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 craniofacial 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

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Five Facial Ethnic Forms

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

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Five Congenital Facial Defects

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

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Five Congenital Facial Defects

Eyes
Nose
Ears
Lips
Facial Skeleton

Complete Facial Imbalance

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DIAGNOSIS OF CRANIOFACIAL CLEFTS

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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

**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

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SAILER’S MORPHOLOGICAL CLASSIFICATION

**STEP II**

**Start**

1. **Congenital**
   - **YES**
     - **Soft Tissue Anomaly Only**
       - **YES**
         - **Classification I**
       - **NO**
     - **Hard Tissue Anomaly Only**
       - **NO**

2. **Acquired**
   - **YES**
     - **Classification I**
   - **NO**
     - **Classification II**
SAILER’S MORPHOLOGICAL CLASSIFICATION

STEP II

Hard and Soft Tissue Anomaly → Isolated to one Ring Only → Classification III

NO → Involving multiple rings → Classification IV

YES → Classification III

Stop

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Craniofacial Clefts

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Boo - Chai Classification

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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

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Craniofacial Clefts
Soft Tissue Defects
Craniofacial Clefts
Soft Tissue Defects

Tessier #0 – 14 facial cleft

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Craniofacial Clefts
Soft Tissue Defects
Tessier #0 facial cleft

Type I
Involving only vermilion
not involving the white roll

TYPE II
Involving vermilion and
the white roll

TYPE III
Involving vermilion,
white roll and philtrum

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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

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Craniofacial Clefts
Soft Tissue Defects

Tessier #2 facial cleft

Minimal to severe notch

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Craniofacial Clefts
Soft Tissue Defects

Tessier #3 facial cleft

B/L Tessier #3
with ocular involvement

U/L Tessier #3

U/L Tessier #3
With Oral Involvement

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Craniofacial Clefts
Soft Tissue Defects

Tessier #5 facial cleft

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Craniofacial Clefts
Soft Tissue Defects

Tessier #6 facial cleft

U/L Tessier #6
B/L Tessier#5 & # 6

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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

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Craniofacial Clefts
Soft Tissue Defects

Tessier #5, #7 facial cleft

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Craniofacial Clefts
Soft Tissue Defects

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

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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

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Craniofacial Clefts
Soft and Hard Tissue Defects

Tessier #3 facial cleft

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Craniofacial Clefts
Soft and Hard Tissue Defects

Unilateral Tessier #4 facial cleft

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Craniofacial Clefts
Soft and Hard Tissue Defects

Tessier #7 facial cleft

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Craniofacial Clefts
Soft and Hard Tissue Defects

Tessier # 10 facial cleft

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Craniofacial Clefts
Soft and Hard Tissue Defects

Tessier #0-14 Facial Cleft with Orbital Hypertelorism

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Craniofacial Clefts
Soft and Hard Tissue Defects

Tessier # 14 Facial Cleft with frontal Encephalocele

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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

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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

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Teratological Regions of the Head

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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.

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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 Study of Outcomes in 796 Patients.

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

Plastic and Reconstructive Surgery 121: 932, 2008

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The Millard flap produced better results when there was a need to rotate the cupid’s 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.
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 side aids rotation and the Pfeifer incision on the cleft side aids lengthening trying to address horizontal and vertical discrepancies of the lip.

Source:
Afroze Incision for Functional Cheiloplasty, Technical Note

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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


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Afroze Incision for Functional Cheiloplasty,

www.craniofacialinstitute.org
Morpho-functional Cleft Lip Repair

Incision design for unilateral cleft lip surgery

Source:
Afroze Incision for Functional Cheiloplasty, Technical Note

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Comparison of Three Incisions to Repair Complete Unilateral Cleft Lip.


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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:
www.craniofacialinstitute.org
Unilateral Cleft Lip Repair

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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

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

Plastic and Reconstructive Surgery 2013

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Craniofacial Cleft Repair
Flap Design

Local rotational flaps

Z-plasty

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Craniofacial Cleft Repair
Flap Design

Pfeifer wave design

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Craniofacial Cleft Repair

Flap Design

Nasolabial Transposition Flap

Nasal Dorsum Rotational Flap

Forehead-Eyelid-Nasal Transposition Flap

Designed in collaboration with Joachim Obwegeser

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Craniofacial Cleft Repair

Tessier # 0-14 Facial Cleft

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Craniofacial Cleft Repair
Tessier # 0-14 Facial Cleft

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Craniofacial Cleft Repair
Tessier # 2 Facial Cleft

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Craniofacial Cleft Repair
Tessier # 2 Facial Cleft

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Craniofacial Cleft Repair

Tessier #2 Facial Cleft
Craniofacial Cleft Repair
Tessier #3 Facial Cleft

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Craniofacial Cleft Repair
Tessier #3 Facial Cleft

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Craniofacial Cleft Repair
Tessier #3 Facial Cleft

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Craniofacial Cleft Repair

Bilateral Tessier # 4 Facial Cleft

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Craniofacial Cleft Repair

Bilateral Tessier # 4 Facial Cleft

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Craniofacial Cleft Repair
Unilateral Tessier # 5 Facial Cleft

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Craniofacial Cleft Repair

Tessier # 2, 3, 7 Facial Cleft

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Craniofacial Cleft Repair

Tessier # 1, 4, 7 Facial Cleft

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Craniofacial Cleft Repair

Tessier # 3, 4, 5 Facial Cleft

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Craniofacial Cleft Repair

Tessier #3, 5, 7 Facial Cleft

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Craniofacial Cleft Repair

Tessier #3, 5, 7 Facial Cleft

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Craniofacial Clefts
SOFT AND HARD TISSUE
REPAIR/RECONSTRUCTION

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Treatment

Tessier #0-14 Craniofacial Cleft

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Treatment
Tessier #0-14 Craniofacial Cleft

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Skin Incision

The skin incision for the intracranial correction of orbital hypotelorism 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

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Treatment
Tessier #0-14 Craniofacial Cleft

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Treatment

Tessier #14 Craniofacial Cleft
Treatment

Stereo Lithographic Models
Treatment

Tessier #14 Craniofacial Cleft

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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

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