REPAIR OF WIDE UNILATERAL CLEFT LIP & ALVEOLUS - HOW IS IT DIFFERENT

Prof. Dr. Dr. Srinivas Gosla Reddy
MBBS, MDS, FRCS (Edin.), FDSRCS (Edin), FDSRCS (Eng.), FDSRCPs (Glasg.), Phd

Dr. Rajgopal R. Reddy
MBBS, BDS, FDSRCPs (Glasg.)

Dr. Ashish Fanan M.D.S.
Dr. Avni Pandey M.D.S.

GSR Institute of Craniofacial Surgery,
Hyderabad India
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
Unilateral Cleft Lip Defect
A 3-Dimensional Problem

Oral
- Discontinuity and mal insertion of Orbicularis oris muscle causing horizontal and vertical lip length discrepancy

Nasal
- Deformity of nasal form caused due to mal insertion of Nasalis and other oro-nasal muscles
- Displacement of septum

Alveolar
- Loss of bony support

Unilateral Cleft Lip Defect

Is the morphology of the unilateral cleft lip defect the same in all patients?
Complete Unilateral Cleft Lip

Without Simonart’s band (Type I a)

With Simonart’s band (Type I b)

Without complete collapse of nasal dome and ala (Type II a)

With complete collapse of nasal dome and ala (Type II b)
Complete Unilateral Cleft Lip

Without difference in level of alveolar ridges (Type III a)

With difference in level of alveolar ridges (Type III b)
Problems of Wide Clefts

• Differential height of the alveolar segments.

• Variations in the horizontal width of the segments.

• Inward turning of the Cupid’s bow towards Columellar base on non cleft side.

• Leading to Severe shortening of skin for Millard rotation.

• Shortening of vertical Height on cleft side and retraction of tissue into the nasal web.

• Collapsed of the nasal dome and severe deviation of nasal septum.
Presurgical Nasoalveolar Orthopedic Moulding in Primary Correction of the Nose, Lip, and Alveolus of Infants Born With Unilateral and Bilateral Clefts

We don’t believe in NAM. Due to burden of care.

So

We believe in **Morpho- Functional Correction**.
Goals of Morphofunctional Correction of Unilateral Cleft Lip Defects

A functional anatomical repair of the underlying hard and soft tissues is essential.

Goals of primary cleft lip repair

- Harmonious lip form in vertical and horizontal dimension
- Nasal symmetry
- Bridging the alveolar ridge
Millard’s Incision for Unilateral Cleft Lip (1996-2000)

Produces better results where

- preoperatively there was a more prominent Cupid's bow and
- where the width of the lip and nostril on the cleft (lateral) side 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.

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.
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.
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
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

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Morpho-functional Cleft Lip Repair

Incision design for unilateral cleft lip surgery

Source:
Afroze Incision for Functional Cheiloplasty, Technical Note
Morpho-functional Cleft Lip Repair

Minimal muscle dissection on cleft side ensuring dissection of OrbicularisOris and Alar head of Nasalis muscle

Source:
Afroze Incision for Functional Cheiloplasty, Technical Note
Wide sub-periosteal dissection is done from the vestibule on the cleft side over the piriform rim, nasal bone, infraorbital and malar to lift the facial mask.

Minimal muscle dissection is done on the non-cleft side

relieving all abnormal attachments on anterior nasal spine and columella

Source:
Afroze Incision for Functional Cheiloplasty, Technical Note
Morpho-functional Cleft Lip Repair

SEPTUM IS KEY
The septum is positioned in its rightful anatomical position

Source:
Afroze Incision for Functional Cheiloplasty, Technical Note

www.craniofacialinstitute.org
Morpho-functional Cleft Lip Repair

Perialveoloplasty is done to exert more medial pressure on the palatal shelves

Source:
Afroze Incision for Functional Cheiloplasty, Technical Note

www.craniofacialinstitute.org
At the time of primary lip repair (Morphofunctional Cleft Lip Repair - *Perialveoplasty*)


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Ala of nose stabilized symmetrically to match that of the normal side by taking a suture through the alar head of the nasalis muscle on the cleft side to the contralateral muscle through the septum.

Source:
Afroze Incision for Functional Cheiloplasty, Technical Note
Morpho-functional Cleft Lip Repair

OrbicularisOris muscle approximation and closure is done

Source:
Afroze Incision for Functional Cheiloplasty, Technical Note
Does this incision design protect the vascularity of the lip?
What we have identified in naso-labial vasculature in cadaver dissection

Morphological and functional variability

- **Superior Labial Artery Caliber asymmetry**
- **Superior Labial Artery Anastomosis Inconsistent**
- **Superior Labial Artery Duplications**
- **Philtral Artery Redundancy Medially**
- **Philtral Artery Asymmetry Laterally**
- **Facialis Artery Asymmetry**
Measurements of $S_vO_2$, rHb, flow, ($O_2$-metab.) in 2 anatomical planes:

- Tissue spectroscopy
- Laser doppler flowmetry

0.4 mm → skin

4 mm → muscle
8 surgical landmarks

22 normal
mean age 62m (SD 43)

33 unilat. Cleft preop
mean age 9m (SD 6)

29 unilat. cleft Late postop
mean age 23m (SD 48)
time postop 27.5m (SD 33.6m)
Vascular adaption normal microcirculation late postoperative in cleft lips.

Columella shows a flow oversupply, which is maintained late postoperative.
Comparison of Three Incisions to Repair Complete Unilateral Cleft Lip

Afroze incision performed better
- Cupids bow position
- Lip length
- Lip height

Millard Incision performed
- Scar position

What about the nose?
No negative sequelae can be observed after manipulation of the septum in children. (Smahel, Z. 1999)

Growth of the nose is favorable after primary rhinoplasty. (McComb, H 1996)
Complete Unilateral Cleft Lip

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COMMON FACTOR IN ALL UNILATERAL COMPLETE CLEFT LIPS

DEVIATED NASAL SEPTUM
Is Primary Septoplasty necessary???

A fifteen year old patient with no primary septoplasty
SEPTOCHEILOPLASTY: Unilateral Cleft Lip

- Perichondrium is reflected on both sides of the septum
- The septum is lifted off the nasal spine
- The septum is positioned in its anatomical center
- Perichondrium is closed
- Nasalis muscle from both sides are approximated to form a sling with the septum in the new central position

Source:
Afroze Incision for Functional Cheiloplasty, Technical Note
Septocheiloplasty: 1 year post operatively
Septocheiloplasty: 3 years post operatively
Septocheiloplasty: 8 years post operatively
2 Dimensional Photographic Analysis
Septocheiloplasty: Measuring Outcomes
2 Dimensional Photographic Analysis

Primary Cheiloplasty *without* Septoplasty

**Note** the septal deviation and alar droop

Source:
Septocheiloplasty: Measuring Outcomes
2 Dimensional Photographic Analysis

Primary Cheiloplasty with Septoplasty

Note the absence of septal deviation and reduced alar droop

Source:
Primary septoplasty showed better results in terms of nasal symmetry when analyzed using two-dimensional photographic analyses.

Despite a multiplicity of surgical approaches to its correction and as much variation in treatment philosophy, the cleft lip nasal deformity remains a formidable challenge to the reconstructive surgeon treating patients with these congenital deformations. Historically, correction of the cleft nose deformity had been deferred until nasal growth was complete. Early surgical intervention was thought to interfere with normal growth, leading to poor long-term results. Patients with cleft nose deformity had to tolerate the physical nasal deformity and the psychological trauma well into their adolescence. Randall noted that these patients often were more concerned with their nasal deformity than with their lip deformity.

Refinement of rhinoplasty techniques has facilitated the ability to address the deformity associated with cleft lip. McComb and Anderson have published long-term studies that show very little impact on growth with primary correction of the nose deformity along with the correction of the cleft lip. Nevertheless, controversy remains regarding the best time to attempt primary surgical correction of unilateral cleft lip nasal deformity. Although a growing number of centers perform the nasal repair in conjunction with cleft lip surgery, some choose a secondary rhinoplasty at a later stage, when the cartilaginous growth is complete.
3 Dimensional Photographic Analysis
3 Dimensional Photographic Equipment

3 Dimensional LASER Equipment

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Measurement: Right Nostril (Transversal)

Right Nostril Transversal: 12.1 mm

Right Nostril Transversal: 12.9 mm

3D Stereophotogrammetric analysis supported by Radboud University, Nijmegen (Prof. Stefaan Berge) and University Medical Center, Basel (Prof. Hans Florian Zeilhofer)

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Landmarks & Measurements
3 D Photographs and LASER Images
Results

3 Dimensional Nasal Analysis of Patients with Complete Unilateral Cleft Lip corrected with Septocheiloplasty

Volumetric analysis of the nose

Source:
Gosla Reddy et.al. 3D Stereo photo grammetric analysis of lip and nasal symmetry after primary cheiloseptoplasty in primary cleft lip repair.
Rhinology. 49: 546-553, 2011
Results

3 Dimensional Nasal Analysis of Patients with Complete Unilateral Cleft Lip corrected with Septocheiloplasty

Transverse/Horizontal Nostril Length

Mean Symmetry ratio of 1.25

Vertical Nostril Length

Mean Symmetry ratio of 0.97

Source:
3 Dimensional Analysis of Patients with Complete Unilateral Cleft Lip corrected with Septocheiloplasty.
Gosla Reddy S, Mommaerts MY, Reddy R, Chaitidis D, Mueller A, Schwenzer K, Berge S: Ongoing Study, Radboud University, Netherlands and University of Basel, Switzerland
Results

3 Dimensional Nasal Analysis of Patients with Complete Unilateral Cleft Lip corrected with Septocheiloplasty

Volumetric analysis of the nose

Ratio Left Volume vs. Right Volume = 1.09

Source:
Primary septoplasty showed better results in terms of nasal symmetry when analyzed using three-dimensional photographic analyses.

My Opinion

The cleft lip defect is a 3 dimensional problem

Only a MorphoFunctional approach that addresses all three dimensions will positively effect the repair of the Unilateral Lip.

My solution

CHEILOPLASTY, SEPTOPLASTY and PERIOPLASTY
Bring the Smile Back