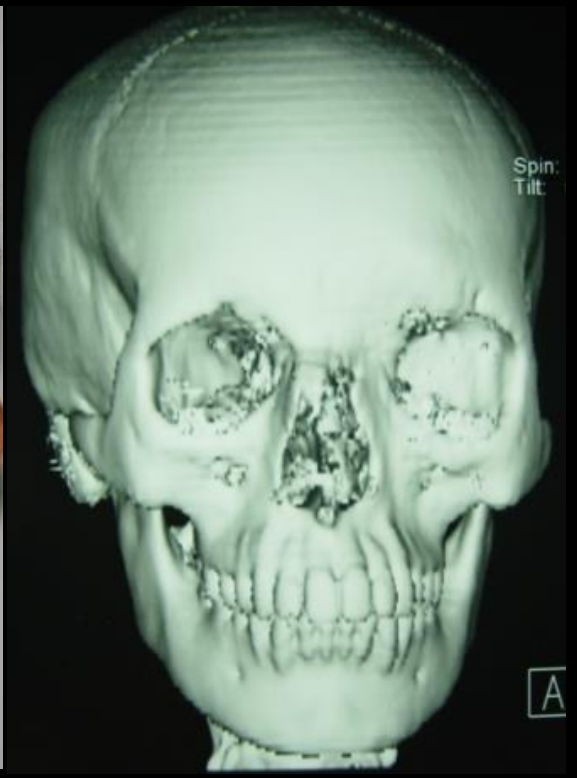
Craniofacial Clefts
Soft and Hard Tissue Defects



Tessier # 0 facial cleft

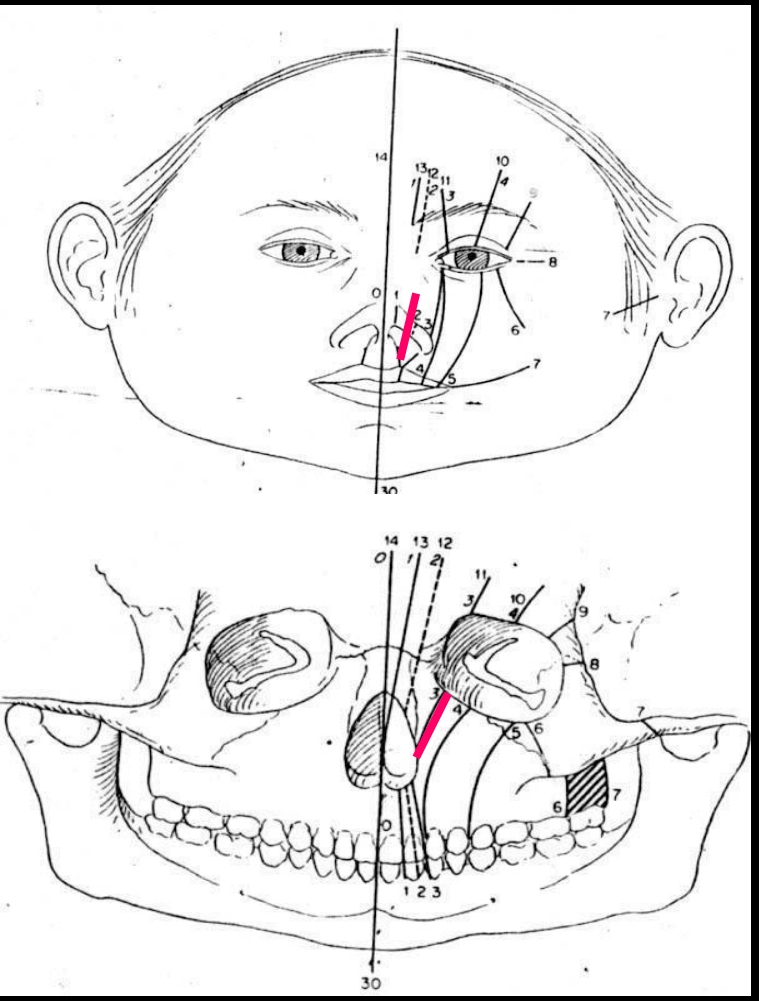
Craniofacial Clefts
Soft and Hard Tissue Defects

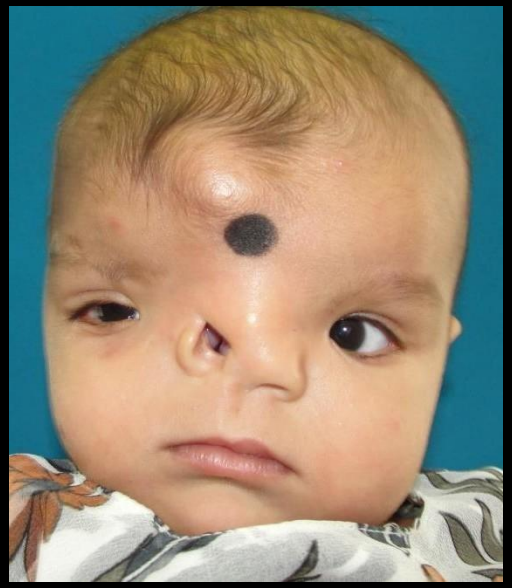




Tessier # 2 facial cleft

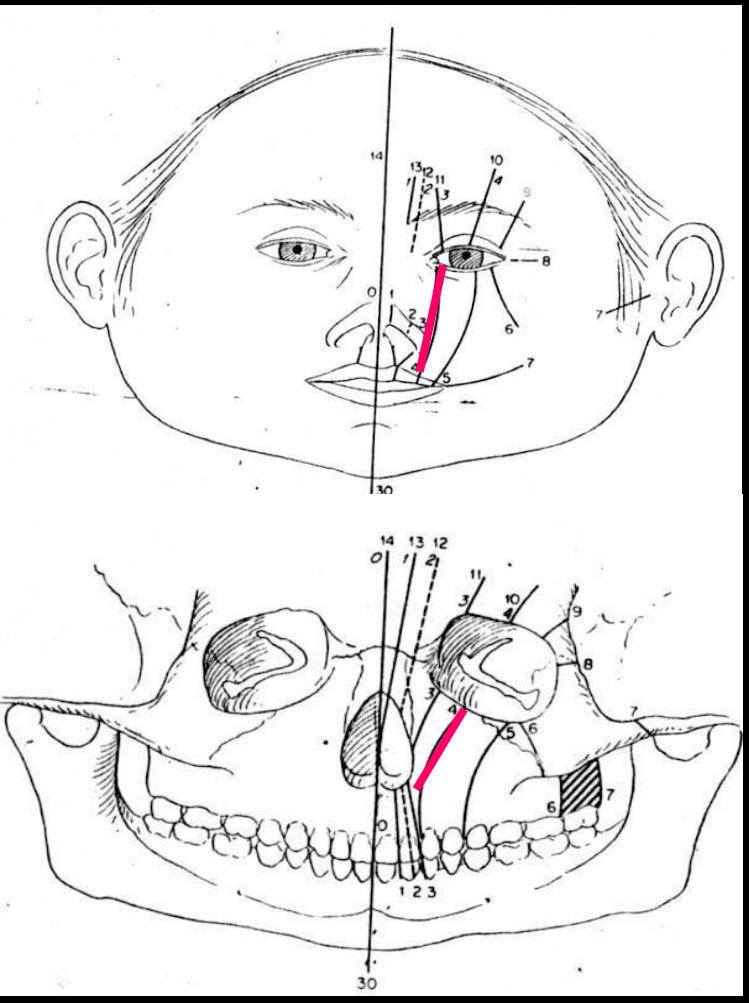
Craniofacial Clefts
Soft and Hard Tissue Defects

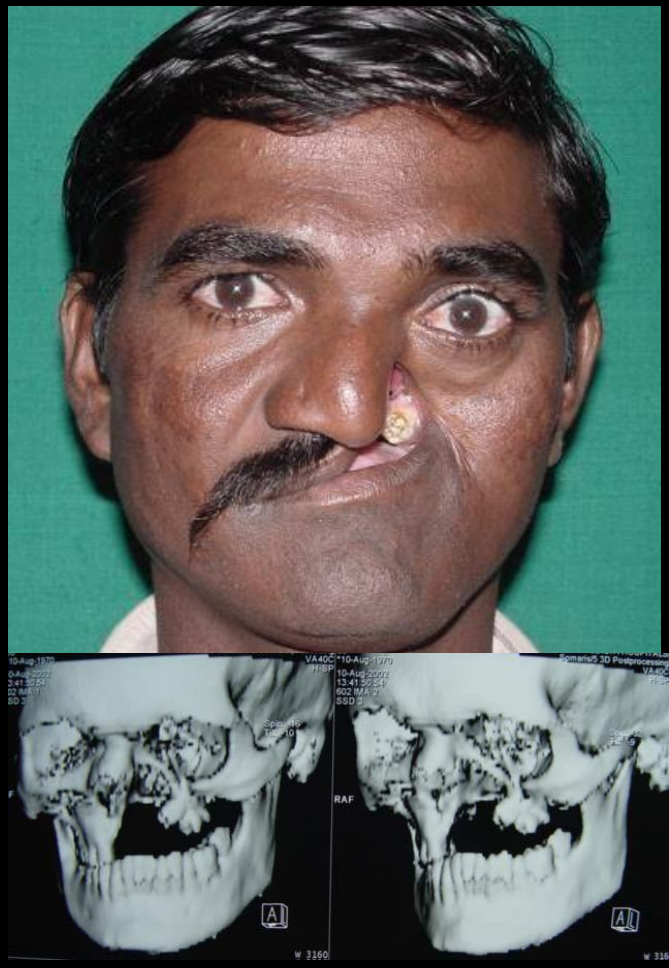




Tessier # 3 facial cleft

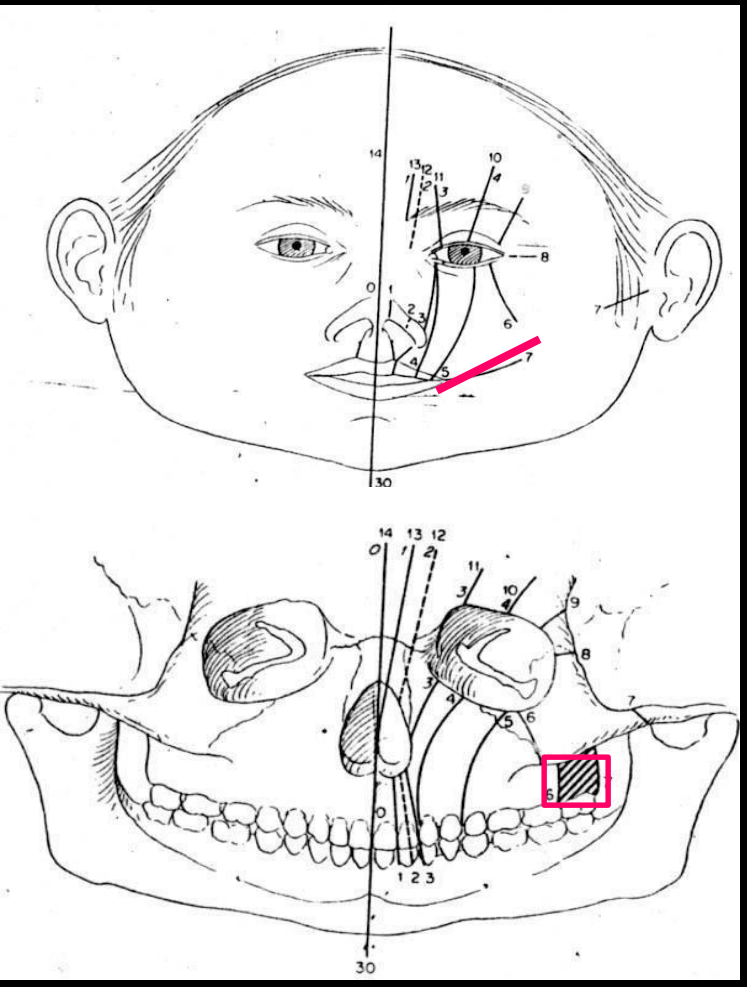
Craniofacial Clefts
Soft and Hard Tissue Defects





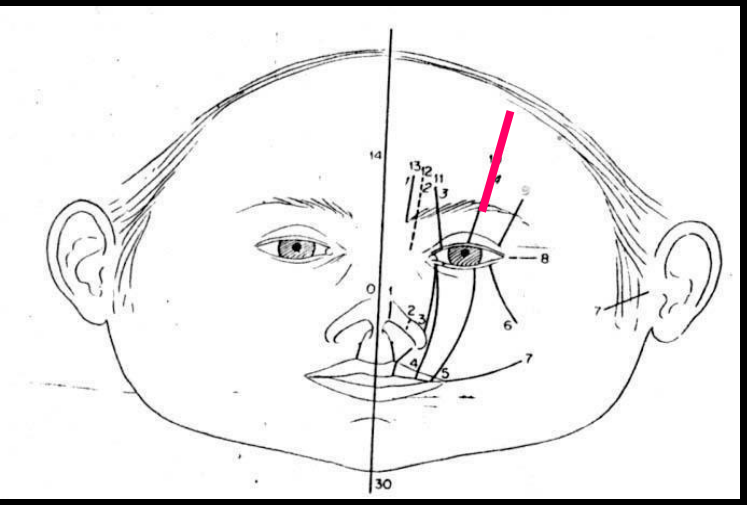
Unilateral Tessier #4 facial cleft

Craniofacial Clefts
Soft and Hard Tissue Defects

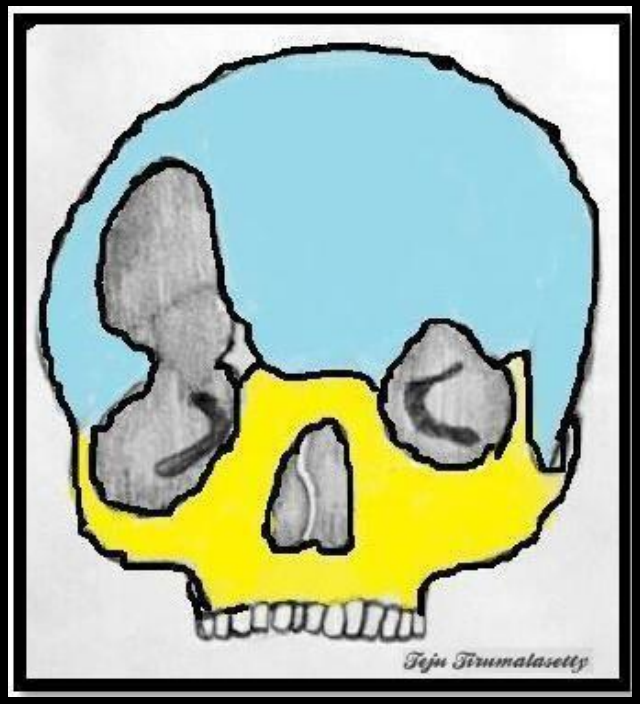


Tessier #7 facial cleft

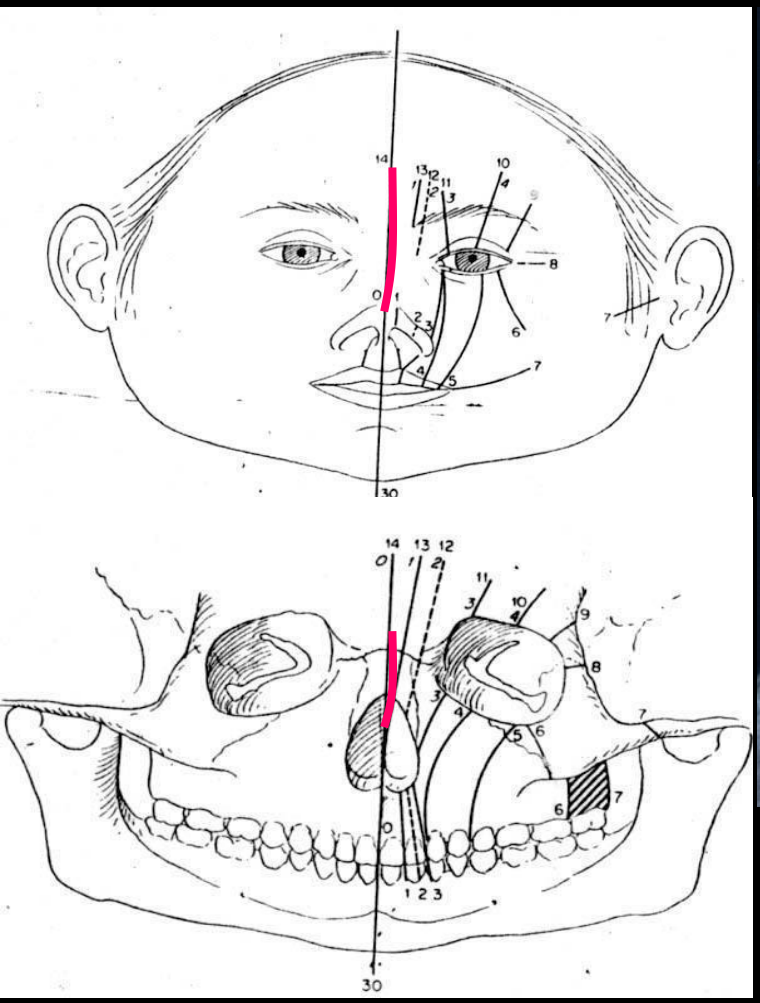
Craniofacial Clefts
Soft and Hard Tissue Defects

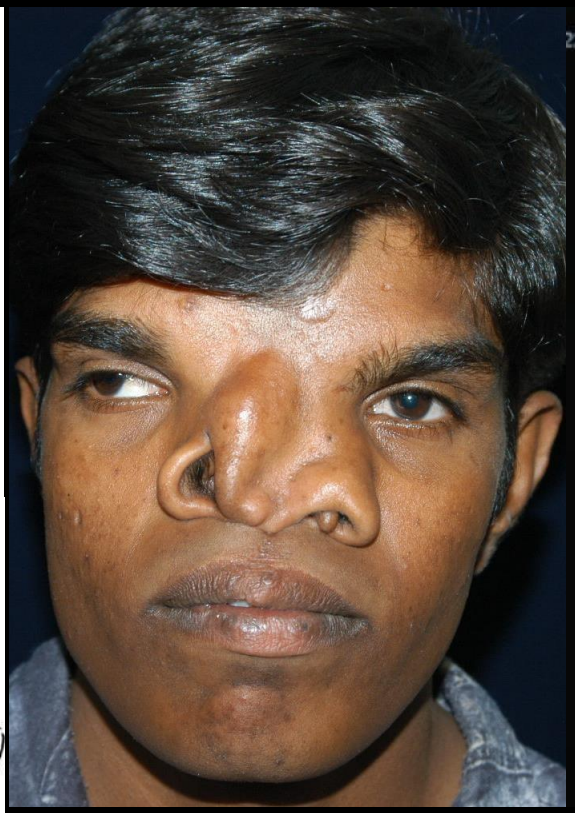


Tessier # 10 facial cleft



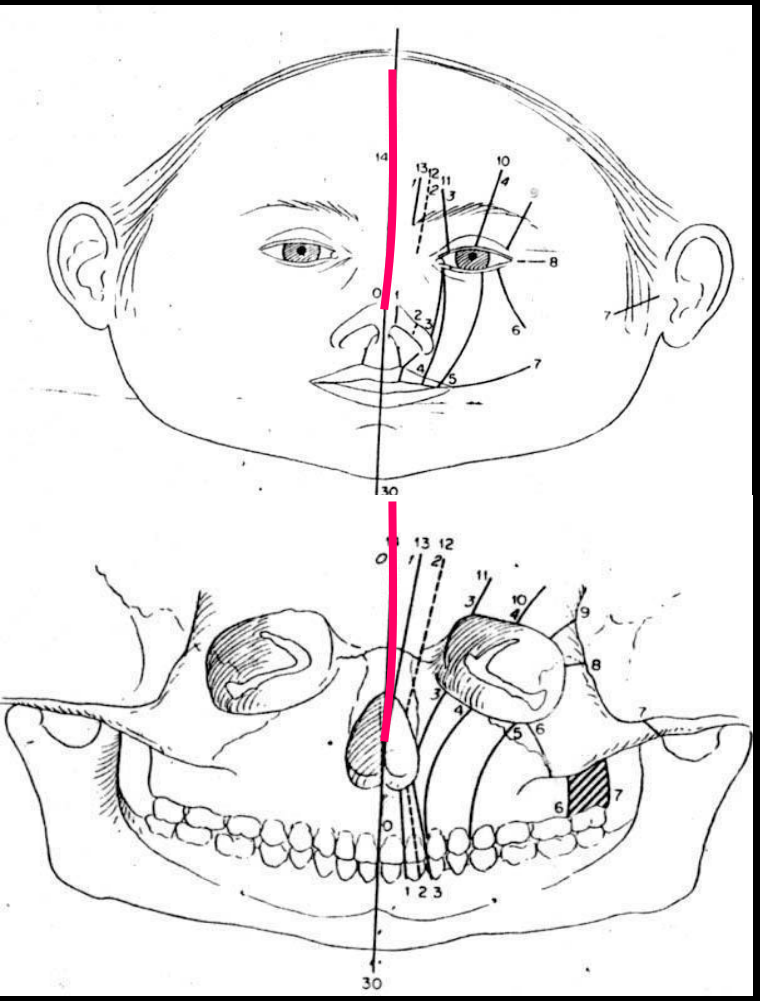
Craniofacial Clefts
Soft and Hard Tissue Defects

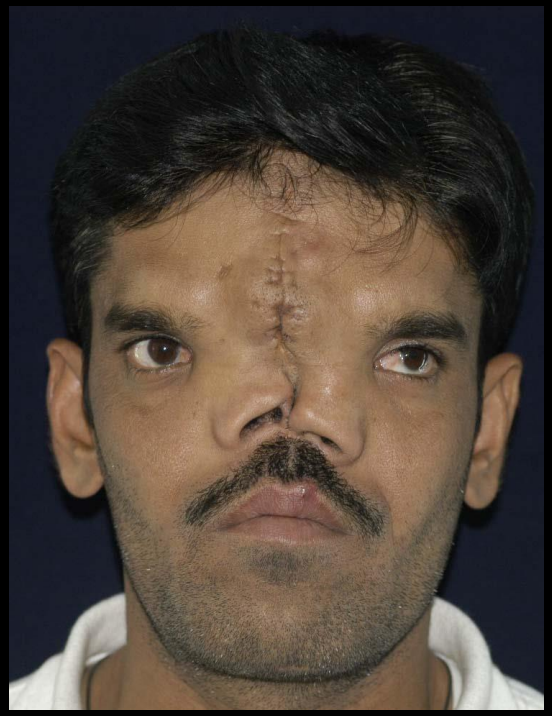


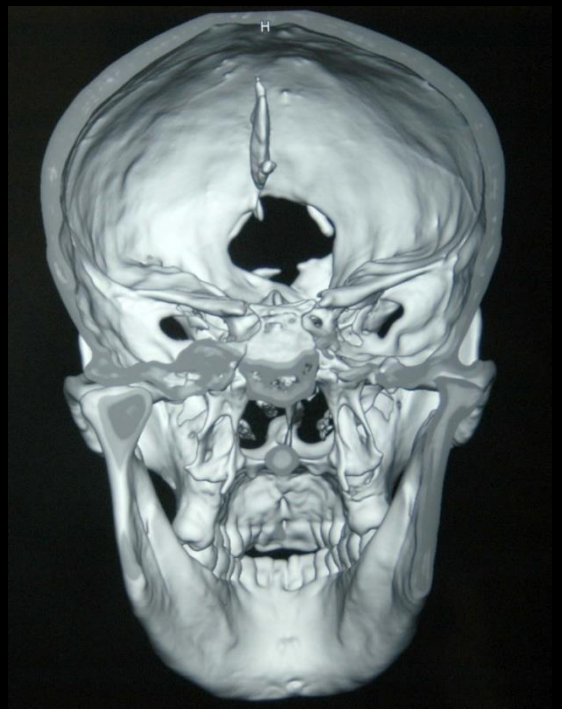


Tessier # 0-14 Facial Cleft with Orbital Hypertelorism

Craniofacial Clefts
Soft and Hard Tissue Defects







Tessier # 14 Facial Cleft with frontal Encephalocele

MANAGEMENT OF CRANIOFACIAL CLEFTS

Principles of craniofacial cleft management

1. Soft tissue

2. Hard tissue

PRINCIPLES OF MANAGEMENT

Soft Tissue Management

Lip	Vermilion notch
	Philtral Height
	Collumellar Height
Nose	Symmetrical Ala
	Projecting Nasal Tip
	Naso Labial Folds
Eye	Medial Canthal Ligament
	Repositioning of Tarsal plates
	Repositioning of the Lacrimal puncta
	Excision and removal of the colobomas of eyes
	Recreation of sufficient conjunctiva

Principles of craniofacial facial cleft management

Hard Tissue Management

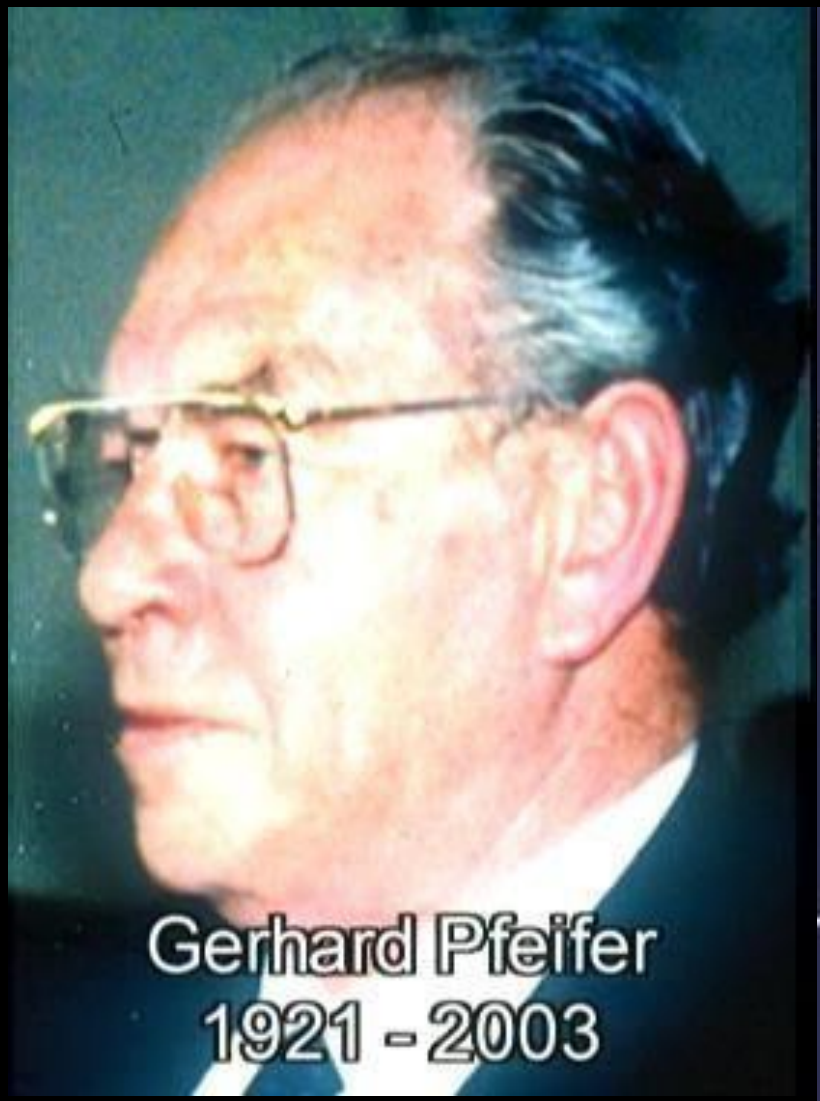
Bone grafting and other hard tissue surgery like

- Resection of encephaloceles
- Hypertelorism correction
- Orthognathic Surgery/Distraction Surgery

Principles of facial cleft management

SOFT TISSUE MANAGEMENT

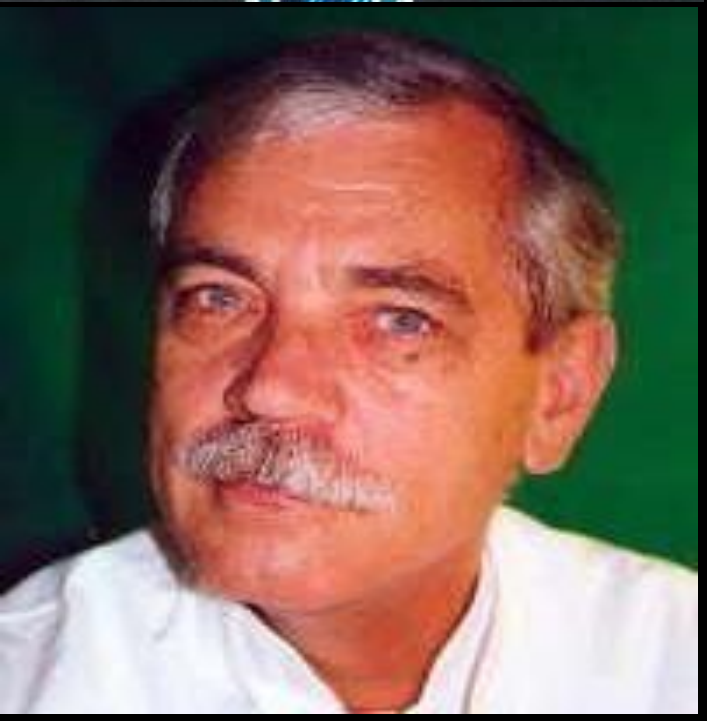
PFEIFER WAVE LINE INCISION ON THE FACE



Teratolaogical Regions of the Head

Prof. Dr. Johannes Schubert, Former Director,
Division of Cranio-maxillofacial Surgery, University Hospital,
Halle Germany

Prof. Schubert introduced me to the work of Prof. Gerhard Pfeifer on a visit to my center in Hyderabad in 2002.



Prof. Dr. Karsten Gundlach, Former Director,
Division of Cranio-maxillofacial Surgery, University Hospital,
Rostok Germany

In 2003, When I visited University Hospital Rostok Prof. Gundlach gave me publications that Prof Pfeifer and he did while they were in University Hospital, Hamburg.

Pfeifer wave line incision in cleft lip surgery

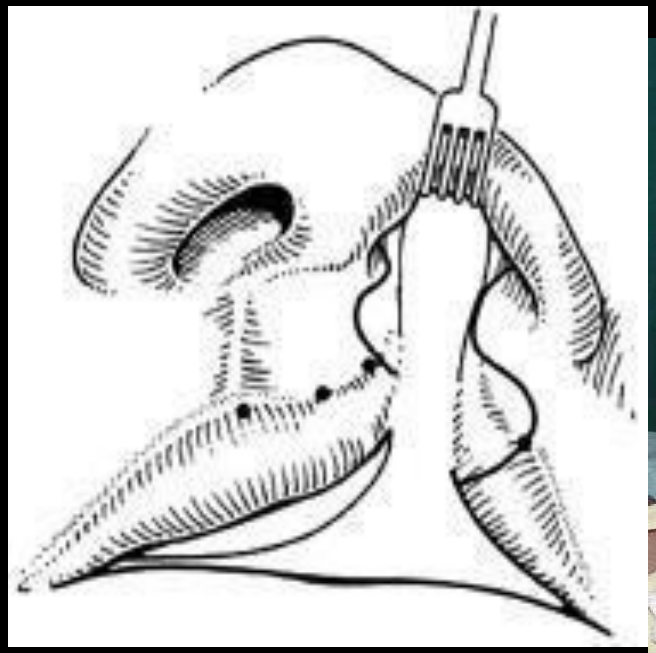
The wave line incision is a very simple incision with corresponding waves on the cleft and non cleft sides.

This simple incision line needs very few measurements

More importantly it produces a straight line scar that conforms almost to the philtral columns.

Over a twenty year period our unit used the Pfeifer wave line incision extensively to repair cleft lips both unilateral and bilateral and both incomplete and complete.

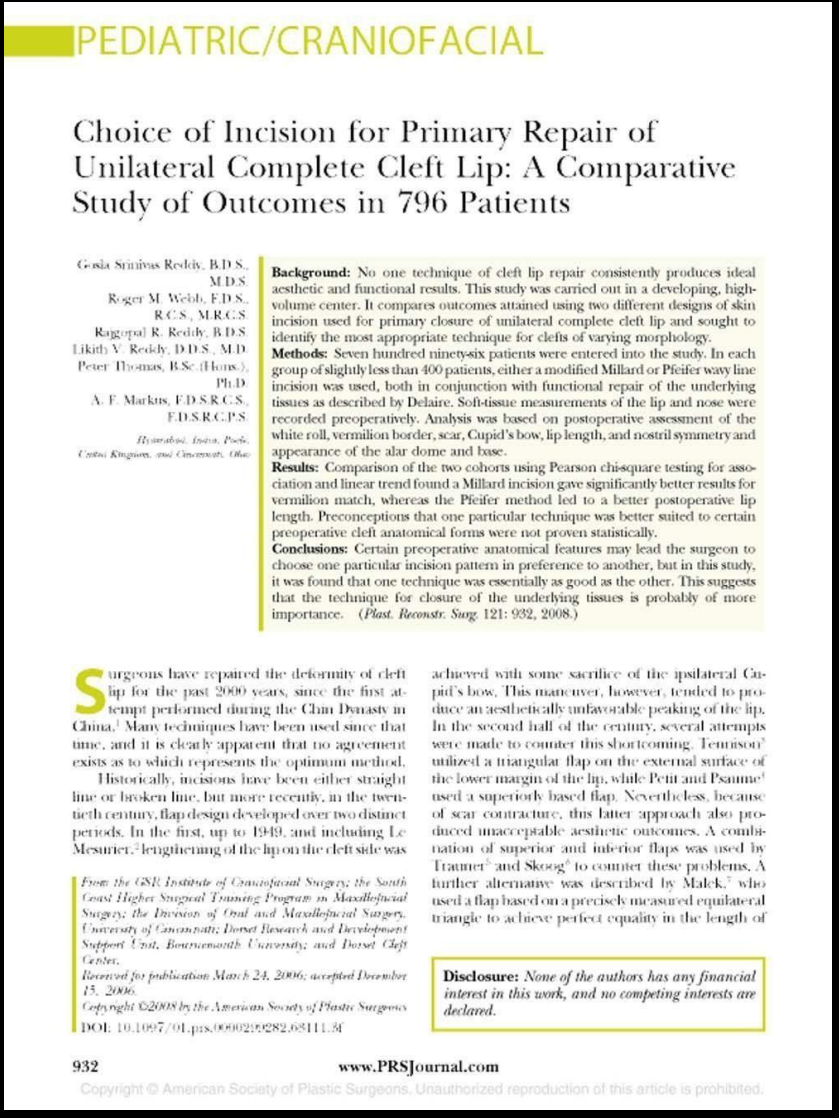
Pfeifer's Incision for Unilateral Cleft Lip (2000-2003)



Produces better results

- where the height of the lip on the cleft side was greater and
- where the columella height and width were greater than mean values

Source:
Choice of Incision for Primary Repair of Unilateral Complete Cleft Lip: A Comparative Studyof Outcomes in 796 Patients.
GoslaSrinivas Reddy et. al.; Plastic Reconstr. Surg.; 121: 932, 2008



PEDIATRIC/CRANIOFACIAL

Choice of Incision for Primary Repair of Unilateral Complete Cleft Lip: A Comparative Study of Outcomes in 796 Patients

Gosla Srinivas Reddy, B.D.S., M.D.S.
Roger M. Webb, F.D.S., R.C.S., M.R.C.S.
Rajgopal R. Reddy, B.D.S.
Likith V. Reddy, D.D.S., M.D.
Peter Thomas, B.Sc. (Hons.), Ph.D.
A. F. Markus, F.D.S.R.C.S., F.D.S.R.C.P.S.
Hyderabad, India, Poole, United Kingdom, and Cincinnati, Ohio

Background: No one technique of cleft lip repair consistently produces ideal aesthetic and functional results. This study was carried out in a developing, high-volume center. It compares outcomes attained using two different designs of skin incision used for primary closure of unilateral complete cleft lip and sought to identify the most appropriate technique for clefts of varying morphology.
Methods: Seven hundred ninety-six patients were entered into the study. In each group of slightly less than 400 patients, either a modified Millard or Pfeifer wavy line incision was used, both in conjunction with functional repair of the underlying tissues as described by Delaire. Soft-tissue measurements of the lip and nose were recorded preoperatively. Analysis was based on postoperative assessment of the white roll, vermilion border, scar, Cupid's bow, lip length, and nostril symmetry and appearance of the alar dome and base.
Results: Comparison of the two cohorts using Pearson chi-square testing for association and linear trend found a Millard incision gave significantly better results for vermilion match, whereas the Pfeifer method led to a better postoperative lip length. Preconceptions that one particular technique was better suited to certain preoperative cleft anatomical forms were not proven statistically.
Conclusions: Certain preoperative anatomical features may lead the surgeon to choose one particular incision pattern in preference to another, but in this study, it was found that one technique was essentially as good as the other. This suggests that the technique for closure of the underlying tissues is probably of more importance. (*Plast. Reconstr. Surg.* 121: 932, 2008.)

Surgeons have repaired the deformity of cleft lip for the past 2000 years, since the first attempt performed during the Chin Dynasty in China.[1] Many techniques have been used since that time, and it is clearly apparent that no agreement exists as to which represents the optimum method.

Historically, incisions have been either straight line or broken line, but more recently, in the twentieth century, flap design developed over two distinct periods. In the first, up to 1949, and including Le Mesurier,[2] lengthening of the lip on the cleft side was achieved with some sacrifice of the ipsilateral Cupid's bow. This maneuver, however, tended to produce an aesthetically unfavorable peaking of the lip. In the second half of the century, several attempts were made to counter this shortcoming. Tennison[3] utilized a triangular flap on the external surface of the lower margin of the lip, while Petit and Psaume[4] used a superiorly based flap. Nevertheless, because of scar contracture, this latter approach also produced unacceptable aesthetic outcomes. A combination of superior and inferior flaps was used by Trauner[5] and Skoog[6] to counter these problems. A further alternative was described by Malek,[7] who used a flap based on a precisely measured equilateral triangle to achieve perfect equality in the length of

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Disclosure: *None of the authors has any financial interest in this work, and no competing interests are declared.*

- The Millard flap produced better results when there was a need to rotate the cupids bow
- Pfeifer's design produced better results in the vertical elongation of the lip

It was found that one technique was essentially as good as the other.

Choice of Incision for Primary Repair of Unilateral Complete Cleft Lip: AComparative Study of Outcomes in 796 Patients.
Plastic and Reconstructive Surgery 121: 932, 2008

An incision utilizing the advantages of both Millard and Pfeifer incision

Afroze incision

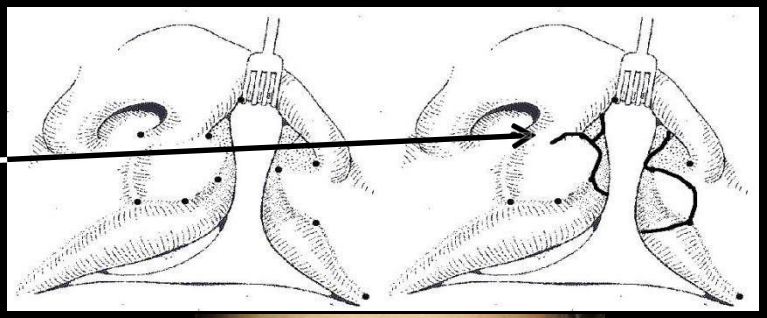
- Developed to address the problem of lip length discrepancy and vermillion matching using only one incision.
- Combined the Millard incision on the non-cleft side (medial side) and the Pfeifer incision on the cleft side (lateral side).
- Millard incision on the non-cleft sideaids rotation and the Pfeifer incision on the cleft sideaids lengthening trying to address horizontal and vertical discrepancies of the lip.

Source:
Afroze Incision for Functional Cheiloplasty, Technical Note
Gosla Srinivas Reddy et. al.; J. Craniofac. Surg. 20(8):1733-1736, September 2009.

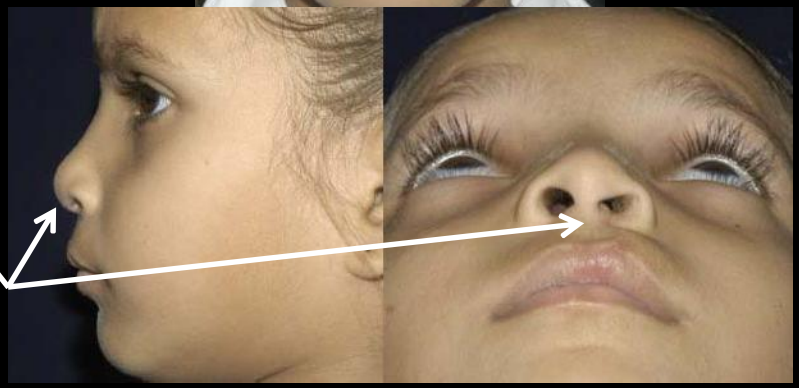
Afroze Incision

The Afroze incision does not cross onto the base of columella.

Incisions which cross the columella cause scarring leading to growth retardation and severe downward pull of the columella on affected side



The Afroze incision separates the medial part of ala on cleft side and its associated mal-aligned muscle to further lift the tip of the nose and improve the alar contour and reduce the webbing in the nose



Source:
Afroze Incision for Functional Cheiloplasty, Technical Note
Gosla Srinivas Reddy et. al.; J. Craniofac. Surg. 20(8):1733-1736, September 2009.

Afroze Incision for Functional Cheiloseptoplasty

Gosla Srinivas Reddy, DDS, MD, Rajgopal R. Reddy, BDS, MBBS,* Nilesh Pagaria, BDS, MDS,* and Stefaan Berge, MD, DD, PhD†*

Abstract: Repair of unilateral cleft lip is a fascinating and challenging procedure. Although a great number of operations have been described for the unilateral cleft lip repair, none fulfill all the plastic surgical criteria, and in most cases, cleft lip repairs require secondary operations in an attempt to achieve described goals of primary cheiloplasty. The Afroze incision is a combination 2 incisions, that is, the Millard incision on the noncleft side and Pfeiffer incision on the cleft side. The flap design is the Millard flap on the noncleft side rotated downward, and the peak of the distal curve of the Pfeiffer flap is positioned in the triangular defect formed by the movement of the Millard flap. The proximal curve lengthens downward to receive the Millard's "C" flap. The advantage of this technique is that there is no tension on the postoperative scar because the incision is essentially horizontal in nature, and the contracture of the scar occurs horizontally rather than vertically. Primary sepial repositioning is performed, which provides stability and exact positioning of the previously lifted alar crus of the cleft side and nasal tip, and the nose can grow in a balanced way with equal muscular force being exerted on both sides. This incision can be used in all types of complete unilateral cleft lip regardless of the width of the cleft, shortening the cleft lip segment.

Key Words: Complete unilateral cleft lip, Afroze incision, cheiloseptoplasty

(*J Craniofac Surg* 2009;20: 1733–1736)

Repair of unilateral cleft lip is a fascinating and challenging procedure. The aims of a unilateral cleft lip repair are to achieve a lip length on the cleft side matching that on the normal side, an inconspicuous residual scar that does not cross anatomic boundaries, an adequate Cupid's bow width, an absence of notching of the vermilion border (whistle tip deformity), and an absence of peaking of the vermilion at the Cupid's bow on the cleft side. Although a great number of operations have been described for the unilateral cleft lip repair, none fulfill all the above criteria, and in most cases, cleft lip repairs require secondary operations in an attempt to achieve this described goal.[1]

The Millard repair is based on a rotation flap on the noncleft (medial) side coupled with an advancement flap on the cleft (lateral) side. One of its main advantages is that the technique allows adjustment as the operation proceeds, with further rotation and advancement movements tailored to the individual case. It requires the approximation of a pair of convex curves that ultimately may leave a scar crossing the midline at the base of the columella. The Pfeiffer incision is designed using the concept of "morphologic order." Measurements of noncleft side height and length are recorded and translated to the cleft side using a flexible wire, thus determining natural anatomic points. The 2 curves are brought together such that the highest and lowest points of 1 curve are approximated with the corresponding highest and lowest points of the other, thus creating a straight line.[2]

On comparison of the 2 techniques, each has its own advantages and shortcomings. The Millard flap produced better results when considering vermilion approximation. In this respect, it is rather more flexible than a straight line design, and the operator is able to position the rotation flap on the noncleft side where it is judged likely to produce the best outcome. This technique also has an improved outcome where preoperatively the lip is wider on the noncleft side. This would lead to a reduction in rotational requirement of the flap on the medial side, resulting in less distortion and a Cupid's bow with better form. Repairs using flaps according to Pfeiffer's design resulted in a better length of lip postoperatively. By its nature, the more waves incorporated in the incision, the greater the height of the lip. A prominent wave placed just above the mucocutaneous junction will tend to exaggerate this factor.[3]

Afroze incision is a combination of 2 incisions, Millard incision on the noncleft side and Pfeiffer incision on the cleft side. The flap design is such that Millard flap on the noncleft side is rotated downward, and the peak of the distal curve of the Pfeiffer flap is positioned in the triangular defect formed by the movement of the Millard flap. The proximal curve lengthens downward to receive the Millard's "C" flap. The advantage of this technique is that there is no tension on the postoperative scar because the incision is essentially horizontal in nature and the contracture of the scar occurs horizontally rather than vertically. There is also no pressure on the Cupid's bow for the same reason.

INCISION MARKING

On the noncleft side, the Cupid's bow is marked by 3 points. Point 1 is the highest point on the contralateral white roll, point 2 is the deepest point on the white roll. Point 3 is marked on the white roll at a distance that is 2 mm more than the distance between points 1 and 2.

On the cleft side, point 4 is marked at a point where the white roll begins to fade (Figs. 1–3).

The Millard incision on the noncleft side is extended from point 3 along the junction of skin and vermilion mucosa and further

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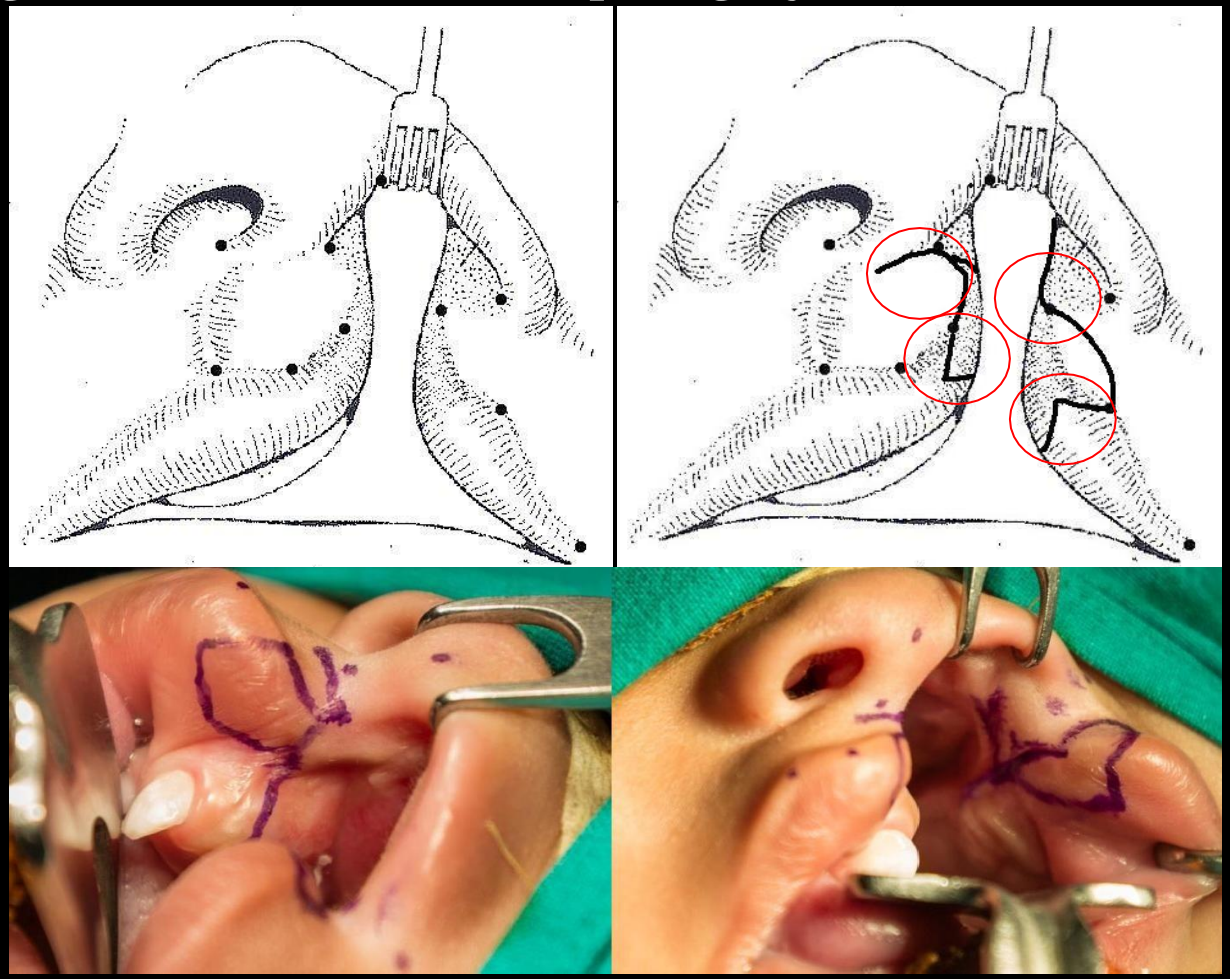
Afroze Incision for Functional Cheiloplasty,
J. Craniofac. Surg. 20(8):1733-1736, September 2009.

www.craniofacialinstitute.org

Morpho-functional Cleft Lip Repair

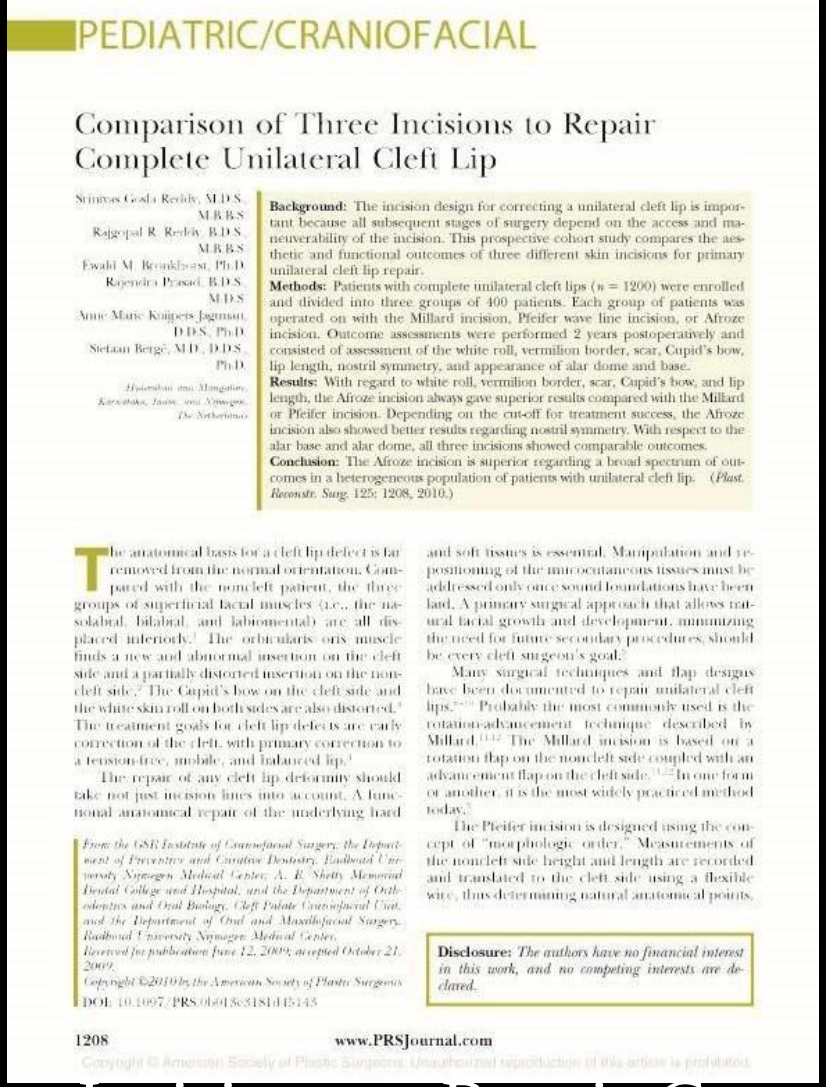
Incision design for unilateral cleft lip surgery



Source:

Afroze Incision for Functional Cheiloplasty, Technical Note

Gosla Srinivas Reddy et. al.; J. Craniofac. Surg. 20(8):1733-1736, September 2009.



Comparison of Three Incisions to Repair Complete Unilateral Cleft Lip

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Background: The incision design for correcting a unilateral cleft lip is important because all subsequent stages of surgery depend on the access and maneuverability of the incision. This prospective cohort study compares the aesthetic and functional outcomes of three different skin incisions for primary unilateral cleft lip repair.

Methods: Patients with complete unilateral cleft lips ($n = 1200$) were enrolled and divided into three groups of 400 patients. Each group of patients was operated on with the Millard incision, Pfeifer wave line incision, or Afroze incision. Outcome assessments were performed 2 years postoperatively and consisted of assessment of the white roll, vermilion border, scar, Cupid's bow, lip length, nostril symmetry, and appearance of alar dome and base.

Results: With regard to white roll, vermilion border, scar, Cupid's bow, and lip length, the Afroze incision always gave superior results compared with the Millard or Pfeifer incision. Depending on the cut-off for treatment success, the Afroze incision also showed better results regarding nostril symmetry. With respect to the alar base and alar dome, all three incisions showed comparable outcomes.

Conclusion: The Afroze incision is superior regarding a broad spectrum of outcomes in a heterogeneous population of patients with unilateral cleft lip. (*Plast. Reconstr. Surg.* 125: 1208, 2010.)

The anatomical basis for a cleft lip defect is far removed from the normal orientation. Compared with the noncleft patient, the three groups of superficial facial muscles (i.e., the nasolabial, bilabial, and labiomental) are all displaced inferiorly.[1] The orbicularis oris muscle finds a new and abnormal insertion on the cleft side and a partially distorted insertion on the noncleft side.[2] The Cupid's bow on the cleft side and the white skin roll on both sides are also distorted.[3] The treatment goals for cleft lip defects are early correction of the cleft, with primary correction to a tension-free, mobile, and balanced lip.[4]

The repair of any cleft lip deformity should take not just incision lines into account. A functional anatomical repair of the underlying hard and soft tissues is essential. Manipulation and repositioning of the mucocutaneous tissues must be addressed only once sound foundations have been laid. A primary surgical approach that allows natural facial growth and development, minimizing the need for future secondary procedures, should be every cleft surgeon's goal.[5]

Many surgical techniques and flap designs have been documented to repair unilateral cleft lips.[6–10] Probably the most commonly used is the rotation-advancement technique described by Millard.[11,12] The Millard incision is based on a rotation flap on the noncleft side coupled with an advancement flap on the cleft side.[11–13] In one form or another, it is the most widely practiced method today.[2]

The Pfeifer incision is designed using the concept of "morphologic order."[6] Measurements of the noncleft side height and length are recorded and translated to the cleft side using a flexible wire, thus determining natural anatomical points.

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Comparison of Three Incisions to Repair Complete Unilateral Cleft Lip.

Plastic and Reconstructive Surgery, 125 (4): 1208-1216, 2010.

Comparison between Pfeifer/Millard/Afroze Incision

- With regard to white roll, vermilion border, scar, cupids bow and lip length the Afroze incision always gave superior results compared to the Millard technique.

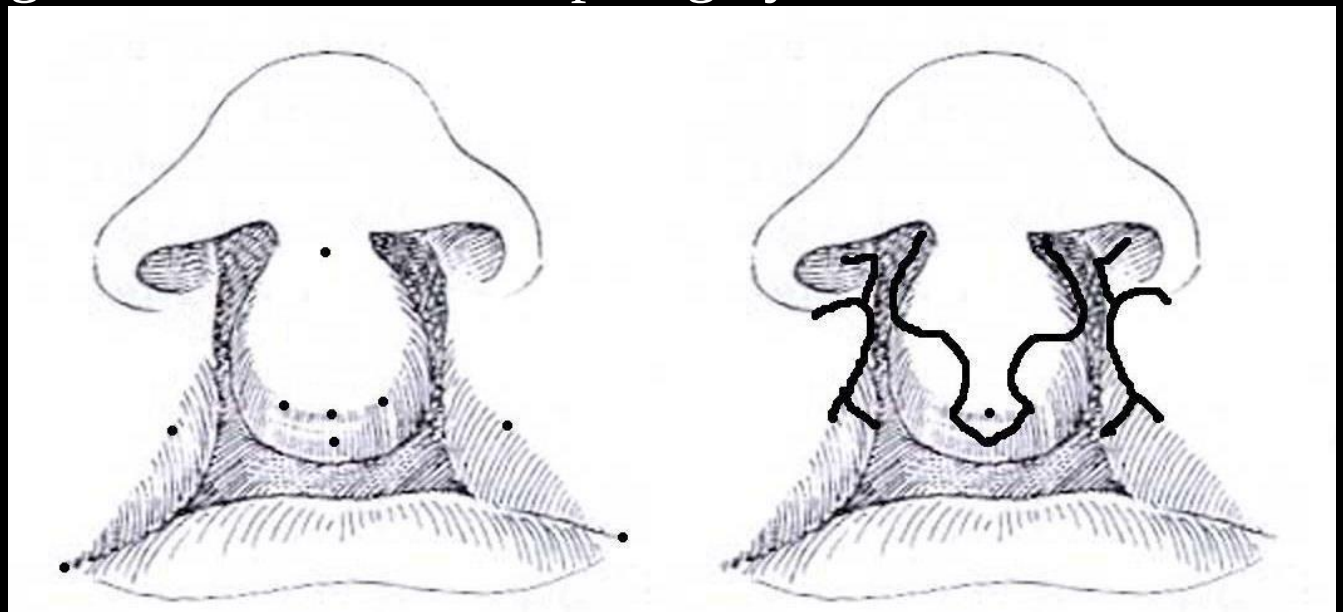
- This study showed the Afroze incision to be superior on a broad spectrum of outcomes in a heterogeneous population of unilateral complete cleft lip patients.

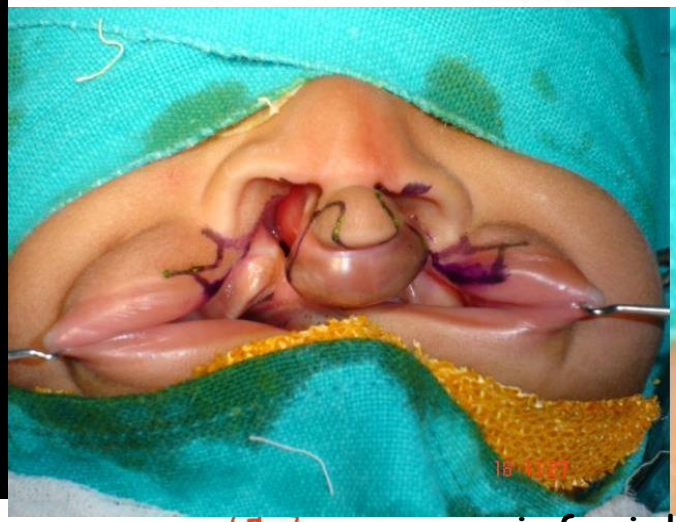
Source:
Gosla Reddy et al. Comparison of Three Incisions to Repair Complete Unilateral Cleft Lip. Plastic and Reconstructive Surgery, 125 (4): 1208-1216, April 2010.

Unilateral Cleft Lip Repair

Bilateral Cleft Lip Repair

Incision design for bilateral cleft lip surgery





Bilateral Cleft Lip Repair

Preoperative | 5 days postoperatively | 9 months postoperatively | 3 years postoperatively

lww | 24/7/13 | 16:13 | 4 Color Fig(s): F2-3 | Art: PRS3205695

A Comparative Study of Two Different Techniques for Complete Bilateral Cleft Lip Repair Using Two-Dimensional Photographic Analysis

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Max J. Zinser, M.D., D.D.S.
Likith V. Reddy, M.D., D.D.S.
Anthony F. Markus, F.D.S.,R.C.S., F.D.S.R.C.P.S., F.R.C.S.
Stefaan J. Bergé, M.D., D.D.S., Ph.D.

Secunderabad, Hyderabad, India; Cologne, Germany; New Orleans, La.; Bournemouth, United Kingdom; and Nijmegen, The Netherlands

Background: The aim of this study was to compare the clinical outcomes of two techniques to repair complete bilateral cleft lip by using indirect two-dimensional photographic analysis.
Methods: One hundred eight bilateral cleft patients were included in this study, 54 patients operated on with the Millard technique and 54 patients operated on with the Afrose technique. Each group of patients was further separated into two subgroups containing symmetrical and asymmetrical cleft lips. All patients were photographed preoperatively and 4 years postoperatively in frontal and submentovertical views in a reproducible way. Eight measurements were performed on the photographs. From these measurements, seven ratios were calculated to compare the two techniques.
Results: The outcomes of the interobserver and intraobserver measurements were analyzed using the Pearson correlation test. There was a statistically significant reliability in the intraobserver and interobserver ratios. Analysis of the ratios was performed using the independent samples *t* test (5 percent level of significance). The authors found that the Afrose technique was better than the Millard technique in six of the seven parameters for symmetrical clefts and in four of the seven parameters for asymmetrical clefts; however, there was no statistically significant difference seen between the two techniques.
Conclusions: The Afrose technique seems to have good clinical outcomes on bilateral cleft lip patients, but more research and long-term follow-up are needed to determine the full outcome of the technique in various parameters. (*Plast. Reconstr. Surg.* 132: 00, 2013.)
CLINICAL QUESTION/LEVEL OF EVIDENCE: Therapeutic, III.

No greater problem exists in the whole field of surgery than the successful treatment of patients suffering from complete, bilateral cleft lip–cleft palate repair.[1] The challenge is to construct the nasolabial complex in three dimensions, incorporating soft and hard tissue and anticipating four-dimensional changes of growth and distortion.[2]

A number of surgical procedures with many variations for the repair of bilateral cleft lip are well described.[3–5] The Millard technique and its variations are extensively used to repair bilateral cleft lips.[6] The Afrose technique is based on a combination of a variation of the Millard technique on the cleft segment and a variation of the Pfeifer technique on the prolabium. The aim of this study was to compare the clinical outcomes of the Millard technique and the Afrose technique by using indirect photographic measurements in complete bilateral cleft lips.

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Disclosure: *The authors have no financial interest to declare in relation to the content of this article.*

A comparative study of two different techniques for complete bilateral cleft lip repair using two-dimensional photographic analysis

Plastic and Reconstructive Surgery 2013

Craniofacial Cleft Repair

Flap Design

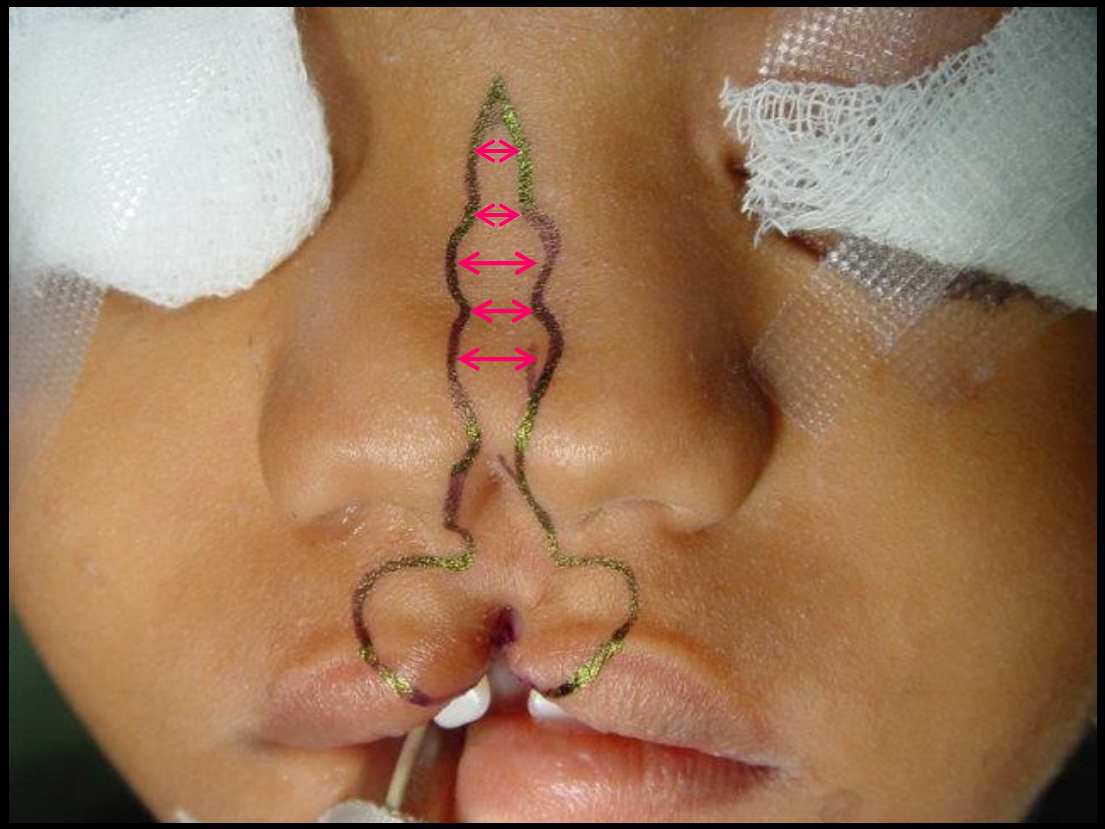
Local rotational flaps

Z-plasty

Craniofacial Cleft Repair

Flap Design

Pfeifer wave design



Craniofacial Cleft Repair

Flap Design

Nasolabial Transposition Flap

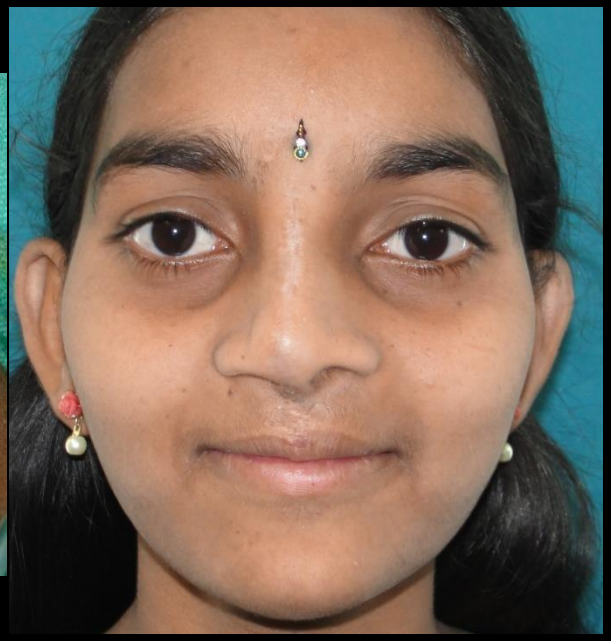
Nasal Dorsum Rotational Flap

Forehead-Eyelid-Nasal Transposition Flap

Designed in collaboration with Joachim Obwegeser

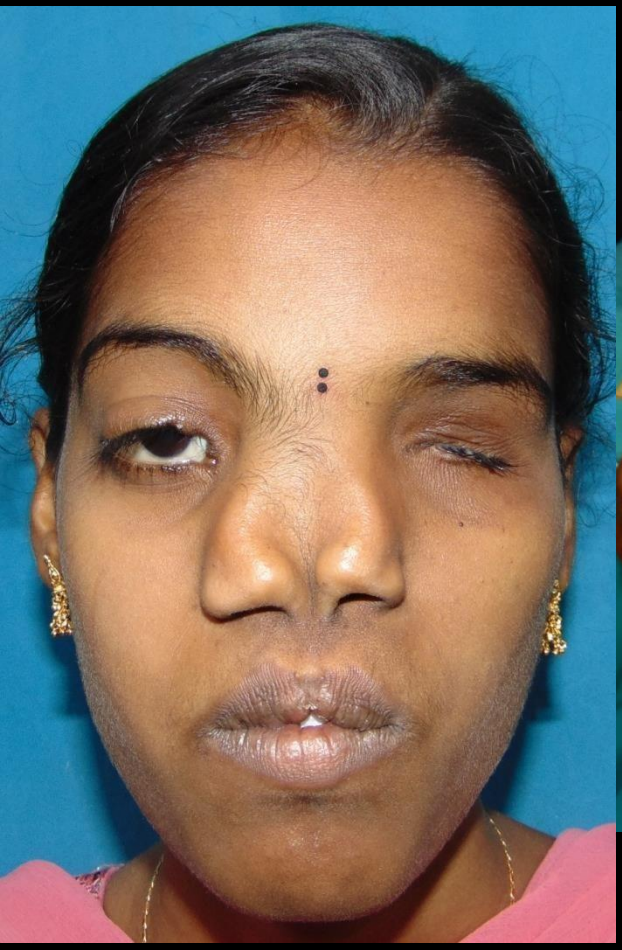
Craniofacial Cleft Repair

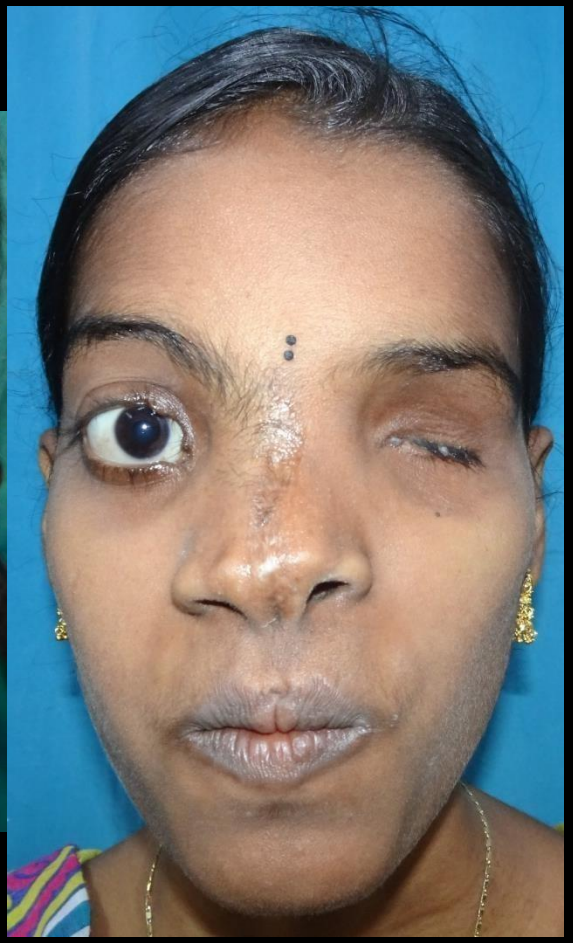
Tessier # 0-14 Facial Cleft



Craniofacial Cleft Repair

Tessier # 0-14 Facial Cleft





Craniofacial Cleft Repair

Tessier # 2 Facial Cleft

Craniofacial Cleft Repair

Tessier # 2 Facial Cleft

Craniofacial Cleft Repair

Tessier # 2 Facial Cleft

Craniofacial Cleft Repair

Tessier #3 Facial Cleft

Craniofacial Cleft Repair

Tessier #3 Facial Cleft

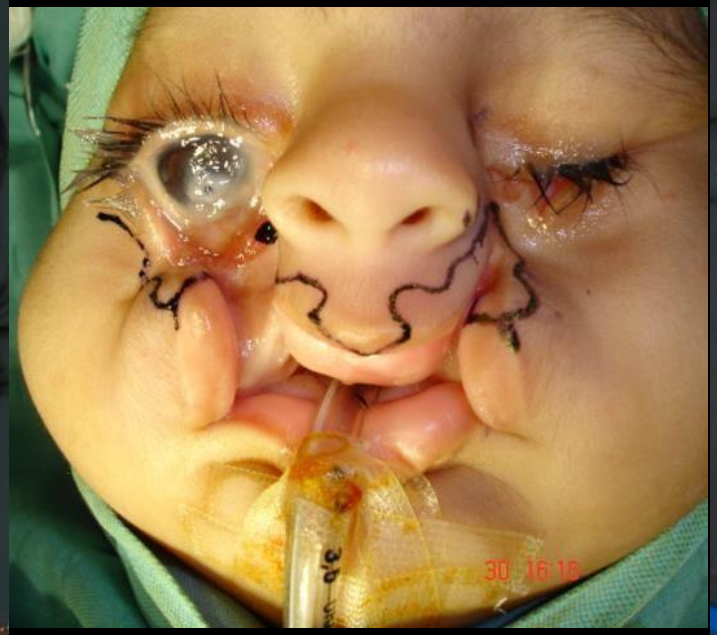
Craniofacial Cleft Repair

Tessier #3 Facial Cleft

Craniofacial Cleft Repair

Bilateral Tessier # 4 Facial Cleft

Craniofacial Cleft Repair



Bilateral Tessier # 4 Facial Cleft

Craniofacial Cleft Repair

Unilateral Tessier # 5 Facial Cleft

Craniofacial Cleft Repair

Tessier # 2, 3, 7 Facial Cleft

Craniofacial Cleft Repair

Tessier # 1, 4, 7 Facial Cleft

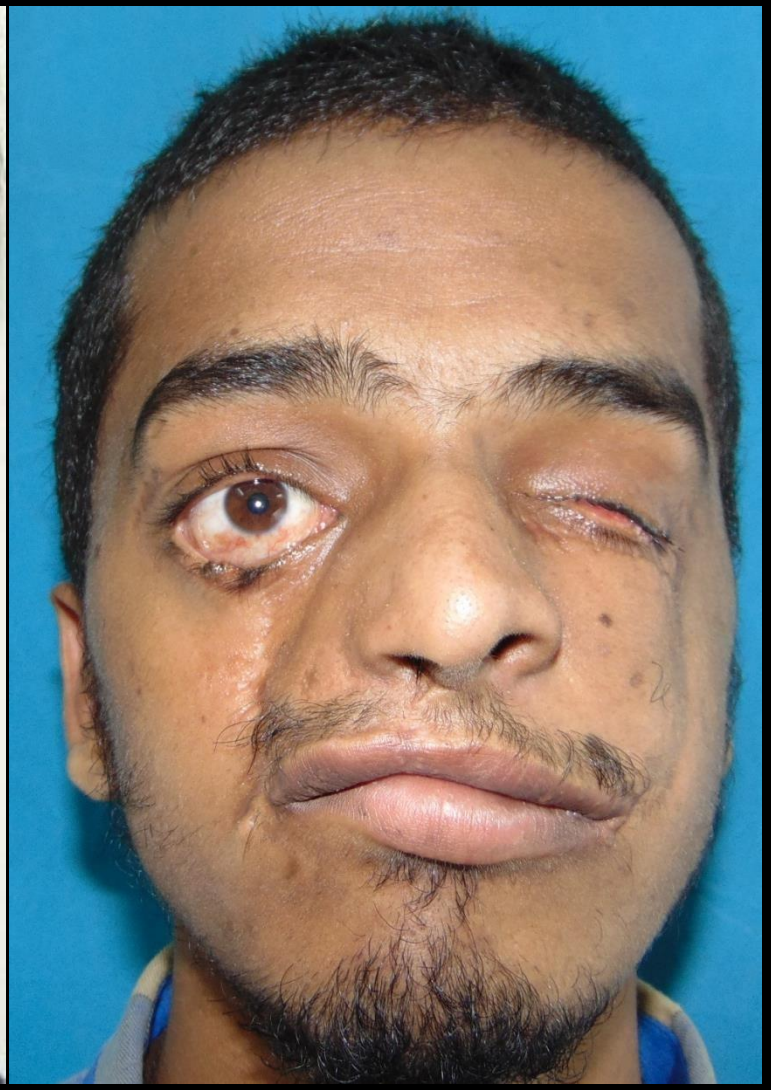
Craniofacial Cleft Repair

Tessier # 3, 4, 5 Facial Cleft

Craniofacial Cleft Repair

Tessier # 3, 5, 7 Facial Cleft

Craniofacial Cleft Repair



Tessier # 3, 5, 7 Facial Cleft

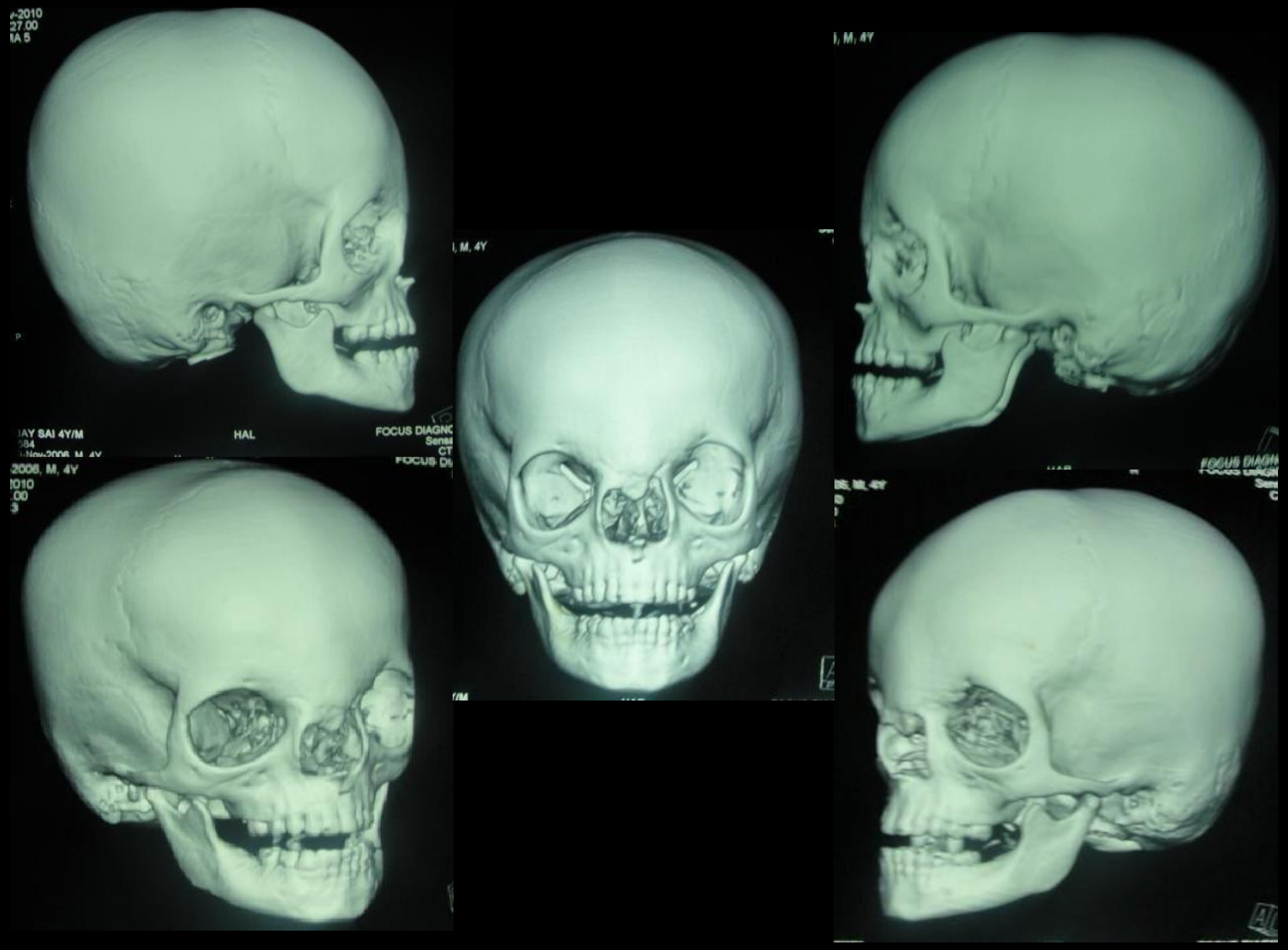
Craniofacial Clefts
SOFT AND HARD TISSUE REPAIR/RECONSTRUCTION

Treatment

Tessier #0-14 Craniofacial Cleft

Treatment

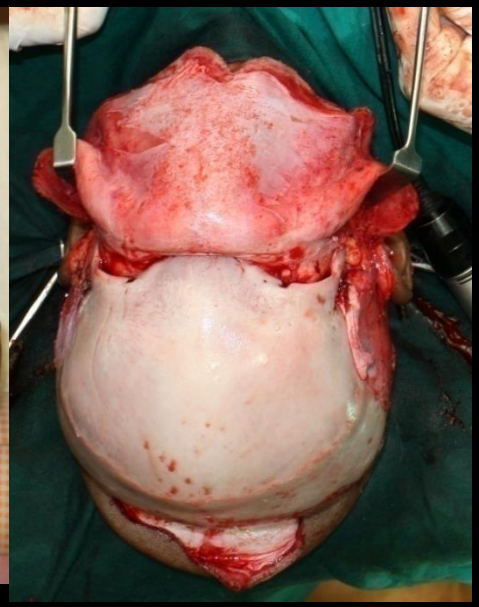
Tessier #0-14 Craniofacial Cleft



Treatment

Tessier #0-14 Craniofacial Cleft



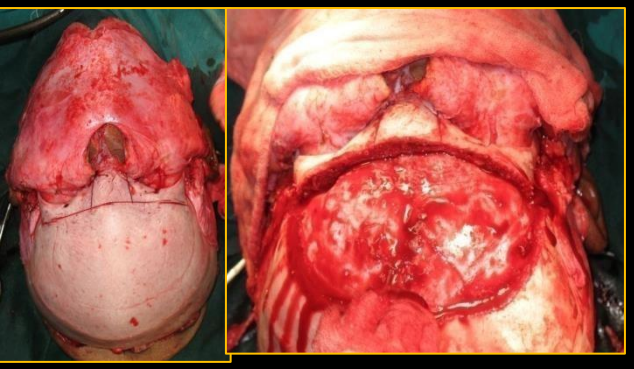



Skin Incision

The skin incision for the intracranial correction of orbital hypetelorism consists of bicoronal incision with the dissection as far forward and anterior as possible.

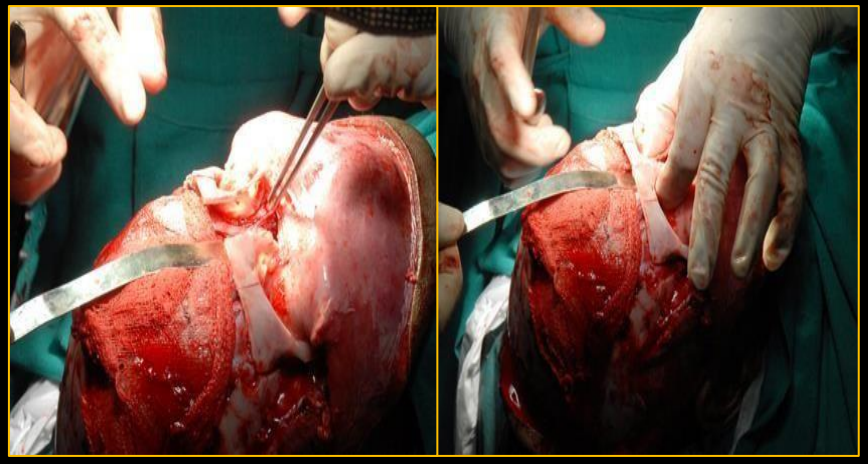
Naso-orbital Complex

Hypertelorism



Transfrontal Craniotomy

Orbital roof osteotomy



Orbital approximation

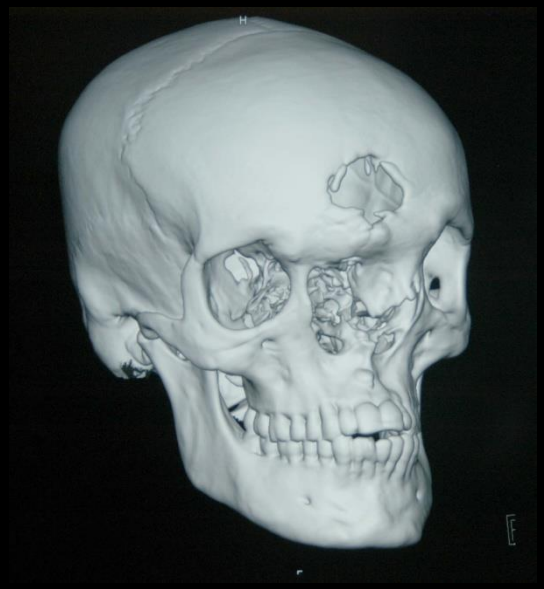
Treatment

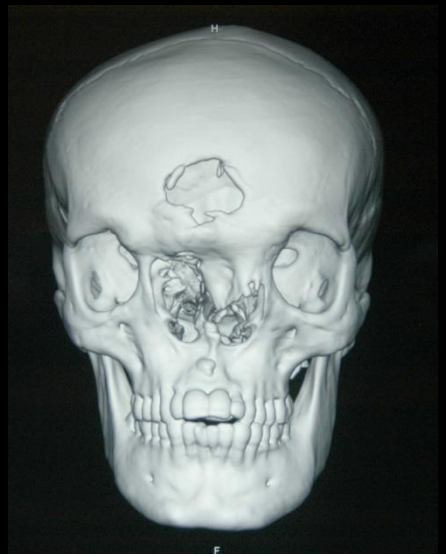
Tessier #0-14 Craniofacial Cleft

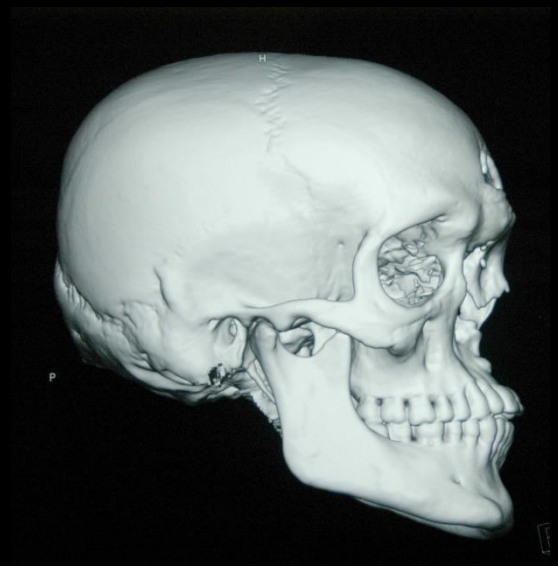
Treatment

Tessier #14 Craniofacial Cleft

Treatment
CT Scan

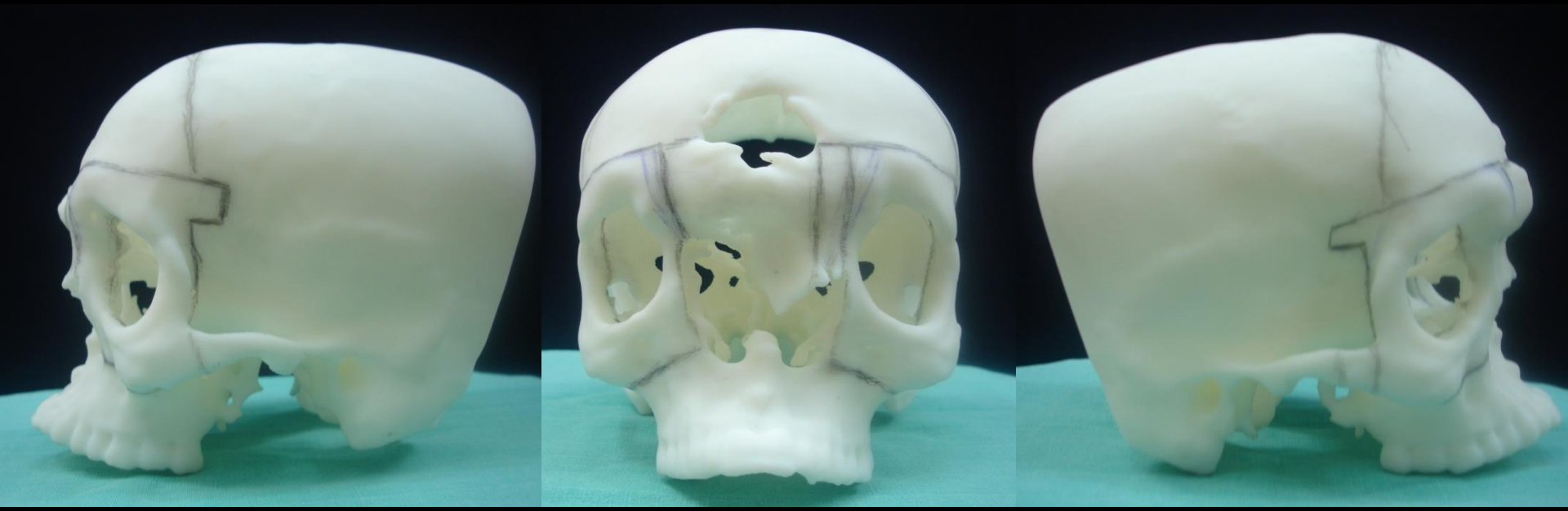






Treatment

Stereo Lithographic Models

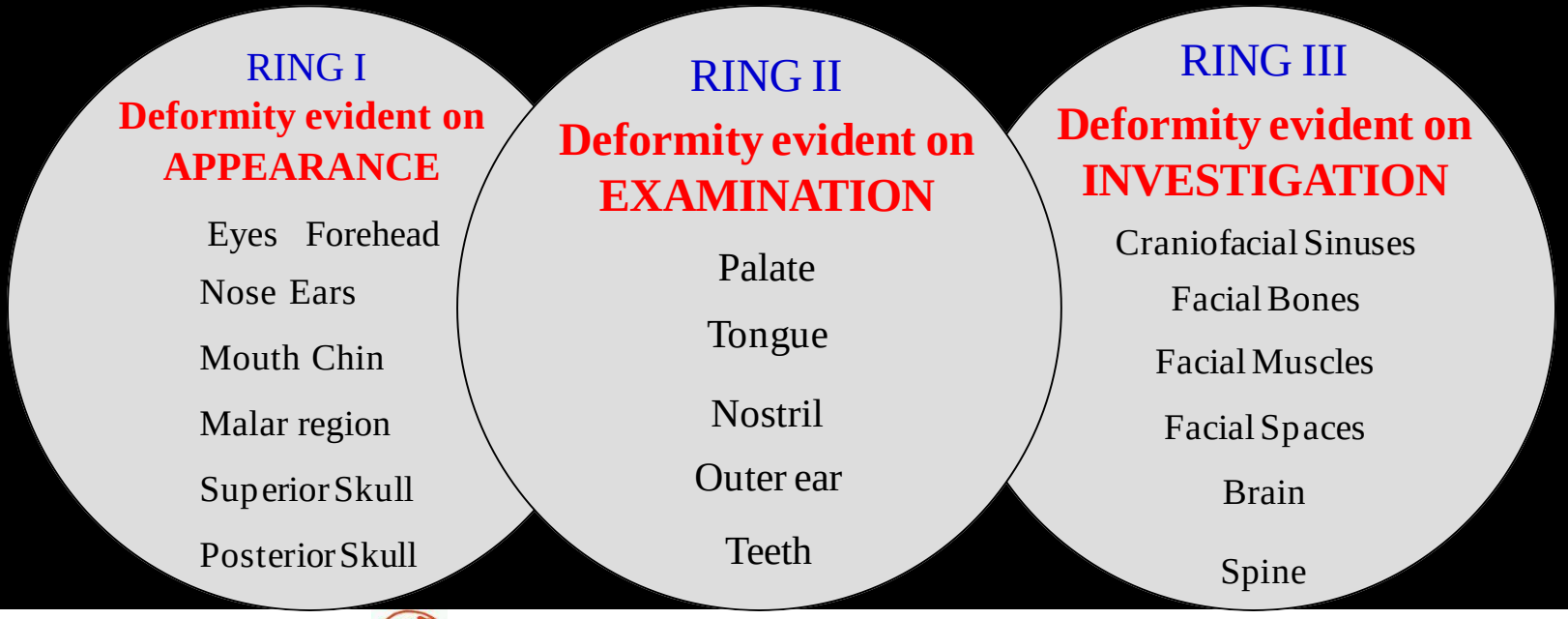


Treatment

Tessier #14 Craniofacial Cleft

My Message

- Craniofacial cleft repair is not a complex surgery
- Diagnosis of the defect should always be made with respect to the morphology of the defect
- Identify the defect in Morphological Sub Units
- Correct each sub unit collectively or independently



Bring the Smile Back

Thank You