GSR INSTITUTE OF FACIAL PLASTIC SURGERY

Prof. Dr. Dr. Srinivas Gosla Reddy

BDS, MBBS, MDS, FRCS (Edin.), FRCS (Glasg), FDSRCS (Edin.), FDSRCS (Eng.), PhD

- Non-profit hospital established in 1996
- Dedicated Cleft & Craniofacial Centre of Excellence
- Presently 1,200 cleft and cranio-facial surgeries are done every year
- 4 surgeons and 5 fellows with full support team
- More than 36,000 documented cleft & craniofacial surgeries have been performed since 1996
- 600 primary new born cleft children are registered every year

REACH

RURAL EFFECTIVE AFFORDABLE COMPREHENSIVE HEALTH CARE

A 25-YEAR REVIEW OF THE REACH MODEL PROVIDING EQUITABLE AND ACCESSIBLE CLEFT AND CRANIOFACIAL ANOMALIES MANAGEMENT IN RURAL INDIA

BACKGROUND: GLOBAL SURGICAL NEED

- Access to safe, timely, affordable surgery remains limited in LMICs
- ~5 billion people lack access to surgical care
- 143 million additional surgical procedures needed annually
- Surgical disease accounts for ~1/3 of global disease burden
- Lancet Commission on Global Surgery highlighted urgent need for scalable systems

WHAT IS THE REACH MODEL?

Rural, Effective, Affordable, Comprehensive Healthcare

- Developed by SHARE, USA.
- Implemented through GSR Institute of Craniofacial and Facial Plastic Surgery for Cleft And Craniofacial Anomalies Management over last 25 years.
- Community-integrated healthcare delivery model

CORE PRINCIPLES OF REACH

- SUSTAINABLE HEALTH CARE
- CONSISTENT HEALTH CARE
- DELIVERABLE HEALTH CARE
- TRANSPARENT HEALTH CARE

OPERATIONAL FRAMEWORK

THREE STRATEGIC PILLARS:

- CREATE – Infrastructure and healthcare systems
- COLLABORATE – Research, education, global partnerships
- COOPERATE – Community engagement and shared responsibility

IMPLEMENTATION

- Retrospective programme analysis (2000–2025)
- Started as a pilot programme in Medchal Mandal in Hyderabad District and escalated to entire state of Andhra Pradesh and Telangana
- Decentralised healthcare workforce
- Community Health Volunteers, supervisors, and doctors
- Referral pathways linking villages to tertiary surgical care

COMMUNITY-BASED WORKFORCE

- Community Health Volunteer per 5000 population(Sanghas, NGOs, Government organizations and patients)
- Household health registers maintained through Janmabhoomi programme 1,2,3.
- Regular home visits and screening through Anganvadi, RBSK, VROs, VHOs.
- Health supervisors coordinate clusters of villages
- Referral pathways to GSR Hospital

PROGRAMME SCALE (2000–2025)

- 61 districts and 28,453 villages covered
- ~92.5 million population served
- 4,800 Community Health Volunteers trained
- 68 Health Supervisors
- 50 locally based doctors

SERVICE UTILISATION

- ~10,800 outpatient visits annually
- 48–60 community screening programmes per year
- 1,200 – 1,500 referrals to tertiary services

SURGICAL CARE IMPACT

- ~36,000 surgical procedures performed
- Focus on cleft and cranio-maxillofacial deformities
- ~80% procedures provided at no cost
- Remaining services subsidised or full-cost

KEY STRENGTHS OF THE MODEL

- Long-term sustainability
- Community engagement and trust
- Workforce development
- Hybrid financing model (Blended, Convergence, financing model)
- Integrated primary and secondary surgical care

REACH

The project is a working model of Proactive health care delivery system that offers promotive, preventive and primary healthcare to rural population.

One of SHARE remarkable programs REACH (Rural Effective Affordable Comprehensive Health Care). A model of universal, comprehensive rural health care that provides health education, immunizations, antenatal care and primary to tertiary care for a population of 45,000 in 42 villages in the Ranga Reddy District of Andhra Pradesh. Local residents with at least a sixth grade education are trained by MediCiti staff and charged with the task of visiting each home in their assigned territory at least once a month. These Community Health Volunteers (CHVs) collect birth and death data.

GOALS OF REACH

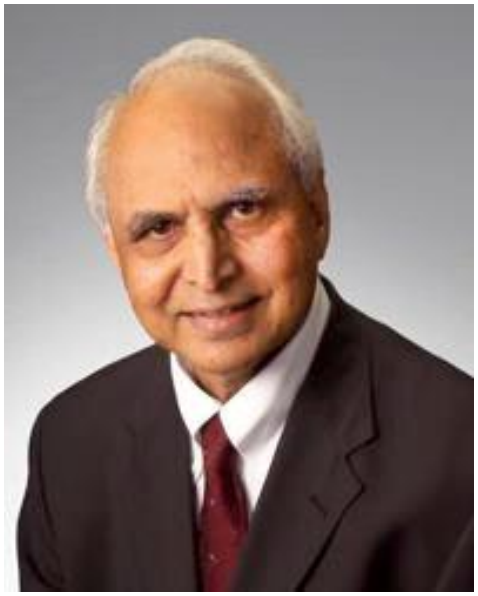
Universal health care to rural population.

Effective (not Nominal) health care.

Affordable (within the economic means of Indian society at large).

Comprehensive (Should include promote, preventive, primary and secondary care).

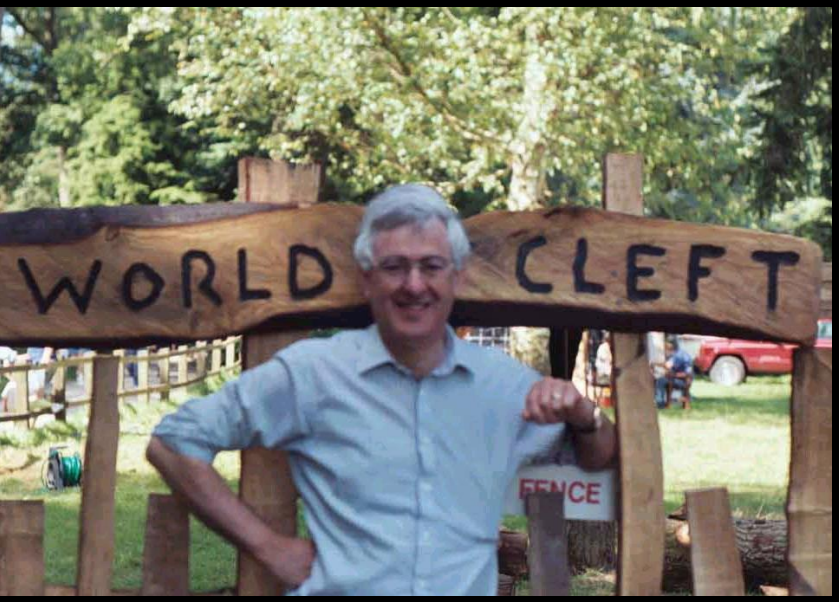
Sustainability (Accessibility and affodability contribute to substance, growth and development).



Dr. P.S. Reddy, Cardiologist, University of Pittsburgh

“Everyone needs a unique face for his identity”

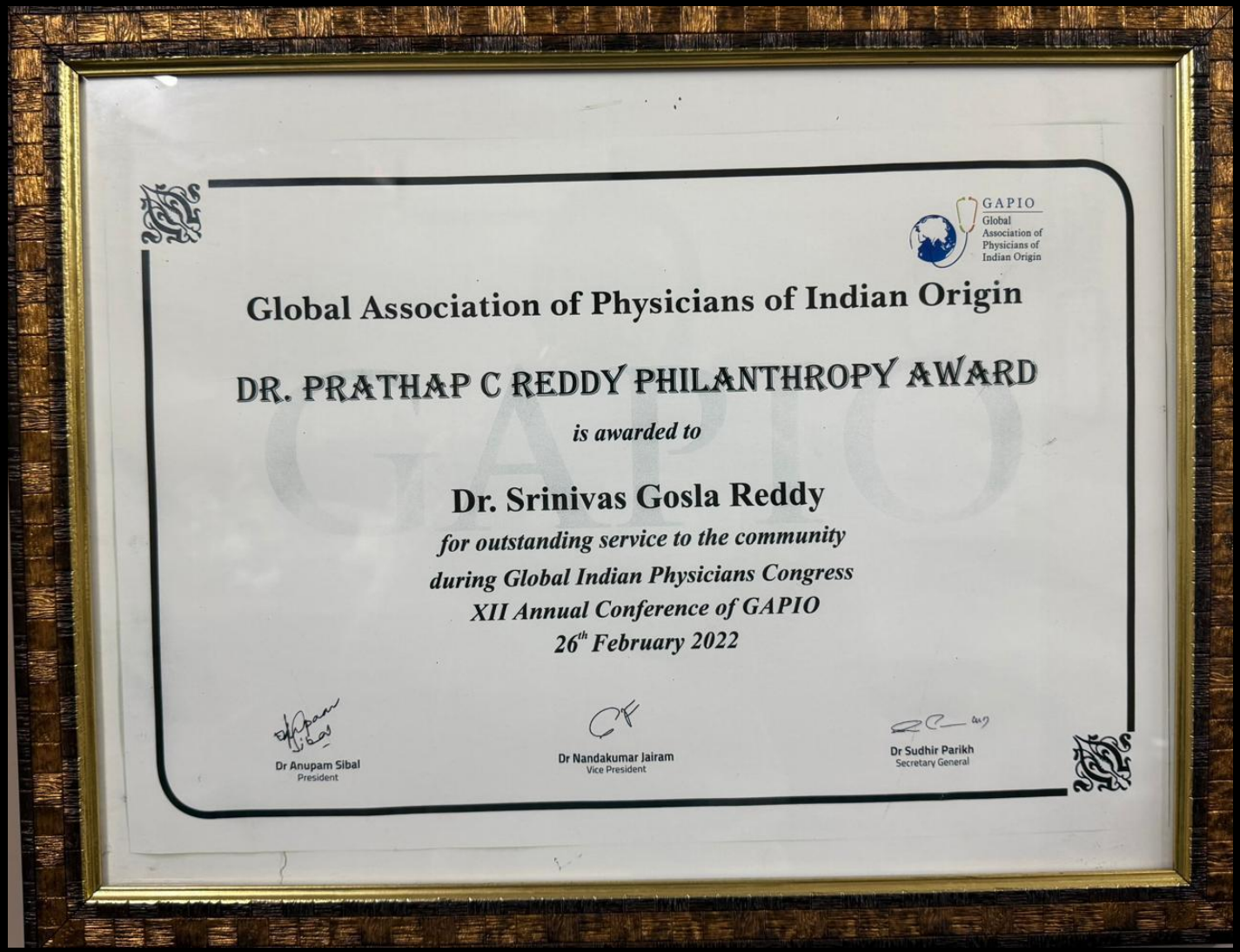
Prof. Dr. Hermann F. Sailer, President, Cleft Children International



“The cost of sickness and the price of health has shown that poverty and disease form a vicious circle. People are sick because they are poor and poorer because they are sick and sicker because they are poorer.”

Mr. A. F. Markus, Consultant, Dorset Cleft Center, Poole, United Kingdom

PHILANTROPHY AWARD



GAPIO
Global Association of Physicians of Indian Origin

Global Association of Physicians of Indian Origin

DR. PRATHAP C REDDY PHILANTHROPY AWARD

is awarded to

Dr. Srinivas Gosla Reddy

for outstanding service to the community
during Global Indian Physicians Congress
XII Annual Conference of GAPIO
26th February 2022

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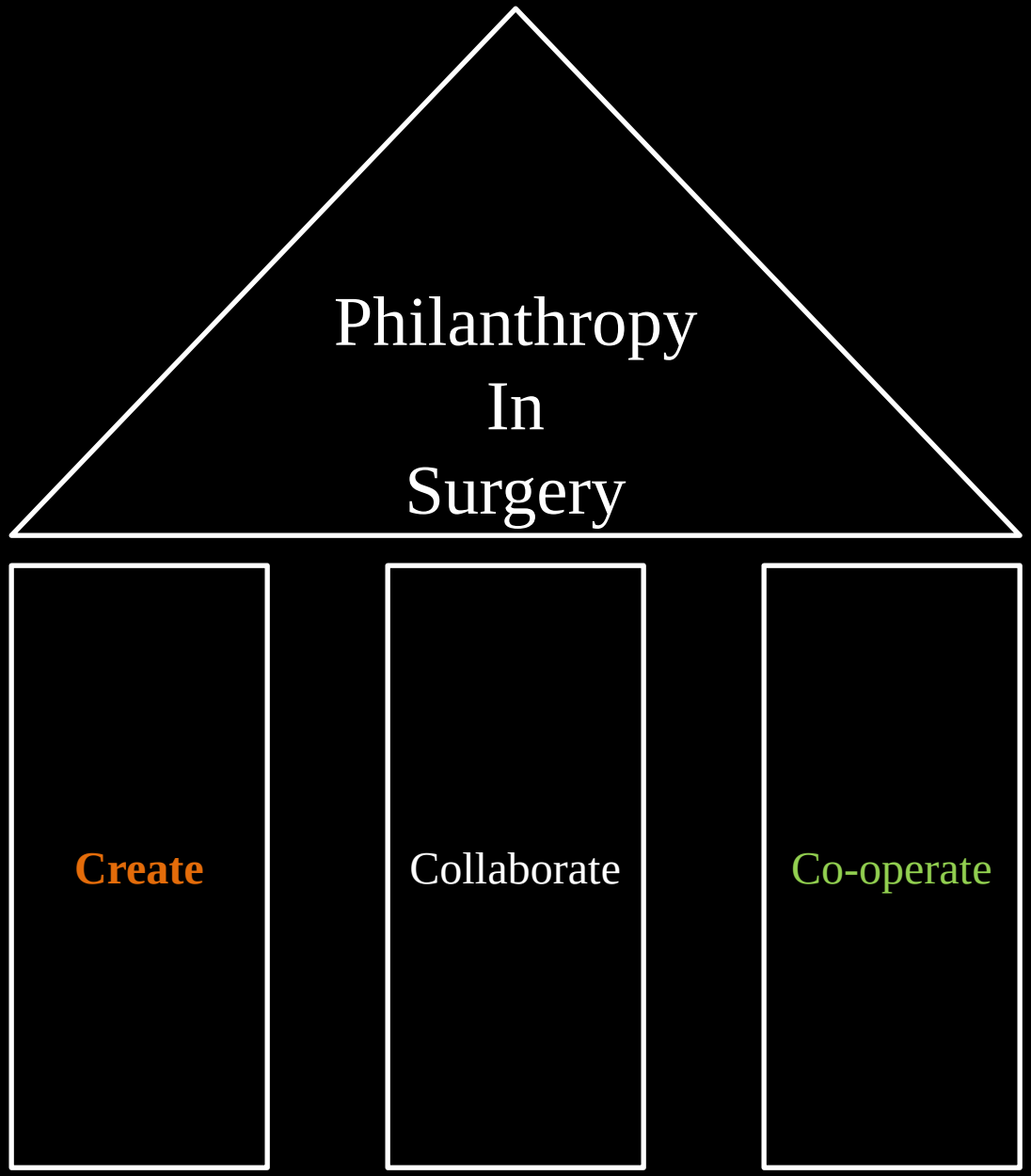
Philanthropy
In
Surgery
Create
Collaborate
Co-operate

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Dr. Erika Sailer

Prof. Tony Markus

Dr. Ann Kummer

Dr Anne Marie KuijpersJagtman

Dr. Maurice Mommaerts

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Dr. Domenico Scopelliti

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Original Article

Incidence of cleft Lip and palate in the state of Andhra Pradesh, South India

Srinivas Gosla Reddy, Rajgopal R. Reddy, Ewald M. Bronkhorst[1], Rajendra Prasad[2], Anke M. Ettema[3], Hermann F. Sailer[4], Stefaan J. Bergé[3]

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ABSTRACT

Objective: To assess the incidence of cleft lip and palate defects in the state of Andhra Pradesh, India. **Design Setting:** The study was conducted in 2001 in the state of Andhra Pradesh, India. The state has a population of 76 million. Three districts, Cuddapah, Medak and Krishna, were identified for this study owing to their diversity. They were urban, semi-urban and rural, respectively. Literacy rates and consanguinity of the parents was elicited and was compared to national averages to find correlations to cleft births. Type and side of cleft were recorded to compare with other studies around the world and other parts of India. **Results:** The birth rate of clefts was found to be 1.09 for every 1000 live births. This study found that 65% of the children born with clefts were males. The distribution of the type of cleft showed 33% had CL, 64% had CLP, 2% had CP and 1% had rare craniofacial clefts. Unilateral cleft lips were found in 79% of the patients. Of the unilateral cleft lips 64% were left sided. There was a significant correlation of children with clefts being born to parents who shared a consanguineous relationship and those who were illiterate with the odds ratio between 5.25 and 7.21 for consanguinity and between 1.55 and 5.85 for illiteracy, respectively. **Conclusion:** The birth rate of clefts was found to be comparable with other Asian studies, but lower than found in other studies in Caucasian populations and higher than in African populations. The incidence was found to be similar to other studies done in other parts of India. The distribution over the various types of cleft was comparable to that found in other studies.

KEY WORDS

Cleft lip & paplate incidence; cleft lip; cleft palate

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INTRODUCTION

Oro-facial clefts, particularly cleft lip with (CLP) or without (CL) cleft palate and cleft palate alone (CP) are a major public health problem affecting 1 in every 500 to 1000 births worldwide.[1,2] A child is born with a cleft somewhere in the world

Srinivas Gosla Reddy et. al.

Incidence of Cleft Lip and Palate in the state of Andhra Pradesh, South India

Indian Journal of Plastic Surgery, 43(2):184-189, July 2010.

Incidence of cleft defects in the state of Andhra Pradesh

1.09 in 1000 live births

Number of Children born with cleft defects in the state of Andhra Pradesh

1830 every year

Congenital Anomalies Associated with Cleft Lip and Palate Defects in a High Volume Indian Centre

Srinivas Gosla Reddy, MDS, MBBS
Rajgopal R. Reddy, BDS, MBBS
Karunakar Konte, MD
Rajendra Prasad, BDS, MDS
Anke M. Ettema, MD, PhD
Stefaan J. Berge, MD, DDS, PhD
Wilfred A. Borstlap, MD, DDS, PhD

Abstract

Objective: *The objective of this study was to find the prevalence of associated anomalies in patients with cleft lip and palate defects. A number of associated anomalies were noticed by the authors while routinely examining patients with cleft and craniofacial defects at their center. An accurate study to identify the prevalence of associated anomalies in cleft lip and palate patients was needed, to emphasize the need for a thorough investigation of children with cleft lip and palate and the need for a multidisciplinary team to diagnose cleft lip and palate. There was also a need to study the impact of associated anomalies on the burden of cleft care in a developing country like India.*

Design and Setting: *This is a retrospective study of 800 consecutive patients with cleft lip and palate CL=184, CLP=532, CP=84 seen in the year 2006. The data was collected retrospectively by processing the case history of the patients. The patient's cleft defect, age and sex was noted along with the religious background, level of income and consanguinity. The anomalies were classified under 10 headings depending on the organ system affected.*

Results: *Associated anomalies were present in 330 cases (41.3%). The highest prevalence of 46.4% was found in patients with cleft lip and palate. The lowest prevalence of 27.7% was found in isolated cleft lip patients. There was no significant difference of prevalence found between unilateral or bilateral clefts and complete or incomplete clefts. The skeletal system was affected the most. Anomalies of the skeletal system count for 42% of all anomalies. Logistic Regression was used to calculate if any of the other background data increased the chance of having an associated anomaly showed that having an isolated cleft palate decreased the chance of having an associated anomaly as was being a Muslim or from another religion as compared to being a Hindu. Other background data did not have a statistically significant chance to have an associated anomaly with clefts.*

Conclusion: *There was a high prevalence of associated anomalies in the study done at this center. There was, however a need to study the reasons for such anomalies further. There is also a need to study the impact of such anomalies on the burden of cleft care in developing countries.*

Key words: *cleft lip, cleft palate, congenital anomalies, associated anomalies, high volume centre.*

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Srinivas Gosla Reddy et. al.

Congenital Anomalies Asssociated with Cleft Lip and Palate Defects in a High Volume Indian Centre

Journal of Cleft Lip Palate & Craniofacial Anomalies, 3(1):1-7, 2011.

Summary of the Issue

Burden of Care

- High Incidence of
  - Clefts (1.09 in 1000 births) and
  - Associated anomalies (41.3% of cleft patients)
- Very few treatment centers
- Lack of funds to treat patients
- Lack of infrastructure
- Lack of awareness

The GSR Institute of Facial Plastic Surgery, Hyderabad

•Treatment for patients is focused on one part of the body thus making it easy for patients to identify their problems and receive treatment.
(Problem with face = GSRIFPS)

•Money raised for a specific purpose benefiting both the donor and recipient.

•Easy to build an administrative system for a hospital treating only one part of the body.

•Funds received can be completely utilized to treat patients.

•Infra structural or administrative expenses can be justified as they are solely used for the work that funding is received for.

ORIGINAL ARTICLE

Developing and Standardizing a Center to Treat Cleft and Craniofacial Anomalies in a Developing Country Like India

Srinivas Gosla Reddy, MDS, MBBS, Likith V. Reddy, DDS, MD, FACS,† and Rajgopal R. Reddy, BDS, MBBS**

Abstract: The range of facial deformities is enormous. All produce some degree of disfigurement and result in the impairment of function to some degree, sometimes even to the point of incompatibility with life. Congenital facial defects in India are associated with considerable superstition, social rejection, and failure to integrate into society.

In India, cleft defects occur in 1 in 500 births. Congenital facial defects are a pressing problem in India owing to the limited resources to treat such patients. Poverty is a major factor for parents of such children to get appropriate treatment.

Setting up an institute to treat children with cleft and craniofacial deformities in India presents problems with financing treatment for poor patients, procuring the right infrastructure, and employing well-trained human resources.

The authors have set up such an institute in Hyderabad in the southern state of Andhra Pradesh in India. The logistics of setting up such a facility in a developing country and the future of funding for cleft treatment are important factors to consider while establishing a center for patients with cleft and craniofacial anomalies.

The aim of setting up such centers was to provide quality comprehensive treatment for patients from all sections of society with cleft and craniofacial anomalies.

Key Words: Cleft lip, cleft palate, craniofacial anomalies, developing and standardizing, institute, cleft surgery, speech therapy, orthodontics

(*J Craniofac Surg* 2009;20: 1664–1667)

The range of facial deformities is enormous. All produce some degree of disfigurement and result in the impairment of function to some degree, sometimes even to the point of incompatibility with life.[1] Congenital facial defects in India are associated with considerable superstition, social rejection, and failure to integrate into society. In managing such defects, the goals of the treatment include the management of the human psyche and the patient's acceptance to the society.

Approximately 15,000 children are born with clefts per hour worldwide. A child is born with a cleft somewhere in the world every 2 minutes.[2] In India, cleft lip/palate occurs in nearly 1 in 500 live births, and most of these defects are not surgically corrected.[3] The congenital facial defects are a pressing problem in India owing to the limited resources. The burden of care for the child with cleft affects the entire family units. It is not unusual to see patients with untreated cleft lip for the entirety of their life. The complete rehabilitation of these patients involves speech therapy and orthodontics; secondary corrections are inconsistent at best and often times unavailable.

India is the second most populated country in the world[4] with a population of 1,147,677,000. The annual per capita income of India as of February 28, 2008, is Indian Rupee 29,786 (US $660).[5] Andhra Pradesh state, where the GSR Craniofacial Institute is situated, is located in the southern part of India. Andhra Pradesh[4] is spread over an area of 275,000 km^2 with a population of 81,315,000. The annual per capita income of Andhra Pradesh is Indian Rupee 33,970 (US $755).[6] The state is divided into 23 administrative districts with Hyderabad city as its capital. Each district is further divided into mandals. There are 1123 mandals in the state, which are further divided into villages, towns, and cities. There are 26,586 villages in the state. Any place that has more than 0.5 million residents is classified as a town and has a municipal administration. Any town that has a population more than 1.5 million is classified as a city. There are 264 towns and cities in Andhra Pradesh.

The health care delivery system in India and Andhra Pradesh in particular is by 2 pathways: the government-funded hospitals and the private or corporate hospitals.

Government-funded general hospitals are situated in every district capital. Subunits of general hospital are usually located in 2 or 3 large towns in the district and are known as area hospitals. Smaller referral primary health centers or community health centers are located on an average, 1 for every 3 villages. This system of health care delivery is government-funded, and the care provided is free of cost to the patient. These hospitals see more than 2 million patients as outpatients and more than 160,000 patients as inpatients.[7] The budget allocation for health care by the government of Andhra Pradesh for the financial year 2007 to 2008 was Indian Rupee 13,150 million (US $292 million).[6] The per capita allocation of funds for health care is less than US $4 per person in the state. This also means that government hospitals are understaffed and have poor infrastructure.

The private or corporate hospitals are usually located in larger towns and cities. These hospitals have better facilities and cater to patients who can afford health insurance or can directly pay for the health care services. The average cost of each surgery for simple

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Srinivas Gosla Reddy et. al.

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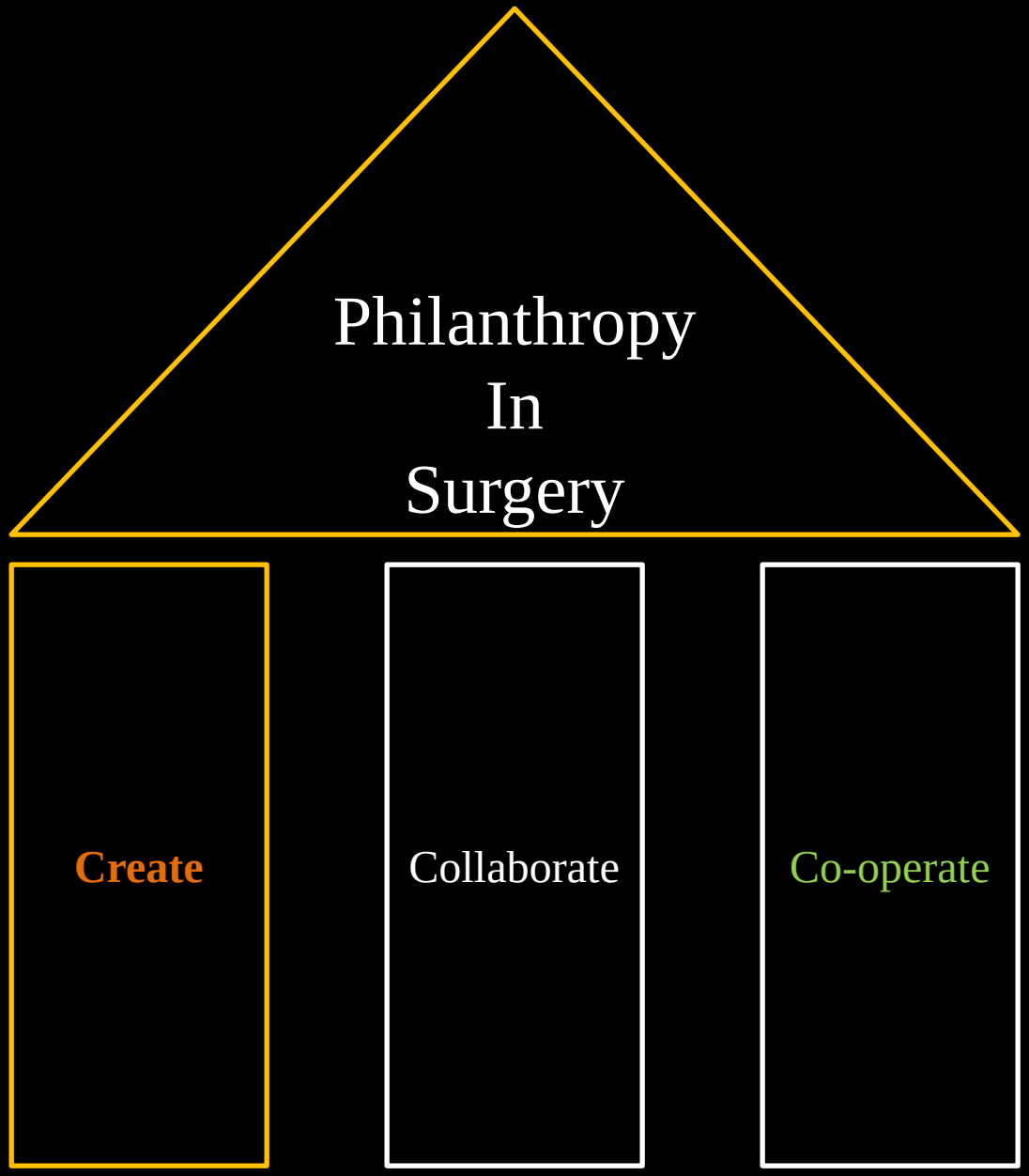
JOURNAL OF CRANIOFACIAL SURGERY, 20(8):1664-1667, SEPTEMBER 2009.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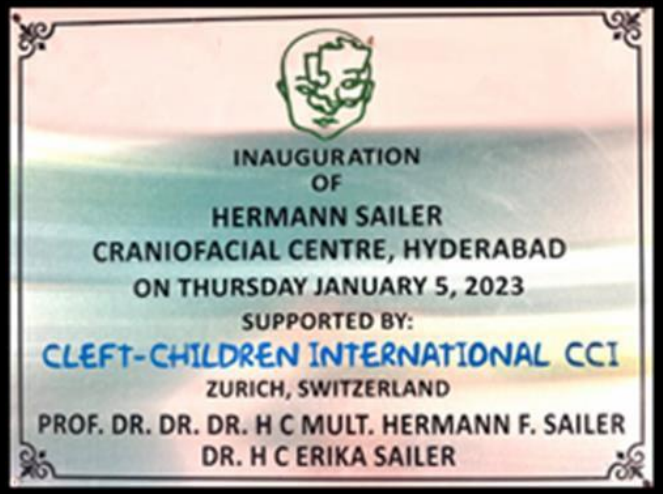

Sumbing Bibir

Sterling bank & trust

FUTURE FACES

The GSR Institute of Facial Plastic Surgery

From 1996

- Very little Infrastructure.
- Five member part time team of surgeons, anesthetists and dentists.
- Visit seven surrounding districts of Hyderabad two days a week.
- Only surgery is done. No orthodontics or speech therapy.
- Patient pays INR 1,000 ($25) per surgery for material used during an operation.

GSR Institute of Craniofacial Surgery

Cleft team:

- 4 Surgeons, 5 Fellows,
- 3 Anesthesiologists,
- 3 Speech therapists,
- 2 Orthodontists and 10 nurses.

Infrastructure

- 2 operating rooms,
- 6 bed post operative facility,
- 50 bed patient ward
- Speech therapy unit,
- Dental and orthodontic unit
- Photography and documentation

BOARD OF TRUSTEES

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OPERATING ROOMS

INTENSIVE CARE UNIT

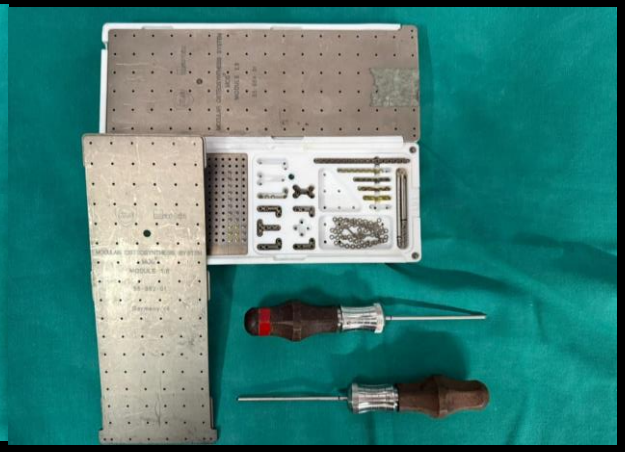
CRANIOTOME

PIEZOELECTRIC UNIT

STRYKER

PLATING SYSTEMS

BIORE



KLS MARTIN

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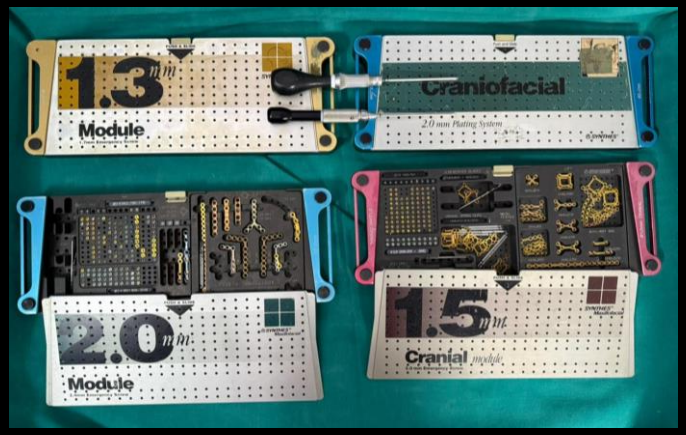
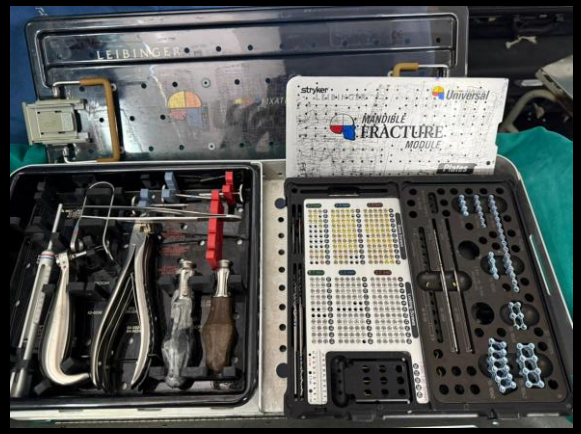


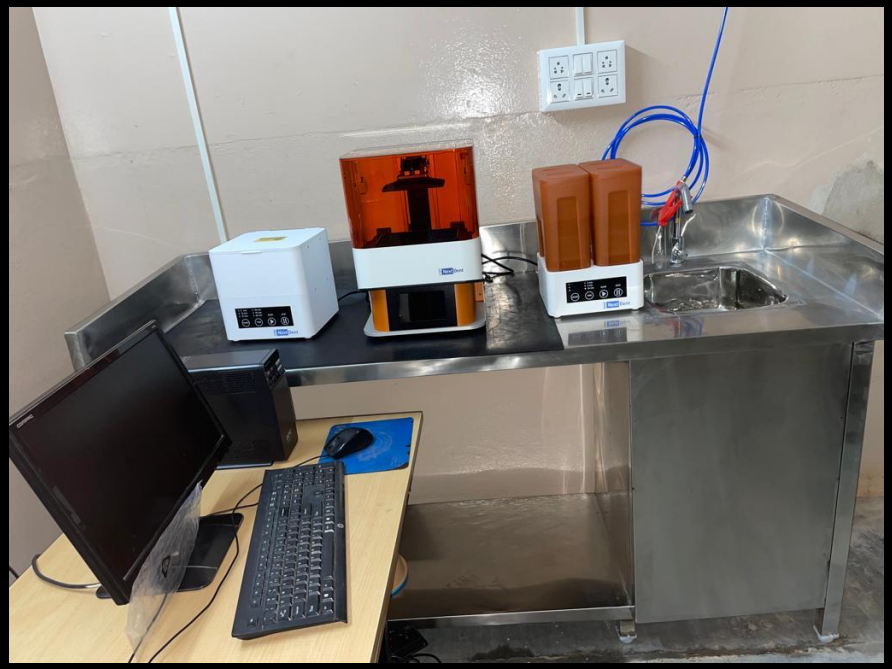
SYNTHES

LEIBINGER KING COMBO



LEIBINGER UNIVERSAL

3D Printer and 3D Camera



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Superior outcomes

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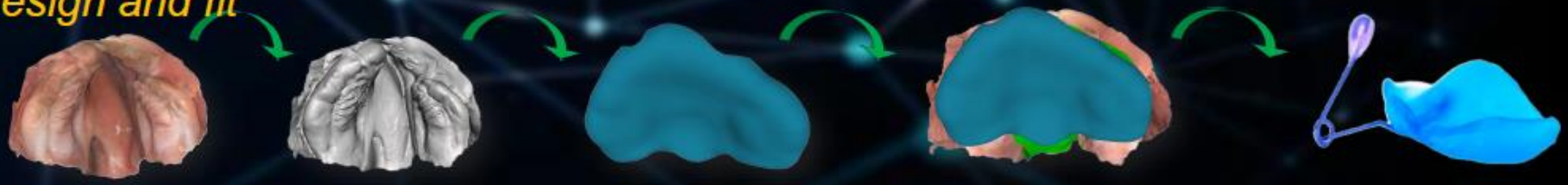
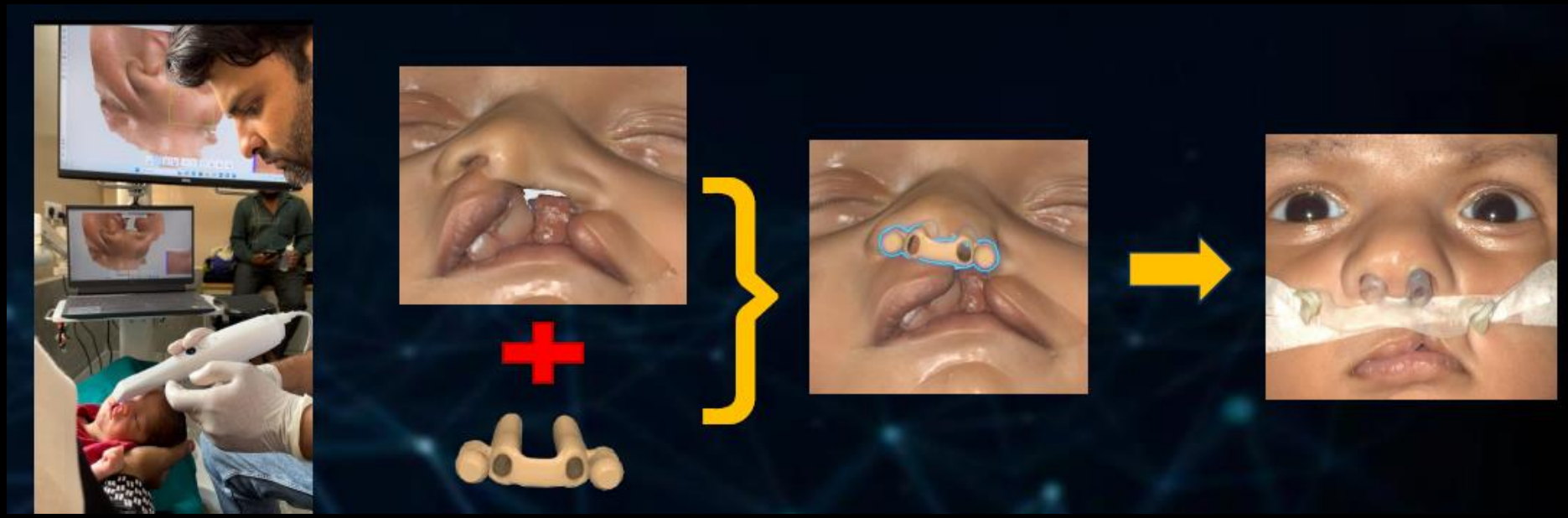
Digital-to-physical model conversion enhanced the accuracy of passive plate design and fit

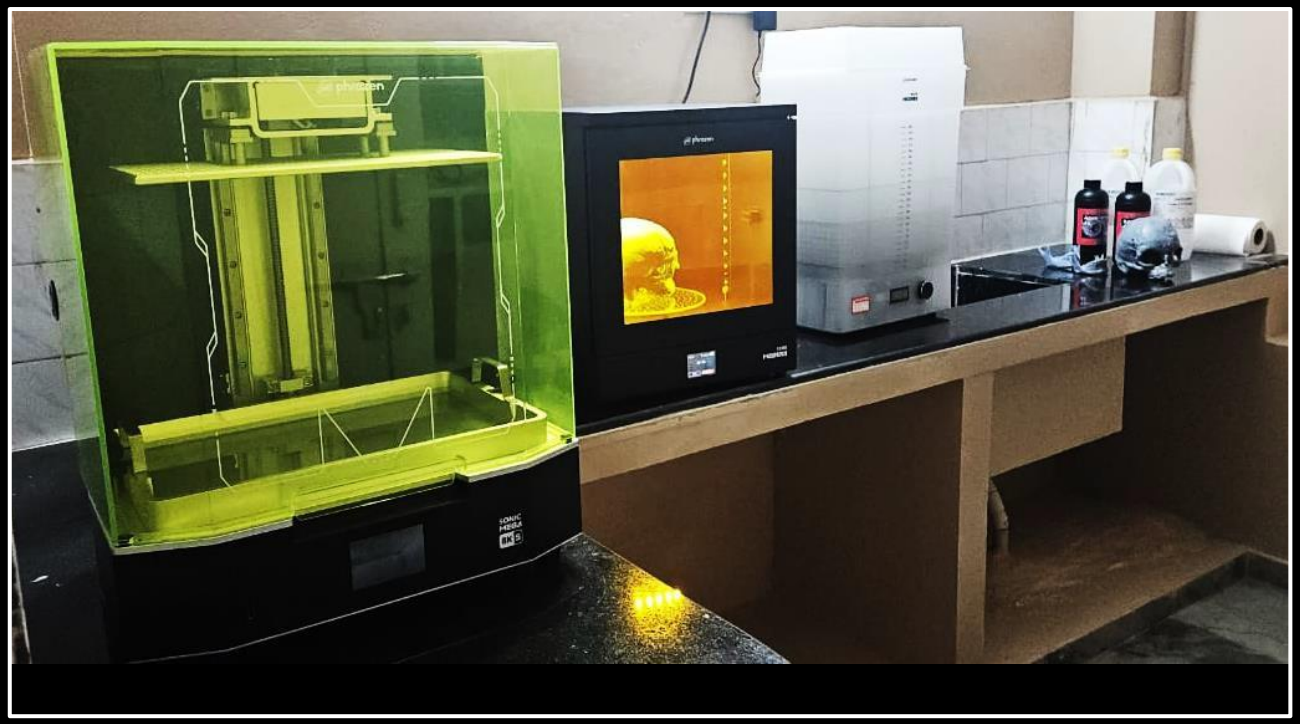


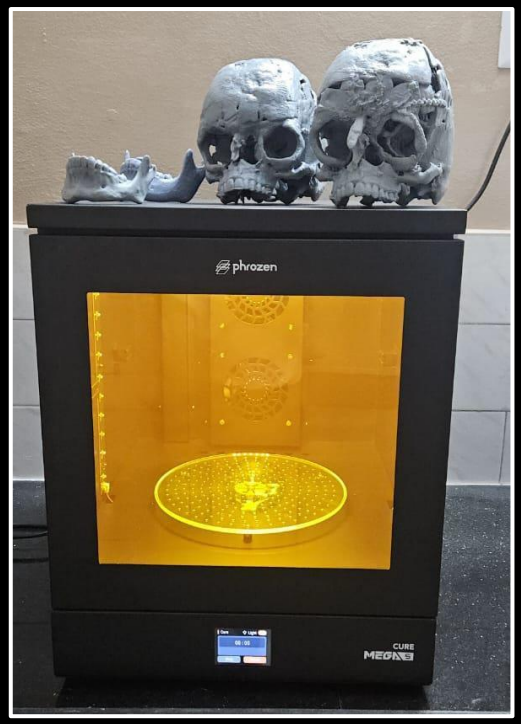
Digital Work Flow for Passive Plate



3D PRINTED NASAL CONFORMER

3D LAB






26-B
JOSUE

We treat our Cleft Patient as a corporate entity!!!

How???

Corporate Philosophy

Well trained Human Resources → Sell product/service

Sell product/service → Earn Revenue to pay for HR and Infrastructure

Earn Revenue to pay for HR and Infrastructure → PROFIT
PAY SHARE HOLDERS

Humanitarian Philosophy

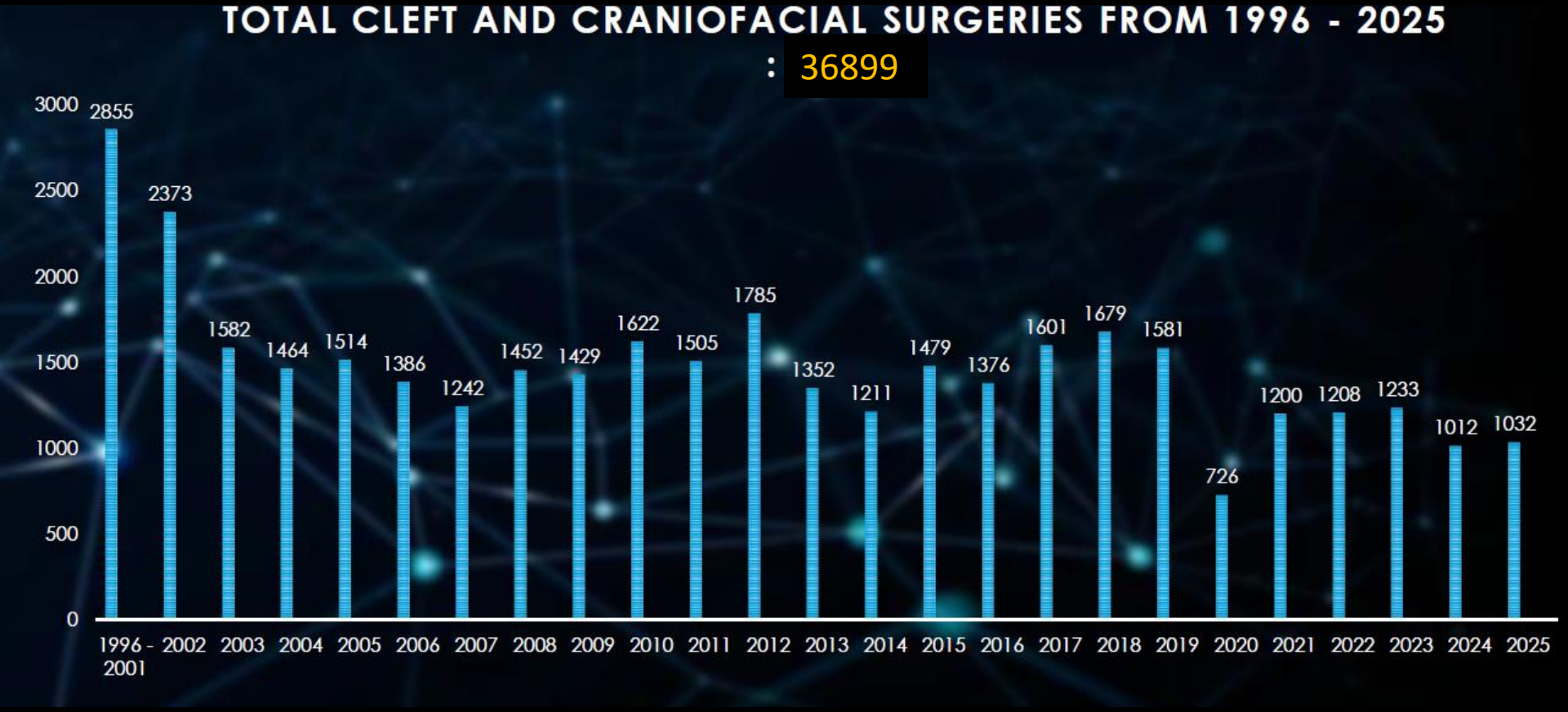
Well trained Human Resources → Treat patients

Treat patients → Earn Revenue through donations to pay for HR and Infrastructure

Earn Revenue through donations to pay for HR and Infrastructure → PROFIT
PAY FOR TREATMENT

Charity is not for pity
But for Corporatization

OUR CASE VOLUME – CRANIOMAXILLOFACIAL SURGERIES



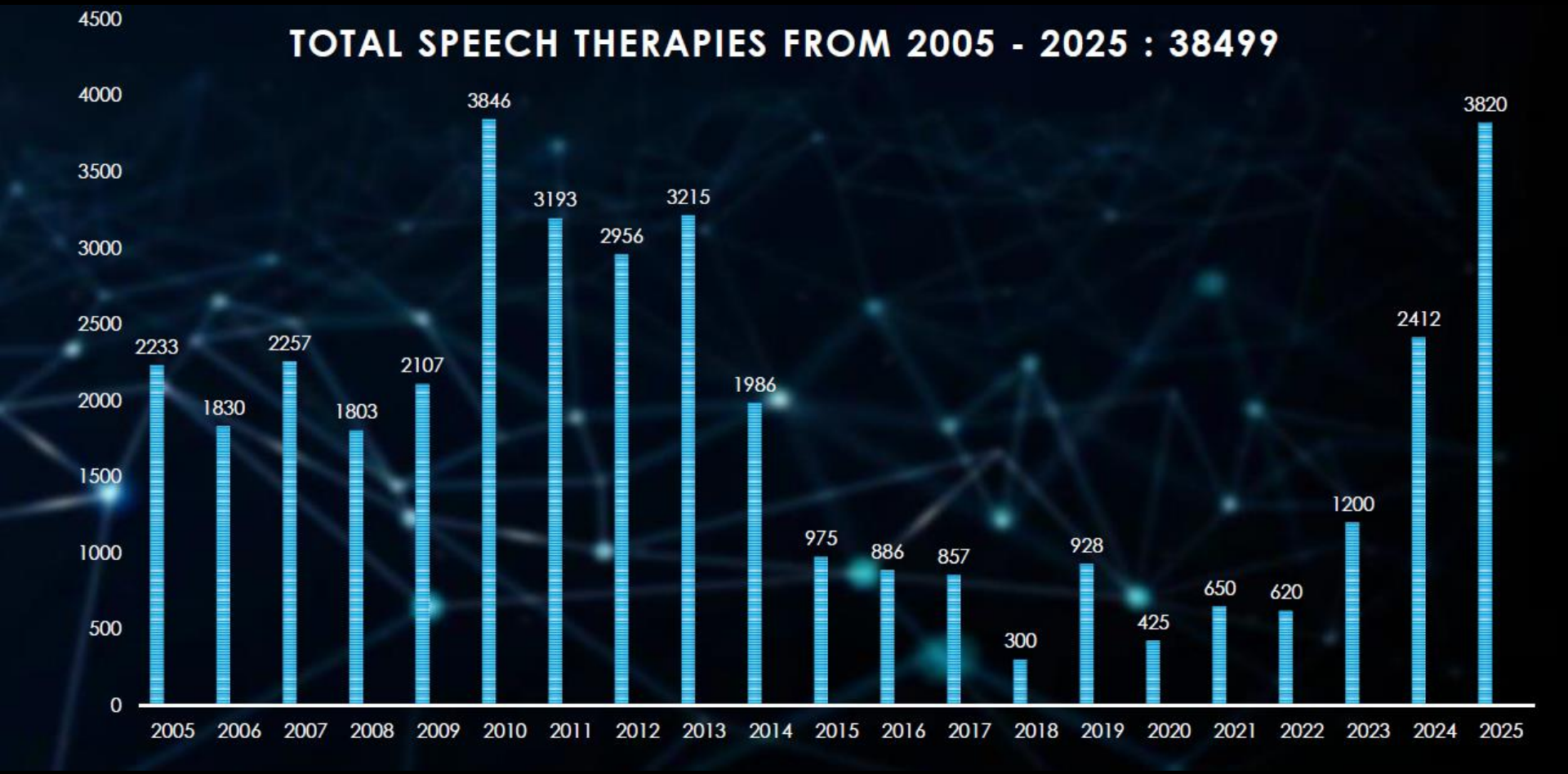
DEPARTMENT OF CLEFT AND CRANIOMAXILLOFACIAL SURGERY

Dr R Priyadharshini

Prof. Dr. Dr. Srinivas Gosla Reddy

Dr Jothish Manohar

OUR CASE VOLUME - SPEECH



DEPARTMENT OF SPEECH THERAPY

CONSULTANTS

Miss . Padmavathi Devella

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Mr. Tenali Nikhil

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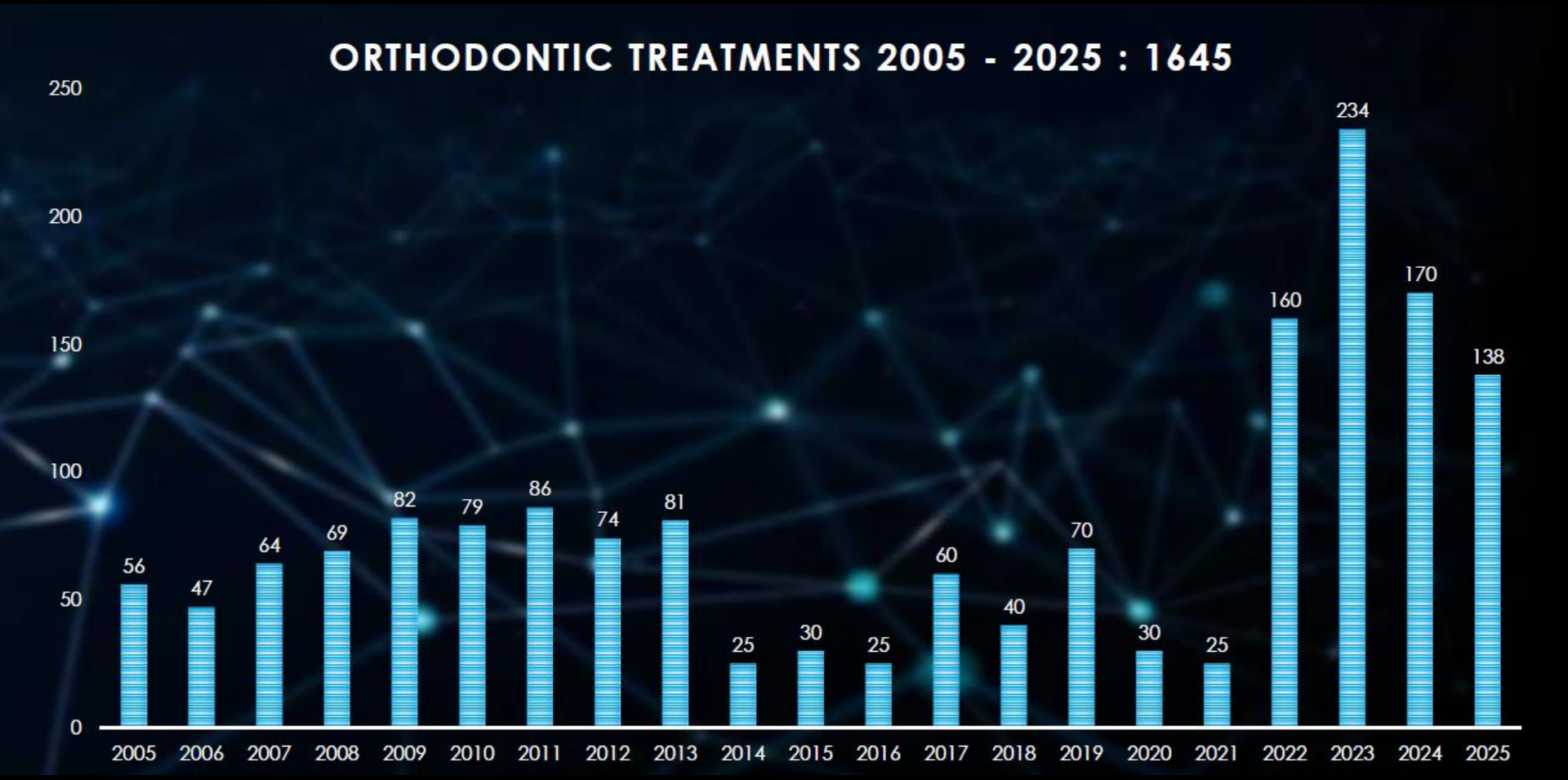
OUR CASE VOLUME - ORTHODONTICS



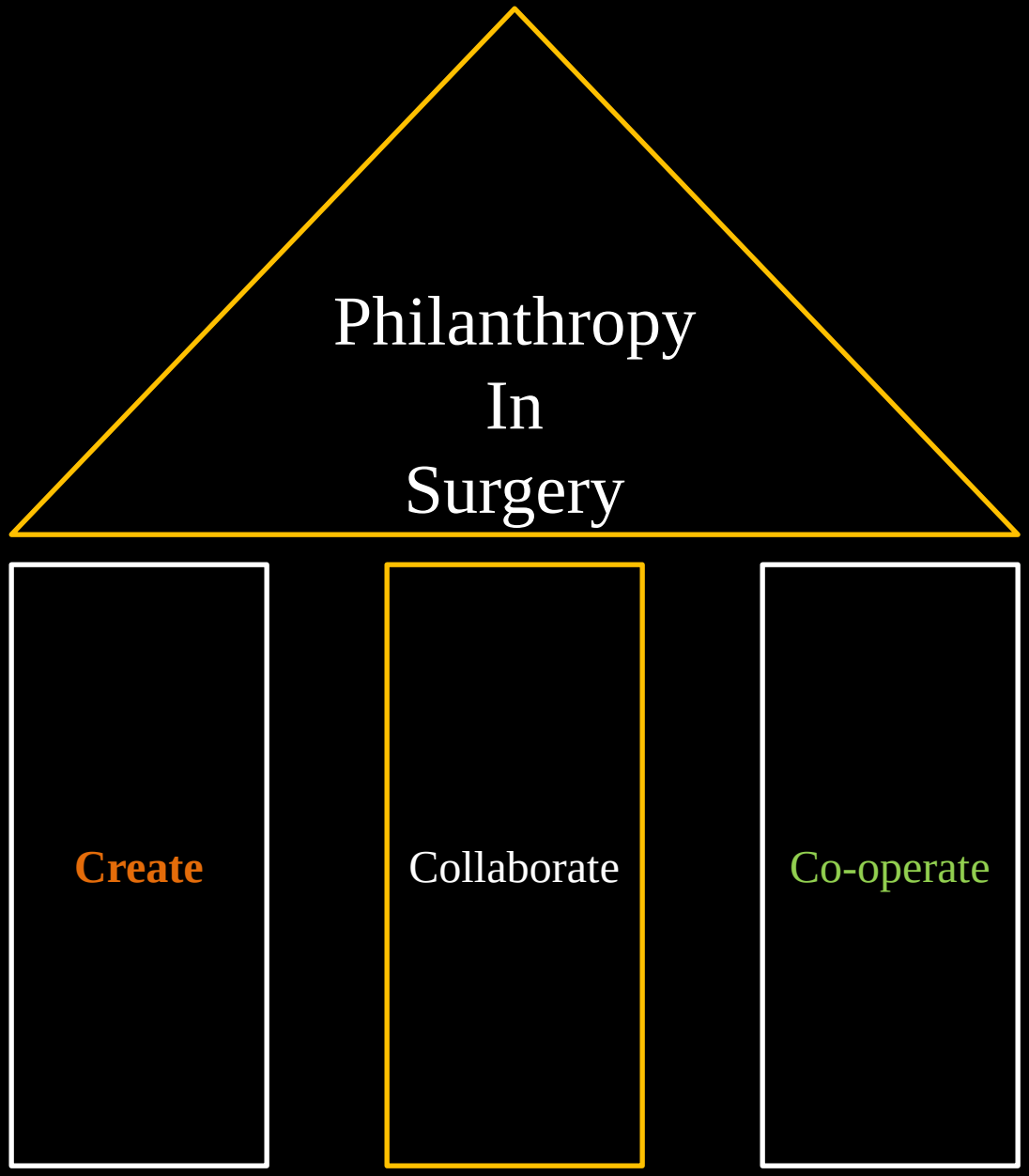
Our Team- Orthodontist and speech Therapist

What did we achieve?

- Huge numbers in patient care
- Establishment of good infrastructure
- Stand alone craniofacial center
- Dedicated craniofacial team

What did we lack?

- Ideology development
- Research
- Cutting edge technological advancement


Philanthropy
In
Surgery
Create
Collaborate
Co-operate

Ideology Development

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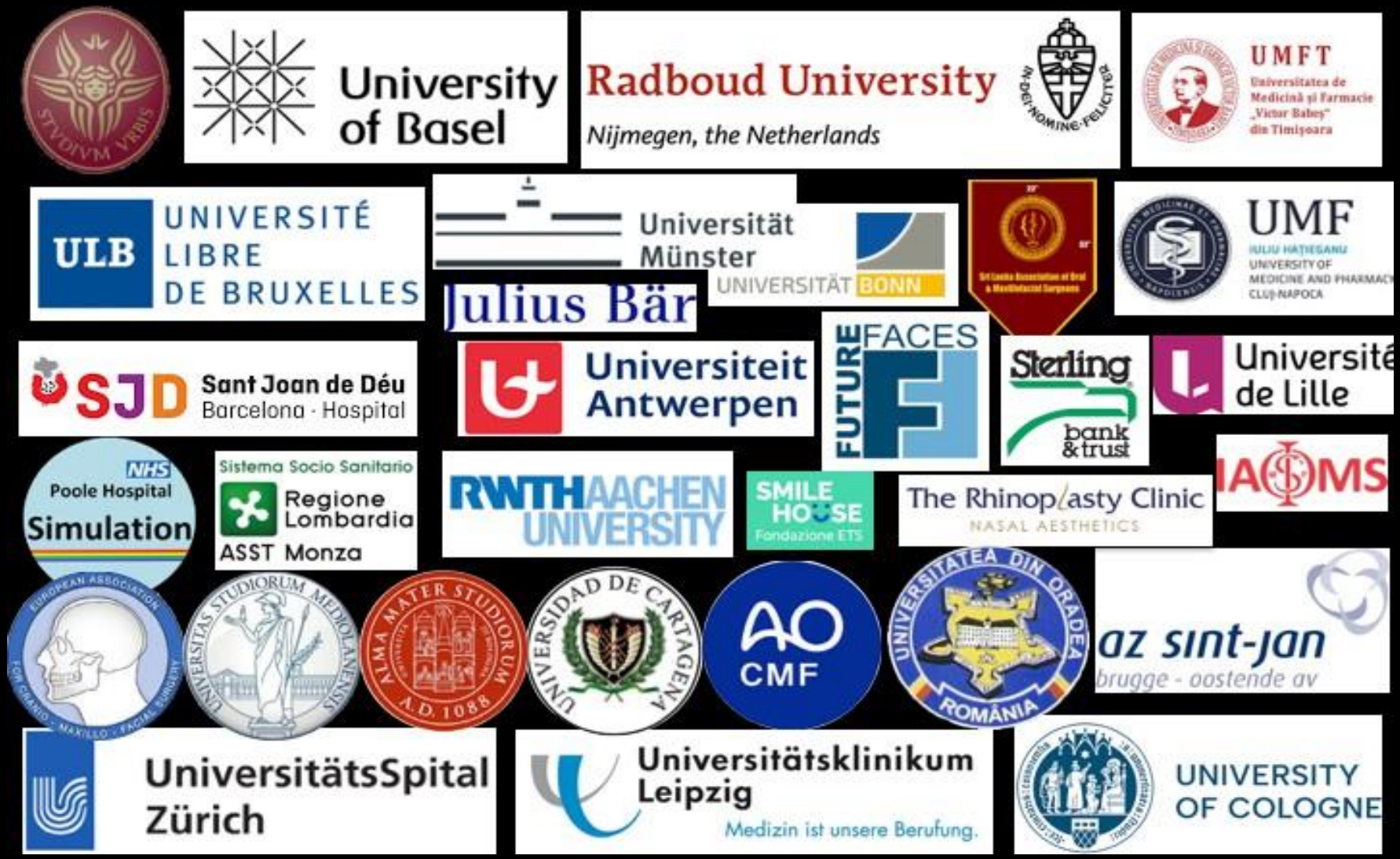
OUR INTERNATIONAL COLLABERATIONS



OUR NATIONAL COLLABERATIONS

EVIDENCE BASED MORPHOFUNCTIONAL PHILOSOPHY FOR CLEFT CARE

Morpho-functional Cleft Lip Repair

Incision design for unilateral cleft lip surgery

ORIGINAL ARTICLE

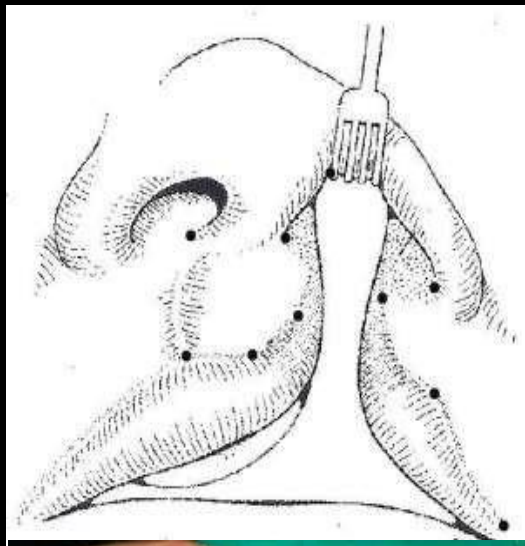
Afroze Incision for Functional Cheiloseptoplasty

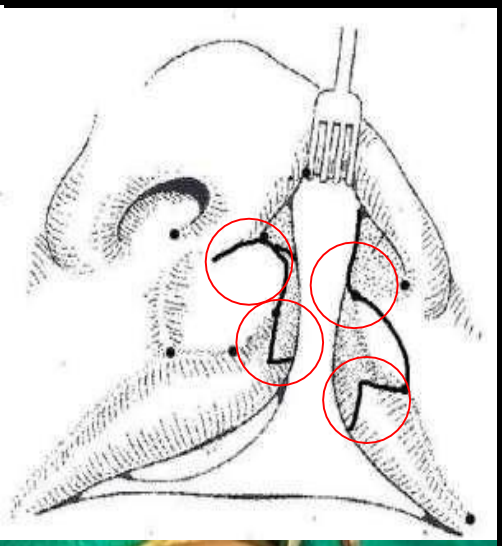
Gosla Srinivas Reddy, DDS, MD,* Rajgopal R. Reddy, BDS, MBBS,* Nilesh Pagaria, BDS, MDS,* and Stefaan Berge, MD, DD, PhD†

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 of 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 septal repositioning is performed, which provides stability and exact positioning of the anatomic tip at the apex of the cleft 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.

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.

On comparison of the 2 techniques, each has its own advantages and disadvantages. The Millard flap produced better results





PEDIATRIC/CRANIOFACIAL

Comparison of Three Incisions to Repair Complete Unilateral Cleft Lip

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Ewald M. Bronkhorst, Ph.D.
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Hyderabad and Mangalore, Karnataka, India; and Nijmegen, The Netherlands

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 shows gave superior results compared with the Millard or Pfeifer incision. Depending on the cutoff 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, labial, 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.[11,12] In one form or another, it is the most widely practiced method today.[5]

The Pfeifer incision is designed using the concept of "morphologic order." 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.

From the GSR Institute of Craniofacial Surgery; the Department of Preventive and Curative Dentistry, Radboud University Nijmegen Medical Center; A. B. Shetty Memorial Dental College and Hospital; and the Department of Orthodontics and Oral Biology, Cleft Palate Craniofacial Unit, and the Department of Oral and Maxillofacial Surgery, Radboud University Nijmegen Medical Center.

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Disclosure: *The authors have no financial interest in this work, and no competing interests are declared.*

PEDIATRIC/CRANIOFACIAL

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

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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; Preston, United Kingdom; and Chatteris, 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 wave 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: 952, 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 nineteenth century, flap designs 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 Pulvenis[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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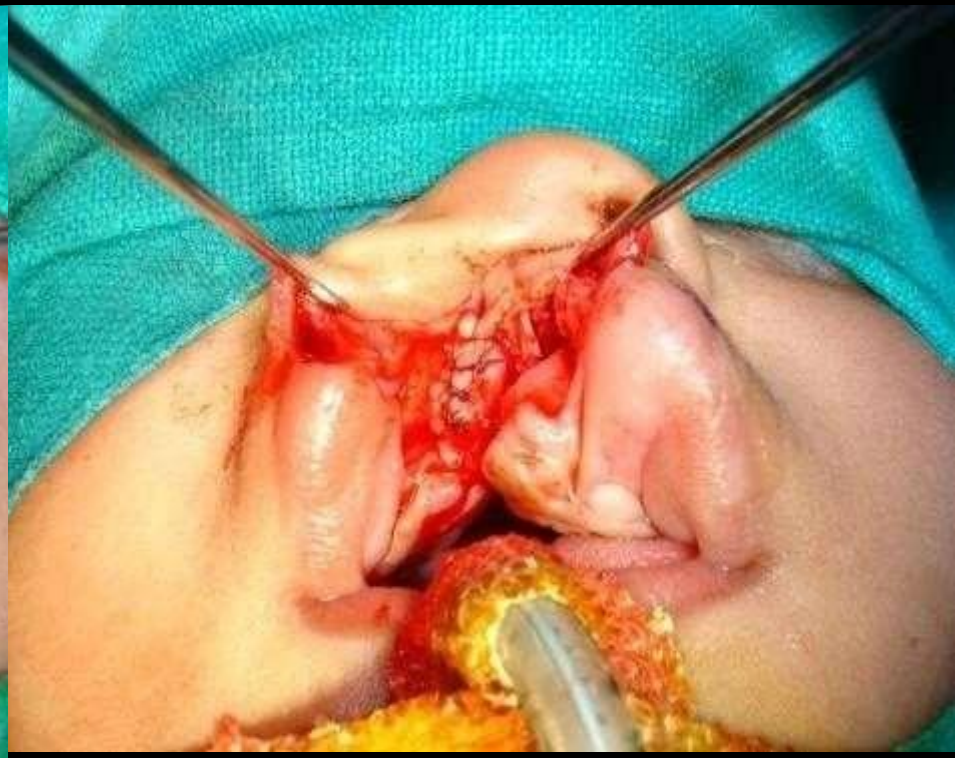
Disclosure: *None of the authors has any financial interest in this work, and no competing interests are declared.*

- Afroze Incision for Functional Cheiloplasty, Technical Note, Gosla Srinivas Reddy et. al.; J. Craniofac. Surg. 20(8):1733-1736, September 2009
- Comparison of three incision to repair complete unilateral cleft lip, Gosla Srinivas Reddy et. al. ;Plastic and Reconstructive Surgery, October, 2009
- Choice of incision for primary repair of unilateral complete cleft lip: A comparative study of outcomes in 796 patients; Gosla Srinivas Reddy et.al.;Plastic and Reconstructive Surgery, December, 2006.

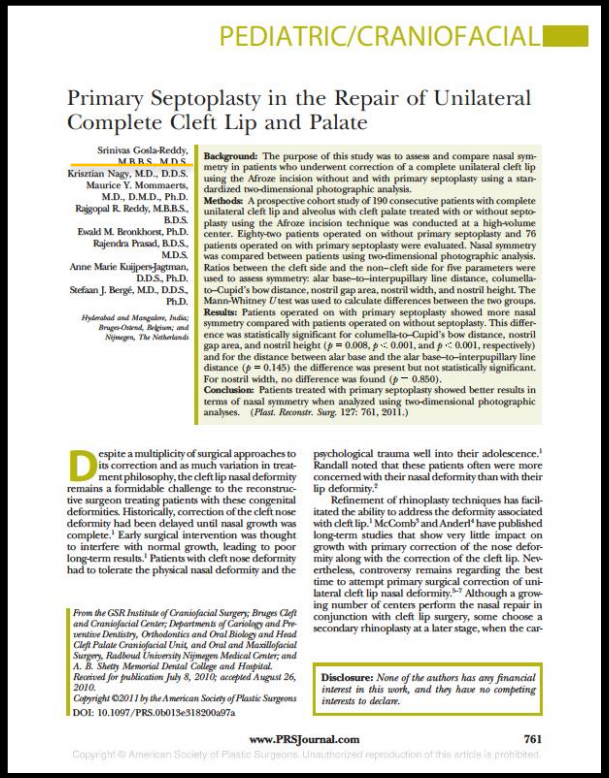
Morpho-functional Cleft Lip Repair



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

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

Morpho-functional Cleft Lip Repair



PEDIATRIC/CRANIOFACIAL

Primary Septoplasty in the Repair of Unilateral Complete Cleft Lip and Palate

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Rajgopal R. Reddy, M.B.B.S., B.D.S.
Ewald M. Bronkhorst, Ph.D.
Rajendra Prasad, B.D.S., M.D.S.
Anne Marie Kuijpers-Jagtman, D.D.S., Ph.D.
Stefaan J. Bergé, M.D., D.D.S., Ph.D.

Hyderabad and Mangalore, India; Bruges-Ostend, Belgium; and Nijmegen, The Netherlands

Background: The purpose of this study was to assess and compare nasal symmetry in patients who underwent correction of a complete unilateral cleft lip using the Afroze incision without and with primary septoplasty using a standardized two-dimensional photographic analysis.
Methods: A prospective cohort study of 190 consecutive patients with complete unilateral cleft lip and alveolus with cleft palate treated with or without septoplasty using the Afroze incision technique was conducted at a high-volume center. Eighty-two patients operated on without primary septoplasty and 76 patients operated on with primary septoplasty were evaluated. Nasal symmetry was compared between patients using two-dimensional photographic analysis. Ratios between the cleft side and the non–cleft side for five parameters were used to assess symmetry: alar base–to–interpupillary line distance, columella-to–Cupid's bow distance, nostril gap area, nostril width, and nostril height. The Mann-Whitney *U* test was used to calculate differences between the two groups.
Results: Patients operated on with primary septoplasty showed more nasal symmetry compared with patients operated on without septoplasty. This difference was statistically significant for columella-to–Cupid's bow distance, nostril gap area, and nostril height ($p = 0.008$, $p < 0.001$, and $p < 0.001$, respectively) and for the distance between alar base and the alar base–to–interpupillary line distance ($p = 0.145$) the difference was present but not statistically significant. For nostril width, no difference was found ($p = 0.850$).
Conclusion: Patients treated with primary septoplasty showed better results in terms of nasal symmetry when analyzed using two-dimensional photographic analyses. (*Plast. Reconstr. Surg.* 127: 761, 2011.)

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 deformities. Historically, correction of the cleft nose deformity had been delayed until nasal growth was complete.[1] Early surgical intervention was thought to interfere with normal growth, leading to poor long-term results.[1] Patients with cleft nose deformity had to tolerate the physical nasal deformity and the psychological trauma well into their adolescence.[1] Randall noted that these patients often were more concerned with their nasal deformity than with their lip deformity.[2]

Refinement of rhinoplasty techniques has facilitated the ability to address the deformity associated with cleft lip.[1] McComb[3] and Anderl[4] 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.[5–7] 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 car-

From the GSR Institute of Craniofacial Surgery; Bruges Cleft and Craniofacial Center; Departments of Cariology and Preventive Dentistry, Orthodontics and Oral Biology and Head Cleft Palate Craniofacial Unit, and Oral and Maxillofacial Surgery, Radboud University Nijmegen Medical Center; and A. B. Shetty Memorial Dental College and Hospital.
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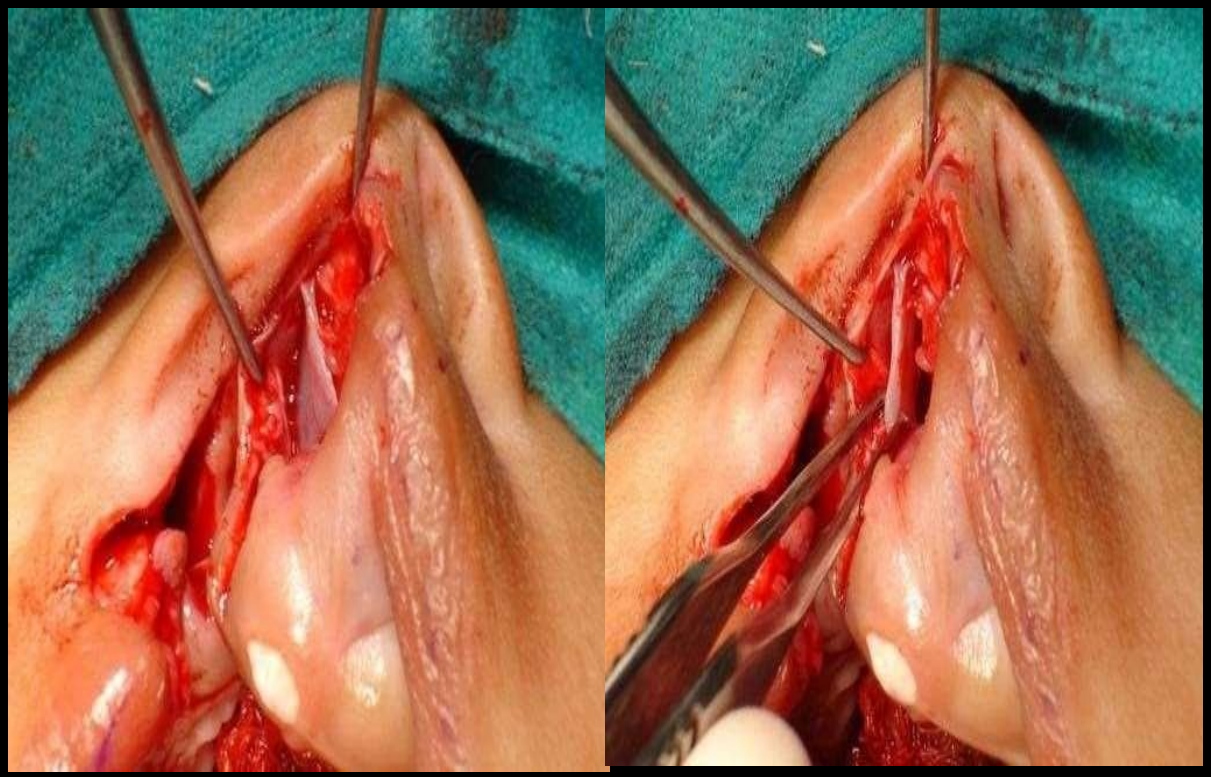
Disclosure: *None of the authors has any financial interest in this work, and they have no competing interests to declare.*

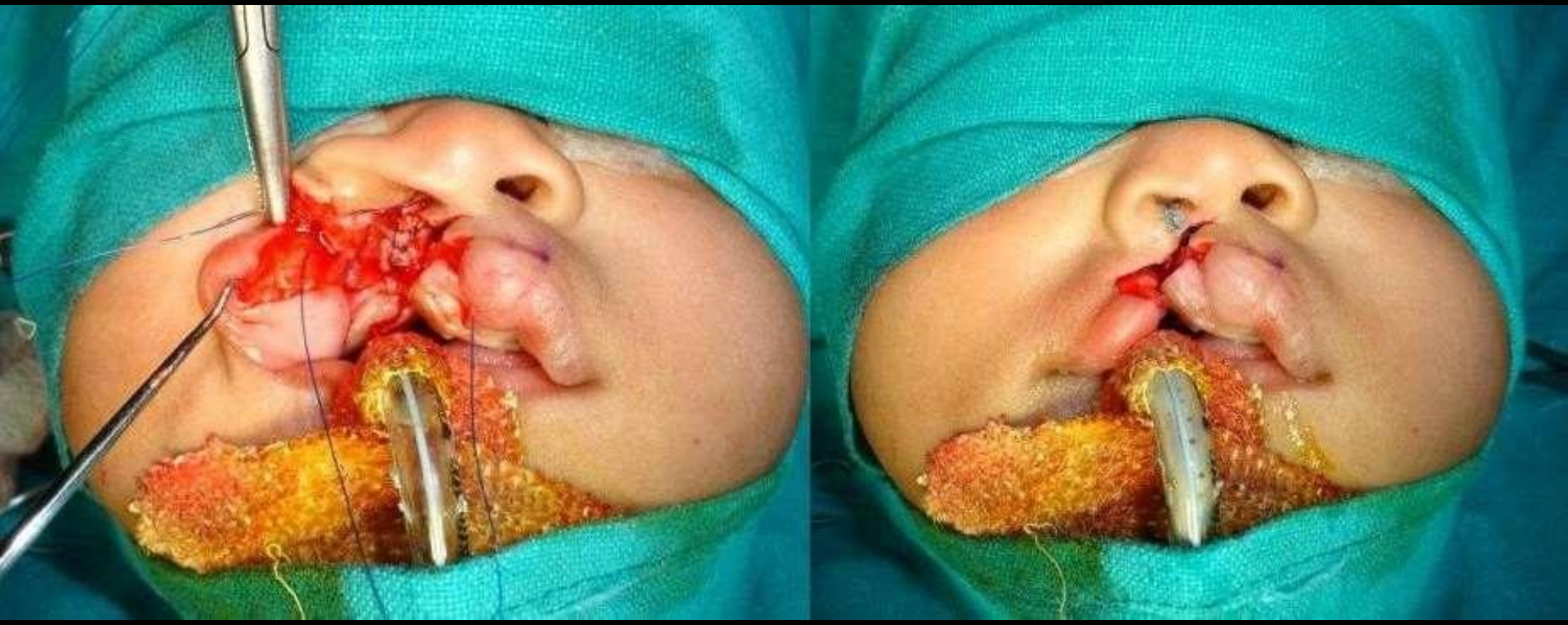


SEPTUM IS KEY

The septum is positioned in its rightful anatomical position

Primary septoplasty in repair of unilateral complete cleft lip and palate
Gosla Srinivas Reddy et. al.; Plastic and Reconstructive Surgery, August,2010.

Morpho-functional Cleft Lip Repair

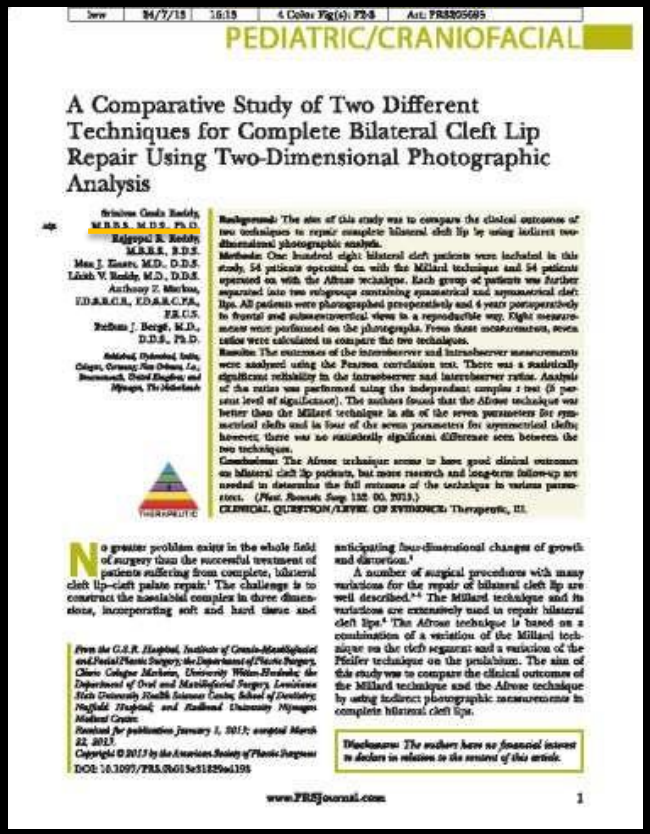


Ala of nose stabilized symmetrically to match that of the normal side by taking a suture through the alar head of the nasalis muscle on the cleft side to the contralateral muscle through the septum

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

Bilateral Cleft Lip Repair

Incision design for bilateral cleft lip surgery



PEDIATRIC/CRANIOFACIAL

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

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Max J. Kuntz, M.D., D.D.S.
Lilith V. Reddy, M.D., D.D.S.
Anthony Z. Markus, F.D.S.R.C.S., F.D.S.R.C.P.S., F.R.C.S.
Prithvi J. Bergé, M.D., D.D.S., Ph.D.

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 clefts. All patients were photographed preoperatively and 6 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 intraobserver and interobserver 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 nasoalveolar complex in three dimensions, incorporating soft and hard tissue and anticipating four-dimensional changes of growth and distortion.[1]

A number of surgical procedures with many variations for the repair of bilateral cleft lip are well described.[2–5] The Millard technique and its variations are extensively used to repair bilateral cleft lips.[4] The Afrose technique is based on a combination of a variation of the Millard technique on the cleft segment and a variation of the Fräser 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.

From the G.S.R. Hospital, Institute of Cranio-Maxillofacial and Facial Plastic Surgery; the Department of Plastic Surgery, Chiro Cologne Marketa, University Witten-Herdecke; the Department of Oral and Maxillofacial Surgery, Louisiana State University Health Sciences Center, School of Dentistry; Nuffield Hospitals; and Radboud University Nijmegen Medical Center.

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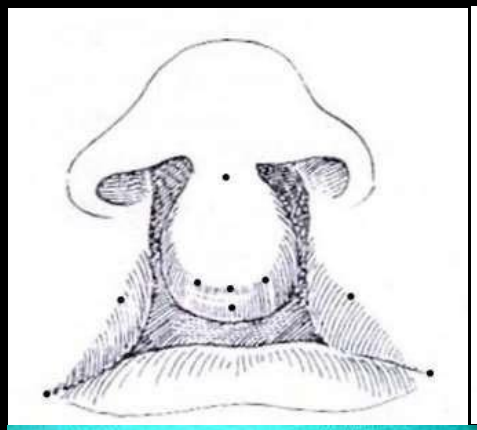
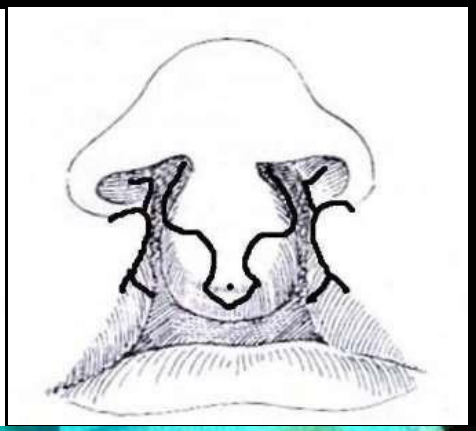
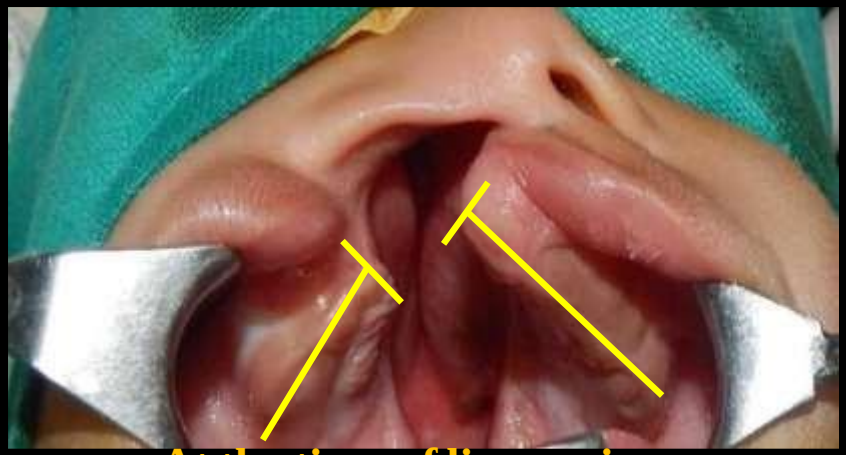


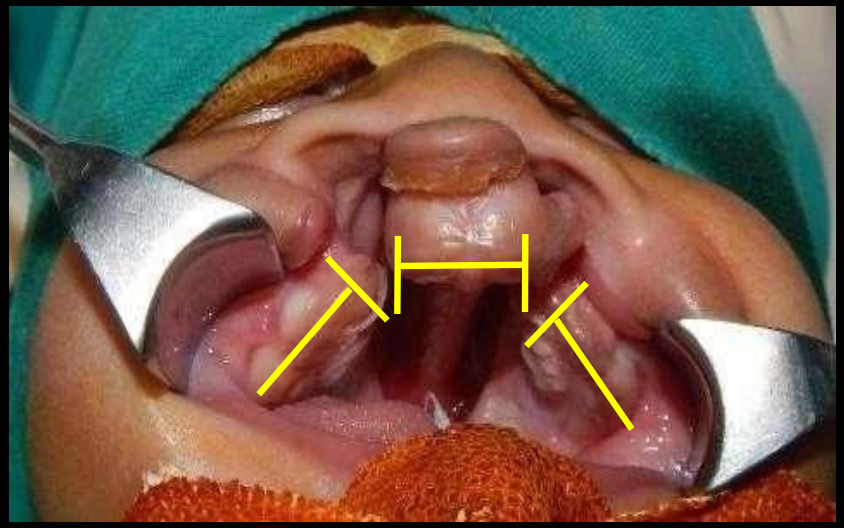


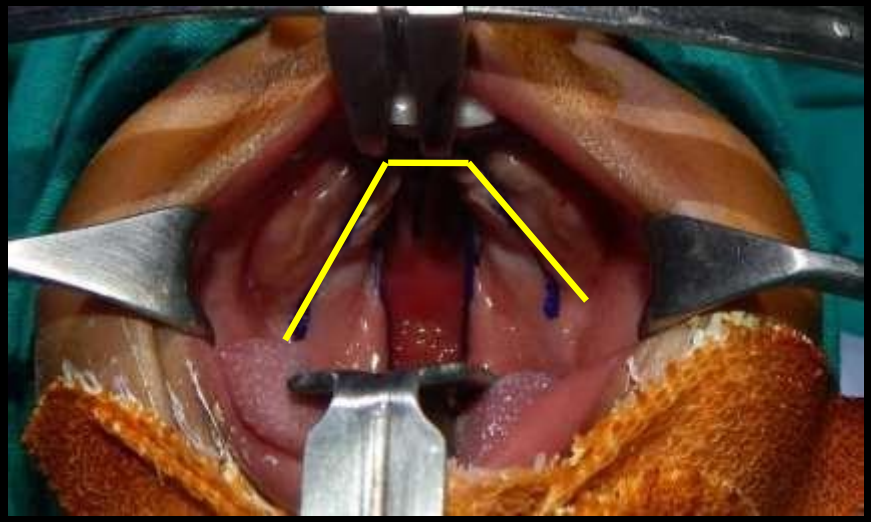
Gosla Reddy S, et al , A comparative study of two different techniques for complete bilateral cleft lip repair using two-dimensional photographic analysis. Plastic and Reconstructive Surgery, 2013



At the time of lip repair

At the time of palate repair





Morpho-functional repair of complete unilateral cleft lip to achieve aesthetic balance between the lip and nose: an evidence based study Gosla-Reddy, S. et al.International Journal of Oral and Maxillofacial Surgery, Volume 44 , e13 - e14, 2015.

Randomized Controlled Trial › Plast Reconstr Surg. 2018 Jul;142(1):42e-50e.
doi: 10.1097/PRS.0000000000004486.

Effect of One-Stage versus Two-Stage Palatoplasty on Hypernasality and Fistula Formation in Children with Complete Unilateral Cleft Lip and Palate: A Randomized Controlled Trial

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Maxillofacial growth and speech outcome after one-stage or two-stage palatoplasty in unilateral cleft lip and palate. A systematic review

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PEDIATRIC/CRANIOFACIAL

Effect of One-Stage versus Two-Stage Palatoplasty on Hypernasality and Fistula Formation in Children with Complete Unilateral Cleft Lip and Palate: A Randomized Controlled Trial

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Vinay Nagar Colony, Saidabad, Hyderabad, India; Nijmegen, The Netherlands; and Cincinnati, Ohio

Background: Is one-stage or two-stage palatoplasty more effective for preventing fistula formation and hypernasality in patients with complete unilateral cleft lip and palate?
Methods: This parallel blocked randomized controlled trial included 100 patients with nonsyndromic complete unilateral cleft lip and palate with a repaired cleft lip, divided into two equal groups. Group A had one-stage palatoplasty patients at age 12 to 15 months while group B had two-stage palatoplasty patients with soft palatoplasty at age 12 to 15 months and hard palatoplasty at age 24 to 25 months. Presence of a fistula was tested clinically at 5 years and speech was tested using nasometry and perceptual analyses at 6 years. Group C consisted of noncleft controls ($n = 20$, age 6 years) for speech using nasometry. Fistula rates, hypernasality ratings, and nasalance scores were compared between groups A and B. Nasometry recordings of groups A and B were compared with control group C.
Results: There was no difference in fistula rates between groups A and B ($p = 0.409$; 95 percent CI, 0.365 to 11.9). Mean nasalance scores of group A showed higher nasalance than group B ($p = 0.006$; 95 percent CI, 1.16 to 6.53). Perceptual analysis showed no difference between groups A and B ($p = 0.857$ and $p = 1.000$). Group A showed higher mean nasalance than group C ($p = 0.857$ and $p = 1.000$), whereas group B showed no difference ($p = 0.088$; 95 percent CI, −0.14 to 2.02).
Conclusions: There was no difference in fistula rates between groups. Nasalance was slightly higher in patients in the one-stage palatoplasty group than two-stage palatoplasty group, but the difference was not clinically significant. (*Plast. Reconstr. Surg.* 142: 42e, 2018.)
CLINICAL QUESTION/LEVEL OF EVIDENCE: Therapeutic, II.

TYCRAPEDTIC

Although cleft palate repair has significant benefits for the patient's feeding and middle ear function, the primary purpose of cleft palate repair is to help the patient develop normal speech with a functioning velopharyngeal valve.[1–4] Incomplete closure of the velopharyngeal valve during speech, despite the palate repair, causes velopharyngeal insufficiency. In addition, failure to completely close the hard palate can result in a fistula that is large enough to cause nasal regurgitation and speech impairment. Patients with velopharyngeal insufficiency or a

From GSR Hospital, Institute of Craniomaxillofacial and Facial Plastic Surgery; the Departments of Cariology and Preventive Dentistry, Craniomaxillofacial Surgery, and Orthodontics and Craniofacial Biology, Radboud University Medical Center; and the Division of Speech-Language Pathology, Cincinnati Children's Hospital Medical Center and the University of Cincinnati Medical Center.
Received for publication June 1, 2017; accepted December 19, 2017.
The trial is registered under the name "Is a One Stage or Two Stage Cleft Palate Repair More Beneficial in Children with Complete One Sided Cleft Palate Defects with Respect to Speech Development and Palatal Fistula Formation?." ISRCTN registry identification number ISRCTN17288141 (http://www.isrctn.com/ISRCTN17288141?q=&filters=condition:Category:Musculoskeletal%20Diseases,ageRange:Child&offset=0&totalResults=396&page=1&pageSize=10&searchType=basic-search).

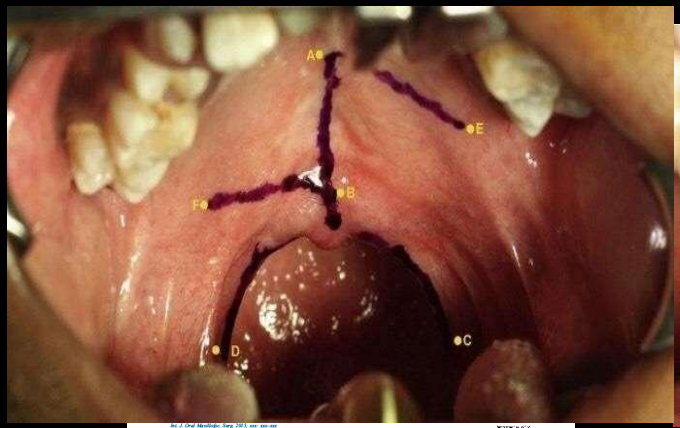


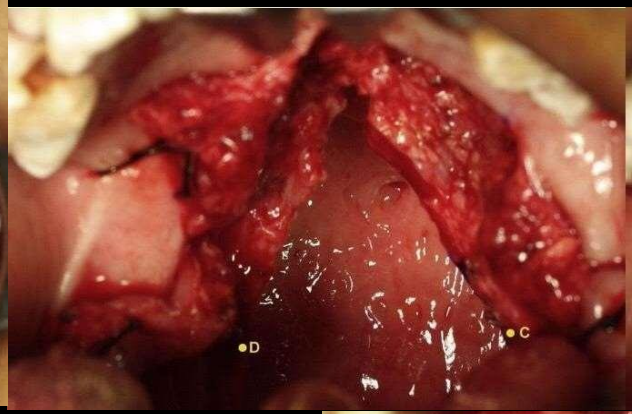


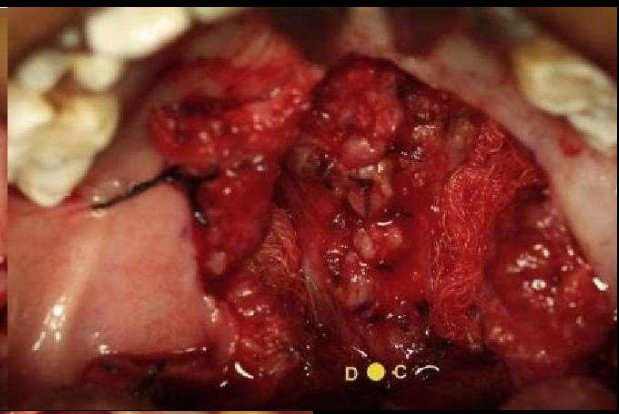

Morpho-Functional Palatoplasty

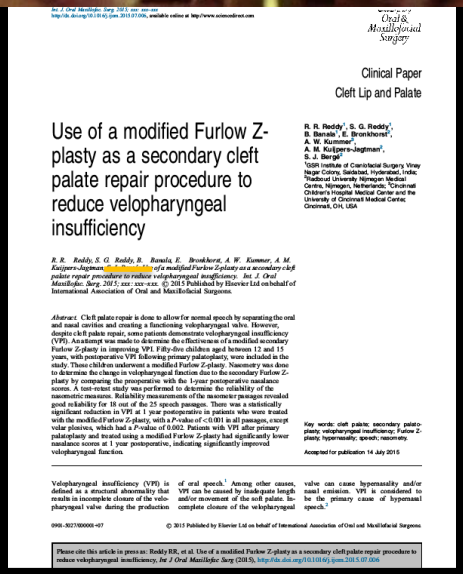
- Maxillofacial growth and speech outcome after one-stage or two-stage palatoplasty in unilateral cleft lip and palate-a systematic review, Gosla Reddy S, et al , Journal of cranio-maxillo-facial surgery, March 2022.
- Effect of one stage versus two- stage palatoplasty on hypernasality and fistula formation in children with complete unilateral cleft lip and palate: A randomized controlled trial, Gosla Reddy S, et al , Plastic Reconstructive surgery, July 2018.
- Effect of one stage Vs. Two- stage palatoplasty on hypernasality and fistula formation in children with complete unilateral cleft lip and palate:A randomized control Trial; Gosla Reddy S, et al , Plastic and Reconstructive Surgery, December 2017

Modified Furlows 'Z' Plasty with Levator Myoplasty for Velopharyngeal insufficiency correction









Oral & Maxillofacial Surgery

Clinical Paper
Cleft Lip and Palate

Use of a modified Furlow Z-plasty as a secondary cleft palate repair procedure to reduce velopharyngeal insufficiency

R. R. Reddy[1], S. G. Reddy[1], B. Banala[1], E. Bronkhorst[2], A. W. Kummer[3], A. M. Kuijpers-Jagtman[2], S. J. Bergé[2]
[1]GSR Institute of Craniofacial Surgery, Vinay Nagar Colony, Saidabad, Hyderabad, India; [2]Radboud University Nijmegen Medical Centre, Nijmegen, Netherlands; [3]Cincinnati Children's Hospital Medical Center and the University of Cincinnati Medical Center, Cincinnati, OH, USA

R. R. Reddy, S. G. Reddy, B. Banala, E. Bronkhorst, A. W. Kummer, A. M. Kuijpers-Jagtman, S. J. Bergé. *Use of a modified Furlow Z-plasty as a secondary cleft palate repair procedure to reduce velopharyngeal insufficiency. Int. J. Oral Maxillofac. Surg. 2015; xxx: xxx–xxx.* © 2015 Published by Elsevier Ltd on behalf of International Association of Oral and Maxillofacial Surgeons.

Abstract Cleft palate repair is done to allow for normal speech by separating the oral and nasal cavities and creating a functioning velopharyngeal valve. However, despite cleft palate repair, some patients demonstrate velopharyngeal insufficiency (VPI). An attempt was made to determine the effectiveness of a modified secondary Furlow Z-plasty in improving VPI. Fifty-five children aged between 12 and 15 years, with postoperative VPI following primary palatoplasty, were included in the study. These children underwent a modified Furlow Z-plasty. Nasometry was done to determine the change in velopharyngeal function due to the secondary Furlow Z-plasty by comparing the preoperative with the 1-year postoperative nasalance scores. A test–retest study was performed to determine the reliability of the nasometric measures. Reliability measurements of the nasometer passages revealed good reliability for 18 out of the 25 speech passages. There was a statistically significant reduction in VPI at 1 year postoperative in patients who were treated with the modified Furlow Z-plasty, with a *P*-value of <0.001 in all passages, except velar plosives, which had a *P*-value of 0.002. Patients with VPI after primary palatoplasty and treated using a modified Furlow Z-plasty had significantly lower nasalance scores at 1 year postoperative, indicating significantly improved velopharyngeal function.

Key words: cleft palate; secondary palatoplasty; velopharyngeal insufficiency; Furlow Z-plasty; hypernasality; speech; nasometry.

Accepted for publication 14 July 2015

Velopharyngeal insufficiency (VPI) is defined as a structural abnormality that results in incomplete closure of the velopharyngeal valve during the production of oral speech.[1] Among other causes, VPI can be caused by inadequate length and/or movement of the soft palate. Incomplete closure of the velopharyngeal valve can cause hypernasality and/or nasal emission. VPI is considered to be the primary cause of hypernasal speech.[2]

0901-5027/000001+07

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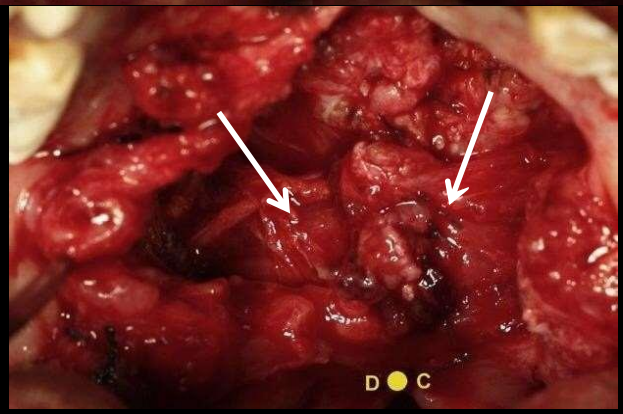
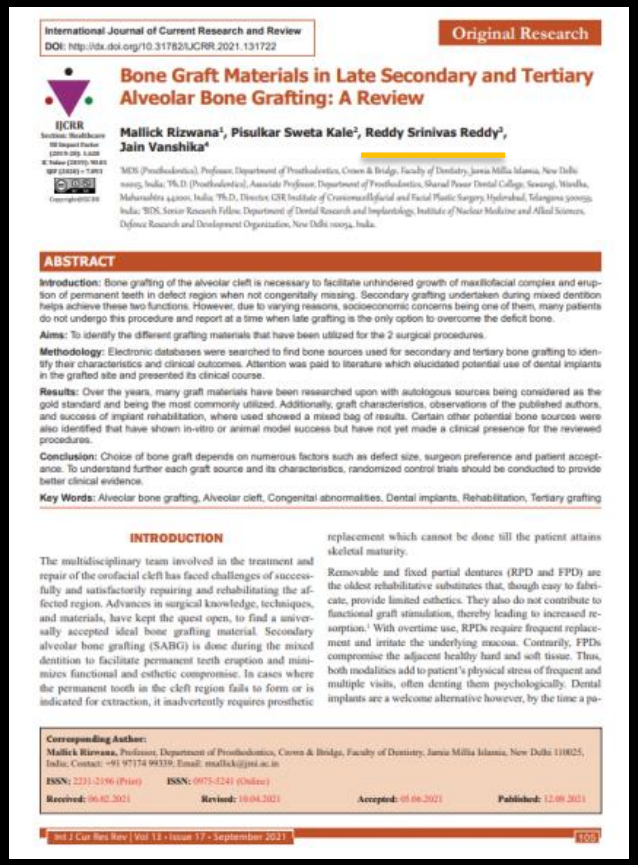


Levator Myoplasty

- Use of a modified Furlow Z- plasty as a secondary cleft palate repair procedure to reduce velopharyngeal insufficient, Gosla Reddy S, et al , International Journal of Oral and maxillofacial Surgery, July 2015.

ALVEOLAR BONE GRAFTING



International Journal of Current Research and Review
DOI: http://dx.doi.org/10.31782/IJCRR.2021.131722

Original Research

Bone Graft Materials in Late Secondary and Tertiary Alveolar Bone Grafting: A Review

IJCRR

Mallick Rizwana[1], Pisulkar Sweta Kale[2], Reddy Srinivas Reddy[3], Jain Vanshika[4]

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ABSTRACT

Introduction: Bone grafting of the alveolar cleft is necessary to facilitate unhindered growth of maxillofacial complex and eruption of permanent teeth in defect region when not congenitally missing. Secondary grafting undertaken during mixed dentition helps achieve these two functions. However, due to varying reasons, socioeconomic concerns being one of them, many patients do not undergo this procedure and report at a time when late grafting is the only option to overcome the deficit bone.

Aims: To identify the different grafting materials that have been utilized for the 2 surgical procedures.

Methodology: Electronic databases were searched to find bone sources used for secondary and tertiary bone grafting to identify their characteristics and clinical outcomes. Attention was paid to literature which elucidated potential use of dental implants in the grafted site and presented its clinical course.

Results: Over the years, many graft materials have been researched upon with autologous sources being considered as the gold standard and being the most commonly utilized. Additionally, graft characteristics, observations of the published authors, and success of implant rehabilitation, where used showed a mixed bag of results. Certain other potential bone sources were also identified that have shown in-vitro or animal model success but have not yet made a clinical presence for the reviewed procedures.

Conclusion: Choice of bone graft depends on numerous factors such as defect size, surgeon preference and patient acceptance. To understand further each graft source and its characteristics, randomized control trials should be conducted to provide better clinical evidence.

Key Words: Alveolar bone grafting, Alveolar cleft, Congenital abnormalities, Dental implants, Rehabilitation, Tertiary grafting

INTRODUCTION

The multidisciplinary team involved in the treatment and repair of the orofacial cleft has faced challenges of successfully and satisfactorily repairing and rehabilitating the affected region. Advances in surgical knowledge, techniques, and materials, have kept the quest open, to find a universally accepted ideal bone grafting material. Secondary alveolar bone grafting (SABG) is done during the mixed dentition to facilitate permanent teeth eruption and minimizes functional and esthetic compromise. In cases where the permanent tooth in the cleft region fails to form or is indicated for extraction, it inadvertently requires prosthetic replacement which cannot be done till the patient attains skeletal maturity.

Removable and fixed partial dentures (RPD and FPD) are the oldest rehabilitative substitutes that, though easy to fabricate, provide limited esthetics. They also do not contribute to functional graft stimulation, thereby leading to increased resorption.[1] With overtime use, RPDs require frequent replacement and irritate the underlying mucosa. Contrarily, FPDs compromise the adjacent healthy hard and soft tissue. Thus, both modalities add to patient's physical stress of frequent and multiple visits, often denting them psychologically. Dental implants are a welcome alternative however, by the time a pa-

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- Bone Graft Materials in late secondary and tertiary alveolar bone grafting: a review, Gosla Reddy S et.al.; International Journal of Current research and review, September 2021.

LEFORT I ADVANCEMENT + BSSO SETBACK

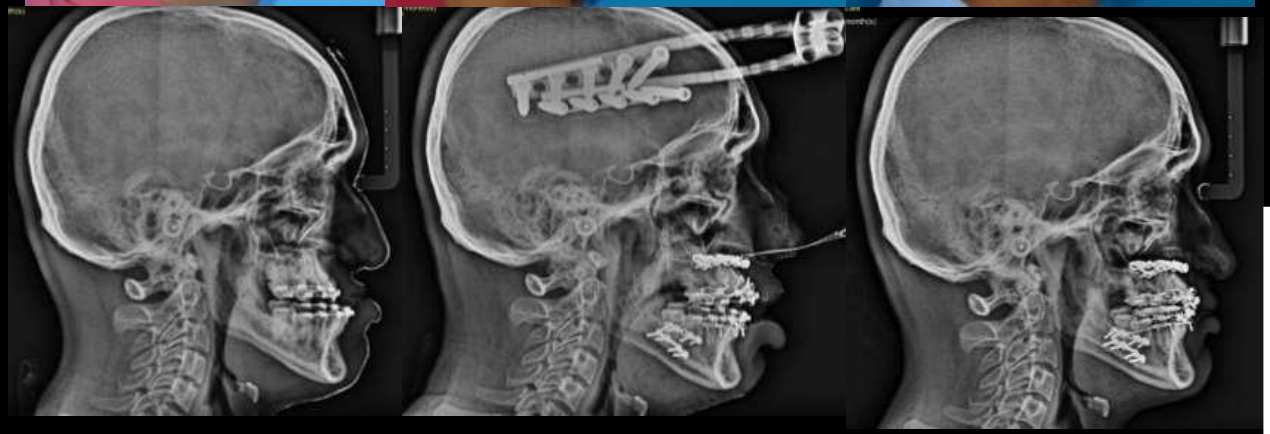
Pre op

Post op

Pre op

Post op

LEFORT I DISTRACTION(RED) WITH BSSO SETBACK



Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology
Volume 37, Issue 1, January 2025, Pages 21-30

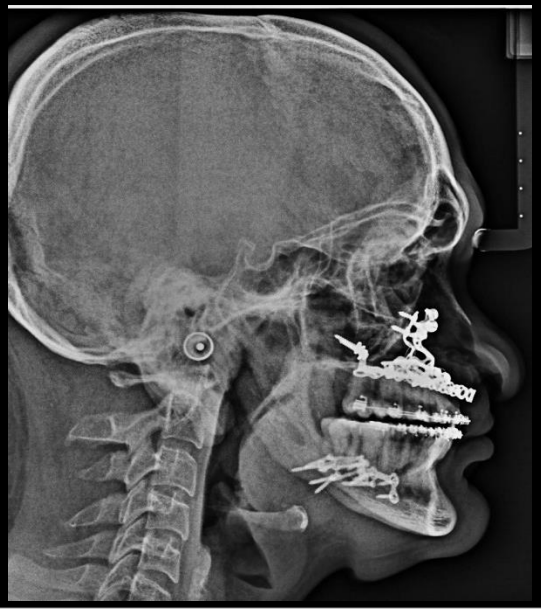
Review article

Comparison of Lefort-1 advancement by internal and external distraction osteogenesis in non-syndromic cleft lip and palate: A systematic review and meta-analysis

Sameer Pandey, Ashi Chug, Srinivas Gosla Reddy, Saurabh S. Simre

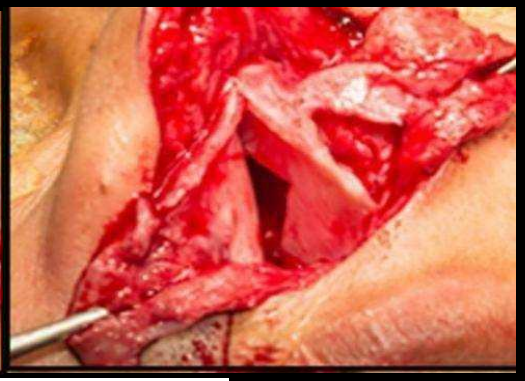
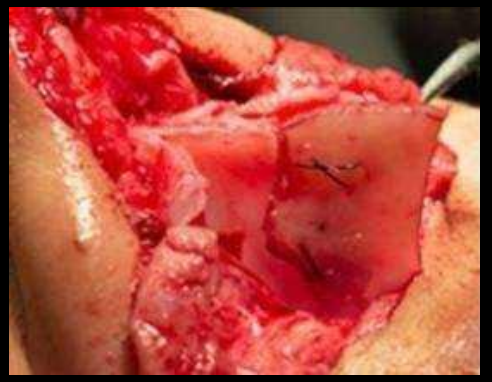
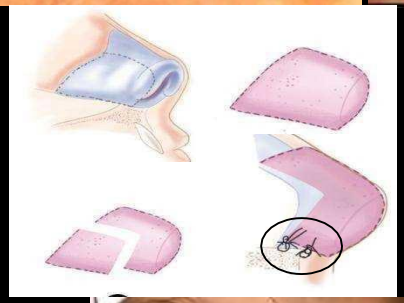
- Comparison of Lefort-I advancement by internal and external distraction osteogenesis in non-syndromic cleft lip and palate: a systematic review and meta-analysis, Srinivas Gosla Reddy , et al , Journal of Oral and maxillofacial surgery, medicine and pathology, January 2025.

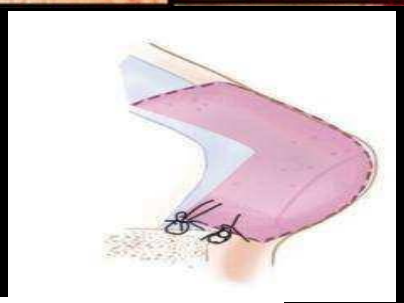
HIGH LEFORT 1 RED DISTRACTION WITH BSSO

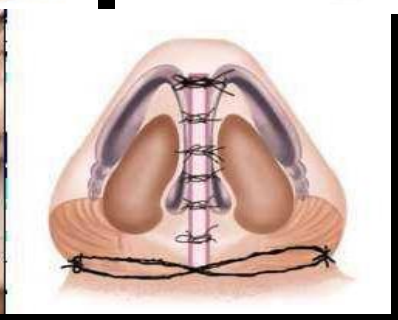


MORPHOFUNCTIONAL CLEFT RHINOPLASTY







Morpho-Functional Septorhinoplasty in Adult Patients With Unilateral Cleft Lip Nasal Deformity: A Comprehensive Approach

*Ashish Fanan, BDS, MDS, * Niels van Heerbeek, MD, PhD, † Tong Xi, MD, DDS, PhD, † Stefaan Bergé, MD, DDS, PhD, ‖ and Srinivas Gosla Reddy, MBBS, MDS, FDSRCS Edin, FDSRCS Eng, PhD ‖*

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Quantitative analysis of aesthetic outcomes of morphofunctional septorhinoplasty for secondary cleft lip nasal deformity

Ashish Fanan [a,*], Niels van Heerbeek [b], Himaja Sai [c], Tong Xi [d], Stefaan Bergé [d], Srinivas Gosla Reddy [e]

- Morpho-functional septorhinoplasty in adult patients with unilateral cleft lip nasal deformity: A comprehensive Approach , Srinivas Gosla Reddy, et al J Oral Maxillofac Surg. November 2020.
- Quantitative analysis of aesthetic outcomes of morphofunctional septorhinoplasty for secondary cleft lip nasal deformity; Srinivas Gosla Reddy,et. al., British Journal of oral and maxillofacial surgery, July 2022


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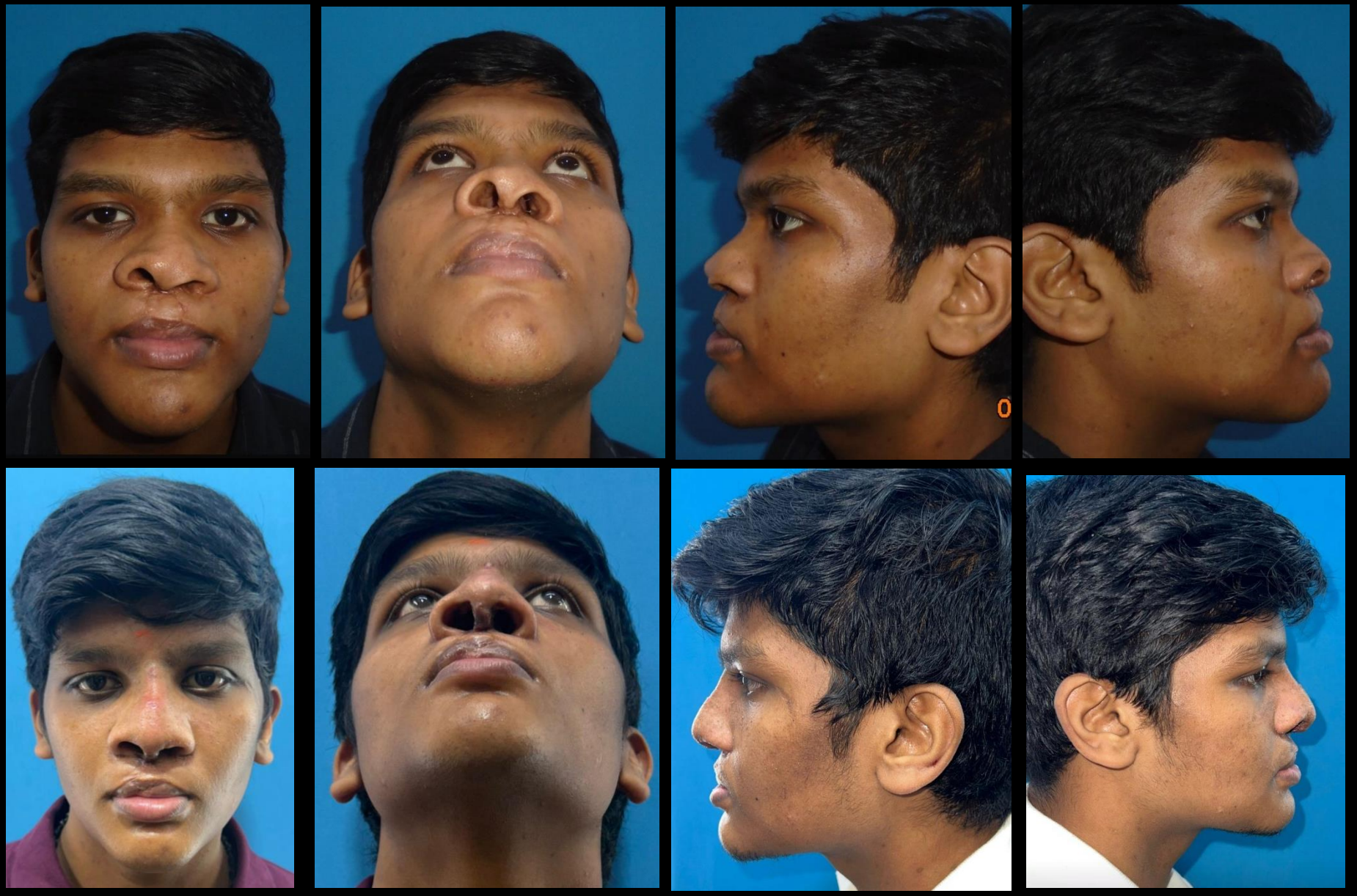


Technological advancement in craniofacial surgery

Dr. S. Anthony Wolfe

Dr. Likith V. Reddy

Dr. David Staffenberg

Dr. Hade Vuyk

Dr. Fabio Mazzoleni

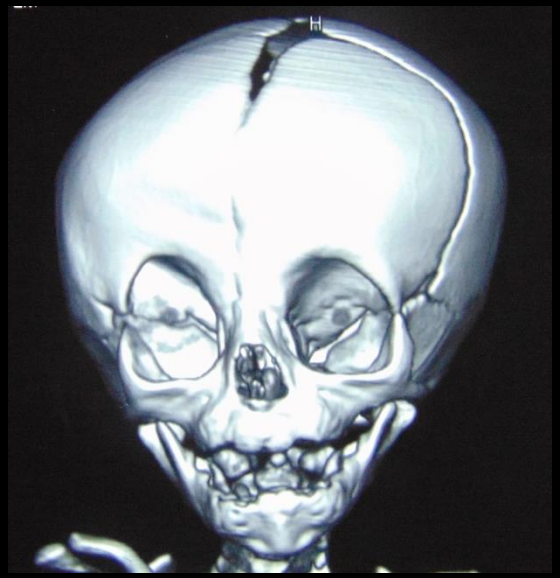
MIAMI CHILDREN'S HOSPITAL

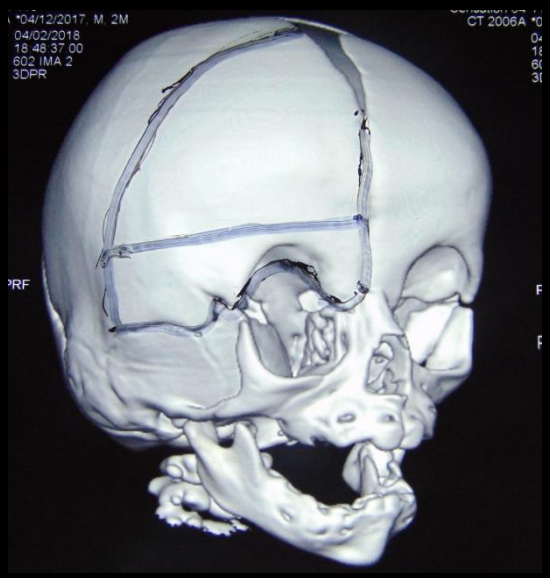
TEXAS A&M HEALTH SCIENCE CENTER BAYLOR COLLEGE OF DENTISTRY

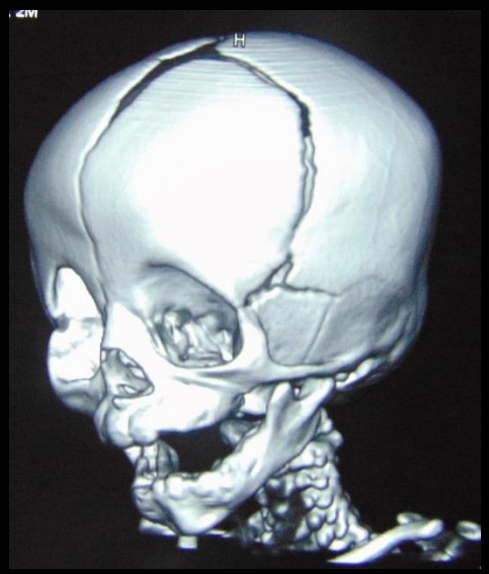
NYU Langone MEDICAL CENTER

SMILE HOUSE Fondazione ETS

PLAGIOCEPHALY







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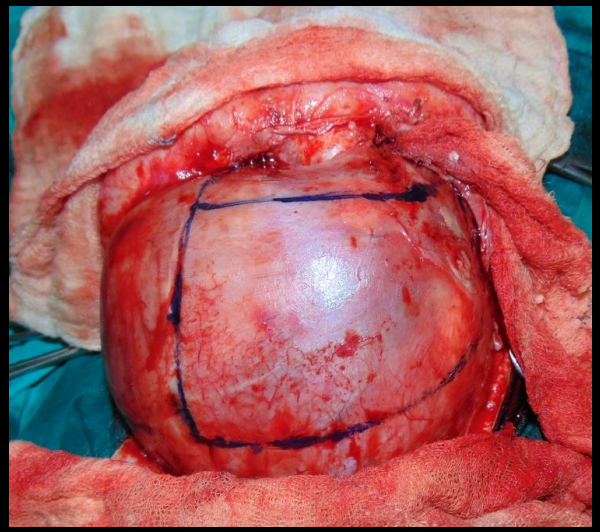
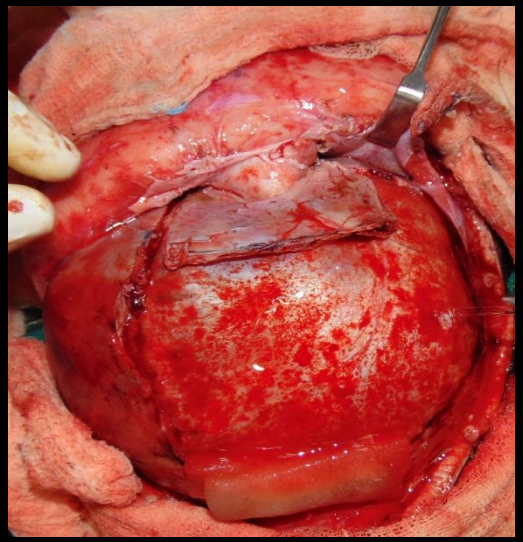
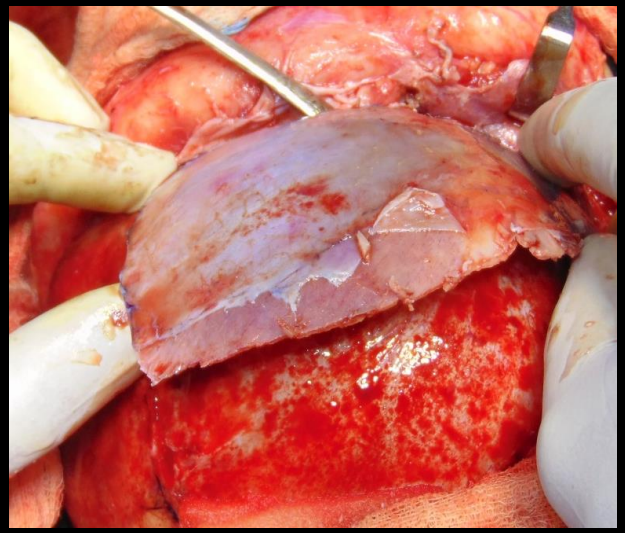
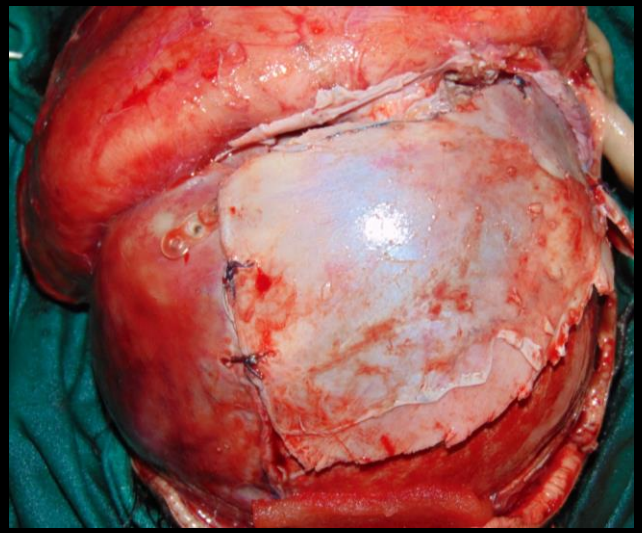








PLAGIOCEPHALY
PREOP VS POST OP






ANTERIOR AND POSTERIOR PLAGIOCEPHALY

PREOP

MARKINGS ON STL MODEL

INTRA OP PICTURES

ANTERIOR AND POSTERIOR PLAGIOCEPHALY
PREOP VS POST OP

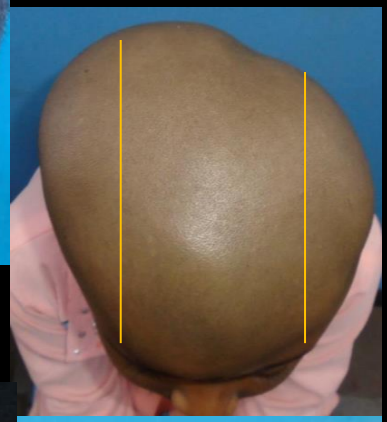
PRE OP

POST OP

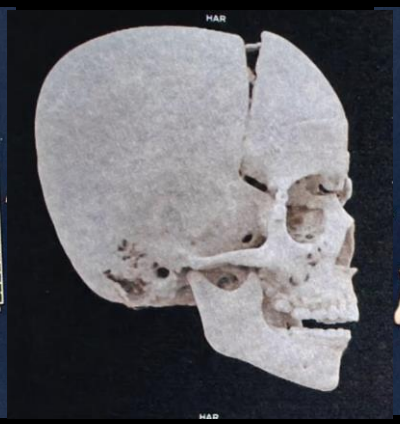
PRE OP

POST OP

PRE OP



PRE OP



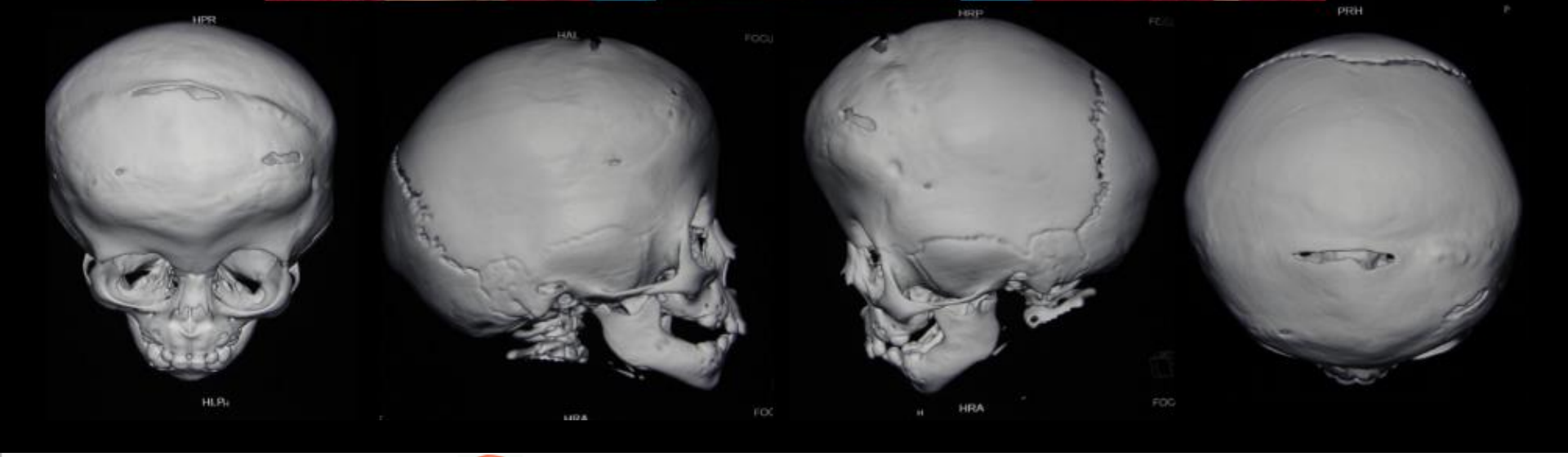
POST OP

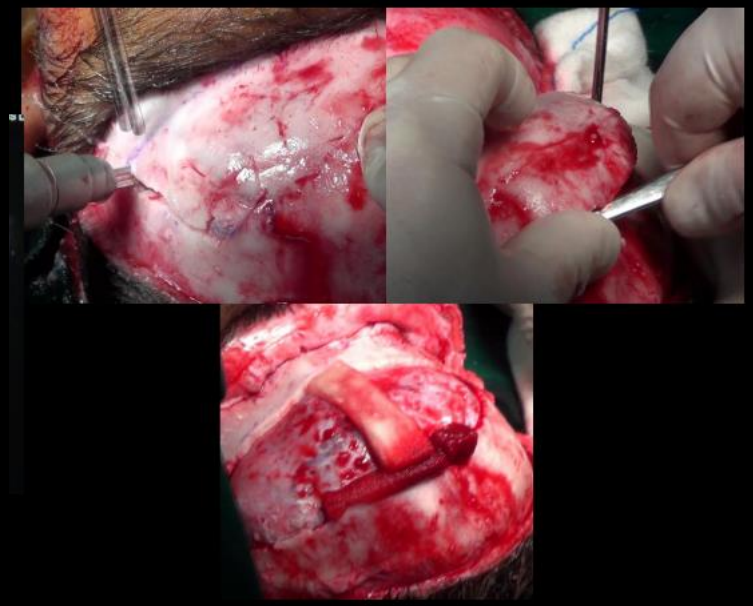
PRE OP

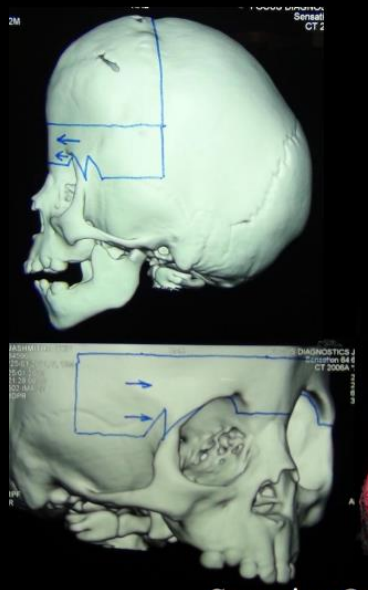
POST OP

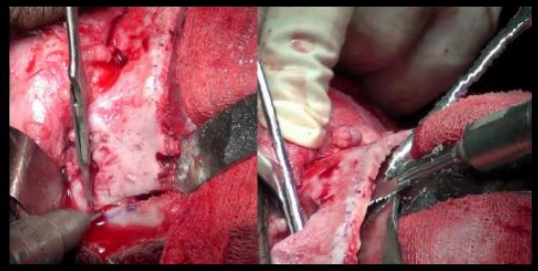
POST OP

BRACHYCEPHALY





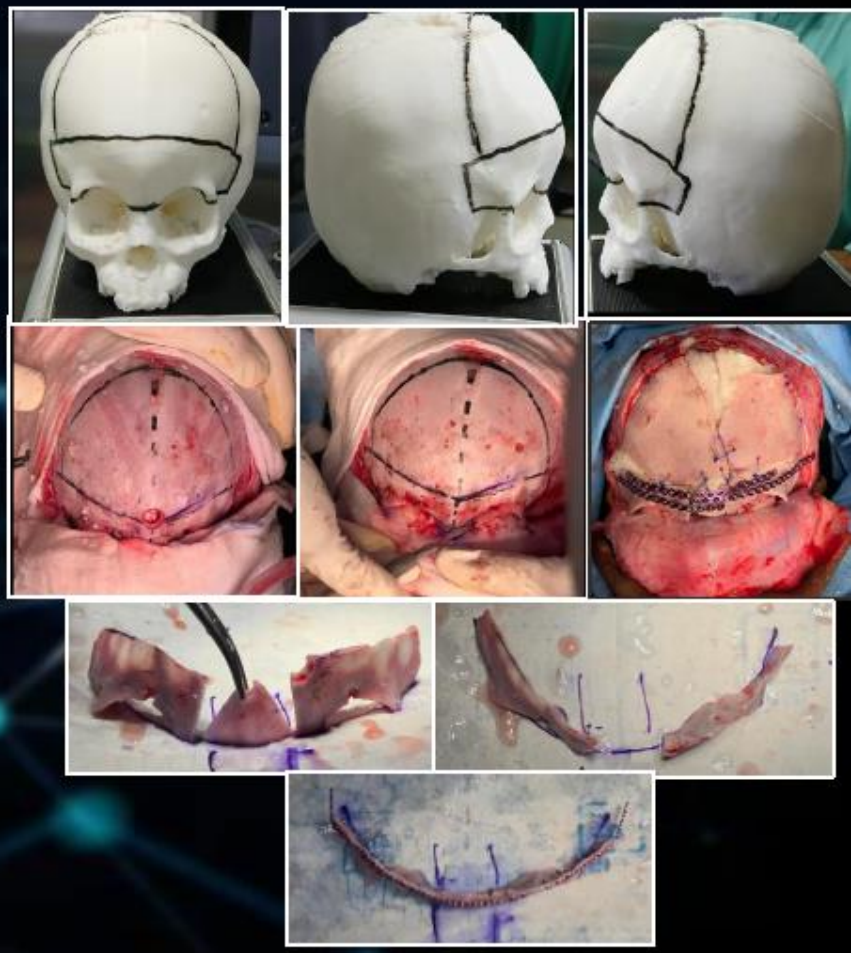




Superior Orbital rim advancement and fixation

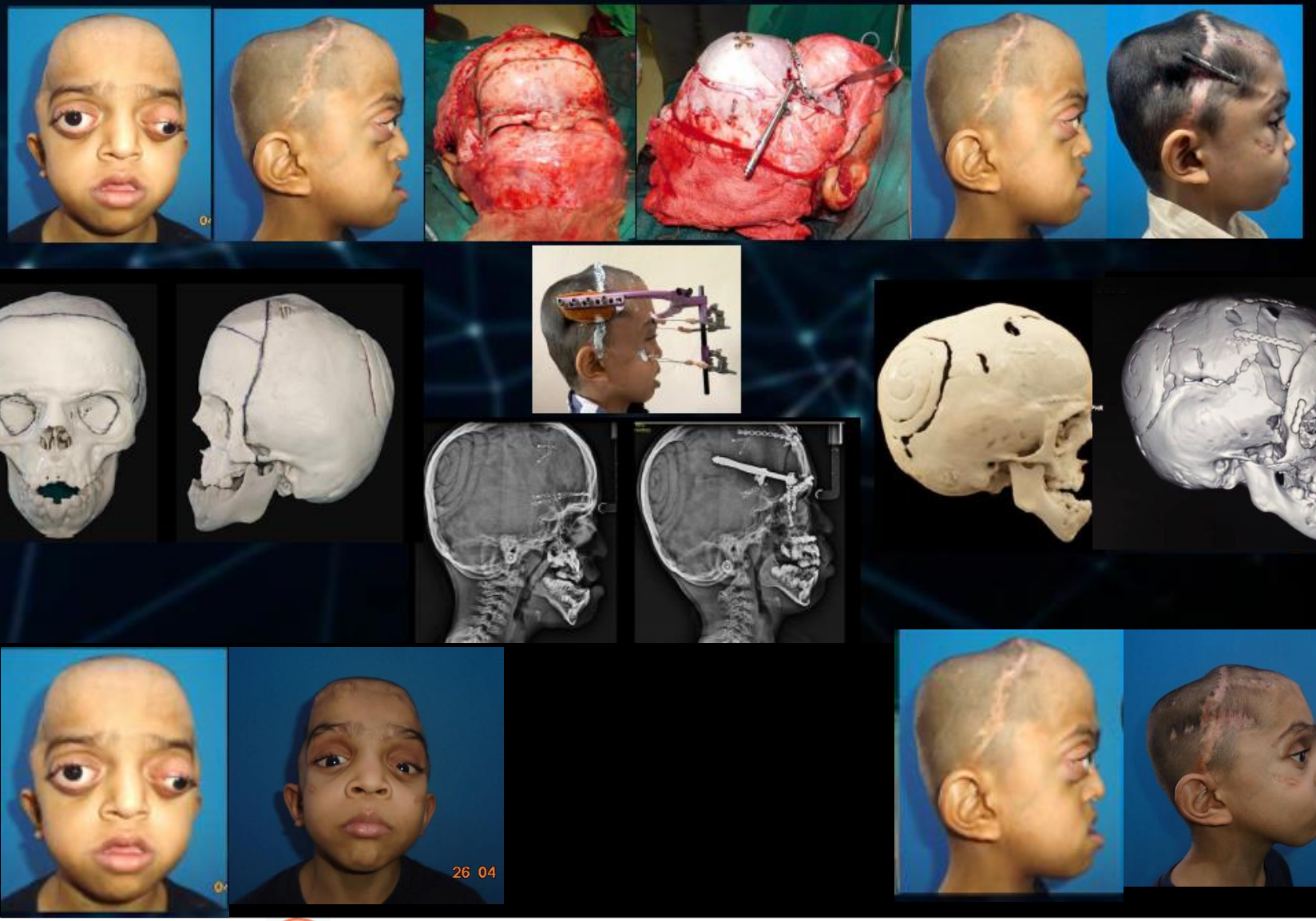
Raising Frontal Flap

TRIGONOCEPHALY CORRECTION - CRANIOPLASTY



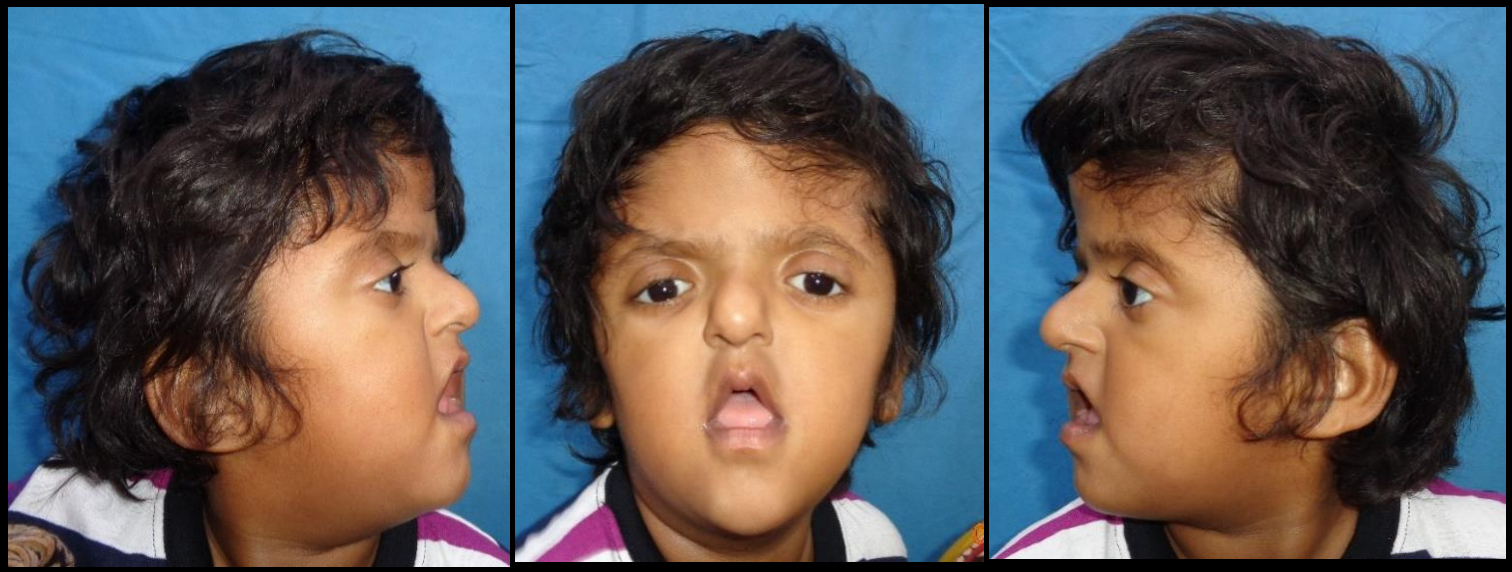
TURRICEPHALY CORRECTION - CRANIOPLASTY

CROUZON SYNDROME
FRONTOMONOBLOCK ADVANCEMENT WITH RED AND INTERNAL DISTRACTOR

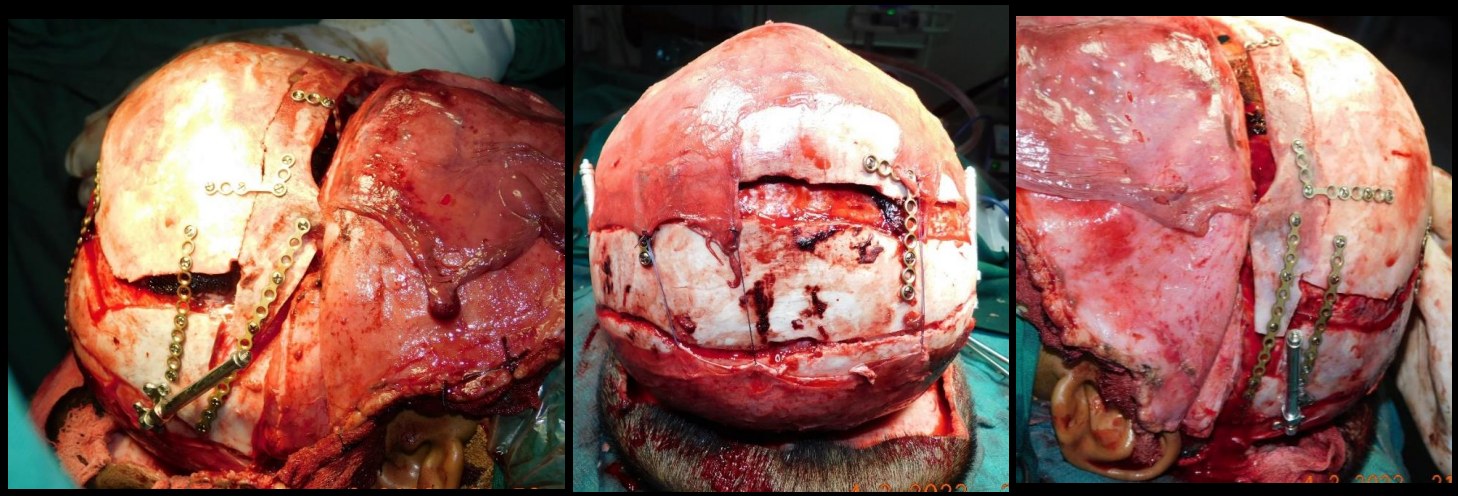


Craniofacial Syndromes and Anomalies

APERT SYNDROME

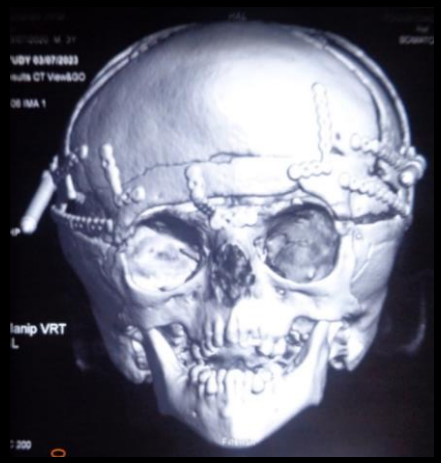


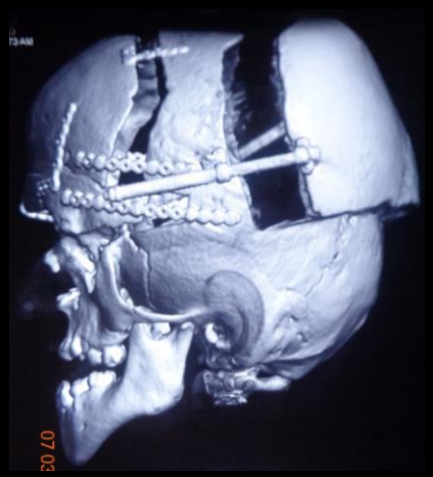
Pre op



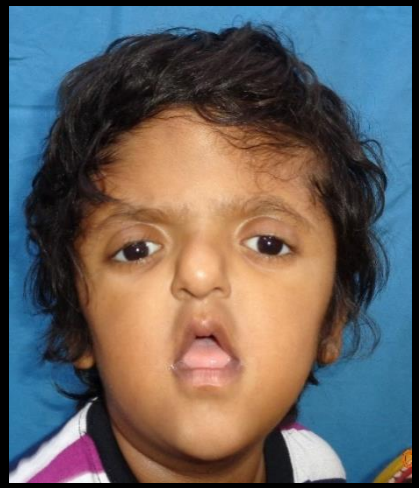
STAGE I: PCVD AND FRONTOORBITAL ADVANCEMENT

POST OP STAGE 1





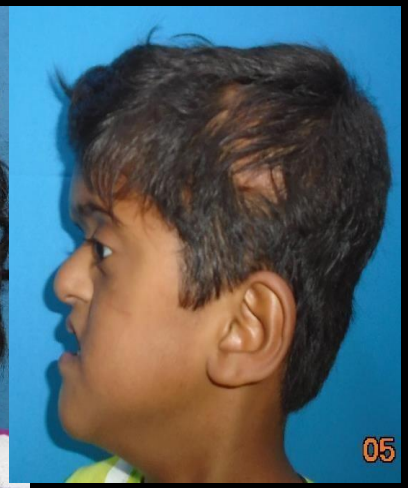
PRE OP



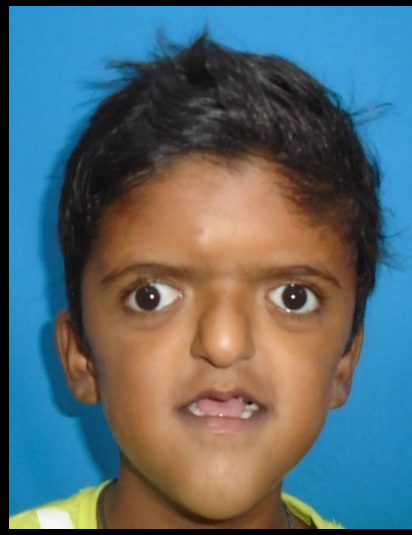
PRE OP

POST OP

PRE OP



POST OP



POST OP

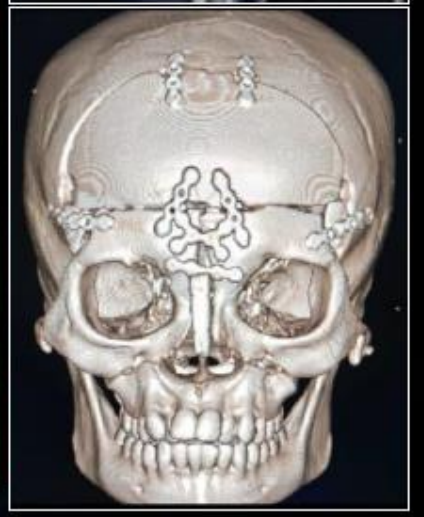
STAGE II: LEFORT III ADVANCEMENT

HYPERTELORISM CORRECTION



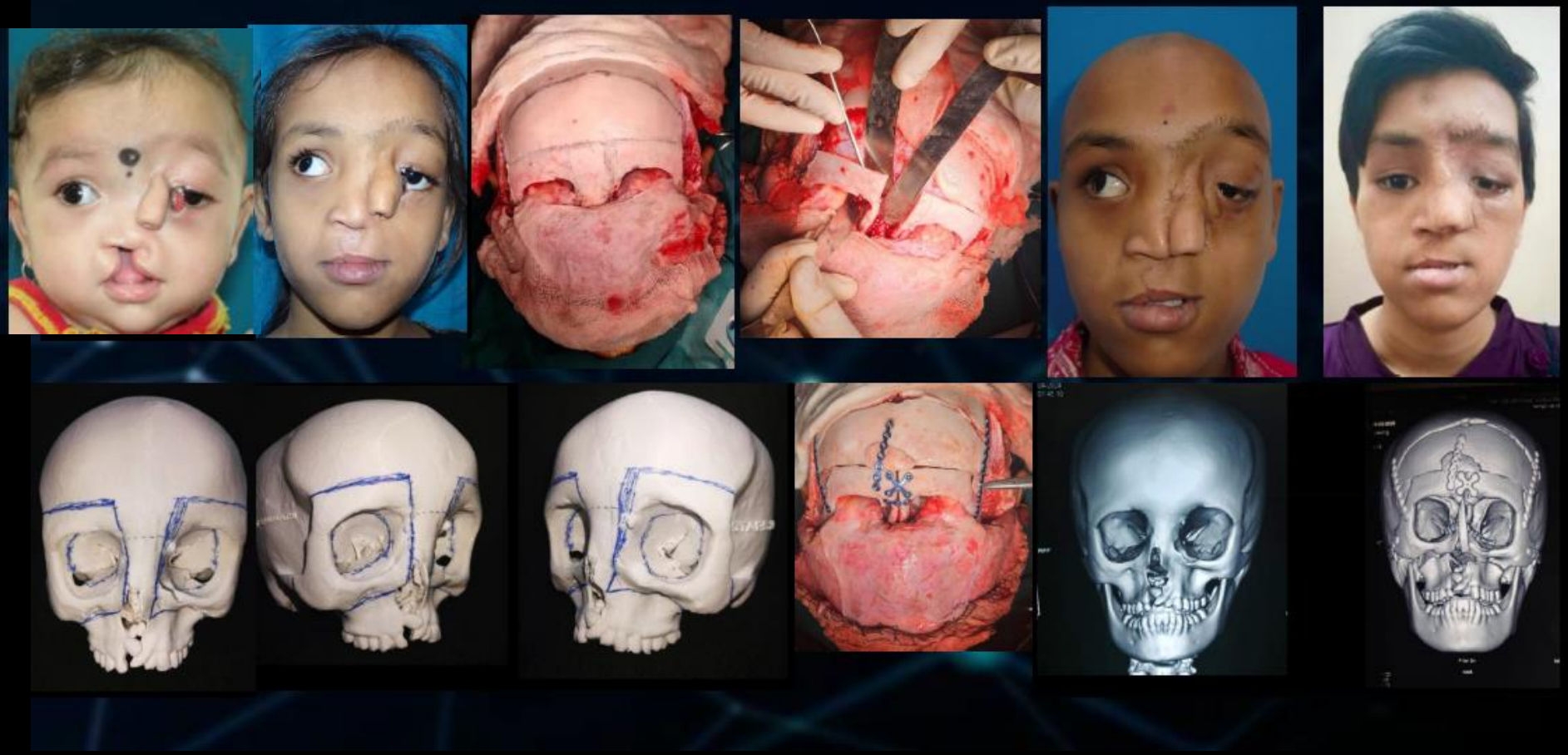






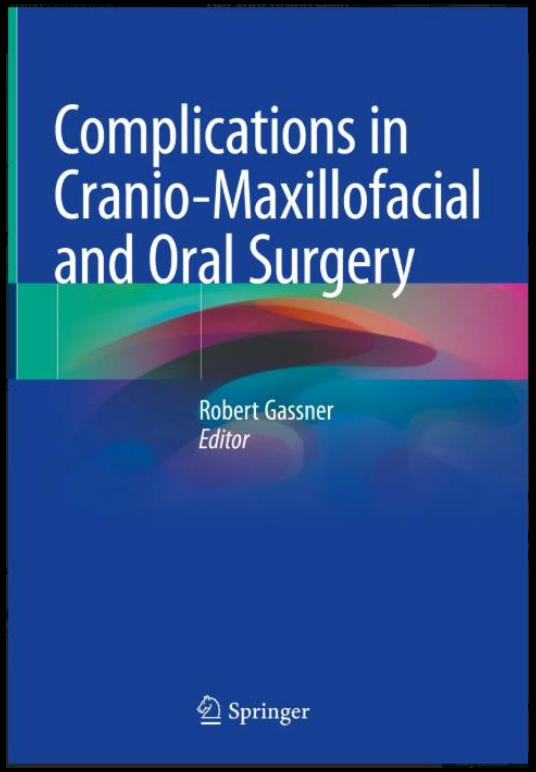
HYPERTELORISM CORRECTION

HYPERTELORISM CORRECTION



MORTALITY AND MORBIDITY

Risks across all surgical scales in the speciality of cleft and craniofacial surgery are quite common



Complications in Cleft Lip and Palate Surgeries

Chapter | First Online: 01 August 2020
pp 3–32 | Cite this chapter

Save chapter

Srinivas Gosla Reddy & Ashish Fanan

919 Accesses 1 Citation

Abstract

Cleft lip and palate is a multifactorial and three-dimensional anomaly involving hard and soft tissues of the face. The comprehensive treatment of cleft lip and palate deformities requires a thorough consideration of the complexities of the anatomical deformity and a balance between intervention and growth. Complications can occur in the management of the cleft patients due to lack of understanding of surgical principles and improper techniques. Poor outcomes were the result of nonexistent protocol, fragmented care, and lack of periodic assessment. Many of the developed countries of the world have a well-structured and organized cleft team practice. However, the situation in most of the developing countries is quite different, where they lack properly trained medical personnel which hinder a high quality team approach delivery to the orofacial cleft patients. The resource-poor nations are managed through surgical outreach programs funded by various philanthropic organizations around the world. This chapter consists of a detailed classification of complications in cleft lip and palate surgeries and its comprehensive multidisciplinary management.

RELAPSE AND PHENOTYPIC RE EXPRESSION

RELAPSE

- Noted within a year post operatively
- Due to unstable / improper fixation
- Unstable movements of bony

PHENOTYPIC RE-EXPRESSION

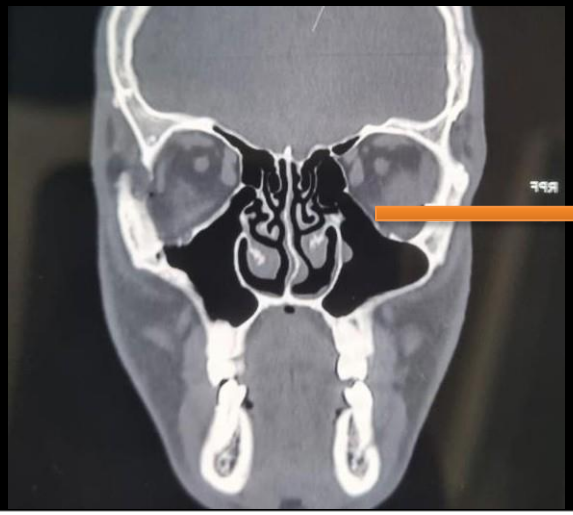
- Occurs with growth
- When overcorrection is not done considering the future growth

PRE OP

1YEAR POST OP

14 YEARS POST OP

WHY ???

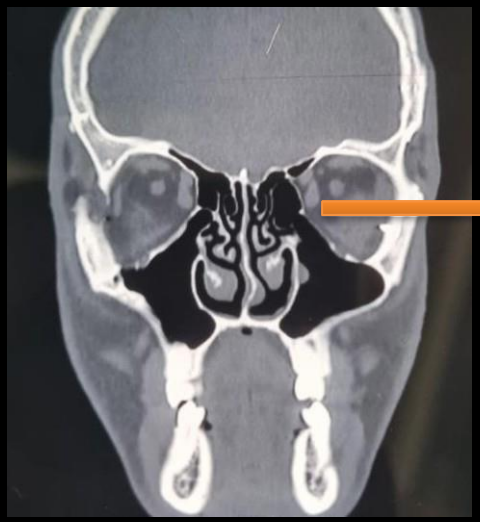


Pneumatisation of ethmoidal air sinuses

PRE OP

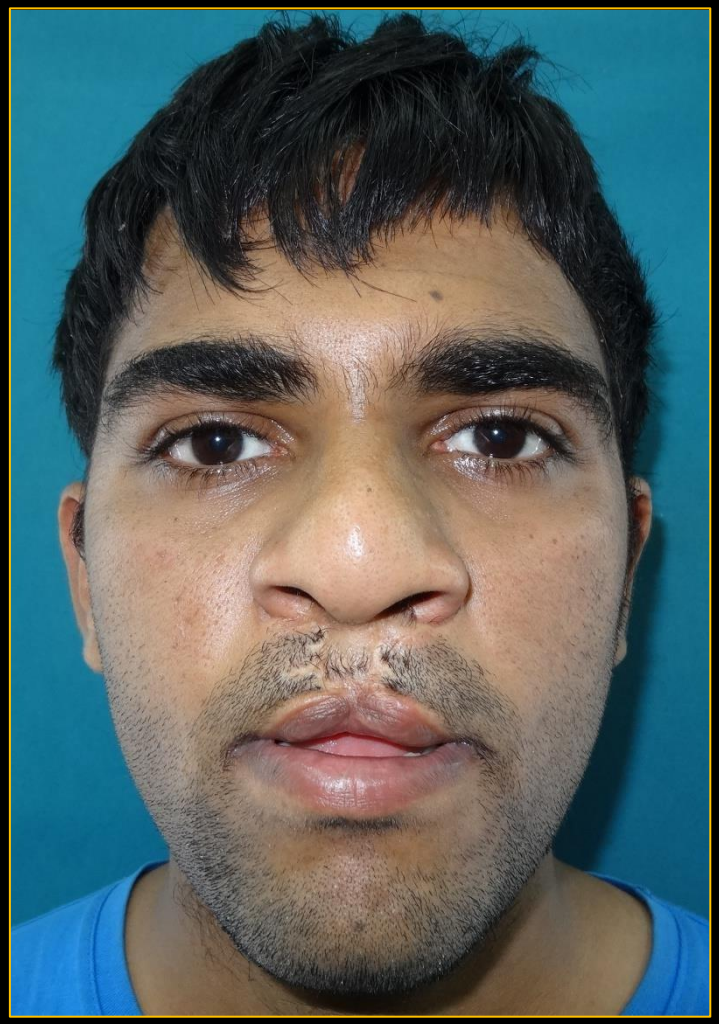
1YEAR POST OP

8 YEARS POST OP



Pneumatisation of
ethmoidal air sinuses

PSYCHOLOGICAL COMPLICATION

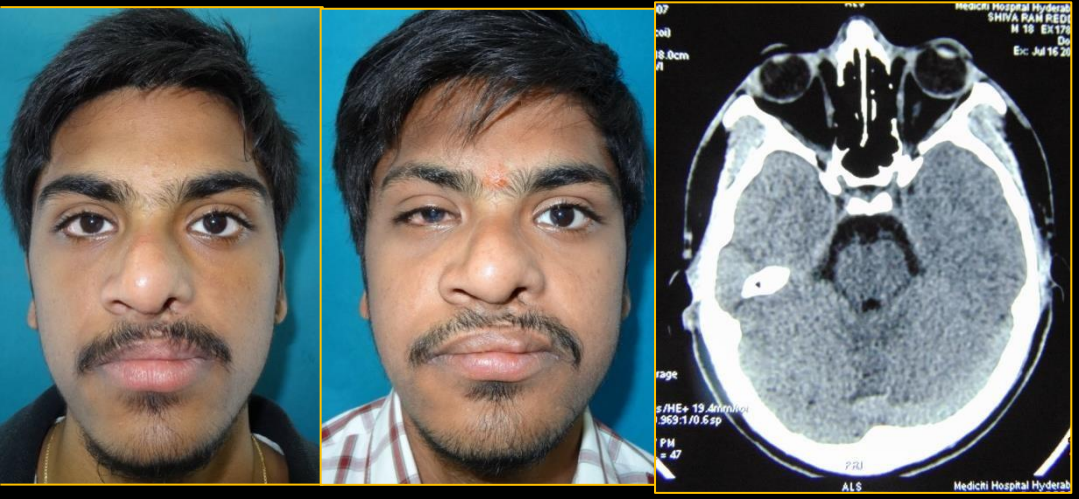


- Depression
- Patient operated for maxillary advancement went into clinical depression as he was dissatisfied with his outcome
- “4-day blues” is a well recognized and common phenomenon

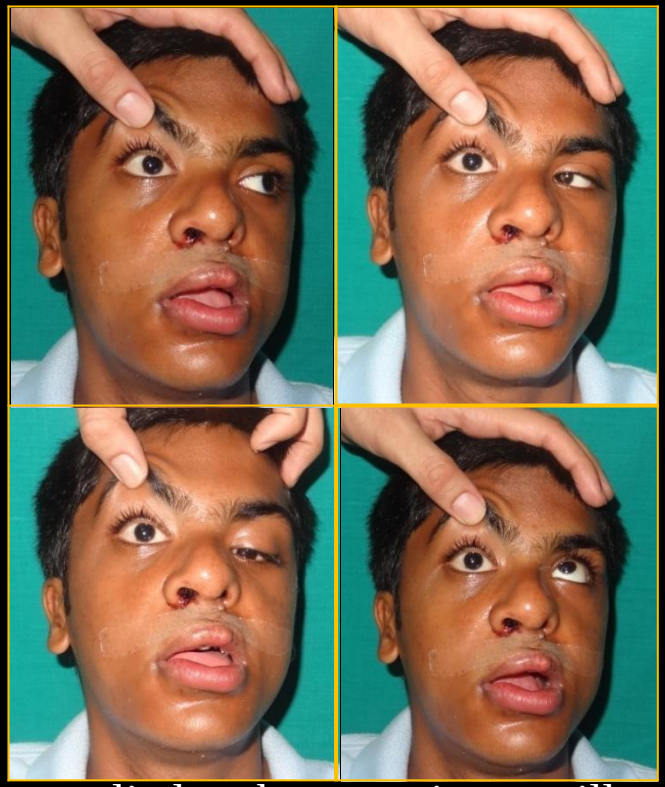
OPHTHALMIC COMPLICATIONS

- Orbital Compartment syndrome

Drooping of Upper Eyelid



Lack of eye movements

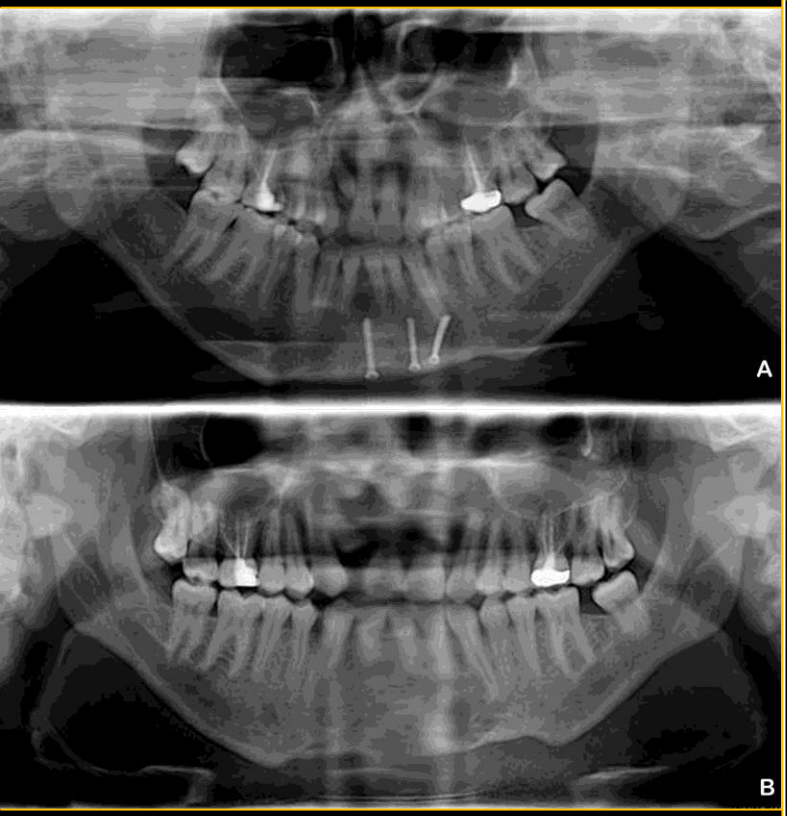


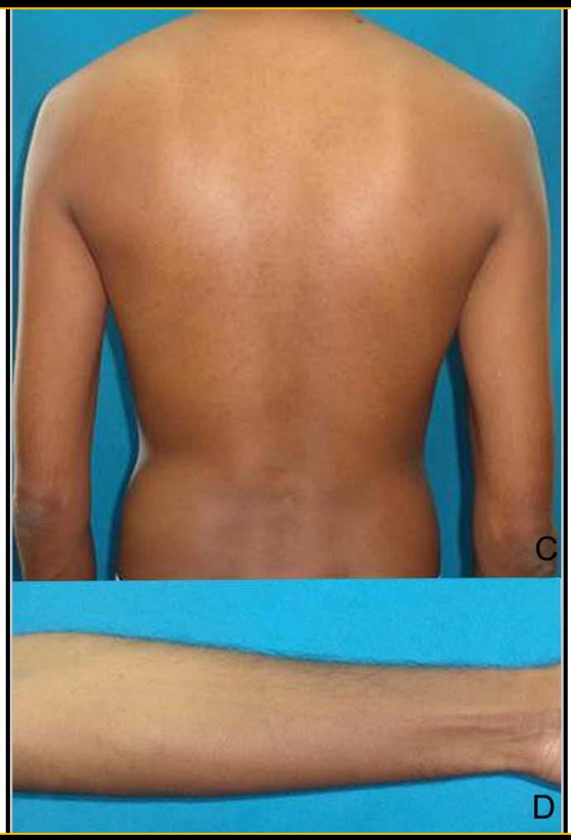
Incomplete osteotomies might have led to excessive force applied to the posterior maxillary segments during manual manipulation, this could cause propagation of excessive force and/or fractures upward via the maxillary sinus walls, resulting in an hairline orbital fracture. This resulting fracture could then lead to retrobulbar hemorrhage or swelling of soft tissue and the disastrous outcome for the patient.

BLINDNESS

Adverse transmission of forces via the sphenoid bone to the base of the skull during separation of the pterygomaxillary junction may explain this case of blindness with negative radiological findings.

Foreign body reaction

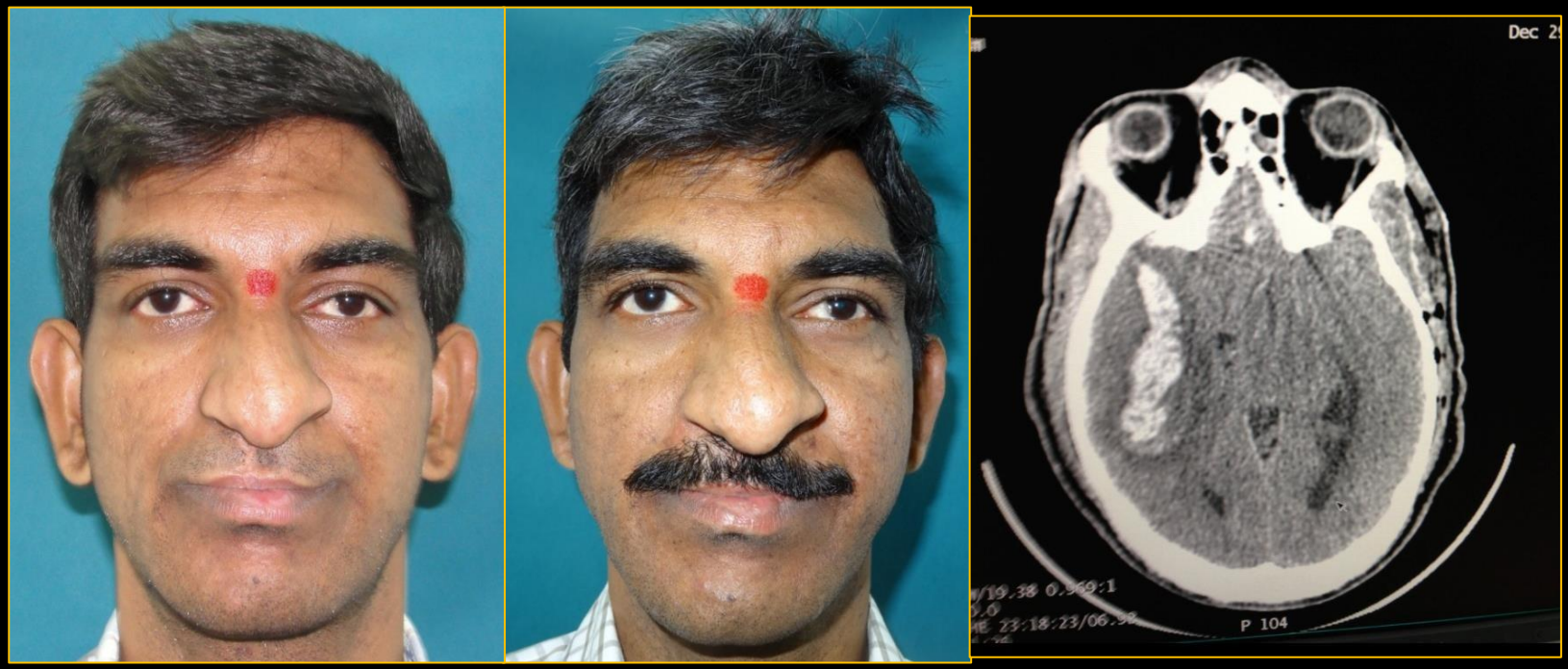




Patient operated for Genioplasty later identified with Titanium allergy

Bleeding Complications

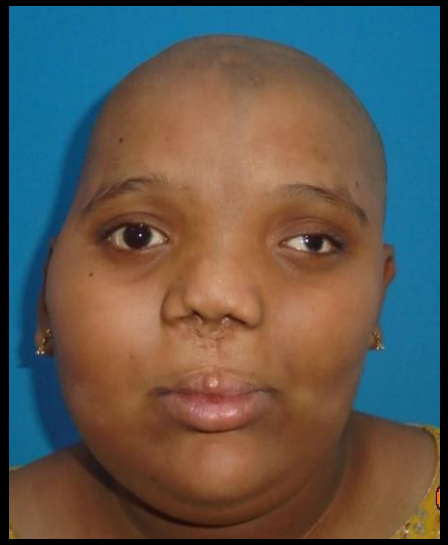
Intracranial Haemorrhage



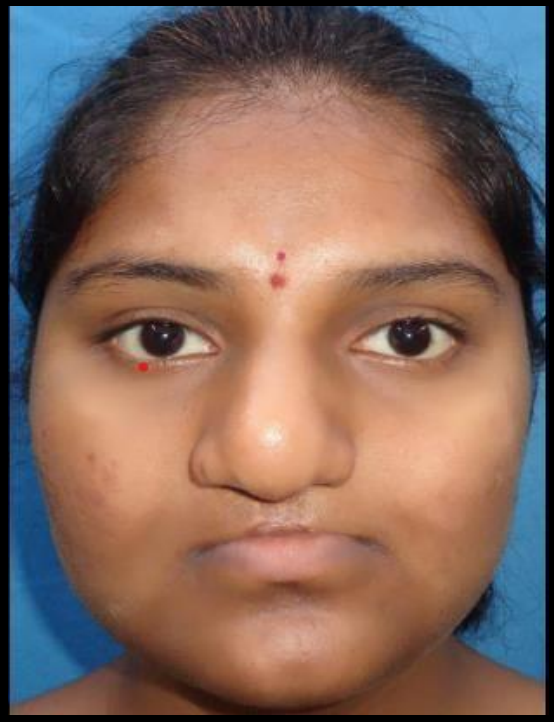
- Patient had left pupillary dilation and was incoherent and partially responding to commands post operatively after LeFort I osteotomy and placement of External Distractor.
- CT scan revealed an intra cranial bleed.
- Neurosurgeon's opinion was that the bleed was present preoperatively and was exacerbated by the surgery.

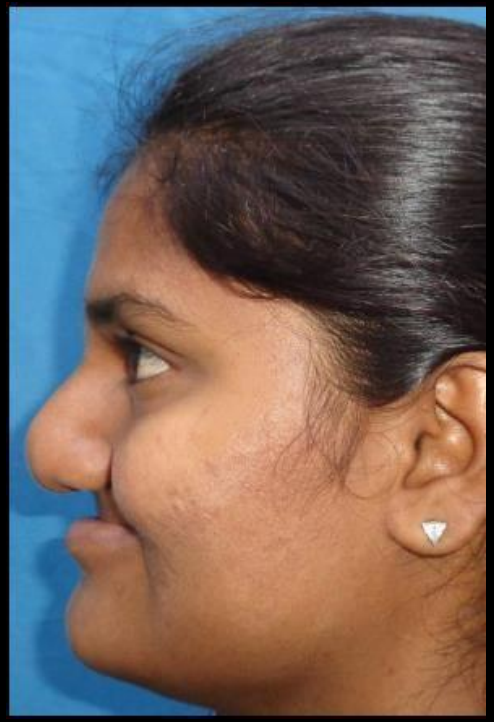
OSTEOMYELITIS OF FRONTAL BONE

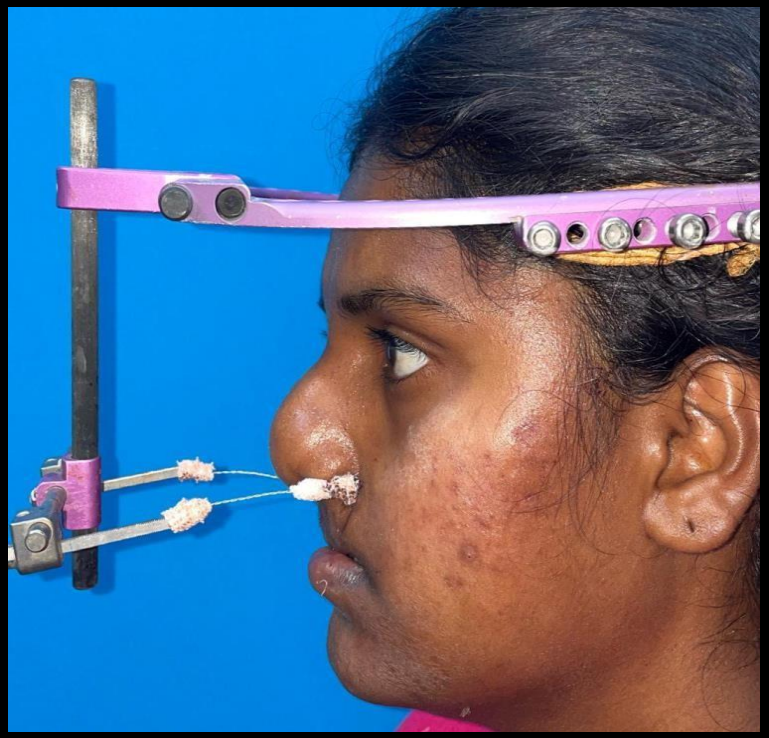
POST HYPERTELORISM CORRECTION



PREMAXILLARY NECROSIS POST DISTRACTION



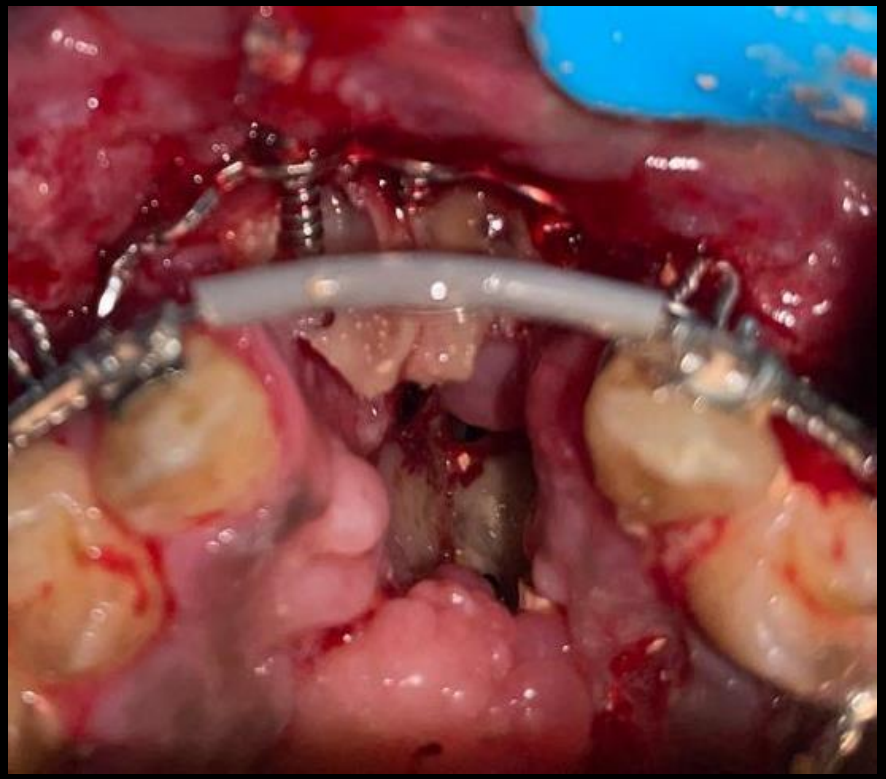




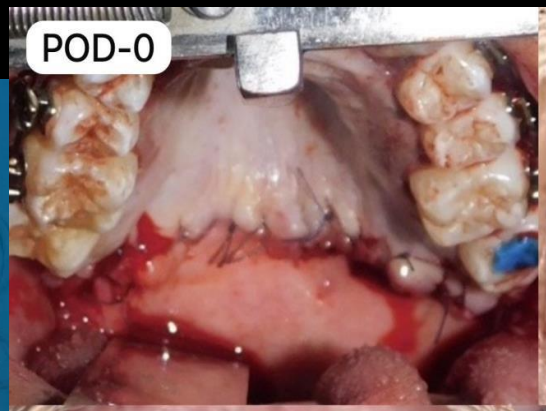
Patient was operated for Lefort I osteotomy and distraction with RED

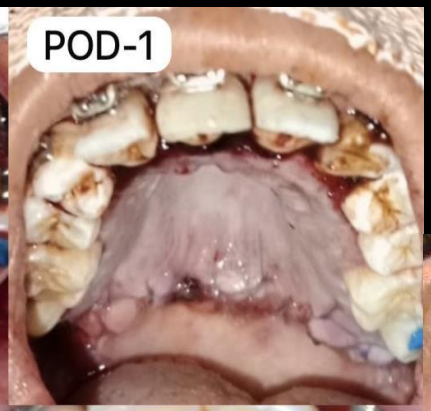
PRE OP

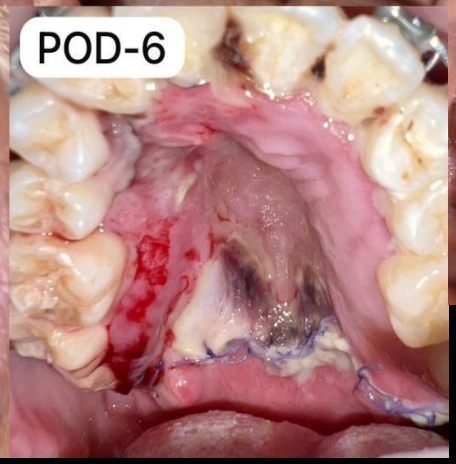
POST OP



MAXILLARY PEDICLE LOSS DURING MAXILLARY DISIMPACTION







AFTER COMPLETE RECOVERY

Patient was planned for counter clockwise rotation of maxillomandibular complex. During the disimpaction of maxilla it popped out losing its entire blood supply. After 20 cycles of HBO therapy healing progressed and revascularization was achieved.

AN EVIDENCE-BASED SURGICAL PHILOSOPHY, TRANSLATED INTO RESEARCH THROUGH COLLABORATION WITH WORLD-CLASS UNIVERSITIES

Research

UMC St Radboud

PhD MEDICINE-2010

PhD MEDICINE-2019

PhD Completed-5

1. Dr Srinivas Gosla Reddy	Unilateral Complete Cleft Lip Repair: A Modern Morpho-functional Surgical Approach	Uni. of Radbound
2. Dr Rajgopal Reddy	Unilateral Complete Cleft Palate Repair: A Morpho- functional Approach	Uni. of Radbound
3. Dr Shahista Parveen MDS Consultant orthodontist	3-dimensional assessment of effect of various orthopedic treatment modalities in non-syndromic unilateral cleft lip and palate patients	Yenepoya University
4. Dr Praveen Neela MDS Consultant orthodontist	Genetic and Epigenetic Factors in etiology of non syndromic cleft lip and palate	Yenepoya University
5. Dr Rizwana MDS Consultant prosthodontist	Assessment of Outcomes of Immediately loaded Dental implants in orofacial	DMIMS ,Wardha University

PhD Ongoing-7

1. Dr Priyadharshini MDS Consultant OMFS	Identification, categorization, treatment protocol suggestion and outcome prediction in unilateral cleft lip	Datta Meghe Institute of Higher Education
2. Dr Harikishore Bhatt MDS Consultant OMFS	Perception of religious belief of children born with cleft and craniofacial defects-an evidence based study in search of truth	Yenepoya University
3. Dr Varsha Bhatt MDS Consultant OMFS	Morphofunctional Management of TMJ Ankylosis	Yenepoya University
4. Praveen Kumar M. Assistant professor of Anatomy	Association Of SNP rs9788972 and rs1801133in the etiology of Cleft Lip Palate in Telangana Population	Kamineni institute of medical sciences, Narketpally.

PhD Ongoing-7

5. Dr Dorin Marțincu MDS OMFS	Bilateral Complete Cleft Lip Repair: A Modern Morpho-functional Surgical Approach	Uni. Of Oradea
6. Dr Hemwati Nandan MDS Consultant Orthodontist	AI-Powered Maxillofacial Growth Prediction: Advancements in Personalized Treatment Planning and Presurgical Infant Orthopedics Device Design for Infants with Unilateral Cleft Lip and Palate	Uni. Of Radbound
7. Dr Myrtle Ciphora Consultant Speech Pathologist	Objective Measurement of Absolute Velopharyngeal Closure Ratio through AI-Powered Novel Tool	Uni. Of Radbound

PUBLICATIONS

1

Original Article

Incidence of cleft Lip and palate in the state of Andhra Pradesh, South India

Srinivas Gosla Reddy, Rajgopal R. Reddy, Ewald M. Bronkhorst[1], Rajendra Prasad[2], Anke M. Ettema[3], Hermann F. Salier[4], Stefaan J. Berge[5]

GSR Institute of Craniofacial Surgery, Hyderabad, Andhra Pradesh, India, [1]Department of Cariology and Preventive Dentistry, [2]Radboud University Nijmegen Medical Center, Nijmegen, The Netherlands, [3]A. B. Shetty Memorial Dental College and Hospital, Mangalore, Karnataka, India, [4]Department of Oral and Maxillofacial Surgery, Radboud University Nijmegen Medical Center, Nijmegen, The Netherlands, [5]Cleft Children International, Zurich, Switzerland

Address for correspondence: Dr. Srinivas Gosla Reddy, GSR Institute of Craniofacial and Facial Plastic Surgery, No. 17-14-1, Vinayanagar Colony, I.S Sedan, Saidabad, Hyderabad, Andhra Pradesh, India. E-mail: goslareddy@gmail.com

ABSTRACT

Objective: To assess the incidence of cleft lip and palate defects in the state of Andhra Pradesh, India. **Design Setting:** The study was conducted in 2001 in the state of Andhra Pradesh, India. The state has a population of 76 million. Three districts, Cuddapah, Medak and Krishna, were identified for this study owing to their diversity. They were urban, semi-urban and rural, respectively. Literacy rates and consanguinity of the parents were elicited and was compared to national averages to find correlations to cleft births. Type and side of cleft were recorded to compare with other studies around the world and other parts of India. **Results:** The birth rate of clefts was found to be 1.09 for every 1000 live births. This study found that 65% of the children born with clefts were males. The distribution of the type of cleft showed 33% had CL, 64% had CLP. 2% had CP and 1% had rare craniofacial clefts. Unilateral cleft lips were found in 79% of the patients. Of the unilateral cleft lips 64% were left sided. There was a significant correlation of children with clefts being born to parents who shared a consanguineous relationship and those who were illiterate with the odds ratio between 5.25 and 7.21 for consanguinity and between 1.55 and 5.85 for illiteracy, respectively. **Conclusion:** The birth rate of clefts was found to be comparable with other Asian studies, but lower than found in other studies in Caucasian populations and higher than in African populations. The incidence was found to be similar to other studies done in other parts of India. The distribution over the various types of cleft was comparable to that found in other studies.

KEY WORDS

Cleft lip & palate incidence; cleft lip; cleft palate

INTRODUCTION

Oro-facial clefts, particularly cleft lip with (CLP) or without (CL) cleft palate and cleft palate alone (CP) are a major public health problem affecting 1 in every 500 to 1000 births worldwide.[1,2] A child is born with a cleft somewhere in the world

2

ORIGINAL ARTICLE

Developing and Standardizing a Center to Treat Cleft and Craniofacial Anomalies in a Developing Country Like India

Srinivas Gosla Reddy, MDS, MBBS, Likith Y. Reddy, DDS, MD, FACS,† and Rajgopal R. Reddy, BDS, MBBS**

Abstract: The range of facial deformities is enormous. All produce some degree of disfigurement and result in the impairment of function to some degree, sometimes even to the point of incompatibility with life. Congenital facial defects in India are associated with considerable superstition, social rejection, and failure to integrate into society.

In India, cleft defects occur in 1 in 500 births. Congenital facial defects are a pressing problem in India owing to the limited resources to treat such patients. Poverty is a major factor for parents of such children to get appropriate treatment.

Setting up an institute to treat children with cleft and craniofacial deformities in India presents problems with financing treatment for poor patients, procuring the right infrastructure, and employing well-trained human resources.

The authors have set up such an institute in Hyderabad in the southern state of Andhra Pradesh in India. The logistics of setting up such a facility in a developing country and the future of funding for cleft treatment are important factors to consider while establishing a center for patients with cleft and craniofacial anomalies.

The aim of setting up such centers was to provide quality comprehensive treatment for patients from all sections of society with cleft and craniofacial anomalies.

Key Words: Cleft lip, cleft palate, craniofacial anomalies, developing and underdeveloping, institute, cleft surgery, speech therapy, ear

(*J Craniofac Surg* 2009;20: 1664–1667)

The range of facial deformities is enormous. All produce some degree of disfigurement and result in the impairment of function to some degree, sometimes even to the point of incompatibility with life.[1] Congenital facial defects in India are associated with considerable superstition, social rejection, and failure to integrate into society. In managing such defects, the goals of the treatment include the management of the human psyche and the patient's acceptance to the society.

Approximately 15,000 children are born with clefts per hour worldwide. A child is born with a cleft somewhere in the world every 2 minutes.[2] In India, cleft lip/palate occurs in nearly 1 in 500 live births, and most of these defects are not surgically corrected.[3] The congenital facial defects are a pressing problem in India owing to the limited resources. The burden of care for the child with cleft affects the entire family unit. It is not unusual to see patients with untreated cleft lip for the entirety of their life. The complete rehabilitation of these patients involves speech therapy and orthodontics; secondary corrections are inconsistent at best and often times unavailable.

India is the second most populous country in the world[4] with a population of 1,147,477,000. (The estimated population of India as of February 28, 2008, is Indian Rupee [INR] 50,750 (US $660).[5] Andhra Pradesh state, where the GSR Craniofacial Institute, is situated, is located in the southern part of India. Andhra Pradesh[6] is spread over an area of 275,000 km^2 with a population of 81,315,000. The annual per capita income of Andhra Pradesh is Indian Rupee 33,976 (US $755).[6] The state is divided into 23 administrative districts with Hyderabad city as its capital. Each district is further divided into mandals. There are 1125 mandals in the state, which are further divided into villages, towns, and cities. There are 26,586 villages in the state. Any place that has more than 0.5 million residents is classified as a town and has a municipal administration. Any town that has a population more than 1.5 million is classified to be a city. There are 264 towns and cities in Andhra Pradesh.

The health care delivery system in India and Andhra Pradesh in particular is by 2 pathways: the government-funded hospitals and the private corporate hospitals.

Government-funded general hospitals are situated in every district capital. Subunits of general hospital are usually located in 2 or 3 large towns in the district and are known as area hospitals. Smaller referral primary health centers or community health centers are located on an average, 1 for every 3 villages. This system of health care delivery is government-funded, and the care provided is free of cost to the patient. These hospitals are more than 2 million patients as outpatients and more than 160,000 patients as inpatients.[7] The budget allocation for health care by the government of Andhra Pradesh for the financial year 2007 to 2008 was Indian Rupee 13,150 million (US $294 million).[8] The per capita allocation of funds for health care is less than US $4 per person in the state. This also means that government hospitals are understaffed and have poor infrastructure.

The private or corporate hospitals are usually located in large towns and cities. These hospitals have better facilities and cater to patients who can afford health insurance or can directly pay for the health care services. The average cost of each surgery for simple

3

Journal of Cleft Lip Palate & Craniofacial Anomalies, Vol. 3, No. 1

Congenital Anomalies Associated with Cleft Lip and Palate Defects in a High Volume Indian Centre

Srinivas Gosla Reddy, MDS, MBBS
Rajgopal R. Reddy, BDS, MBBS
Karunakar Konte, MD
Rajendra Prasad, BDS, MDS
Anke M. Ettema, MD, PhD
Stefaan J. Berge, MD, DDS, PhD
Wilfred A. Borstlap, MD, DDS, PhD

Abstract

Objective: *The objective of this study was to find the prevalence of associated anomalies in patients with cleft lip and palate defects. A number of associated anomalies were noticed by the authors while routinely examining patients with cleft and craniofacial defects at their center. An accurate study to identify the prevalence of associated anomalies in cleft lip and palate patients was needed, to emphasize the need for a thorough investigation of children with cleft lip and palate and the need for a multidisciplinary team to diagnose cleft lip and palate. There was also a need to study the impact of associated anomalies on the burden of cleft care in a developing country like India.*

Design and Setting: *This is a retrospective study of 800 consecutive patients with cleft lip and palate CL=184, CLP=532, CP=84 seen in the year 2006. The data was collected retrospectively by processing the case history of the patients. The patients were examined, and the findings were recorded along with the medical history, level of income and consanguinity. The anomalies were classified under 10 headings depending on the organ system affected.*

Results: *Associated anomalies were present in 330 cases (41.3%). The highest prevalence of 46.4% was found in patients with cleft lip and palate. The lowest prevalence of 27.7 % was found in isolated cleft lip patients. There was no significant difference of prevalence found between unilateral or bilateral clefts and complete or incomplete clefts. The skeletal system was affected the most. Anomalies of the skeletal system count for 42% of all anomalies. Logistic Regression was used to calculate if any of the other background data increased the chance of having an associated anomaly.Showed that having an isolated cleft palate decreased the chance of having an associated anomaly as was being a Muslim or from another religion as compared to being a Hindu. Other background data did not have a statistically significant chance to have an associated anomaly with clefts.*

Conclusion: *There was a high prevalence of associated anomalies in the study done at this center. There was, however a need to study the reasons for such anomalies further. There is also a need to study the impact of such anomalies on the burden of cleft care in developing countries.*

Key words: *cleft lip, cleft palate, congenital anomalies, associated anomalies, high volume centre.*

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Original research

Health related quality of life of patients with non-syndromic orofacial clefts

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ABSTRACT

Objective: To evaluate the relation between health-related quality of life (QOL), in a large representative group of adolescents with non-syndromic orofacial clefts.

Study design: 724 non-syndromic patients with an orofacial cleft who had finished their surgical treatment were included in this prospective study. Mean age of the patients was 16.8 years (SD = 1.6). Patients were divided into two groups: cleft lip (CL), and cleft lip and palate (CLP). The CL and CLP group were again divided into patients with unilateral and bilateral cleft lips. Health-related quality of life was measured using a modified IF-30 questionnaire to measure eight dimensions. To validate the modified IF-30 questionnaire a control group of 744 patients who had undergone ENT surgeries were given the same questionnaire.

Results: The answers of the ENT patients were compared with the answers of the cleft patients, using the Chi-Square test. Cleft patients showed a high score on the eight dimensions of the questionnaire. For five of the dimensions the mean score was above 4. The lowest score was found on bodily pain (mean 3.45). There was no effect of age. Having a cleft palate influenced all eight dimensions statistically more in a negative way than a cleft lip does.

Conclusion: Cleft patients have a good health related quality of life. However, there were differences in the levels of satisfaction. The major factor influencing quality of life negatively was the presence of a cleft palate.

1. Background

The World Health Organization (WHO) defines health as not only the absence of disease but also as the presence of factors that enhance physical, mental, and social well-being [1]. This has led to a broader conceptualization of overall health in a way that quality of life plays an essential role in this WHO-well-being concept. As a consequence, successful outcome of medical treatment is not solely defined in terms of cure, repair or remission anymore, but is also extended to the maintenance or improvement of patients' quality of life after treatment. In this context, quality of life can be defined as a subjective well-being that reflects the difference between the hopes and expectations of a person and their present experience [2]. This is certainly true for children with chronic health conditions or conditions that require long-term treatment protocols, such as children with craniofacial abnormalities [1].

The face is a very sensitive region of the body which gives recognition to an individual [3]. Therefore it is not surprising that facial esthetics are a very important aspect of an individual's general perception of life, especially between the ages of 18 and 30 years [4]. Acquired (e.g. trauma, tumor) or congenital (e.g. orofacial clefts) facial deformities may influence quality of live in many different ways. Therefore, the treatment of cleft lip and palate deformities should not only provide good functional (e.g. speech, growth, occlusion) but also optimal esthetic results [5,6].

Judging functional and esthetic outcomes of cleft surgery have traditionally been performed by clinicians (surgeons, speech therapists, orthodontists) [7]. There are very few studies that elicit from patients how they feel after cleft therapy and how they assess their quality of life themselves [7]. One of the most successful methods of judging the overall treatment outcomes, is by measuring patient's

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ORIGINAL ARTICLE

Perceptions of Family Members of Children With Cleft Lip and Palate in Hyderabad, India, and Its Rural Outskirts Regarding Craniofacial Anomalies: A Pilot Study

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Objective: *This pilot study aimed to understand cultural perspectives on cleft anomalies in the community of Hyderabad, India, and its rural outskirts.*

Design: *Interviews focusing on perceptions of cleft lip and palate were conducted using a 21-item interview guide approved by the director of the Gosla Srinivas Reddy Institute of Craniofacial Surgery (GSRI).*

Settings: *Interviews were conducted at GSRI, a specialty surgical center located in Hyderabad, India.*

Patients and Participants: *All patients who presented to GSRI with either cleft lip, cleft palate, or cleft lip and palate at the time of this study were included.*

Results: *Of the 23 families interviewed, 12 mothers believed the cleft was caused by an eclipse, and two believed the scientific explanation their physician offered. Fourteen families were offered no explanation for the cleft lip and/or palate at the time of their first physician visit. No families practiced non-Western methods for treatment at the cleft. One family identified beliefs held in the community that their child with a cleft lip was bad luck.*

Conclusion: *A commonly held belief in this community in India is that cleft lip, cleft palate, or cleft lip and palate are caused by an eclipse. Physicians appear to be providing families with insufficient education on cleft impairments. Data generated from studies similar to this can be used to design educational protocols that address this gap in community understanding of orofacial clefting.*

KEY WORDS: *beliefs, cleft, culture, Hyderabad*

Cleft lip and/or palate (CL±P) are relatively common anomalies among Asian populations, and the incidence in state of Andhra Pradesh, India, is cited as 1.09/1000 live births (Reddy, 2010). Folklore surrounding facial clefts varies greatly among cultures, ranging from positive views that the child may possess a special, sometimes spiritual, role in the community to negative or even dangerous views that the child represents an omen of bad luck (Cheng, 1990). Popular folklore in this region of CL±P have as a result followed general themes such as the belief that it is a result of "God's will" or "fate" (Ross, 2007). The belief that CL±P is the result of the mother's petting a rabbit or consuming rabbit products during pregnancy has resulted in the eponym "harelip" (Cheng, 1990). Studies in the Philippines found community beliefs that CL±P resulted from fetal "malposition" in the womb or "cravings" during the first trimester (Dauck-Hirsh, 2010). Beliefs may also be regionally specific. In Egypt, for example, some parents believe their child's cleft is the result of gazing at a camel or too long at the moon (Ross, 2007).

There may be a preference for using alternative medicine in the treatment of CL±P among different ethnic and religious communities (Olusoji et al., 2007; Ross, 2007). Practices within Asian/Pacific populations have included the use of various herbs and balms, acupuncture, steam inhalation, coin rubbing, and pinching (Cheng, 1990). Anecdotal evidence from the Gosla Srinivas Reddy Institute of Craniofacial Surgery (GSRI) clinic in Hyderabad, India, suggests that alternative treatments, such as burning the child on the abdomen or burying the child up to the head in sand to be left in the direct sunlight for an entire day, have been used in the community for the treatment of cleft anomalies. Identifying the prevalent beliefs that exist in the community concerning CL±P may

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Clinical Paper
Cleft Lip and Palate

Screening for maternal coeliac disease as a potential risk factor for orofacial clefts—a pilot study

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S. G. Reddy, R. R. Reddy, A. Vaidhyanathan, A. Markus, J. Snook: Screening for maternal coeliac disease as a potential risk factor for orofacial clefts—a pilot study. Int. J. Oral Maxillofac. Surg. 2013; 42: 1424–1426. © 2013 International Association of Oral and Maxillofacial Surgeons. Published by Elsevier Ltd. All rights reserved.

Abstract. There is increasing evidence that dietary folic acid deficiency in utero may increase the risk of developing the 'cleft lip with or without cleft palate' (CL ± P) variant of orofacial cleft. Coeliac disease is a common cause of folic acid malabsorption, and in the majority of cases remains undiagnosed. This pilot study assessed the relative prevalence of undiagnosed coeliac disease in a cohort of mothers of infants with CL ± P in the Hyderabad area of India. The seroprevalence of coeliac disease of 1.33% (95% confidence interval 0.37–2.64%) was little different from the expected figure based on published population studies, making a clinically significant association unlikely.

Key words: cleft lip; cleft palate; coeliac disease.

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Non-syndromic orofacial cleft (OFC) is one of the most common congenital malformations, found in up to 0.2% of live births in Europe[1] and India.[2] It is characterized by incomplete separation of the nasal and oral cavities without any associated anomalies, and is composed of two distinct but related entities: cleft lip with or without cleft palate (CL ± P) and cleft palate isolated (CP). The aetiology of non-syndromic OFC is complex and incompletely understood, but there appear to be genetic and environmental factors, with distinct differences between CL ± P and CP. The genetic influence is proposed to be greater for CP than for CL ± P.[3] Predisposing environmental factors include folic acid deficiency – this is known to cause OFC in rodents,[4] and there is evidence for a similar consequence in humans – both as a consequence of dietary insufficiency and maternal use of dihydrofolate reductase inhibitors.[5,6,7] Furthermore, a recent large case–control study in Norway showed that folic acid supplementation during early pregnancy reduced the risk of CL ± P by 39%, whilst there was no effect on the risk of CP.[8]

Coeliac disease (CD) is a chronic inflammatory disorder of the small bowel, with characteristic mucosal histology.[9] Whilst the pathogenesis is not fully understood, there is overwhelming evidence that CD results from mucosal exposure in genetically predisposed individuals to dietary gluten, a family of related proteins found in the cereals wheat, barley, and rye.[10] The immune system is strongly implicated in modulation of the inflammatory response in CD,[11] and an manifestation of this is that most patients with untreated CD acquire circulating autoantibodies, in particular endomysial antibody (EMA) – the dominant component of which is directed against the enzyme, tissue transglutaminase 2.[12] EMA has a relatively high sensitivity and specificity for untreated CD, and has therefore been used widely to determine the seroprevalence of CD in population studies.[13,14]

CD has been increasingly recognized in Asian populations over recent years. Recent seroprevalence studies would suggest that CD is as common in Indian populations as it is elsewhere in the world, with figures in the range 0.5–1.3%.[15,16] The majority of individuals with CD are

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PEDIATRIC/CRANIOFACIAL

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

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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 Baume[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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ORIGINAL ARTICLE

Afroze Incision for Functional Cheiloseptoplasty

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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 septal 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 have a scar crossing the midline at the base of the columella. The Pfeiffer incision is designed using the concept of "morphologic order."[2] 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.[3]

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 retouchment 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 musculocutaneous junction will tend to exaggerate this factor.[4]

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 cutaneous vermilion 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 vermillion mucosa and further

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PEDIATRIC/CRANIOFACIAL

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 shows more superior results compared with the Millard or Pfeifer incision. Depending on the cutoff 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 2 groups of superficial facial muscles (i.e., the nasolabial, labialaé, and labiomentalis) 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 a 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.[4]

Many surgical techniques and flap designs have been documented to repair unilateral cleft lips.[4–10] 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.[11,12] 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."[2] 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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PEDIATRIC/CRANIOFACIAL

Primary Septoplasty in the Repair of Unilateral Complete Cleft Lip and Palate

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Background: The purpose of this study was to assess and compare nasal symmetry in patients who underwent correction of a complete unilateral cleft lip using the Afroze incision without and with primary septoplasty using a standardized two-dimensional photographic analysis.
Methods: A prospective cohort study of 190 consecutive patients with complete unilateral cleft lip and alveolus with cleft palate treated with or without septoplasty using the Afroze incision technique was conducted at a high-volume center. Eighty-two patients operated on without primary septoplasty and 76 patients operated on with primary septoplasty were evaluated. Nasal symmetry was compared between patients using two-dimensional photographic analysis. Ratios between the cleft side and the non–cleft side for five parameters were used to assess symmetry: alar base–to–interpupillary line distance, columella-to–Cupid's bow distance, nostril gap area, nostril width, and nostril height. The Mann-Whitney *U* test was used to calculate differences between the two groups.
Results: Patients operated on with primary septoplasty showed more nasal symmetry compared with patients operated on without septoplasty. This difference was statistically significant for columella-to–Cupid's bow distance, nostril gap area, and nostril height ($p = 0.008$, $p < 0.001$, and $p < 0.001$, respectively) and for the distance between alar base and the alar base–to–interpupillary line distance ($p = 0.145$) the difference was present but not statistically significant. For nostril width, no difference was found ($p = 0.850$).
Conclusion: Patients treated with primary septoplasty showed better results in terms of nasal symmetry when analyzed using two-dimensional photographic analyses. (*Plast. Reconstr. Surg.* 127: 761, 2011.)

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 deformities. Historically, correction of the cleft nose deformity had been delayed until nasal growth was complete.[1] Early surgical intervention was thought to interfere with normal growth, leading to poor long-term results.[2] Patients with cleft nose deformity had to tolerate the physical nasal deformity and the psychological trauma well into their adolescence.[1] Randall noted that these patients often were more concerned with their nasal deformity than with their lip deformity.[3]

Refinement of rhinoplasty techniques has facilitated the ability to address the deformity associated with cleft lip.[1] McComb[4] and Anderl[5] 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.[6,7] 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 car-

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Assessment of nostril symmetry after primary cleft rhinoplasty in patients with complete unilateral cleft lip and palate☆

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Nostril symmetry

ABSTRACT

The aim of this study was to assess the nostril symmetry following primary cleft rhinoplasty done with either a dorsal onlay or columellar strut graft in patients with non-syndromic complete unilateral cleft lip and palate. In this retrospective study 30 consecutive patients treated with autogenous or alloplastic dorsal onlay grafts and 30 consecutive patients treated with autogenous or alloplastic columellar strut grafts for complete unilateral cleft nose reconstruction were analyzed for nasal symmetry. The autogenous grafts used were costo-chondral or septal cartilage and the alloplastic graft used was high-density polyethylene (Medpore®). Assessment of the nostril symmetry was done using a two-dimensional nasal analysis 24–30 months postoperatively. Ratios between cleft and noncleft side nostril for three parameters were used to assess symmetry namely nostril width, nostril height and nostril gap area. None of the three parameters showed statistically significant changes. A satisfactory, though not statistically significant, difference in symmetrical outcome could be achieved to both the groups with the exception of nostril width symmetry in group treated with dorsal onlay graft.

1. Introduction

Despite a plethora of surgical approaches aimed at correcting the cleft nose deficit, no one procedure has been universally satisfactory in the repair of nasal deformities associated with cleft lip abnormalities (Trenite et al., 1997). The various treatment options for the correction of cleft rhinoplasty include columella lengthening, septal repositioning, radix grafting, tip augmentation, tip grafting, lower lateral cartilage repositioning, alar base wedge resections, piriform augmentation and nasal base osteotomies (Trenite et al., 1997). The typical problems with all the unilateral cleft nasal deformity which must be addressed is the nasal asymmetry. Each of the surgical techniques that have been used to correct the unilateral cleft nasal deformity has attempted to improve symmetry by translocation of the alar cartilage with its attached vestibular lining into a normal position, thereby establishing the normal vault and shape of the cartilage (Bardini et al., 2011). Several methods are reported in the literature to assess cleft lip nasal deformities, but difficulties in standardization make these studies less reproducible (Tanikawa et al., 2010).

The present study is an attempt to quantify and evaluate nostril symmetry achieved after primary rhinoplasty in patients with complete unilateral cleft lip and palate (UCLP) using a dorsal onlay and a columellar strut graft. The effect of these two techniques on the shape of the nostril was studied.

2. Materials and methods

To address the nasal deformity a retrospective study was conducted on patients operated on for unilateral cleft nose deformity at our institute between January 2007 and February 2008. Thirty consecutive patients (11 males and 19 females) with dorsal grafting and 30 consecutive patients with strut grafting (11 males and 19 females) were enrolled in the study.

2.1. Surgical technique

Open structured rhinoplasty was performed by a single surgeon on all the patients. After a transcolumellar incision approach, the alar cartilages were exposed and released from their mucosal attachments. A back cut was given in the cleft side nasal vestibular mucosa to ensure a satisfactory lift of the buckled cleft side alar cartilages.

Patients with a depressed nasal bridge, drooping nasal tip and short columella of the nose were treated with a dorsal onlay graft

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PEDIATRIC/CRANIOFACIAL

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

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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 Afroze 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 correlation between and intraobserver error. Analysis of the ratios was performed using the independent samples *t* test (5 percent level of significance). The authors found that the Afroze 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, these were not statistically significant results between the two techniques.
Conclusions: The Afroze 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: 634, 2013.)
CLINICAL QUESTION/LEVEL OF EVIDENCE: Therapeutic, III.

No greater problem exists in the whole field of surgery than that of successful treatment of patients suffering from complete, bilateral cleft lip—cleft palate.[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.[3–6] The Millard technique and its variations are extensively used to repair bilateral cleft lips.[6] The Afroze 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 Afroze technique by using indirect photographic measurements in complete bilateral cleft lips.

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Original Article

Options for the nasal repair of non-syndromic unilateral Tessier no. 2 and 3 facial clefts

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ABSTRACT

Background: Non-syndromic Tessier no. 2 and 3 facial clefts primarily affect the nasal complex. The anatomy of such clefts is such that the ala of the nose has a cleft. Repairing the ala presents some challenges to the surgeon, especially to correct the shape and missing tissue. Various techniques have been considered to repair these cleft defects. **Aim:** We present two surgical options to repair such facial clefts. **Materials and Methods:** A nasal dorsum rotational flap was used to treat patients with Tessier no. 2 clefts. This is a local flap that uses tissue from the dorsal surface of the nose. The advantage of this flap design is that it helps move the displaced rim of a Tessier no. 2 cleft into its normal position. A forehead-eyelid-nasal transposition flap design was used to treat patients with Tessier no. 3 clefts. This flap design includes three prongs that are rotated downward. A forehead flap is rotated into the area above the eyelid, the first from above the eyelid is rotated into orbital area and the flap from the inferolateral area that includes the free nasal rim of the cleft is rotated into place. **Results and Conclusions:** These two flap designs show good results and can be used to augment the treatment options for repairing Tessier no. 2 and 3 facial clefts.

KEY WORDS

Facial clefts; Tessier clefts; Tessier no. 2 cleft; Tessier no. 3 cleft

INTRODUCTION

A facial cleft is the result of a partially or totally missing fusion of the embryonal craniofacial tissue. The severity of the deformity can range from slight skin excavation and hair loss to wry mouth, skewed eyes and the absence of nose and face, seriously impairing the patient's appearance and function.[1]

Facial clefts are usually found along the lines of fusion of the different embryonic processes responsible for the development of the face during the first 8 weeks of embryonic life.[2]

The incidence of these craniofacial malformations is higher in cleft lip, alveolus and palate patients (31: 1000 facial clefts/cleft lip and palate) than in people without cleft lip, alveolus and palate.[2] Facial clefts have been classified according to pathology, aetiology, pathomorphology, topographic anatomy and at the time of development.[1,3] Tessier's anatomically based classification is, presently, almost universally used by craniofacial surgeons.[4] Tessier no. 2 and 3 facial clefts are lateral nasal clefts that are located at the junction between the products of the median and lateral nasal processes.[1]

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ORIGINAL CONTRIBUTION

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3D stereophotogrammetric analysis of lip and nasal symmetry after primary cheiloseptoplasty in complete unilateral cleft lip repair*

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SUMMARY

Background: The aim of this study was to evaluate symmetry of the lip and nose in patients with CUCLP after primary cheiloseptoplasty (Afrose technique), in comparison to non-cleft controls.

Methodology: In this prospective study, forty-four patients with operated non-syndromic CUCLP were included. The control group consisted of 44 volunteers without cleft defects of approximately the same age and sex. Primary septoplasty was performed in conjunction with the cleft lip (CL) repair using the Afrose incision. 3D facial images were acquired using 3D stereophotogrammetry. After a 3D cephalometric analysis of the lip and nose was performed in both groups, linear and volumetric data were acquired. Lip and nose symmetry were calculated and compared using Student's t-tests as well as the Chi square test.

Results: For all measurements, the control group was up to 30% closer to perfect symmetry compared to the CUCLP group after primary surgery. This difference was statistically significant.

Conclusions: After primary cheiloseptoplasty according to the Afrose technique in patients with CUCLP, asymmetry in the nose and lip area still exists as compared to non-cleft controls. Although non-cleft individuals also show some degree of asymmetry, the results of this study stress the difficulty in obtaining near normal symmetrical relations.

Key words: cleft palate, three-dimensional imaging, maxillofacial surgery, nose, rhinoplasty, 3D stereophotogrammetry, volume.

INTRODUCTION

The ultimate goal for repair of the complete unilateral cleft lip, alveolus and palate (CUCLP) deformity is to create normal oronasal form and function. This aim has resulted in a plethora of techniques and innovations to optimize the esthetic and functional results. However, the management of CUCLP deformities, especially that of the nose, remains a challenge.

Various studies [1-9] have been undertaken to evaluate the results of different operative procedures to correct the CUCLP nose deformity. However, quantification of rhinoplastic procedures remains difficult. Besides direct anthropometric measurements [10], studies comparing pre- and postoperative nose and lip changes in patients with clefts are limited to two dimension-

Footnote: #Both authors contributed equally to the study
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PEDIATRIC/CRANIOFACIAL

Intraoperative Vascular Anatomy, Arterial Blood Flow Velocity, and Microcirculation in Unilateral and Bilateral Cleft Lip Repair

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Background: Cleft lip repair aims to normalize the disturbed anatomy and function. The authors determined whether normalization of blood circulation is achieved.
Methods: The authors measured the microcirculatory flow, oxygen saturation, and hemoglobin level in the lip and nose of controls (n = 22) and in patients with unilateral and bilateral cleft lip–cleft palate. The authors measured these parameters before lip repair (n = 29 and n = 11, respectively), at the end of lip repair (n = 27 and 10, respectively), and in the late postoperative period (n = 33 and n = 20, respectively). The arterial flow velocity was measured in unilateral groups at the same time points (n = 13, n = 11, and n = 12, respectively). Statistical differences were determined using analysis of variance.
Results: Before surgery, the arterial flow velocities and microcirculation values were similar on each side of the face and between groups. The microcirculatory flow was significantly higher in the prolabium of bilateral patients than in the philtrum of controls. All circulation values in unilateral and bilateral patients in the late postoperative period were within the range of controls and of those before surgery. Intraoperatively, the authors consistently found a perforating artery on the superficial side of the transverse nasalis muscle.
Conclusions: There appears to be no intrinsic circulatory deficit in unilateral and bilateral cleft lip–cleft palate patients. The increased flow in the prolabium indicates a strong hemodynamic need in this territory, compelling in vascular preservation. Whether surgical preservation of the nasalis perforator artery is of long-term benefit should be addressed in future studies. (*Plast. Reconstr. Surg.* 130: 1120, 2012.)
CLINICAL QUESTION/LEVEL OF EVIDENCE: Therapeutic, V.

Cleft lip repair techniques differ mainly in the design of the skin incisions, how the muscle portions are reconstructed, and how the nasal framework is repositioned.[1] The vascular anatomy has remained largely unaddressed in current surgical techniques, and the reasons for this have yet to be explored.

Normal blood supply is a precondition for development and growth. Thus, it would be of clinical interest to determine whether cleft anatomy leads to a change in the blood supply before or after surgery.

Current techniques for cleft lip repair exclude surgical anastomosis of the lip artery. However, this clinical approach is not based on blood circulation data and so the current standard must be challenged. Vascular damage in cleft surgery interrupts the existent hemodynamics and necessitates further trauma to stop the bleeding, after which the blood circulation may take several months to recover.[2] Gentle surgical soft-tissue han-

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Clinical Paper
Cleft Lip and Palate

Use of a modified Furlow Z-plasty as a secondary cleft palate repair procedure to reduce velopharyngeal insufficiency

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Abstract. Cleft palate repair is done to allow for normal speech by separating the oral and nasal cavities and creating a functioning velopharyngeal valve. However, despite cleft palate repair, some patients demonstrate velopharyngeal insufficiency (VPI). An attempt was made to determine the effectiveness of a modified secondary Furlow Z-plasty in improving VPI. Fifty-five children aged between 12 and 15 years, with postoperative VPI following primary palatoplasty, were included in the study. These children underwent a modified Furlow Z-plasty. Nasometry was done to determine the change in velopharyngeal function due to the secondary Furlow Z-plasty by comparing the preoperative with the 1-year postoperative nasalance scores. A test–retest study was performed to determine the reliability of the nasometric measures. Reliability measurements of the nasometer passages revealed good reliability for 18 out of the 25 speech passages. There was a statistically significant reduction in VPI at 1 year postoperative in patients who were treated with the modified Furlow Z-plasty, with a *P*-value of <0.001 in all passages, except velar plosives, which had a *P*-value of 0.002. Patients with VPI after primary palatoplasty and treated using a modified Furlow Z-plasty had significantly lower nasalance scores at 1 year postoperative, indicating significantly improved velopharyngeal function.

Key words: cleft palate; secondary palatoplasty; velopharyngeal insufficiency; Furlow Z-plasty; hypernasality; speech; nasometry.

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Velopharyngeal insufficiency (VPI) is defined as a structural abnormality that results in incomplete closure of the velopharyngeal valve during the production of oral speech.[1] Among other causes, VPI can be caused by inadequate length and/or movement of the soft palate. Incomplete closure of the velopharyngeal valve can cause hypernasality and/or nasal emission. VPI is considered to be the primary cause of hypernasal speech.[2]

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Lengthening temporalis myoplasty versus free muscle transfer with the gracilis flap for long-standing facial paralysis: A systematic review of outcomes

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ABSTRACT

Background: Our aim was to compare the outcomes of reconstructive surgery for long-standing facial paralysis by gracilis free flap transfer versus lengthening temporalis myoplasty (LTM) according to Daniel Labbé.

Materials and methods: PubMed, Web of Science, Wiley Online library Cochrane Library, Directory of Open Access Journals, and SAGE Premier 2011 database were electronically searched. Randomized controlled trials (RCTs), controlled clinical trials (CCTs), and case series with a sample size > 5 were sought. Data were extracted by a single investigator.

Results: Sixteen articles met the selection criteria. All of these studies were retrospective case series. Efficacy outcomes were analyzed by assessing mouth symmetry both at rest and upon smiling, as well as the quality and the spontaneity of the smile. Consensus and displacement in patients operated by the gracilis flap was greater after surgery involving masseteric nerve reinnervation than a cross-facial nerve graft reinnervation. Patients with double innervation had similar results to those who had surgery involving only masseteric nerve reinnervation. These results are in accordance with the subjective evaluation of patients operated by the lengthening temporalis myoplasty technique (on lateral movement of the commissure, with reinnervation of the zygomatic only "minimally").

Conclusions: There are currently no published RCTs or CCTs regarding facial reanimation surgery. Thus, only very weak evidence is available to support the use of one type of surgery over another. However, our review suggests that LTM achieves results that are at least equal to those obtained with gracilis transfer, but LTM is a less extensive procedure that provides quicker results without the need for more than one operation. LTM, therefore, seems a good alternative to free muscle flap.

Level of evidence: IV.

1. Introduction

Long-standing facial paralysis has substantial functional, morphological, and psychological effects on the affected person. The lack of facial expression on the paralyzed side is not only an aesthetic issue but also a functional one, as the affected individual cannot communicate effectively, which may lead to social isolation. When managing facial paralysis, the primary interest focuses on reanimation of the smile and eyelid (Monnet et al., 2013). This review will focus on smile reanimation. The inability to smile is unfortunately not the only dynamic problem in the midface. The paralyzed side also remains static upon talking, which is equally embarrassing to the patients.

The main challenge of facial reanimation surgery is to provide symmetry at rest and with facial expressions. The current gold standard is revascularized and reinnervated free muscle transfer, mainly with a gracilis free muscle flap (Biglioli et al., 2015). Pedicled regional muscle flaps, such as temporalis muscle flaps, have received renewed interest. The indications for the 2 types of flaps are very similar, if not identical (Labbé and Bénateau, 2002). The gracilis flap can be innervated by either the contralateral facial

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Maxillofacial growth and speech outcome after one-stage or two-stage palatoplasty in unilateral cleft lip and palate. A systematic review

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ABSTRACT

Background: The number of surgical procedures to repair a cleft palate may play a role in the outcome for maxillofacial growth and speech. The aim of this systematic review was to investigate the relationship between the number of surgical procedures performed to repair the cleft palate and maxillofacial growth, speech and fistula formation in non-syndromic patients with unilateral cleft lip and palate.

Material and methods: An electronic search was performed in PubMed/all MEDLINE, the Cochrane Library, EMBASE, Scopus and CINAHL databases for publications between 1960 and December 2015. Publications before 1950 were hand searched in journals of plastic and maxillofacial surgery—were hand searched. Additional hand searches were performed on studies mentioned in the reference lists of relevant articles. Search terms included unilateral cleft lip and/or palate and palatoplasty. Two reviewers assessed eligibility for inclusion, extracted data, applied quality indicators and graded level of evidence.

Results: Twenty-six studies met the inclusion criteria. All were retrospective and non-randomized comparisons of one- and two-stage palatoplasty. The methodological quality of most of the studies was graded moderate to low. The outcomes concerned the comparison of one- and two-stage palatoplasty with respect to growth of the maxilla, mandible and cranial base, and speech and fistula formation.

Conclusions: Due to the lack of high-quality studies there is no conclusive evidence of a relationship between one- or two-stage palatoplasty and facial growth, speech and fistula formation in patients with unilateral cleft lip and palate.

1. Introduction

Despite considerable progress in the treatment of children with non-syndromic cleft lip and palate, there is no agreement as to the optimal timing, sequence and types of surgical procedure that yield the best result. Techniques such as the von Langenbeck (Wallace, 1987; Lindsay and Wrzel, 1998), the Veau-Wardill-Kilner push-back (Wallace, 1987) and the Bardach two-flap (Bardach and Salyer, 1987; Bardach, 1995) for single-stage, and the Schweckendiek (Schweckendiek and Doz, 1978) and Delaire (Markus et al., 1983) for two-stage palatal repair were recommended. Braithwaite (1956), Kriens (1969) and Sommerlad (2003) advocated intervelar veloplasty in the soft palate by re-orientation of the levator muscle, while the Furlow Z-plasty technique was performed to improve soft palate length (Furlow, 1986).

Several earlier systematic reviews have addressed different issues regarding timing and technique of cleft palatoplasty (Nollet et al., 2005; Liao and Mars, 2006; Yang and Liao, 2010). In a systematic review on timing of hard palate repair and facial growth in 2006, the authors came to the conclusion that there is no consensus on the effect of timing on facial growth (Liao and Mars, 2006). All studies included in this review were retrospective and non-

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PEDIATRIC/CRANIOFACIAL

Effect of One-Stage versus Two-Stage Palatoplasty on Hypernasality and Fistula Formation in Children with Complete Unilateral Cleft Lip and Palate: A Randomized Controlled Trial

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Background: Is one-stage or two-stage palatoplasty more effective for preventing fistula formation and hypernasality in patients with complete unilateral cleft lip and palate?
Methods: This parallel blocked randomized controlled trial included 100 patients with nonsyndromic complete unilateral cleft lip and palate with a repaired cleft lip, divided into two equal groups. Group A had one-stage palatoplasty patients at age 12 to 15 months while group B had two-stage palatoplasty patients with soft palatoplasty at age 12 to 15 months and hard palatoplasty at age 24 to 25 months. Presence of a fistula was tested clinically at 5 years and speech was tested using nasometry and perceptual analyses at 6 years. Group C consisted of noncleft controls ($n = 20$, age 6 years) for speech using nasometry. Fistula rates, hypernasality ratings, and nasalance scores were compared between groups A and B. Nasometry recordings of groups A and B were compared with control group C.
Results: There was no difference in fistula rates between groups A and B ($p = 0.409$; 95 percent CI, 0.360 to 11.9). Mean nasalance scores of group A showed higher nasalance than group B ($p = 0.006$; 95 percent CI, 1.16 to 6.53). Perceptual analysis showed no difference between groups A and B ($p = 0.857$ and $p = 1.000$). Group A showed higher mean nasalance than group C ($p = 0.857$ and $p = 1.000$), whereas group B showed no difference ($p = 0.088$; 95 percent CI, −9.14 to 2.02).
Conclusions: There was no difference in fistula rates between groups. Nasalance was slightly higher in patients in the one-stage palatoplasty group than two-stage palatoplasty group, but the difference was not clinically significant. (*Plast. Reconstr. Surg.* 142: 42e, 2018.)
CLINICAL QUESTION/LEVEL OF EVIDENCE: Therapeutic, II.

THERAPEUTIC

Although cleft palate repair has significant benefits for the patient's feeding and middle ear function, the primary purpose of cleft palate repair is to help the patient develop normal speech with a functioning velopharyngeal valve.[1–4] Incomplete closure of the velopharyngeal valve during speech, despite the palate repair, causes velopharyngeal insufficiency. In addition, failure to completely close the hard palate can result in a fistula that is large enough to cause nasal regurgitation and speech impairment. Patients with velopharyngeal insufficiency or a

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The trial is registered under the name "Is a One Stage or Two Stage Cleft Palate Repair More Beneficial in Children with Complete Unilateral Cleft Lip and Palate?" (http://www.trialregister.nl/trialreg/admin/rctview.asp?TC=6187).

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with Complete One Sided Cleft Palate Defects with Respect to Speech Development and Palatal Fistula Formation?," in ISCTN registry (identification number ISRCTN17288141) (http://www.isrctn.com/ISRCTN17288141?q=&filter=&sortAlias=&sortDirection=&page=1&pageSize=10&searchType=basic-search).

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Review Article

Clinical utility of cone-beam computed tomography in patients with cleft lip palate: Current perspectives and guidelines

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ABSTRACT

The aim of this article is to provide a comprehensive review of the application of cone-beam computed tomography (CBCT) in individuals with cleft lip and palate (CLP). A literature search was conducted from September 2016 to December 2017 in Medline, Scopus, ScienceDirect, Google Scholar, and Ebsohost databases using keywords "CBCT, cleft lip and palate." The inclusion criterion was any published original article where CBCT was used to assess the craniofacial structures in patients with CLP. An additional Google and manual search was carried out by examining the references of the included articles. All retrieved relevant articles (69 original articles) were tabulated under different sections and analyzed. Data were tabulated as follows: – CBCT in the assessment of craniofacial structures in CLP, first author, year of publication, study design, characteristics of the study population and number of participants, age/gender distribution, and conclusions of the studies which are also described in the narrated review. Apart from this, the search also included guidelines for the application of CBCT in patients with CLP. This article gives the cleft team a compilation of all recent literature regarding the use of CBCT in patients with CLP, which helps in providing better care for patients with CLP, keeping in mind the various guidelines issued by different professional bodies regulating the welfare of patients.

Keywords: Cone-beam computed tomography, cone-beam computed tomographic guidelines, diagnosis and treatment planning, patients with cleft lip palate

INTRODUCTION

Cone-beam computed tomography (CBCT) was developed as an evolutionary process of computed tomography (CT) for obtaining three-dimensional (3D) information of the craniofacial structures [Figure 1].[1] Even though the technique used in CBCT has been applied in medical imaging since 1982, the technological transfer of CBCT to dentistry first occurred in 1998.[2–4] The New Tom QR-DVT 9000 became the first commercial CBCT unit to be introduced in the market in Europe in 1999.[5] Since its inception, constant use of CBCT in different fields of dentistry has led to the introduction of various CBCT devices.[6] CBCT technology provides excellent imaging at reduced radiation doses and lower cost than CT.[7] In orthodontics, the application of CBCT extends from locating impacted teeth to planning of orthognathic surgeries.[8–10]

Cleft lip and palate (CLP) is a true 3D facial deformity; and it could be assumed that 3D imaging would provide a better insight into the anatomical condition.[11] This information is important in treatment planning.

The objective of this article is to assess the awareness of CBCT use in the management of patients with CLP. The assessment of criteria, limitations, and guidelines assumes importance with the increased use of CBCT in patients with CLP. As CBCT has been recently introduced, it is imperative that the cleft team should be aware of all the aspects of the use of CBCT in patients

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Plastic and Reconstructive Surgery Advance Online Article
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Effect of One-Stage versus Two-Stage Palatoplasty on Hypernasality and Fistula Formation in Children with Complete Unilateral Cleft Lip and Palate: A Randomized Controlled Trial

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Efficacy of morpho-functional repair in management of different morphological variants of unilateral complete cleft lip

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ABSTRACT
Background: To study the surgical outcome in various morphological variants of unilateral complete cleft lip in our high volume centre over a period of 14 years, using Morpho-Functional technique in all cases by indirect two dimensional photographic analysis.
Methods: In this prospective cohort study, 748 patients with Unilateral Cleft Lip with palate were included over a period of 4 years from January 2010 to December 2014. All Subjects underwent surgery before the age of 1 year with the follow-up two dimensional photographs taken at 4 years post-operatively. Eight measurements were performed on the photographs. All parameters were measured on both Cleft & Non cleft sides and the ratio was considered with the normal side as the base line. Shapiro–Wilk and Kolmogrov–Smirnoff tests were used to confirm that the data was normally distributed. One way ANOVA was done to find out if there were any significant differences amongst the different groups along various parameters, respectively. Further Tukey post hoc analysis was done to confirm where the differences occurred between groups.
Results: None of the groups showed any statistical differences on any parameters. There were minor variations between the different groups due to the ranging morphology of the defect but overall satisfactory to good results were seen on all measured parameters when evaluated.
Conclusion: This shows that the Morpholfunctional technique, with its combinations & modifications of various school of thought, is versatile enough to achieve good surgical outcomes despite the wide variations seen in size and type of defects in unilateral cleft lip. This comes about because of the comprehensive nature of the technique & the balance that it creates among the affected structures.

1. Introduction

The primary goal of cleft lip repair should be to achieve adequate lip length on the cleft side. Other equally important objectives are an inconspicuous residual scar that does not cross anatomical boundaries; adequate Cupid's bow width, absence of notching of vermilion border and an absence of peaking of the vermilion at the Cupid's bow on cleft side (Lazarus et al., 1998; Reddy et al., 2009a). These treatment outcomes also depend on how wide the cleft is, the amount of nasal septum deviation and variation in abnormal muscle attachment, and any surgical repair should take these into consideration (Davis and Ritchie, 1922).

Unilateral cleft lip repair designs can be divided into 3 schools, (1) straight-line closure, (2) geometric, and (3) rotation-advancement techniques. The most common technique used to repair a unilateral cleft lip is the Millard rotation-advancement flap. Along with its various modifications, like the Noordhoff vermilion flap, the Mohler modification and Tennison and Randall technique (Davis and Ritchie, 1922; Stirman et al., 2008). However, no single technique fulfils all of the above mentioned criteria.

With this in mind, we decided to study the surgical outcome in various morphological variants of unilateral complete cleft lip in our high volume centre over a period of 4 years [January 2010 to December 2014], using a Morpho-Functional Septocheiloplasty technique in all cases.

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Original Article

Association of cleft lip and/or palate in people born to consanguineous parents: A 13-year retrospective study from a very high-volume cleft center

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ABSTRACT

Objective: The objective of this study was to investigate the association of cleft lip (CL) and/or cleft palate (CP) in people born to consanguineous parents. **Methodology:** This retrospective study was conducted at GSR Institute of Craniofacial Surgery, Hyderabad, a very high-volume cleft center. Medical records of 18,242 cleft patients who came for treatment in the past 13 years were physically searched for the presence of consanguinity of their parents. About 3653 patients' case records were identified. Then, the data related to gender, type of cleft, degree of consanguinity, presence of positive family history were collected from these 3653 patients' records and entered in Microsoft Excel which was later sent for statistical analysis. **Results:** Distribution of study participants according to various study variables such as gender, type of cleft, and degree of consanguinity showed interesting findings. Almost 20.02% of the total 18,242 cleft patients' records showed consanguinity of their parents. Nearly 96.7% of patients had CL, CP was seen in 73.7% of patients. About 57.8% of parents had the first degree of consanguinity. Only 3.5% had a positive family history. Chi-square test showed that there was a significant difference in the distribution of patients according to degree of consanguinity and CL, variations in CL and gender, cleft alveolus and gender, degree of consanguinity and CL. **Conclusion:** Consanguinity is a major etiological factor in CL and/or CP.

Key words: Cleft lip and palate, consanguinity, retrospective study

INTRODUCTION

Cleft lip (CL) and/or cleft palate (CP) is one of the most common visible congenital deformities of the face. The affected individuals may have both cleft lip and palate (CLP) or either on its own. CLP is more frequent in males whereas isolated CP is more frequent in females, but their prevalence varies according to ethnic group and geographic location. According to Reddy *et al.*,[1] the incidence of clefts in India is around 1:800–1:1000, and three infants are born with some type of cleft every hour. Global surveys have shown that the frequency of CLP varies greatly from country to country. It is lowest in Africans (1:2500), and North American Indians and East Asians have the highest prevalence rates (1:500). Formation of lip happens between the 4th and the 7th weeks of intrauterine life whereas the palate between the 6th and the 9th weeks. In general, facial clefting results when lateral nasal processes and a maxillary process forming craniofacial complex do not fuse completely. Approximately 70% of the CLP cases are of nonsyndromic in nature and occur as isolated cases whereas the remaining 30% of clefts are syndromic and are associated with some other anomalies.[2,3]

The etiology of CLP is very complex, because of congenital anomalies that are associated with it.[4,5] CLP is polygenic and multifactorial involving both genetic

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Original Article

Three-dimensional assessment of transverse displacement with Facemask and Maxgym in unilateral cleft lip and palate model

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ABSTRACT

Background: Growing patients with cleft lip and palate (CLP) exhibit maxillary deficiency due to early surgical intervention. Maxillary protraction with expansion is the recommended treatment modality for deficient maxilla. Facemask is a conventional protraction appliance, and Maxgym is a new protraction appliance. The purpose of this study is to compare the efficacy of Maxgym with Facemask using finite-element analysis. **Methods:** A three-dimensional finite-element model consisting of 49,807 nodes and 185,620 tetrahedral-shaped elements was created using computed tomography scan of a patient with unilateral CLP. F1, F2, and F3 represent different protraction forces of facemask, and M1, M2, and M3 represent different protraction forces of Maxgym. E1 represents slow maxillary expansion (SME) force, and E2 represents rapid maxillary expansion (RME) force. Facemask and Maxgym forces were applied parallel to the occlusal plane from the middle of the clinical crown on the buccal side of the first premolars. The forces E1 and E2 were also applied on the middle of the crown height on the lingual side of the first premolars and the first molars to simulate expansion. The amount of displacement for Maxgym and Facemask forces in transverse direction was analyzed designating specific nodes to represent dental and skeletal structures. **Results:** The dental and skeletal structures were displaced in transverse direction under all loading conditions. Only expansion or protraction force resulted in transverse displacement of nodes. RME produces greater transverse displacement as compared to SME. Maxgym forces produce greater transverse displacement as compared to facemask. Maxgym with RME produces greater transverse displacement as compared to Maxgym with SME, whereas facemask with RME produces greater transverse displacement as compared to facemask with SME. **Conclusions:** Maxgym forces produce greater transverse displacement as compared to facemask with or without expansion.

KEYWORDS: Facemask, finite-element analysis, Maxgym, rapid maxillary expansion, slow maxillary expansion, transverse displacement, unilateral cleft lip and palate model

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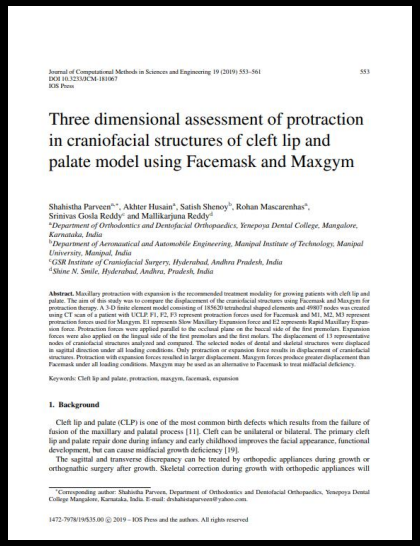

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Three dimensional assessment of protraction in craniofacial structures of cleft lip and palate model using Facemask and Maxgym

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Abstract. Maxillary protraction with expansion is the recommended treatment modality for growing patients with cleft lip and palate. The aim of this study was to compare the displacement of the craniofacial structures using Facemask and Maxgym for protraction therapy. A 3-D finite element model consisting of 185620 tetrahedral shaped elements and 49887 nodes was created using CT scan of a patient with UCLP. F1, F2, F3 represent protraction forces used for Facemask and M1, M2, M3 represent protraction forces used for Maxgym, E1 represents Slow Maxillary Expansion force and E2 represents Rapid Maxillary Expansion force. Protraction forces were applied parallel to the occlusal plane on the buccal side of the first premolars. Expansion forces were also applied on the lingual side of the first premolars and the first molars. The displacement of 13 representative nodes of craniofacial structures analyzed and compared. The selected nodes of dental and skeletal structures were displaced in sagittal direction under all loading conditions. Only protraction or expansion force results in displacement of craniofacial structures. Protraction with expansion forces resulted in larger displacement. Maxgym forces produce greater displacement than Facemask under all loading conditions. Maxgym may be used as an alternative to Facemask to treat midfacial deficiency.

Keywords: Cleft lip and palate, protraction, maxgym, facemask, expansion

1. Background

Cleft lip and palate (CLP) is one of the most common birth defects which results from the failure of fusion of the maxillary and palatal process [11]. Cleft can be unilateral or bilateral. The primary cleft lip and palate repair done during infancy and early childhood improves the facial appearance, functional development, but can cause midfacial growth deficiency [19].

The sagittal and transverse discrepancy can be treated by orthopedic appliances during growth or orthognathic surgery after growth. Skeletal correction during growth with orthopedic appliances will

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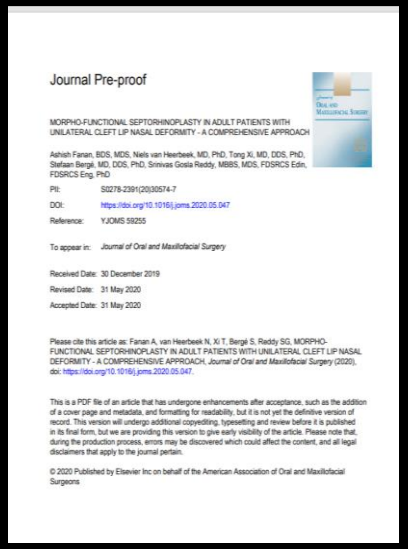

Journal Pre-proof

MORPHO-FUNCTIONAL SEPTORHINOPLASTY IN ADULT PATIENTS WITH UNILATERAL CLEFT LIP NASAL DEFORMITY - A COMPREHENSIVE APPROACH

Ashish Fanan, BDS, MDS, Niels van Heerbeek, MD, PhD, Tong Xi, MD, DDS, PhD, Stefaan Bergé, MD, DDS, PhD, Srinivas Gosla Reddy, MBBS, MDS, FDSRCS Edin, FDSRCS Eng, PhD

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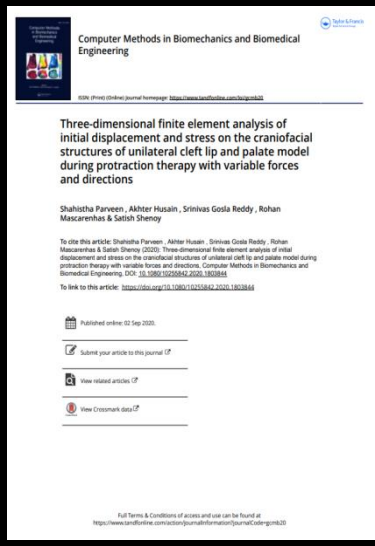

Computer Methods in Biomechanics and Biomedical Engineering

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Three-dimensional finite element analysis of initial displacement and stress on the craniofacial structures of unilateral cleft lip and palate model during protraction therapy with variable forces and directions

Shahistha Parveen , Akhter Husain , Srinivas Gosla Reddy , Rohan Mascarenhas & Satish Shenoy

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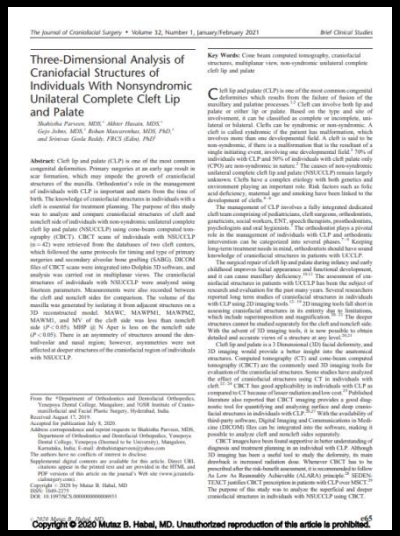

The Journal of Craniofacial Surgery • Volume 32, Number 1, January/February 2021 — Brief Clinical Studies

Three-Dimensional Analysis of Craniofacial Structures of Individuals With Nonsyndromic Unilateral Complete Cleft Lip and Palate

Shahistha Parveen, MDS, Akhter Husain, MDS,* Goja Johns, MDS,* Rohan Mascarenhas, MDS, PhD,* and Srinivas Gosla Reddy, FRCS (Edin), PhD†*

Abstract: Cleft lip and palate (CLP) is one of the most common congenital deformities. Primary surgeries at an early age result in scar formation, which may impede the growth of craniofacial structures of the maxilla. Orthodontist's role in the management of individuals with CLP is important and starts from the time of birth. The knowledge of craniofacial structures in individuals with a cleft is essential for treatment planning. The purpose of this study was to analyze and compare craniofacial structures of cleft and noncleft side of individuals with non-syndromic unilateral complete cleft lip and palate (NSUCCLP) using cone-beam computed tomography (CBCT). CBCT scans of individuals with NSUCCLP (n = 42) were retrieved from the databases of two cleft centers, which followed the same protocols for timing and type of primary surgeries and secondary alveolar bone grafting (SABG). DICOM files of CBCT scans were integrated into Dolphin 3D software, and analysis was carried out in multiplanar views. The craniofacial structures of individuals with NSUCCLP were analyzed using fourteen parameters. Measurements were also recorded between the cleft and noncleft sides for comparison. The volume of the maxilla was generated by isolating it from adjacent structures on a 3D reconstructed model. MAWC, MAWPM1, MAWPM2, MAWMI, and MV of the cleft side was less than noncleft side ($P < 0.05$). MHP @ N Apar is less on the noncleft side ($P < 0.05$). There is an asymmetry of structures around the dentoalveolar and nasal region; however, asymmetries were not reflected in deeper structures of the craniofacial region of individuals with NSUCCLP.

Key Words: Cone beam computed tomography, craniofacial structures, multiplanar view, non-syndromic unilateral complete cleft lip and palate

Cleft lip and palate (CLP) is one of the most common congenital deformities which results from the failure of fusion of the maxillary and palatine processes.[1,2] Cleft can involve both lip and palate or either lip or palate. Based on the type and site of involvement, it can be classified as complete or incomplete, unilateral or bilateral. Clefts can be syndromic or non-syndromic. A cleft is called syndromic if the patient has malformation, which involves more than one developmental field. A cleft is said to be non-syndromic, if there is a malformation that is the resultant of a single initiating event, involving one developmental field.[3] 70% of individuals with CLP and 50% of individuals with cleft palate only (CPO) are non-syndromic in nature.[4] The causes of non-syndromic unilateral complete cleft lip and palate (NSUCCLP) remain largely unknown. Clefts have a complex etiology with both genetics and environment playing an important role. Risk factors such as folic acid deficiency, maternal age and smoking have been linked to the development of clefts.[5–8]

The management of CLP involves a fully integrated dedicated cleft team comprising of pediatricians, cleft surgeons, orthodontists, geneticists, social workers, ENT, speech therapists, prosthodontists, psychologists and oral hygienists.[9] The orthodontist plays a pivotal role in the management of individuals with CLP and orthodontic intervention can be categorized into several phases.[10–12] Keeping long-term treatment needs in mind, orthodontists should have sound knowledge of craniofacial structures in patients with UCCLP.

The surgical repair of cleft lip and palate during infancy and early childhood improves facial appearance and functional development and it can cause maxillary deficiency.[10,13] The assessment of craniofacial structures in patients with UCCLP has been the subject of research and evaluation for the past many years. Several researchers reported long term studies of craniofacial structures of individuals with CLP using 2D imaging tools.[14–16] 2D imaging tools fall short in assessing craniofacial structures in its entirety due to limitations, which include superimposition and magnification.[16,17] The deeper structures cannot be studied separately for the cleft and noncleft side. With the advent of 3D imaging tools, it is now possible to obtain detailed and accurate views of a structure at any level.[18,19]

Cleft lip and palate is a 3 Dimensional (3D) facial deformity, and 3D imaging would provide a better insight into the anatomical structures. Computed tomography (CT) and cone-beam computed tomography (CBCT) are the commonly used 3D imaging tools for evaluation of the craniofacial structures. Some studies have analyzed the effect of craniofacial structures using CT in individuals with cleft.[20–22] CBCT has good applicability in individuals with CLP as compared to CT because of lesser radiation and low cost.[23] Published literature also reported that CBCT imaging provides a good diagnostic tool for quantifying and analyzing surface and deep craniofacial structures in individuals with CLP.[24,25] With the availability of third-party software, Digital Imaging and Communications in Medicine (DICOM) files can be integrated into the software, making it possible to analyze cleft and noncleft sides separately.

CBCT images have been found supportive in better understanding of diagnosis and treatment planning in an individual with CLP. Although 3D imaging has been a useful tool to study the deformity, its main drawback is increased radiation dose. Whenever CBCT has to be prescribed after the risk-benefit assessment, it is recommended to follow the ALARA (As Low As Reasonably Achievable) principle.[26] Hence, TETACT (modified CBCT) prescription in patients with CLP was MRT.[27] The purpose of this study was to analyze the superficial and deeper craniofacial structures in individuals with NSUCCLP using CBCT.

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Original Article

Association of MAPK4 and SOX1-OT gene polymorphisms with cleft lip palate in multiplex families: A genetic study

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Abstract

Background. Cleft lip and palate (CLP) is a common congenital anomaly. Many genes, like MAPK4 and SOX-1OT, are associated with its etiology in different populations. High-risk markers on these genes reported in other populations have not been studied in our population. Hence, the study aimed to determine the association of MAPK4 and SOX-1OT polymorphisms in CLP in multiplex families.

Methods. Based on inclusion and exclusion criteria, we selected 20 multiplex CLP families for this case-control study, in which the affected individuals and healthy controls selected from these families were considered. Fifty subjects affected with cleft and 38 unaffected subjects were included in the study. The polymorphisms studied for the association consisted of rs726435 and rs29019972 in the genes SOX-1 OT and MAPK4, respectively. DNA was isolated and sent for genotyping using the MassARRAY method. Plink, a whole-genome association analysis toolset, was used for statistical analysis.

Results. Both polymorphisms followed Hardy-Weinberg equilibrium. The rs726435 of SOX-1OT yielded a P-value of 0.003 and an allelic odds ratio (OR) of 0.083. For rs29019972 of MAPK4, the P-value was 0.04 (significant), and the allelic OR was 0.51. Minor allele frequency (MAF) in the unaffected subjects was more than the MAF in the affected subjects for rs29019972.

Conclusion. The results suggested that polymorphism rs726435 on SOX-1OT was not associated with familial cases of CLP. Since MAF in the unaffected subjects was more than the MAF-affected subjects, rs29019972 on MAPK4 is protective in the multiplex families.

Introduction

Cleft lip and palate (CLP) is one of the most common congenital deformities occurring in humans. The affected individuals might have a cleft of the lip or palate or both. Cleft lip and palate is more common in males compared to an isolated cleft palate in females, but their prevalence varies according to ethnicity and geographical location.[1] According to Reddy et al,[2] the incidence of clefts in India is around 1:800 to 1:1000, and three cleft babies are born with some type of cleft every hour. Worldwide surveys have shown that the frequency of CLP varies significantly from one country to another. It is the lowest in Africans (1:2500), and North American Indians and East Asians have the highest prevalence (1:500).[3] 70% of the CLP cases are non-syndromic and occur as isolated cases. In contrast, 30% of clefts are syndromic and are associated with a few other deformities.[4,5]

The etiology of (CLP) is very complicated because of the relevant congenital anomalies.[6] The etiology is polygenic and multifactorial, involving both genetic and environmental factors,[7] including heredity, consanguinity, fetal environment, demographic factors, other factors like drugs, vitamins, alcohol consumption and smoking during pregnancy, infections, diet, etc.[7] Among all these etiologies, consanguinity is an important factor. Neela et al[8] reported in a 13-year retrospective study that 20.02% of cleft patients had consanguineous parents. Ram Kumar Sah and Rajesh Powar[9] reported that consanguineous marriage was noted in 48.9% of the parents.

The lips form during the 4th–7th weeks of fetal life, whereas the palate is formed between the sixth and ninth weeks. Cleft lip occurs when the lateral nasal

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Original Article

CRISPLD2 Gene Polymorphisms with Nonsyndromic Cleft Lip Palate in Indian Population

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Abstract

Cleft lip palate (CLP) is one of the common congenital anomalies with multifactorial etiology. Many genes are associated with its etiology. In one of the studies *CRISPLD2* gene polymorphisms rs1546124, rs4783099, and rs16974880 were reported in the Chinese population. However, its role in the Indian population is not yet studied. Hence, this research was conducted on the Indian population to know the role of these high-risk polymorphisms in patients with nonsyndromic CLP. Following an inclusion and exclusion criteria, 20 multiplex CLP families were selected from a high volume cleft center in India. Genomic DNA was isolated from these families. Single nucleotide polymorphism (SNP) rs1546124, rs4783099, and rs16974880 were analyzed for their association using MassARRAY method. A whole-genome association analysis toolset, PLINK was used for statistical analysis. The polymorphisms followed Hardy-Weinberg equilibrium. None of the polymorphisms showed any significance. Hence the high-risk polymorphisms rs1546124, rs4783099, and rs16974880 are not associated with nonsyndromic CLP in Indian population.

Keywords
- cleft lip palate
- gene
- polymorphism
- *CRISPLD2*
- MassARRAY

Introduction

Cleft lip palate (CLP) is an important congenital disability affecting humans. An infant is born with a cleft lip and/or palate somewhere on the planet every 2 minutes according to a World Health Organization (WHO) study.[1] Prevalence of cleft lip and palate varies significantly from one country to another. It is highest in North American Indians and East Asians (1:2,500) and lowest in Africans (1:500). The cleft incidence in India is around 1:800 to 1:1,000, and three infants are born with some type of cleft every hour.[2] Cleft lip palate can be syndromic or nonsyndromic. A total of 70% of the cleft lip and palate cases are nonsyndromic, whereas 30% are syndromic which are associated with some other anomalies.[3] Our understanding of the etiology and pathogenesis of nonsyndromic variants yet remains relatively poor. The etiology is multifactorial, ranging from genetic causes, malnutrition, endocrine disorders, infection, trauma, consanguinity, etc. Roughly 20% of the CLP showed consanguinity of their parents while the percentage of familial cases is 3.5% of all the cleft cases.[4] Some form of cleft phenotype characterizes approximately 600 syndromes.[5]

Genetic Causes

Genetic research of clefts uses both association analysis and link analysis to determine the genetic determinants. The results of candidate gene-based association studies, performed on various ethnicities, populations have been mostly inconclusive or conflicting, with many candidate loci implicated in cleft phenotypes. Inconsistency is mostly due to genetic heterogeneity. Various researchers discovered multiple candidate genes linked to nonsyndromic CLP (NSCLP) such as *IRF6*, *MSX1*, *ABCA*, *RARA*, *TCF4*, *TGFβ*, *p63*, *MYH9*, *BCL3*, *MTHFR*, *TGFB2*, *SATB2*, *P63*, *MSX2*, *FOXE1*, *BMP4*, *PAX7*, *PVRL1*, *TGFB3*, *RARA*, *RUNX2*, *BCL3*, *TGFB1*, *TBX1*, and *BCL3*.[6–14] Genetic variation in cysteine-rich secretory protein Ensembles ciliering factor *C. Eschlis* (Cre3c-502) and IgE1 (LCC1) domain containing 2 (CRISPLD2) gene reported as an etiological factor in CLP.[15] These SNPs identified in the study analyzed for its association in Northern Chinese

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Original Article

Comparison of piezosurgery and conventional rotatory technique in transalveolar extraction of mandibular third molars: A pilot study

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ABSTRACT

Objectives: To compare the postoperative outcomes in impacted mandibular third molar extraction using piezosurgery and conventional rotary technique; and to assess the stress levels in both the techniques by measuring salivary cortisol levels.

Methods: Ten patients with symmetrical impacted lower third molars were included in this split mouth pilot study. Measurements for mouth opening and swelling were taken preoperatively on the day of surgery and 1 week after surgery. Pain was evaluated using Visual Analog Score (VAS) from first postoperative day for six consecutive days. Saliva collection for analysis of cortisol levels was done at four time intervals – before starting the procedure, immediately after the procedure, 20 min and 1 week later. The mean in two groups was compared using paired t-test/Wilcoxon signed-rank test as applicable. Friedman test was used to compare multiple readings of pain and salivary cortisol.

Results: Reduction in mouth opening was more in rotary group than piezosurgery group but was not statistically significant ($p = 0.0625$). Swelling was more in rotary group than in piezo group on postoperative day 1 with statistically significant values ($p = 0.028$). Rotary group had higher values for postoperative pain as compared to piezosurgery on all the days and the difference was statistically significant on each day except second postoperative day. Salivary cortisol levels were elevated in both the groups with the mean values higher in group 1 (rotary) than in group II (Piezosurgery).

Conclusion: Extraction of impacted lower third molar results in more favourable outcome when carried out by piezosurgery technique. Further studies are needed to compare the salivary cortisol response in rotary and piezosurgery techniques.

1. Introduction

Extraction of impacted third molars is one of the most common oral surgical procedure done under local anesthesia.[1] The transalveolar extraction of impacted lower third molars produces a significant degree of trauma to the surrounding hard and soft tissues, which results in inflammation manifesting as pain, edema and reduced mouth opening.[2] Osteotomy is one of the most critical steps involved and various methods have been described.

When conventional rotary bur technique is used for osteotomy, marginal osteonecrosis is produced due to high temperature during the procedure due to which continuous irrigation of saline is required.[3]

Recently, piezoelectric surgery technique has been used to overcome the disadvantages associated with conventional rotatory technique. Piezoelectric technique (Piezotome) uses an alternating current, which when applied results in alternate expansions and contractions of the crystal.[4] Its handpiece has an oscillation frequency of 28–36 Khz with the following advantages: microsurgical precision and selective hard tissue cutting action, which reduces the chances of inferior alveolar or lingual nerve damage.[5]

Increased patient stress during tooth extraction results in the stimulation of adrenal cortex to increase the secretion of cortisol.[6] It has

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Review Article

Partial facial hemihypertrophy: A case report and review of literature

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ABSTRACT

Hypertrophy of the facial region is rare developmental malformation. The aim of this study is to report a case of partial facial hemihypertrophy describing its clinical features and debatable heterogeneity of etiologies, along with the review of literature to supplement to its current knowledge in English literature. Published search was done from 1996 to 2018, using the terms "Partial facial hemi-hypertrophy" or "Facial hemi-hypertrophy" or "Facial Gigantism" and 95 articles were identified. After manual reviewing and screening, 27 results were included in the analysis. Men are more commonly affected than women, with right side showing more involvement than the left side. Both hard and soft tissues are involved on the affected site. Reconstructive surgeries are usually planned after cessation of physiological growth. It includes orthognathic surgeries or osteotomies. Multiple soft tissue debulking procedures may be performed including excision of excess subcutaneous tissue and masticatory muscles, face-lift surgeries, lip reduction surgery, or parotidectomy. No malignant transformation has been reported in literature. The great variation of asymmetries caused by facial hemihypertrophies requires a combination and variety of sequential treatment procedures to gain adequate functional and cosmetic results. Hence, treatment of such malformation varies radically.

Key words: Facial deformity, facial gigantism, facial hemihypertrophy, hemihypertrophy, partial facial hemihypertrophy

INTRODUCTION

Hypertrophy of the facial region is rare developmental malformation. Hypertrophy has been defined by Dorland as organ enlargement or overgrowth, as a whole or in part, caused by increase in constituent cells size.[1] However, overgrowth limited to unilateral part of the body was called as hemihypertrophy and should involve both skeletal and soft tissues. It was observed that all the structures do not enlarge to the same extent.[2] Embryologically, structures derived from first branchial cleft or from nasal processes are usually involved in hypertrophy. Male dominance (M:F ratio: 3:2) is usually reported, but an equal distribution is seen between the sides involved. Various etiologies have been put forward, but no specific mechanism has been discovered for the same. Management of this deformity shows much variation owing to its numerous types of involvement. The purpose of this article is to represent a case report of partial facial hemihypertrophy along with its review of literature to add to its current knowledge.

CASE PRESENTATION

A 17-year-old female patient presented to our department with the complaint of facial asymmetry since birth which has been increasing with time [Figure 1]. Birth of the patient was by normal delivery. The parents had visited various hospitals for management of the same, but no intervention was done. Medical and family history was unremarkable. There is no history of trauma or any other systemic illness. Serum chemistry gave normal results.

On extraoral examination, there was gross asymmetry with prominent swelling on the left side of the face with following extensions: superiorly, a horizontal line

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REVIEW ARTICLE

A Causal *not* Casual Approach to Coronavirus Disease 19. Tracing the Roots of Novel Virus

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Abstract:

Coronavirus disease (COVID) 19 has generated extraordinary circumstances worldwide like never before; India is already reeling under the health issues caused by this disease. At this critical juncture, having insights into pathogenesis is important so that unwanted panic and uncertainty regarding causative mechanisms can be curtailed. The causative pathogen of COVID19 has been identified to be SARS Cov2 or also known as novel Coronavirus (nCov), which is a variant of the Coronaviruses (CoV). Through this review, we intend to present phylogenetic analysis of nCoV, epidemiology and pathogenesis of COVID 19. On the basis of nucleotide sequencing, nCoV isolates from China and US were found to have the highest similarity index of about 88.2% with two "Bat-SARS-like-CoV (Bat-SL-CoVZC45 and Bat-SL-CoVZXC21). Researchers think that bat might have initiated the outbreak and an unknown wild animal might have acted as an intermediate host prior to the transmission to human. Nasal cavity is considered to be the entry point for nCoV. Initially, a defined RBD of nCoV will locate the ACE2 receptors of Type II Pneumocytes in the alveoli, and will attach and fuse together to form a receptor host membrane. This critical step is responsible for the susceptibility of the host. Following its diagnosis is that the mutation rate of "nCoV" is much slower than "SARS CoV" and "MERS-CoV". Thus, vaccines and antiviral agents developed will not be rendered ineffective early due to slow genetic drift. The two animal markets act as highly potential centres for spill-over of viruses from their reservoirs to other species and in turn humans. Such markets need to be dealt with diligently as the wake of the high risk they pose for such outbreaks.

Keywords: SARS Cov2, nCov, CovidI9, MERS CoV, SARS CoV, Acute Respiratory Distress Syndrome (ARDS)

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1. INTRODUCTION

Coronavirus disease (COVID) 19 has generated extraordinary circumstances like never before, world is already reeling under the health issues caused by this disease. This global pandemic has engulfed more than 200 countries and the numbers are still soaring. Reasons for resurgence and transmissibility of coronavirus are varied. At this critical juncture, having insights into pathogenesis is important so that unwanted panic and uncertainty regarding causative mechanisms can be curtailed.

The causative pathogen of COVID19 has been identified to be SARS Cov2, also known as novel Coronavirus (nCov), which is a variant of the Coronaviruses (CoV). The genetic structure of CoV places it in Coronaviridae family with single strands of RNA genome. Corona in Latin means crown and its name is derived due to its spike projections from the virus membrane, which are known to be largest amongst RNA viruses' genome [1].

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The Coronavirus primarily affects the respiratory system of humans. The first instance of COVID 19 dates back to December 2019 when a few patients with a history of pneumonia were reported. This was the first emergent situation pertaining to nCoV of this decade, which originated from the animal wholesale market in Wuhan, China.[2]. Origin of COVID 19 has been marred with various conjectures. It is still not clear whether a superspreading event occurred in this market or it was the reason of the initial outbreak.

All coronaviruses have a similar structural genome expression, which consists of sixteen non-structural proteins followed by four structural proteins viz. Spike (S), Envelope (E), Membrane (M), and Nucleocapsid (N) Fig. (1). Human Coronavirus (HCoV) are amongst the variants of Cov, which are primarily known to infect humans. These HCoVs are six in number, namely, "HCoV-NL63, Severe Acute Respiratory Syndrome coronavirus (SARS-CoV), HCoV 229E, Middle East Respiratory Syndrome Coronavirus (MERS-CoV), HCoV OC43 and HCoV-HKU1"[3]. Phylogenetically CoV has four generations, namely "Alpha-CoV, Beta-CoV, Gamma-CoV and Delta-CoV" [4]. Alpha and Beta forms of CoV infect only

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Letter to Editor

Unusual presentation of an extraoral and multiple intraoral sinus tracts in a 6-year-old pediatric patient

Dear Editor,

We would like to present this brief report highlighting the unusual and simultaneous presentation of an extraoral and multiple intraoral pus draining sinus tracts of dental origin in a pediatric patient. A 6-year-old female was referred to the department of dentistry with chief complaint of pus discharge from the line of fold of the face for the past 2 months. The patient in her previous physician visits was advised extensive investigations, prescribed multiple antibiotics and medicated dressings and underwent incision and drainage of the cutaneous lesion under GA, with no improvements in symptoms. The patient gradually developed a swelling in the same region with intermittent low-grade fever since 3 month.

Extraorally, the patient had facial asymmetry with a diffuse swelling over the left mandibular angle and submandibular region. The swelling was tender on palpation, associated with an extraoral sinus on left cheek with granulation tissue, spontaneous pus discharge, and crusting of the surrounding skin [Figure 1a]. Intra oral examination revealed mandibular deviation with a decreased mouth opening of 15 mm. Multiple intra oral pus draining sinuses were present on the gingiva associated with a discolored left primary molar [Figure 1b]. Panoramic radiograph revealed dental caries of left primary molar associated with resorption of left inferior border of mandible [Figure 2]. Considering the clinical presentation, age of the patient, chronicity of the lesion and limited mouth opening, extraction of the involved teeth with excision of the extra oral sinus tract was planned under GA.

Intraoral drainage is more common than extra oral drainage with the mandibular teeth being a more common source than the maxillary teeth.[1,2] Extra oral sinus tracts can be non-odontogenic and odontogenic in origin and often present a diagnostic challenge. Only 10% of the patients with facial cutaneous sinus tracts have tooth-related symptoms because of which, patients are often attended to by health care professionals other than dentists.[3] The distance of the extraoral sinus from the primary odontogenic etiology further confuses the clinical picture. The differential diagnosis includes osteomyelitis, furuncle, congenital fistula, salivary gland fistula, deep mycotic infection, granulomatous disorder, pustule, mycosis, foreign body lesion, infected cyst, suppurative lymphadenitis, and neoplasm.[2,3]

The unusual clinical presentation seen with respect to the primary molars in the present case is attributed to the delay in diagnosis due to antibiotic therapy and multiple antibiotic therapies which blocked the drainage partially through incomplete healing.[2] It has been reported that permanent teeth are at low risk of infection may be expelled as foreign bodies through the extra oral sinus tract in which case the patient may complain of loss of a tooth through the extra oral sinus tract.[4] Inappropriate management like biopsy, curettage, antibiotic therapy, surgical excision of the cutaneous lesion, and radiotherapy may provide temporary relief but are inevitably followed by recurrence and compromised aesthetics due to skin scarring.[4] Primary health care physicians encountering such cases should therefore take a history of trauma to teeth, toothache before development of sinus and examine the oral cavity for presence of heavily discolored or treated teeth, as they are the patients first point of contact in the peripheral areas. This article emphasizes on considering an odontogenic source of infection and timely referral to a dental surgeon in such clinical presentations to avoid misdiagnosis. This will ensure prompt dental treatment aimed towards eliminating the source of infection and good prognosis while avoiding development of acute sequelae and subsequent hospital admission. Patient consent was obtained for publication in scientific journals.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient (s) has/have

Figure 1: 1a. Extra oral sinus with spontaneous pus discharge. 1b. Multiple draining intra oral sinus tracts associated with discolored left primary molar

Figure 2: Panorex showing carious left primary molar associated with resorption of left inferior border of mandible

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Letter to Editor

Relevance of teledentistry during the COVID-19 pandemic

Dear Editor,

Coronavirus disease or COVID-19 was declared a public health emergency of global concern by the World Health Organization (WHO) in late January 2020.[1] The novel virus responsible for this outbreak, belongs to a family of single-stranded RNA viruses known as Coronaviridae and was named severe acute respiratory syndrome corona virus 2 (SARS-CoV-2), also popularly known as the COVID-19 virus.[1,2] The possible sources of nosocomial spread in health care setups like a dental operatory are through respiratory droplets i.e., cough and sneeze of infected patients, contact with contaminated fomites and saliva of the infected patient.[3,4] Dental treatments are aerosol-generating procedures and pose a high risk to practitioners as there is a strong possibility of cross-infection and then acquiring the disease or becoming potential carriers.[3,5] It is important to emphasize that this disease has followed a sustained human to human transmission through contact with known COVID-19 patients and asymptomatic carriers in the incubation period (0–24 days).[2]

In the context of this ongoing pandemic with immense social and economic implications, teledentistry (TD) offers key advantages as the dental treatment of many patients without involving the above-mentioned risks. TD is a combination of telecommunications and dentistry, involving the exchange of clinical information and images over remote distances for dental consultation and treatment planning.[6] In the present situation, screening and triage questions such as relevant symptoms, travel history, or contact with known COVID-19 patients can be assessed through TD.[7,8] It can support and supplement the existing health care professionals working in the emergency department of the hospitals and primary health centers to provide emergency care to patients who have reported with dental concerns without unnecessary exposure to extra personnel. It can facilitate easier consultations in pediatric patients, especially those with special health care needs who are dependent on their caregivers for their health care including oral hygiene. Caregivers often prefer to use home remedies for the child's dental symptoms instead of consulting a dental professional straight away, which may aggravate the condition and present in the later, unsalvageable stages of the disease. TD provides a stress-free environment for examination of the child patient as the child is reassured and sitting with the parents at home. Timely consultations can in turn reduce the number of emergency visits, which becomes important at the current time of extra burden on health care systems. The importance of regular tooth brushing and other preventive care can be reiterated to the parents. More importantly, in the periods of lockdown, TD can provide specialist consultation to patients living in difficult terrains/mountains where routine access to dental care is unavailable[9] Ascertaining the nature of the dental emergency is of paramount importance by the primary care physicians. Swellings that can threaten airways and subsequently require hospital admissions should be scheduled for an in-person appointment in a facility equipped with proper personal protective equipment and ambulatory care services.[10] Teleconsultation can be deferred via real-time consultation, store-and-forward method, and remote monitoring.[6] It is important to select the appropriate technology for TD that can be used by the patient and also arrange the assistance of an authorized person for local coordination. The patient's records should be safely stored in a confidential manner.[7] Additional information such as means of technology used, contacting the dentist, and the identity and the patient and written or verbal consent obtained from the patient should also be documented.

To conclude, the authors suggest setting up TD services in medical and dental institutes, especially in peripheral areas during the COVID-19 pandemic as it would allow wider visibility of dental professionals in communities and bridge the gap between patients and consultants in a cost-effective and safe manner. Furthermore, diagnosis, pharmacotherapy, emergency dental care, referrals, and follow-up of patients can be done while reducing human-to-human transmission and nosocomial spread. TD consultations can eventually be continued as routine office treatments once the acute phase of the pandemic is over.

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Conflicts of interest
There are no conflicts of interest.

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Original Article

Association of Nucleotide Variants of GRHL3, IRF6, NAT2, SDC2, BCL3, and PVRL1 Genes with Nonsyndromic Cleft Lip With/Without Cleft Palate in Multigenerational Families: A Retrospective Study

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Abstract

Background: Several genes are associated with the etiology of cleft lip and palate (CLP) in different populations. Many nucleotide variants on genes such as GRHL3, IRF6, NAT2, SDC2, BCL3, and PVRL1 were reported in different populations, but not studied in multigenerational cases in the Indian population. **Aim and Objective:** The aim of this study is to evaluate whether nucleotide variants rs41268755, rs861020, rs1044983, rs1862180, rs2065105, and rs10790132 are involved in the etiology of nonsyndromic CLP (NSCLP) in multigenerational Indian families. **Study Design:** Retrospective genetic study. **Materials and Methods:** Based on inclusion and exclusion criteria, 20 multigenerational families with nonsyndromic cleft lip with or without cleft palate (NSCLP) were selected. Blood samples from both affected and unaffected participants were collected as a source of genomic DNA. Six nucleotide variants on these genes were genotyped to test for the association with NSCLP. Genotyping was performed with the Mass Array method. Genotype distribution was used to calculate the Hardy–Weinberg equilibrium using PLINK, a whole-genome association analysis toolset. The allelic association was computed among cases and controls using Chi-squared test as implemented in PLINK. $P \leq 0.05$ indicates statistical differences between groups. **Results:** No significant associations were found between individual single-nucleotide polymorphisms and NSCLP. The odds ratio was 1.531, 1.198, 0.6682, 1.418, 1, and 0.5929 for polymorphisms rs41268755, rs861020, rs1044983, rs1862180, rs2065105, and rs10790132, respectively. **Conclusion:** Our findings suggest that among the multigenerational families in our population, the high-risk nucleotide variants GRHL3 rs41268755, IRF6 rs861020, NAT2 rs1044983, SDC2 rs1862180, BCL3 rs2065105, and PVRL1 rs10790132 are not associated with increased risk of NSCLP.

Keywords: *BCL3 and PVRL1, cleft lip and palate, gene, genotyping, GRHL3, IRF6, mass array method, NAT2, nonsyndromic cleft lip/palate, polymorphism, SDC2*

Introduction

Cleft lip and palate (CLP) is among the most common congenital birth anomalies in humans. According to a study conducted by the WHO it was found that, at every 1 of around an infant is born with cleft lip/palate in the world.[1,2] A study conducted by Reddy et al. showed that the incidence of clefts in India is around 1:800–1:1000, and three infants are born with some type of cleft every hour.[3,4] The care of patients with cleft palate remains a concern for consumers, which will impose a substantial economic burden on society because of its increasing occurrence and costs of medical care.[5] CLP can be classified into syndromic and nonsyndromic, of which 70% are nonsyndromic and 30% are syndromic.[6] The etiology of CLP is multifactorial including genetic causes, malnutrition, endocrine disorders, infection, trauma, consanguinity, alcohol consumption, and some other environmental causes. About 20% of the CLP showed consanguinity of their parents, while the percentage of familial cases is 3.3% of all the cleft cases.[7] About 600 syndromes are characterized by some form of cleft phenotype.[8]

Genetic research on CLP uses various methods, including association analysis and linkage analysis, to determine the genetic determinants of oral and facial clefts. The results of candidate gene-based association studies, performed in diverse populations, have been mostly inconclusive or conflicting, with only a few candidate loci

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JMIR RESEARCH PROTOCOLS Mallick et al

Protocol

Assessment of Outcomes of Immediately Loaded Dental Implants in Orofacial Cleft Patients: Protocol for a Single-Arm Clinical Trial

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Abstract

Background: Orofacial cleft, one of the most common congenital deformities, presents with a plethora of defects, subjecting the patient to a multitude of treatments from a young age. Among the oral hard tissue problems, absence of a maxillary permanent tooth in the cleft region either due to congenital absence or extraction due to compromised prognosis is a common finding. Conventionally, the missing tooth is replaced using a removable or fixed partial denture; however, the treatment modality does not satisfactorily meet patient expectations. The most recent decade has seen increasing use of dental implants in the cleft region; however, the outcome of an immediately loaded dental implant is still elusive for orofacial cleft patients.

Objective: This protocol is for a single-arm clinical trial aimed at determining the treatment outcome of immediately loaded dental implants in patients with a nonsyndromic orofacial cleft.

Methods: Patients meeting the set criteria will be sequentially enrolled until a sample size of 30 dental implants is met and will undergo the proposed treatment according to the predecided protocol. All patients will be followed up at the designated time intervals to record various clinical and radiographic parameters. Implant success will be defined based on the criteria elucidated by Misch et al in the Pisa, Italy Consensus. A quality-of-life assessment questionnaire will also be recorded at the end of patient's follow-up to determine their acceptance of the treatment.

Results: A total of 30 dental implants will be placed in patients with a nonsyndromic orofacial cleft. Obtained results will be statistically analyzed to determine the treatment outcomes and success.

Conclusions: This study will help determine the feasibility of immediately loaded dental implants in compromised bone sites such as those presented in cleft patients and will help in generating findings that can be used to fill the lacunae currently present in the holistic treatment of cleft patients.

Trial Registration: Clinical Trial Registry of India CTRI/2020/09/027997; http://ctri.nic.in/Clinicaltrials/showallp.php?mid1=47659&EncHid=&userName=dental%20implants

International Registered Report Identifier (IRRID): PRR1-10.2196/25244

(JMIR Res Protoc 2021;10(5):e25244) doi: 10.2196/25244

KEYWORDS

clinical trial protocols; dental implants; dentistry; immediate dental implant loading; implant-supported dental prosthesis; mouth rehabilitation; oral health; orofacial cleft; quality of life; rehabilitation research; treatment outcome

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Association of Single Nucleotide Polymorphisms on Locus 18q21.1 in the Etiology of Nonsyndromic Cleft Lip Palate (NSCLP) in Indian Multiplex Families

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Global Med Genet 2021;8:24–31.

Abstract

Background Cleft lip palate (CLP) is a common congenital anomaly with multifactorial etiology. Many polymorphisms at different loci on multiple chromosomes were reported to be involved in its etiology. Genetic research on a single multigenerational American family reported 18q21.1 locus as a high-risk locus for nonsyndromic CLP (NSCLP). However, its association in multiple multiplex families and Indian population is not analyzed for its association in NSCLP.

Aim This study was aimed to evaluate whether high-risk single nucleotide polymorphisms (SNPs) on chromosome 18q21.1 are involved in the etiology of NSCLP in multiplex Indian families.

Materials and Methods Twenty multigenerational families affected by NSCLP were selected for the study after following inclusion and exclusion criteria. Genomic DNA was isolated from the affected and unaffected members of these 20 multiplex families and sent for genetic analysis. High-risk polymorphisms, such as rs6507872 and rs8091995 of *CTIF*, rs17715416, rs17713847 and rs183559995 of *MYO5B*, rs78950893 of *SMAD7*, rs1450425 of *LOXND1*, and rs6507992 of *SKA1* candidate genes on the 18q21.1 locus, were analyzed. SNP genotyping was done using the MassARRAY method. Statistical analysis of the genomic data was done by PLINK.

Results Polymorphisms followed the Hardy–Weinberg equilibrium. In the allelic association, all the polymorphisms had a *p*-value more than 0.05. The odds ratio was not more than 1.6 for all the SNPs.

Keywords
- cleft lip palate
- chromosome
- SNP

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Modified anterior maxillary distraction using "Winged Osteotomy": A technical note

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ARTICLE INFO

Keywords:
Cleft maxilla
Anterior maxillary distraction
Winged osteotomy
Maxillary hypoplasia
Modified anterior maxillary distraction

ABSTRACT

Hypoplasia of the maxilla is common in cleft lip and palate (CLP) deformities. Orthognathic surgery has been the traditional method of correction in such developmental anomalies since 1970's, with Le-Fort I advancement as its long-established management modality, which results in significant speech alteration and relapse rate. In contrast, anterior maxillary distraction (AMD) has the advantage of lesser chances of relapse, velopharyngeal insufficiency, and alteration of speech. This modified AMD technique carries a handful of its advantages as it is an easier procedure compared to the Le-Fort I osteotomy as it gives positive soft tissue changes by improving the projection of the nose and the upper lip, normalizes naso-labial angle, and changes the facial prominence from concave to convex simultaneously as it gives nasolabial and soft-tissue prominence post-operatively due to the extension of horizontal vais up to to the zygomatic region, leading to lesser complications. Also, the bothering caused by the conventional AMD osteotomy cuts is eliminated by the extension of the winged osteotomy.

Hypoplasia of the maxilla is common in cleft lip and palate (CLP) deformities. Orthognathic surgery has been the traditional method of correction in such developmental anomalies since 1970's, with Le-Fort I advancement as its long-established management modality, which results in significant speech alteration and relapse rate. In contrast, anterior maxillary distraction (AMD) has the advantage of lesser chances of relapse, velopharyngeal insufficiency, and alteration of speech.[1]

Modified AMD involves using "Winged Osteotomy" followed by conventional appliance fixation. Cohen-block performed and reported the first segmental anterior maxillary osteotomy (AMO) in 1922.[2] Several AMO techniques have been advocated like Wassmund's (1927), Wunderer's (1963), and Caparo's (1954), which is mostly preferred by surgeons as it allows direct access for the removal of the bone through the floor of the nose. The bone from the lateral, superior, and posterior palatal surfaces are removed in slow until the pre-maxillary segment is placed in the pre-determined position.[3]

1. Surgical technique of "Winged Osteotomy"

Once oro-endotracheal intubation is completed and general anaesthesia is induced, local anaesthesia is infiltrated, followed by split labial incision from maxillary second pre-molar to contral incisor on both the sides. Full thickness mucoperiosteal flap is raised to expose pyriform aperture and infra-orbital foramen. The osteotomy cut starts from the inter-dental region between the two premolars, extending laterally up to to the malar prominence, and converging at the region of pyriform aperture (Fig. 1a–d). This modification is done to achieve augmentation of zygoma post-operatively. Placement of the palatal cut was facilitated via tunnelling through the nasco-periosteum, taking care to guard the palatal mucosa with the help of the finger. The customized tooth-borne "double Hyrax screw AMD appliance" is fixed using Glass Ionomer Cement (GIC), and device was activated to check the movement between the segments (Fig. 1e). The supra-premaxillary ligament is affixed to the nasal spine anteriorly with a 2–0 prolene suture. A Y–Y closure is then done in two layers with 3–0 vicryl suture. The distraction was done for 10–15 days based on requirement of the patient, with about 25% overcorrection, as the relapse rate is found to be around 15–20%. The patient was followed up for 2 years.

This modified AMD technique carries a handful of its advantages as it is an easier procedure compared to the Le-Fort I osteotomy because the osteotomy involves only the anterior component of occlusion and the malar area, sparing the posterior maxillary segment, which reduces the chances of velopharyngeal insufficiency; and also decreases the risk of neurovascular damage. Therefore, it gives a positive soft tissue

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TECHNICAL NOTE

"Endotracheal Tube" as a Temporary Method of Mandibular Reconstruction in Infant with Juvenile Ossifying Fibroma

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Reconstruction of adult mandibular defects is well-established, however, there are no conclusive guidelines regarding the same in the pediatric population [1]. Management becomes challenging in infants with widespread jaw destruction like "Juvenile Ossifying Fibroma" (JOF). PubMed and Cochrane CENTRAL database literature search for (("infant") AND ("lower jaw" OR "mandible") AND (benign jaw tumor" OR "juvenile ossifying fibroma") AND ("resection and reconstruction" OR "reconstruction")) yielded zero results. A definitive paradigm for reconstructive options in pediatric mandible is the need of time. We describe a method of temporary mandibular reconstruction with "Endotracheal tube" following total mandibulectomy in infants.

The goal of pediatric mandibular reconstruction (PMR) is to achieve function, aesthetics, and to provide scope for future dental rehabilitation. Although various bony reconstruction options have been utilized in pediatrics over a wide age-range in benign and malignant etiologies, like iliac-crest, costochondral graft, free-fibula graft, titanium reconstruction plate, bony distraction and various prosthetic materials like customized cribs [2], but the optimal technique and time for such surgeries have not been established. It depends upon multiple factors like growth potential, location, type and nature of the lesion, defect size, method of management, remaining bone and soft tissue cover, postoperative chemotherapy and radiotherapy.

Although vascularized free-fibula flap is popular for larger adult mandibular reconstruction, however, its use in the pediatric population is a challenge as growth potential of the neo-mandible remains controversial postoperatively [3]. Costochondral graft has also been considered, nonetheless, it can cause overgrowth or extrusion of the graft with time. A "staged-protocol" was also defined by Troulis et al., where two patients exhibited spontaneous bony regeneration [4].

A newborn male neonate presented with lower jaw swelling. Medical and family history was non-significant. The swelling gradually increased with time. Patient reported at the age of 2 months, when the swelling involved the entire mandible, with marked buccal cortical expansion (Fig. 1). On palpation, the swelling was non-tender, with no associated paresthesia. Non-contrast computed tomography (NCCT) face revealed heterogenous and mixed radiopaque-radiolucent lesion encompassing the complete mandible, with thinned-out buccal cortex and multiple areas of perforation including the inferior border. Histo-pathological examination observed multiple bony trabeculae, osteoids at peripheral areas with osteoblastic rimming and multiple spindle-shaped mesenchymal cells, suggestive of JOF.

Total mandibulectomy was performed under general anesthesia through intraoral approach (Fig. 2), followed by reconstruction with silicone "Endotracheal (ET) Tube" of size 3.5, which was fixed with a resorbable 3-0 vicryl suture (Fig. 3). This was done to preserve the overlying soft tissue, otherwise it might show prolapse with time, and thus would hinder the future bony reconstruction without adequate soft tissue cover. No complications were observed at a one-year follow-up, with ET tube well in position (Fig. 4).

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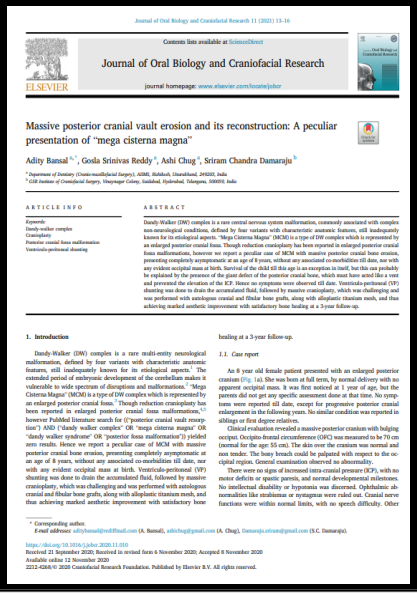

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Massive posterior cranial vault erosion and its reconstruction: A peculiar presentation of "mega cisterna magna"

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Dandy-walker complex
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Posterior cranial fossa malformation
Ventriculo-peritoneal shunting

ABSTRACT

Dandy-Walker (DW) complex is a rare central nervous system malformation, commonly associated with complex non-neurological conditions, defined by four variants with characteristic anatomic features, still inadequately known for its etiological aspects. "Mega Cisterna Magna" (MCM) is a type of DW complex which is represented by an enlarged posterior cranial fossa. Though reduction cranioplasty has been reported in enlarged posterior cranial fossa malformations, however we report a peculiar case of MCM with massive posterior cranial bone erosion, presenting completely asymptomatic at an age of 8 years, without any associated co-morbidities till date, nor with any evident occipital mass at birth. Survival of the child till this age is an exception in itself, but this can probably be explained by the presence of the giant defect of the posterior cranial bone, which must have acted like a vent and prevented the elevation of the ICP. Hence no symptoms were observed till date. Ventriculo-peritoneal (VP) shunting was done to drain the accumulated fluid, followed by massive cranioplasty, which was challenging and was performed with autologous cranial and fibular bone grafts, along with alloplastic titanium mesh, and thus achieving marked aesthetic improvement with satisfactory bone healing at a 3-year follow-up.

1. Introduction

Dandy-Walker (DW) complex is a rare multi-entity neurological malformation, defined by four variants with characteristic anatomic features, still inadequately known for its etiological aspects.[1] The extended period of embryonic development of the cerebellum makes it vulnerable to wide spectrum of disruptions and malformations.[2–4] "Mega Cisterna Magna" (MCM) is a type of DW complex which is represented by an enlarged posterior cranial fossa.[5] Though reduction cranioplasty has been reported in enlarged posterior cranial fossa malformations,[6] however PubMed literature search for (("posterior cranial vault resorption") AND ("dandy walker complex" OR "mega cisterna magna" OR "dandy walker syndrome" OR "posterior fossa malformation")) yielded zero results. Hence we report a peculiar case of MCM with massive posterior cranial bone erosion, presenting completely asymptomatic at an age of 8 years, without any associated co-morbidities till date, nor with any evident occipital mass at birth. Ventriculo-peritoneal (VP) shunting was done to drain the accumulated fluid, followed by massive cranioplasty, which was challenging and was performed with autologous cranial and fibular bone grafts, along with alloplastic titanium mesh, and thus achieving marked aesthetic improvement with satisfactory bone healing at a 3-year follow-up.

1.1. Case report

An 8 year old female patient presented with an enlarged posterior cranium (Fig. 1a). She was born at full term, by normal delivery with no apparent occipital mass. It was first noticed at 1 year of age, but the parents did not get any specific assessment done at that time. No symptoms were reported till date, except for progressive posterior cranial enlargement in the following years. No similar condition was reported in siblings or first degree relatives.

Clinical evaluation revealed a massive posterior cranium with bulging occiput. Occipito-frontal circumference (OFC) was measured to be 70 cm (normal for the age: 55 cm). The skin over the cranium was normal and non tender. The bony breach could be palpated with respect to the occipital region. General examination observed no abnormality.

There were no signs of increased intra-cranial pressure (ICP), with no motor deficits or spastic paresis, and normal developmental milestones. No intellectual disability or hypotonia was discerned. Ophthalmic abnormalities like strabismus or nystagmus were ruled out. Cranial nerve functions were within normal limits, with no speech difficulty. Other

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Analysis of SNPs on Locus 13q33.1-34 in Cleft Lip Palate [Neela PK, et al.] Indones Biomed J. 2021; 13(1): 27-33

RESEARCH ARTICLE

Analysis of Single Nucleotide Polymorphisms on Locus 13q33.1-34 in Multigenerational Families of Cleft Lip Palate using MassArray

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Abstract

BACKGROUND: Cleft lip palate is a common congenital anomaly with multifactorial etiology. Many high-risk markers at different loci were reported to be involved in its etiology. Advanced genetic research led to the discovery of evidence of a new linkage on 13q33.1-34 region at marker rs1830756 in two multigenerational Indian families. However, no further study was reported to confirm or validate this linkage in other families. Hence, the present study was designed.

METHODS: Twenty multigenerational families affected by non-syndromic cleft lip palate were selected for the study. Polymorphisms, rs1830756, rs1323672, rs1935135 of *FAM155A* gene; rs1961495, rs953386, rs14110040 of *COL4A1* gene; and rs726449, rs984300 of *MYO16* gene were selected. Genomic DNA was isolated and sent for genetic analysis by single nucleotide polymorphism (SNP) genotyping using the Mass Array method. Statistical analysis of the genomic data was done by PLINK. Bonferroni correction was applied and haplotype analysis was done using Haploview software.

RESULTS: Polymorphisms followed the Hardy Weinberg Equilibrium. In the allelic association, all the polymorphisms analysed showed no statistical significance. Hence, there was no significant difference in the allelic frequencies between non-syndromic cleft lip palate patients and healthy controls. The odds ratio was not more than 1.6 for all the SNPs. Haplotype analysis showed that haplotypes were not significantly higher in non-syndromic cleft patients than in control subjects.

CONCLUSION: There is no association between SNPs analysed in the locus 13q33.1-34 with cleft lip palate.

KEYWORDS: cleft lip palate; chromosome; polymorphism

Indones Biomed J. 2021; 13(1): 27-33

Introduction

Clefts in the oro-facial region is an important congenital anomaly affecting humanity. An infant is born with a cleft lip or palate somewhere on the planet every 2 minutes according to a WHO study.(1) Global surveys have shown that the frequency of cleft lip and palate varies significantly from one country to another. Cleft lip palate (CLP) is lowest in Africans (1:2500), while the North American Indians and East Asians have the highest prevalence (1:500). According to a study the incidence of clefts in India is around 1:300 to 1:1000 and 3 infants are born with some type of cleft every hour.(2) Cleft lip palate can be syndromic or non-syndromic. Approximately 70 % of the cleft lip and palate cases are non-syndromic and occur as isolated cases, whereas the remaining 30% of clefts are syndromic and are associated with some other anomalies. Our knowledge of

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Original article

Rebecca Chowdhry[1], Hanif Abdul Rahman[2], Priyanka Mishra[1], Suresh Kumar Sharma[3], Srinivas Gosla Reddy[1], Sachinjeet Kaur Sodhi Dhaliwal[4], Jagjit Singh Dhaliwal[1,2]

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Acquaintance, attitude, practices and challenges of palliative oral care among healthcare professionals: A cross-sectional survey at a tertiary healthcare institute in India

Abstract

Introduction: To assess knowledge, experiences, perceptions and barriers of healthcare professionals regarding oral palliative care.
Material and methods: The study involved 150 participants working at a tertiary healthcare institute in India. The data collection tool was pretested and self-administered with sections on demographics, knowledge, attitude and practices, patient referral, perspectives, and barriers to oral palliative care.
Results: The majority of participants 142 (94.6%) believed that palliative care patients need oral care, 85 (68.6%) participants had treated palliative care patients with dental problems. However, 60 (40%) had not received formal training for assessment and referral of patients with oral problems; 95 (63.4%) had never used tools to assess oral conditions of palliative care patients. According to 69 (46%), the best method to maintain oral hygiene is rinsing with saline and 81 (54%) expected physicians to be responsible for oral care of palliative care patients. The main challenges in providing oral care were lack of proper guidelines listed by 117 (78%) and lack of formal training indicated by 60 (40%) respondents.
Conclusions: This study highlighted the need for effective assessment of the mouth and appropriate oral care. Training of healthcare professionals, educating families and patients with oral palliative care are necessary to effectively manage oral symptoms. An appropriate patient follow-up and care delivery system should be structured at comprehensive cancer centres, which can improve the quality of life and compliance of patients. There is a need for the development of assessment tools and referral practices for providing relief, comfort and consolation to patients and families.

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Key words: advanced disease, cancer, hospice, oral care, palliative care

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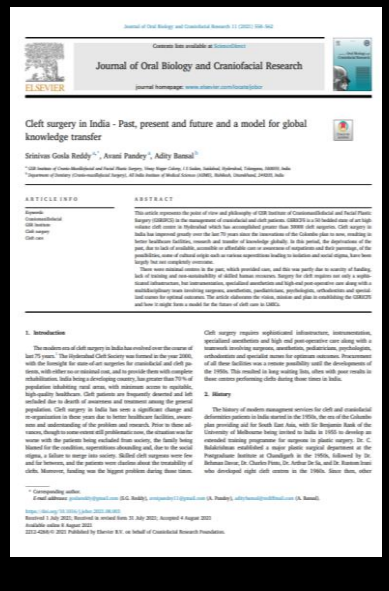

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Cleft surgery in India - Past, present and future and a model for global knowledge transfer

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Craniomaxillofacial
GSR Institute
Cleft surgery
Cleft care

ABSTRACT

This article represents the point of view and philosophy of GSR Institute of Craniomaxillofacial and Facial Plastic Surgery (GSRICFS) in the management of craniofacial and cleft patients. GSRICFS is a 50 bedded state of art high volume cleft centre in Hyderabad which has accomplished greater than 30000 cleft surgeries. Cleft surgery in India has improved greatly over the last 70 years since the innovations of the Columbia plan to now, resulting in better healthcare facilities, research and transfer of knowledge globally. In this period, the deprivations of the past, due to lack of available, accessible or affordable care or awareness of outpatients and their parentage, of the possibilities, some of cultural origin such as various superstitions leading to isolation and social stigma, have been largely but not completely overcome.

There were minimal centres in the past, which provided care, and this was partly due to scarcity of funding, lack of training and non-sustainability of skilled human resources. Surgery for cleft requires not only a sophisticated infrastructure, but instrumentation, specialized anesthetists and high end post-operative care along with a multidisciplinary team involving surgeons, anesthetists, paediatricians, psychologists, orthodontists and specialized nurses for optimum outcomes. Procurement of all these facilities was a remote possibility until the developments of the 1950s. This resulted in long waiting lists, often with poor results in those centres performing clefts during those times in India.

1. Introduction

The modern era of cleft surgery in India has evolved over the course of last 75 years.[1] The Hyderabad Cleft Society was formed in the year 2000, with the foresight for state-of-art surgeries for craniofacial and cleft patients, with either no or minimal cost, and to provide them with complete rehabilitation. India being a developing country, has greater than 71% of population inhabiting rural areas, with minimum access to equitable, high-quality healthcare. Cleft patients are frequently deserted and left secluded due to dearth of awareness and treatment among the general population. Cleft surgery in India has seen a significant change and re-organization in three years due to better healthcare facilities, awareness and understanding of the problem and research. Prior to these advances, though treatment still problematic-now, the situation was far worse with the patients being excluded from society, the family being blamed for the condition, superstitions abounding and, due to the social stigma, a failure to merge into society. Skilled cleft surgeons were few and far between, with many patients' parents clueless about the treatability of clefts. Moreover, funding was the biggest problem during those times.

Cleft surgery requires sophisticated infrastructure, instrumentation, specialized anesthetists and high end post-operative care along with a framework involving surgeons, anesthetists, pediatricians, psychologists, orthodontists and specialist nurses for optimum outcomes. Procurement of all these facilities was a remote possibility until the developments of the 1950s. This resulted in long waiting lists, often with poor results in those centres performing clefts during those times in India.

2. History

The history of modern management services for cleft and craniofacial deformities patients in India started in the 1950s, the era of the Colombo plan providing aid for South East Asia, with Sir Benjamin Rank of the University of Melbourne being invited to India in 1952 to develop an extended training programme for surgeons in plastic surgery. Dr. C. Balakrishnan established a major plastic surgical department at the Postgraduate Institute at Chandigarh in the 1950s, followed by Dr. Ashman Dewar, Dr. Charles Dent, Dr. Arthur De Sa, and Dr. Ramon Irani who developed eight cleft centres in the 1960s. Since then,

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Review Article

Silver Diamine Fluoride Versus Atraumatic Restorative Treatment in Pediatric Dental Caries Management: A Systematic Review and Meta-analysis

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Introduction: The objective was to compare the clinical efficacy of silver diamine fluoride (SDF) and atraumatic restorative treatment (ART) in arresting active caries in primary teeth and first permanent molars in children.
Materials and Methods: The study protocol was registered in PROSPERO (CRD42020205675). A systematic search was performed in PubMed, Scopus, Embase, Cochrane Library, and gray literature for randomized controlled trials (RCTs) published in English language with a minimum follow-up of 6 months, comparing the caries arrest potential of SDF with ART in primary teeth and first permanent molars in children. The risk of bias and quality assessment of the studies was done using the Cochrane Collaboration Tool and Joanna Briggs Institute Critical Appraisal Tool. Data analysis was performed using RevMan software; the outcomes were summarized in meta-analysis (MA) using the random-effects model, and the odds ratio (OR) at 95% confidence interval (CI) was computed. **Results:** A total of 1059 studies were identified, out of which 562 remained after removal of duplicates. Eight studies were considered for full-text eligibility, and four studies were included in the qualitative review. Three out of four studies were conducted on primary dentition, whereas one study was done on erupting first permanent molars in children. MA of the two studies compared 38% SDF with ART in primary molars at 12 months and revealed the OR to be 2.02 (95% CI: 0.86–4.71; $I^2 = 62\%$; $P = 0.10$). **Conclusion:** The current review points to the lack of solid evidence comparing SDF with ART for arresting active caries in primary teeth, especially in the first permanent molars. No statistically significant difference between 38% SDF and ART in primary molars at 12 months was found in the present review. Well-designed RCTs are required to determine a minimum concentration of SDF which is effective and safe for caries arrest in children.

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Keywords: *Atraumatic restorative treatment, dental caries arrest, minimal intervention dentistry, non-aerosol-generating procedures, pediatric dentistry, silver diamine fluoride*

INTRODUCTION

Early childhood caries is the most prevalent preventable disease affecting 60-90% of schoolchildren globally.[1] This significant public health

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Relapse and temporomandibular joint dysfunction (TMD) as postoperative complication in skeletal class III patients undergoing bimaxillary orthognathic surgery: A systematic review

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ARTICLE INFO

Keywords:
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Postoperative complication

ABSTRACT

Objectives: The aim of this study was to determine Relapse and TMD as postoperative complication in skeletal class III patients undergoing bimaxillary orthognathic surgery.
Materials and methods: Data was obtained by database searching using The Cochrane Central Register of Controlled Trials (central), PUBMED, SCOPUS, EMBASE, Google scholar, National Medical library, New Delhi. The titles and abstracts of the electronic search results were screened and evaluated by two observers for eligibility according to the inclusion and exclusion criteria.
Results: A total of 4679 articles were identified through the searching. Among them, 3479 duplicate articles were removed. 418 studies were selected based on the eligibility criteria. For the present review, 20 articles were included after evaluation according to the inclusion criteria. The Prisma diagram flowchart demonstrates our selection scheme. Quality assessment criteria to evaluate the studies were decided by two review authors in accordance with CONSORT guidelines. Each study was assessed using the evaluation method described in the Cochrane Handbook for Systematic Reviews. Among the 20 studies included in the review, marked degree of relapse in the mandible was noted from 3 months - 1 year postoperatively in 8 studies, 5 studies reported both TMD prevalence and relapse, whereas only 4 studies reported TMD disorder alone.
Conclusion: Complications of relapse and TMD are associated with bimaxillary orthognathic surgery procedures. More RCTs and CCTs are needed in this regard to get better quality evidence. This review was registered with PROSPERO- CRD42020211342.

1. Introduction

Orthognathic surgery is frequently performed by oral surgeons for treatment of maxillofacial deformities. The surgery has psychological and social benefits, as it causes improvement in the function and facial appearance of the patient. Achievement of long-term stability after surgical correction is essential for the success of the procedure.[1]

However, complications do occur while performing orthognathic surgery such as relapse (change in position of bones after surgery), maxillary sinusitis, sensory nerve morbidity, bone necrosis, loss of tooth vitality, vascular complications, unfavourable fractures of the skull base or pterygoid plates, nasal septum deviation, malpositioning, nonunion, and temporomandibular joint (TMJ) problems; A combination of complications are rare but could be fatal. The surgeon does keep an account of preventive protocols and is also prepared to treat them if they occur.[2,3]

Bimaxillary surgery is planned when both jaw osteotomized after the consensus diagnostic planning and evaluation.[4] Bimaxillary surgeries have been practiced for many years now, with the advantages of enhancing the aesthetic profile of the patient and rendering the functional correction with reduction in morbidity and mortality.[5]

Although systematic reviews have investigated orthognathic surgeries in terms of preoperative, intraoperative and postoperative complications, antibiotic prophylaxis and skeletal stability,[6–8] none have examined the incidence of relapse and temporomandibular joint

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Original Research

Bone Graft Materials in Late Secondary and Tertiary Alveolar Bone Grafting: A Review

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ABSTRACT

Introduction: Bone grafting of the alveolar cleft is necessary to facilitate unhindered growth of maxillofacial complex and eruption of permanent teeth in defect region when not congenitally missing. Secondary grafting undertaken during mixed dentition helps achieve these two functions. However, due to varying reasons, socioeconomic concerns being one of them, many patients do not undergo this procedure and report at a time when late grafting is the only option to overcome the deficit bone.
Aims: To identify the different grafting materials that have been utilized for the 2 surgical procedures.
Methodology: Electronic databases were searched to find bone sources used for secondary and tertiary bone grafting to identify their characteristics and clinical outcomes. Attention was paid to literature which elucidated potential use of dental implants in the grafted site and presented its clinical course.
Results: Over the years, many graft materials have been researched upon with autologous sources being considered as the gold standard and being the most commonly utilized. Additionally, graft characteristics, observations of the published authors, and success of implant rehabilitation, where used showed a mixed bag of results. Certain other potential bone sources were also identified that have shown in-vitro or animal model success but have not yet made a clinical presence for the reviewed procedures.
Conclusion: Choice of bone graft depends on numerous factors such as defect size, surgeon preference and patient acceptance. To understand further each graft source and its characteristics, randomized control trials should be conducted to provide better clinical evidence.

Key Words: Alveolar bone grafting, Alveolar cleft, Congenital abnormalities, Dental implants, Rehabilitation, Tertiary grafting

INTRODUCTION

The multidisciplinary team involved in the treatment and repair of the orofacial cleft has faced challenges of successfully and satisfactorily repairing and rehabilitating the affected region. Advances in surgical knowledge, techniques, and materials, have kept the quest open, to find a universally accepted ideal bone grafting material. Secondary alveolar bone grafting (SABG) is done during the mixed dentition to facilitate permanent teeth eruption and minimizes functional and esthetic compromise. In cases where the permanent tooth in the cleft region fails to form or is indicated for extraction, it inadvertently requires prosthetic replacement which cannot be done till the patient attains skeletal maturity.

Removable and fixed partial dentures (RPD and FPD) are the oldest rehabilitative substitutes that, though easy to fabricate, provide limited esthetics. They also do not contribute to functional graft stimulation, thereby leading to increased resorption.[1] With overtime use, RPDs require frequent replacement and irritate the underlying mucosa. Contrarily, FPDs compromise the adjacent healthy hard and soft tissue. Thus, both modalities add to patient's physical stress of frequent and multiple visits, often denting them psychologically. Dental implants are a welcome alternative however, by the time a pa-

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Case Report

Nasal deformity correction with nasal prosthesis

Megha Sahu, Monal Karkar, Vaibhav Rama Subramaniam[1], Gosla Srinivas Reddy

ABSTRACT

Nasal deformities can vary in the form of severity. Several different factors such as congenital, burn and traumatic nasal fractures or soft-tissue injury/loss, neoplastic defects resulting from surgery for the treatment of cancers causing compromise the structural architecture and functional framework of the nose. This case report describes the prosthetic rehabilitation of two female patients, one who was reported with congenital arrhinia and another one who had accidental electrical burns of the face. The surgeon's team as well as the maxillofacial prosthetics team discussed the treatment options with the parents and decided to rehabilitate with a nasal prosthesis. This clinical report is imparting an accessible and ergonomic method for prosthetic rehabilitation of a patient.

Key words: Arrhinia, maxillofacial prosthesis, nasal deformity

INTRODUCTION

Nasal distortions can be congenital, or due to burns, trauma, and neoplasia, causing compromise in the auxiliary designs and utilitarian structures of the nose.[1] Recent advances in treatment and restoration, especially maxillofacial prosthetics, may ease the sequelae of many distressing medical procedures and helps in the form of function.[2]

For those two situation report, a conclusive attractive nasal prosthesis has been utilized for restoration of a fractional nasal deformity utilizing mechanical and anatomic retentive guides.

CASE REPORTS

Case 1

In 2010, an 8-year-old girl reported to our institute with a complete absence of nose since birth. The patient was complaining of breathing difficulty. On examination, absence of the nose, nasal root and nasal pits, longitudinal ridge-like protuberances in the mid-face, bulging swelling appeared near the inner corner of the right eye, fanned medial canthi of eyes bilaterally, bilateral strabismus, hypoplastic maxilla, microphthalmia, and hypertelorism [Figure 1]. Three-dimensional computed tomography information showed an atretic bony plate and the absence of piriform aperture and nasal bones. Blockage of the nasal passages (choanal atresia) [Figure 2].

Surgical treatment of the congenital arrhinia was planned in two steps:-

In the initial step, correction of hypertelorism was done. Correction of arrhinia was done by raising dorsal nasal fold alongside maxillary labial sulcus cut and the nasal cavity was made by putting a nasogastric tube [Figure 3]. A "Spectacle osteotomy" was planned, and the orbits were mediatized in the wake of eliminating the overabundance bone from the midline nasal territory.

In the second step, careful adjustment of arrhinia was finished. This was accomplished by raising the dorsal nasal fold alongside maxillary labial sulcus cut and the nasal cavity was drilled through and through from

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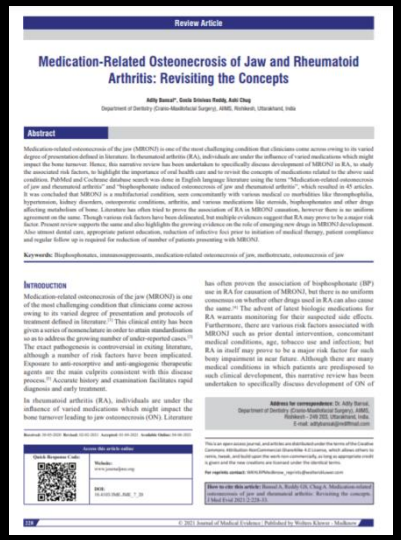

Review Article

Medication-Related Osteonecrosis of Jaw and Rheumatoid Arthritis: Revisiting the Concepts

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Abstract

Medication-related osteonecrosis of the jaw (MRONJ) is one of the most challenging condition that clinicians come across owing to its varied degree of presentation defined in literature. In rheumatoid arthritis (RA), individuals are under the influence of varied medications which might impact the bone turnover. Hence, this narrative review has been undertaken to specifically discuss development of MRONJ in RA, to study the associated risk factors, to highlight the importance of oral health care and to revisit the concepts of medications related to the above said condition. PubMed and Cochrane database search was done in English language literature using the terms "Medication-related osteonecrosis of jaw and rheumatoid arthritis" and "bisphosphonate induced osteonecrosis of jaw and rheumatoid arthritis", which resulted in 45 articles. It was concluded that MRONJ is a multifactorial condition, seen concomitantly with various medical co-morbidities like rheumatoid arthritis, hypertension, kidney disorders, osteoporotic conditions, arthritis, and various medications like steroids, bisphosphonates and other drugs affecting metabolism of bone. Literature has often tried to prove the association of RA in MRONJ causation, however there is no uniform agreement on the same. Though various risk factors have been delineated, but multiple evidences suggest that RA may prove to be a major risk factor. Present review supports the same and also highlights the growing evidence on the role of emerging new drugs in MRONJ development. Also utmost dental care, appropriate patient education, reduction of infective foci prior to initiation of medical therapy, patient compliance and regular follow up is required for reduction of number of patients presenting with MRONJ.

Keywords: Bisphosphonates, immunosuppressants, medication-related osteonecrosis of jaw, methotrexate, osteonecrosis of jaw

Introduction

Medication-related osteonecrosis of the jaw (MRONJ) is one of the most challenging condition that clinicians come across owing to its varied degree of presentation and protocols of treatment defined in literature.[1,2] This clinical entity has been given a series of nomenclature in order to attain standardisation so as to address the growing number of under-reported cases.[3] The exact pathogenesis is controversial in existing literature, although a number of risk factors have been implicated. Exposure to anti-resorptive and anti-angiogenic therapeutic agents are the main culprits consistent with this disease process.[3] Accurate history and examination facilitates rapid diagnosis and early treatment.

In rheumatoid arthritis (RA), individuals are under the influence of varied medications which might impact the bone turnover leading to jaw osteonecrosis (ON). Literature has often proven the association of bisphosphonate (BP) use in RA for causation of MRONJ, but there is no uniform consensus on whether other drugs used in RA can also cause the same.[4] The advent of latest biologic medications for RA warrants monitoring for their suspected side effects. Furthermore, there are various risk factors associated with MRONJ such as prior dental intervention, concomitant medical conditions, age, tobacco use and infection; but RA in itself may prove to be a major risk factor for such bony impairment in near future. Although there are many medical conditions in which patients are predisposed to such clinical development, this narrative review has been undertaken to specifically discuss development of ON of

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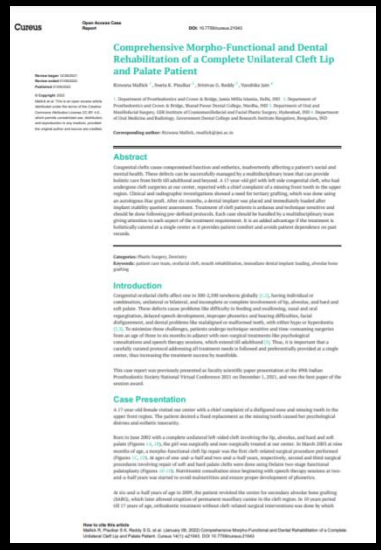

Cureus

Open Access Case Report

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Comprehensive Morpho-Functional and Dental Rehabilitation of a Complete Unilateral Cleft Lip and Palate Patient

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Abstract

Congenital cleft lips cause compromised function and esthetics, inadvertently affecting a patient's social and mental health. These defects can be successfully managed with a multidisciplinary team that can provide holistic care from birth till adulthood and beyond. A 17-year-old girl with left side congenital cleft, who had undergone cleft surgeries at our center, reported with a chief complaint of a missing front tooth in the upper region. Clinical and radiographic investigations showed a need for tertiary grafting, which was done using an autologous iliac graft. After six months, an implant was placed and immediately loaded after implant stability quotient assessment. Treatment of cleft patients is arduous and technique sensitive and should be done following pre-defined protocols. Each case should be handled by a multidisciplinary team giving attention to each aspect of the treatment requirement. It is an added advantage if the treatment is periodically catered at a single center as it provides patient comfort and avoids patient dependence on past records.

Categories: Plastic Surgery, Dentistry
Keywords: patient care team, orofacial cleft, mouth rehabilitation, immediate dental implant loading, alveolar bone grafting

Introduction

Congenital orofacial clefts affect one in 500-1,000 newborns globally [1,2], having individual or combination, unilateral or bilateral, and incomplete or complete involvement of lip, alveolus, and hard and soft palate. These defects cause problems like difficulty in feeding and swallowing, nasal and oral regurgitation, delayed speech development, dentoalveolar anomalies and hearing difficulties, facial disfigurement, and dental problems like malaligned or malformed teeth, with either hypo- or hyperdontia [3,4]. To minimize these challenges, patients undergo multistage corrective and time-consuming surgeries from an age of three to six months in adjunct with non-surgical treatments like psychological consultations and speech therapy sessions, which extend till adulthood [5,6]. Thus, it is important that a carefully curated protocol addressing all treatment needs is followed and preferentially provided at a single center, thus increasing the treatment success by manifolds.

This case report was previously presented as faculty scientific paper presentation at the 49th Indian Prosthodontic Society National Virtual Conference 2021 on December 1, 2021, and was the best paper of the session award.

Case Presentation

A 17-year-old female visited our center with a chief complaint of a disfigured nose and missing tooth in the upper front region. The patient desired a fixed replacement as the missing tooth caused her psychological distress and esthetic insecurity.

Born in June 2002 with a complete unilateral left-sided cleft involving the lip, alveolus, and hard and soft palate (Figures 1a, 1b), the girl was surgically and non-surgically treated at our center. In March 2005 at nine months of age, a morpho-functional cleft lip repair was the first cleft-related surgical procedure performed (Figures 1c, 1d). At ages of one and a half and four years, respectively, second and third surgical procedures involving repair of soft and hard palate clefts were done using Delaire two-stage functional palatoplasty (Figures 1e-1h). Nutritional consultation since beginning with speech therapy sessions at two- and a half years was started to avoid malnutrition and ensure proper development of phonetics.

At six and a half years of age in 2009, the patient revisited the center for secondary alveolar bone grafting (SABG), which later allowed eruption of permanent maxillary canine in the cleft region. At 10 years period till 17 years of age, orthodontic treatment without cleft-related surgical interventions was done by which

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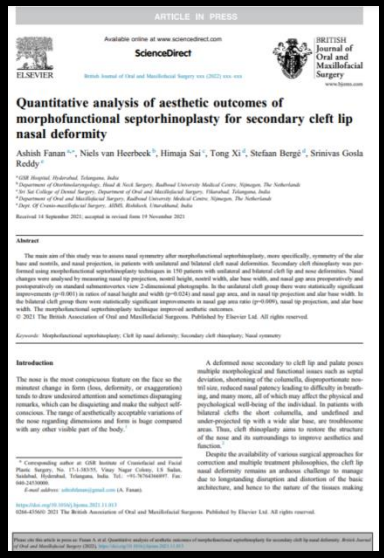

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Quantitative analysis of aesthetic outcomes of morphofunctional septorhinoplasty for secondary cleft lip nasal deformity

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Abstract

The main aim of this study was to assess nasal symmetry after morphofunctional septorhinoplasty, more specifically, symmetry of the alar base and nostrils, and nasal projection, in patients with unilateral and bilateral cleft nasal deformities. Secondary cleft rhinoplasty was performed using morphofunctional septorhinoplasty techniques in 150 patients with unilateral and bilateral cleft lip and nose deformities. Nasal changes were analysed by measuring nasal tip projection, nostril height, nostril width, alar base width, and nasal gap area preoperatively and postoperatively on standard submentovertex view 2-dimensional photographs. In the unilateral cleft group there were statistically significant improvements ($p<0.001$) in ratios of nasal height and width ($p=0.024$) and nasal gap area, and in nasal tip projection and alar base width. In the bilateral cleft group there were statistically significant improvements in nasal gap area ratio ($p=0.009$), nasal tip projection, and alar base width. The morphofunctional septorhinoplasty technique improved aesthetic outcomes.

Keywords: Morphofunctional septorhinoplasty; Cleft lip nasal deformity; Secondary cleft rhinoplasty; Nasal symmetry

Introduction

The nose is the most conspicuous feature on the face so the minutest change in form (loss, deformity, or exaggeration) tends to draw undesired attention and sometimes disparaging remarks, which can be disquieting and make the subject self-conscious. The range of aesthetically acceptable variations of the nose regarding dimensions and form is huge compared with any other visible part of the body.[1]

A deformed nose secondary to cleft lip and palate poses multiple morphological and functional issues such as septal deviation, shortening of the columella, disproportionate nostril size, reduced nasal patency leading to difficulty in breathing, and many more, all of which may affect the physical and psychological well-being of the individual. In patients with bilateral clefts the short columella, and undefined and under-projected tip with a wide alar base, are troublesome areas. Thus, cleft rhinoplasty aims to restore the structure of the nose and its surroundings to improve aesthetics and function.[2]

Despite the availability of various surgical approaches for correction and multiple treatment philosophies, the cleft lip nasal deformity remains an arduous challenge to manage due to longstanding disruption and distortion of the basic architecture, and hence to the nature of the tissues making

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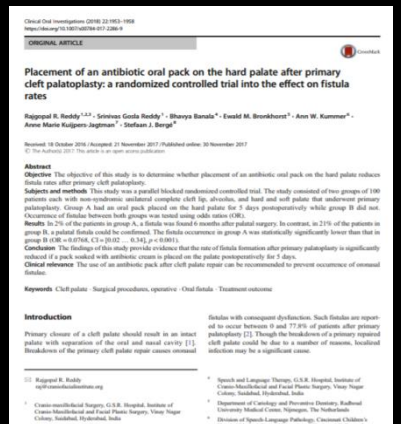

Clinical Oral Investigations (2018) 22:1963–1968
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ORIGINAL ARTICLE

CrossMark

Placement of an antibiotic oral pack on the hard palate after primary cleft palatoplasty: a randomized controlled trial into the effect on fistula rates

Rajgopal R. Reddy[1,2,3] · Srinivas Gosla Reddy[4] · Bhavya Banala[4] · Ewald M. Bronkhorst[5] · Ann W. Kummer[6] · Anne Marie Kuijpers-Jagtman[7] · Stefaan J. Bergé[8]

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Abstract

Objective The objective of this study is to determine whether placement of an antibiotic oral pack on the hard palate reduces fistula rates after primary cleft palatoplasty.

Subjects and methods This study was a parallel blocked randomized controlled trial. The study consisted of two groups of 100 patients each with non-syndromic unilateral complete cleft lip, alveolus, and hard and soft palate that underwent primary palatoplasty. Group A had an oral pack placed on the hard palate for 5 days postoperatively while group B did not. Occurrence of fistulae between both groups was tested using odds ratios (OR).

Results In 2% of the patients in group A, a fistula was found 6 months after palatal surgery. In contrast, in 21% of the patients in group B, a palatal fistula could be confirmed. The fistula occurrence in group A was statistically significantly lower than that in group B (OR = 0.0768, CI = [0.022 ... 0.34], $p < 0.001$).

Conclusion The findings of this study provide evidence that the rate of fistula formation after primary palatoplasty is significantly reduced if a pack soaked with antibiotic cream is placed on the palate postoperatively for 5 days.

Clinical relevance The use of an antibiotic pack after cleft palate repair can be recommended to prevent occurrence of oronasal fistulae.

Keywords Cleft palate · Surgical procedures, operative · Oral fistula · Treatment outcome

Introduction

Primary closure of a cleft palate should result in an intact palate with separation of the oral and nasal cavity [1]. Breakdown of the primary cleft palate repair causes oronasal fistulas with consequent dysfunction. Such fistulas are reported to occur between 0 and 77.8% of patients after primary palatoplasty [2]. Though the breakdown of a primary cleft palate could be due to a number of reasons, localized infection may be a significant cause.

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ELSEVIER

Posterior cranial vault distraction osteogenesis: A systematic review

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ARTICLE INFO

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Posterior cranial vault distraction osteogenesis (PCVDO)
Craniosynostosis
Intracranial pressure (ICP)
Monobloc frontal advancement (FOA)
Distraction

ABSTRACT

Purpose: Posterior cranial vault distraction osteogenesis (PCVDO) has become the treatment of choice in specific indications within 12 years since its introduction in 2006. It is used to treat or prevent intracranial hypertension secondary to craniosynostosis. However, there is still a lack of evidence describing this procedure's safety concerning the anomalies that bring it close to the vertex. This systematic review aims to generate evidence regarding the safety of this new technique.

Material and method: A systematic search of Pubmed and Embase database were done without any time limit until the last search date of July 31, 2021. Articles focused on posterior cranial vault distraction osteogenesis were shortlisted using defined inclusion criteria. In addition, complications, volume gain, and distraction protocols in patients with craniosynostosis were assessed.

Results: The review included 11 articles from 11 different centres. Of the total 241 patients, 51 were non-syndromic patients, and 190 were syndromic patients. There were 242 procedures done on 241 patients. The proportion of patients with complications was 45%. Wound infection was the most commonly reported complications. PCVDO resulted in 20–26% volume gain and successfully prevented worsened intracranial pressure (ICP).

Conclusion: The systematic review has significantly identified a 45.680% incidence of complications in PCVDO. The complexity was linked directly to the Posterior cranial vault distraction osteogenesis procedure (PCVDO). The authors identified the evolution of many unique vectors and asymmetry designs customized for patients and practices for safe surgery. The effects of PCVDO on the anterior cranial fossa remain a topic of interest and require observational studies for better understanding.

1. Introduction

The premature fusion of a skull suture causes restricted growth of the skull perpendicular to it and resultant compensatory growth parallel to the suture. Thus, the cranial vault may become asymmetrical and smaller to accommodate the brain. This restriction in the Intracranial volume causes increased intracranial pressure and sequelae of events.

Usually seen in the first year after birth, the affected child is clinically drowsy, irritable, and can present with nausea and vomiting. Fundoscopy can reveal papilledema, with thumb printing on the skull on radiographic examination. Older patients complain of headaches. Invasive measurements of ICP(intracranial pressure) also give increased readings[1]

The treatment approach to such a clinical challenge is to increase the intracranial volume. Conventionally taking advantage of the plasticity of pediatric skull one stage cranioplasty or frontal-orbital advancement (FOA) was done.

However, with the introduction of distraction osteogenesis (DO), management of craniosynostosis has evolved.

Thomas et al.[2] have described the role of Posterior cranial vault distraction osteogenesis (PCVDO) in redirecting calvarial growth along the fronto-occipital plane. in addition, the procedure reduces raised ICP (intracranial pressure). Thus, more complicated FOA (fronto-orbital advancement) surgery is deferred.

Previously DO was used in Fronto-orbital Advancement (FOA) as suggested by Hirabayashi in the 1998 Hong Kong Series[3]. However, in 2004 Komuro et al.[4] reported the first use of cranial distraction in the posterior skull for unilateral lambdoid synostosis.

Abbreviations: PCVDO, Posterior cranial vault distraction osteogenesis; ICP, intra-cranial pressure; DO, distraction osteogenesis.

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Review Article

Assessing Time Gap between Alveolar Cleft Repair and Dental Implant Placement: A Systematic Review

RIZWANA MALLICK, SWETA KALE PISULKAR, SRINIVAS GOSLA REDDY, VANSHIKA JAIN

ABSTRACT

Introduction: Orthodontic treatment is commonly undertaken in cleft patients for space closure in cleft region. However, it is only able to achieve 50-75% closure, resorting to use of dental prosthesis in form of removable or fixed partial dentures. Dental implant-based rehabilitation provides a suitable solution however, their success depends on the quality and quantity of the residual bone. Resorption of bone graft is a known scientific fact and thus, it is important to know the minimum time after which the implants can be placed so that the grafted bone is minimally lost. However, this time gap between final bone grafting and implant placement in cleft patients has not been well established.

Aim: To determine whether the clinical and/or radiological success of dental implant-based rehabilitation depends on the time elapsed between the last grafting procedure and dental implant placement in cleft region with missing permanent teeth in a unilateral or bilateral alveolar cleft patient.

Materials and Methods: The systematic review was registered in PROSPERO (International Prospective Register of Systematic Reviews) via registration number CRD42020197709. Systematic review was done at GSR Institute of Craniomaxillofacial and Facial Plastic Surgery, Hyderabad, Telangana, India, between March 2020 to July 2020 wherein articles in electronic databases (PubMed, ScienceDirect, Web of Science, &literatura Latino-Americana de Ciencias da Saude), Cochrane Library and Google scholar, published between January 2011 to February 2020 were searched. Combination of Medical Subject Headings (MeSH) terms used included "cleft palate", "cleft lip", "alveolar bone grafting", and "survival" as some of the key terms. Additional information was sought by contacting the corresponding authors. Search items included were cleft, alveolar bone grafting and dental implants. Only studies with details of time gap between last grafting procedure and implant placement were included. Data extraction was done independently by two authors using pre-defined fields.

Results: Total of 12 studies were included wherein 259 dental implants were placed in 180 patients. In patients undergoing tertiary grafting, a time of 10 to 26 months was given prior to implant placement while in patients where tertiary grafting was not done, a time of 24 to 144 months was seen between last procedures. A high implant success of 95-100% was seen irrespective of the grafted bone. The JBI (Joanna Briggs Institute) tool of risk of bias assessment was used. Low level of evidence was presented by case reports and case series.

Conclusion: In case of tertiary grafting, a healing period of 24 months was seen to be ideal for successful implant treatment however, a need for more comprehensive studies was recognized due to lack of mutual assessment parameters and shared information in the currently reviewed literature.

Keywords: Aesthetics, Bone grafting, Nonsyndromic cleiling, Oral health, Prosthetics, Psychological assessment, Tooth agenesis

INTRODUCTION

Orthodontic treatment in cleft patients is able to achieve only 50 to 75% closure of residual space thereby, requiring remaining space closure using dental prosthesis [1]. Dental implants in grafted alveolar cleft often provide enhanced functional and aesthetic results, improving patient's psychological well-being and treatment acceptance [2-5]. However, they pose unique challenges that need due acknowledgment during treatment planning. Secondary bone grafting is performed prior to growth completion, while dental implants cannot be placed till patient's craniofacial growth is complete [6]. During this duration, i.e., from secondary grafting till the patient attains skeletal maturity, there is an unavoidable loss in bone dimensions, often reaching dimensions that is unsuitable for implant placement [7,8].

This bone loss inadvertently calls for repeated bone grafting in the form of tertiary grafting to restore the lost bone [9]. However, certain patients present inhibition to the latter because of the involvement of additional surgical procedures and in such cases, dental implants have to be placed under compromised conditions [2]. Of the many factors on which success of dental implant depends, presence of foundational bone has a major influence that dictates osseointegration and implant surface coverage [1]. The currently available literature although identifies the problem of postgrafting bone resorption, they fail to comprehensively conclude about the minimum time after which implant can be placed in a grafted site so that this grafted bone is not lost [1]. The systematic review was done with an aim of determining the time elapsed between last performed bone graft surgery and dental implant placement in the alveolar cleft site in asymptomic patients. It also aimed at enumerating different sources used for grafting and probable outcomes associated with their use, characterisation of macro and micro features of the used dental implants including implant dimensions and its surface treatment, implant loading protocol used, clinical and radiographic parameters assessed, clinical success of placed dental implants, and follow-up durations.

MATERIALS AND METHODS

The presented systematic review was done after following the 27-item Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) checklist [10,11]. The review was conducted at GSR Institute of Craniomaxillofacial and Facial Plastic Surgery, Hyderabad, Telangana from March 2020 to July 2020.

The present review was done using the following patient Population, Intervention, Comparison, Outcome (PICO) guidelines [12]:

P- Unilateral or bilateral alveolar cleft patients with missing permanent tooth in cleft region.

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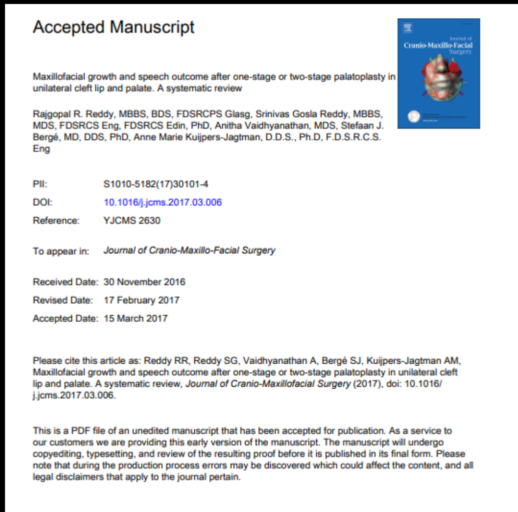
Accepted Manuscript

Maxillofacial growth and speech outcome after one-stage or two-stage palatoplasty in unilateral cleft lip and palate. A systematic review

Rajgopal R. Reddy, MBBS, BDS, FDSRCPS Glasg, Srinivas Gosla Reddy, MBBS, MDS, FDSRCS Eng, FDSRCS Edin, PhD, Anitha Vaidhyanathan, MDS, Stefaan J. Bergé, MD, DDS, PhD, Anne Marie Kuijpers-Jagtman, D.D.S., Ph.D, F.D.S.R.C.S. Eng

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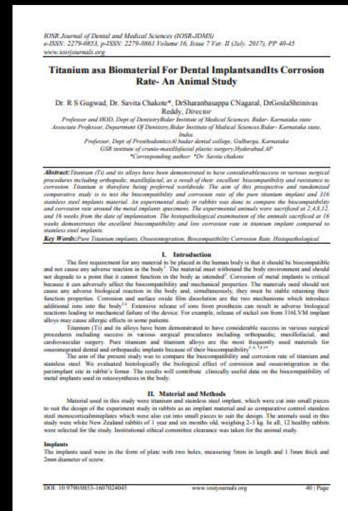
IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)

Titanium asa Biomaterial For Dental ImplantsandIts Corrosion Rate- An Animal Study

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Short Communication

The Possible Link between Cheilitis Granulomatosa and Oral Health?

Tulika Wakhloo, Srinivas Gosla Reddy, Ashi Chug, Arvind Kumar

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Case Report

A case of idiopathic hypogonadotropic hypogonadism with dental and orofacial defects: A key to the perception of possible molecular etiology

Adity Bansal, Prashant Kumar Verma, Rahul Bhakat, Ashi Chug, Srinivas Gosla Reddy

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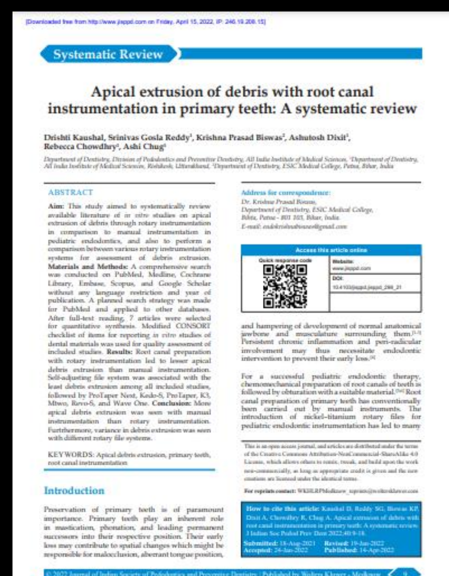
Systematic Review

Apical extrusion of debris with root canal instrumentation in primary teeth: A systematic review

Drishti Kaushal, Srinivas Gosla Reddy, Krishna Prasad Biswas, Ashutosh Dixit, Rebecca Chowdhry, Ashi Chug

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Journal of Oral Biology and Craniofacial Research

Reconstruction options in pediatric population with hemi or total mandibulectomy defects: A systematic review

Adity Bansal, Shakil Ahmed Nagori, Ashi Chug, Ashutosh Dixit, Rebecca Chowdhry, Srinivas Gosla Reddy

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Journal of Oral Biology and Craniofacial Research

Effect of antibiotic pack on hard palate after fistula closure on nasal airflow and reoccurrence rate

Rajgopal R. Reddy, Srinivas Gosla Reddy, Avni Pandey, Bhavya Banala, Ewald M. Bronkhorst, Anne Marie Kuijpers-Jagtman

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Editorial

The road ahead

Srinivas Gosla Reddy

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Journal of Cranio-Maxillo-Facial Surgery

Systematic review of "filling" procedures for lip augmentation regarding types of material, outcomes and complications

Joan San Miguel Moragas, Rajgopal R. Reddy, Federico Hernández Alfaro, Maurice Y. Mommaerts

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UNILATERAL COMPLETE CLEFT LIP REPAIR:
A MODERN MORPHO-FUNCTIONAL SURGICAL APPROACH

The Effect of Primary Cheilo-Septoplasty with Afroze Incision based on the Morpho Functional Philosophy in the Repair of Complete Unilateral Cleft Lip Defects

Een wetenschappelijke proeve op het gebied van de Medische Wetenschappen

PROEFSCHRIFT

ter verkrijging van de graad van doctor
aan de Radboud Universiteit Nijmegen
op gezag van de Rector Magnificus prof. mr. S.C.J.J. Kortmann,
volgens besluit van het college van decanen
in het openbaar te verdedigen op woensdag 17 november 2010
om 13.30 uur precies

door

Srinivas Gosla Reddy
geboren op 21 juni 1969
te Nellore, Andhra Pradesh, India

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Unilateral Complete Cleft Palate Repair:
A Morpho-functional Approach

Doctoral Thesis

to obtain the degree of doctor
from Radboud University Nijmegen
on authority of the
rector magnificus, prof. dr. J.H.J.M. van Krieken
according to the decision of the Council of
Deans to be defended in public on
Friday, 16 November 2018 at 12:30 hours

by

Rajgopal R. Reddy
born on 11 November 1971
in Hyderabad, India

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Case Report

A Rare Case of Solitary Palatal Myofibroma in a Young Pediatric Patient

Abstract

Myofibroma (MF) is a benign spindle cell neoplasm rarely found in the oral cavity. It is common in males than females (2:1) and mostly seen to develop before 2 years of age with few cases reported in adults. This article reports a rare case of solitary MF of the hard palate in an 8-year-old female child; highlighting the clinical features, histopathology, differential diagnosis while emphasizing the importance of immunohistochemistry in establishing an accurate diagnosis and management of the same. The objective should be to differentiate benign versus malignant spindle cell lesions of smooth muscle, nerve tissue, fibrocytic, and histiocytic origin. Rapid growth of the lesion often raises suspicion of malignancy and may lead to misdiagnosis and inappropriate management.

Tulika Wakhloo, Gosla Reddy, Ashi Chug, Arvind Kumar

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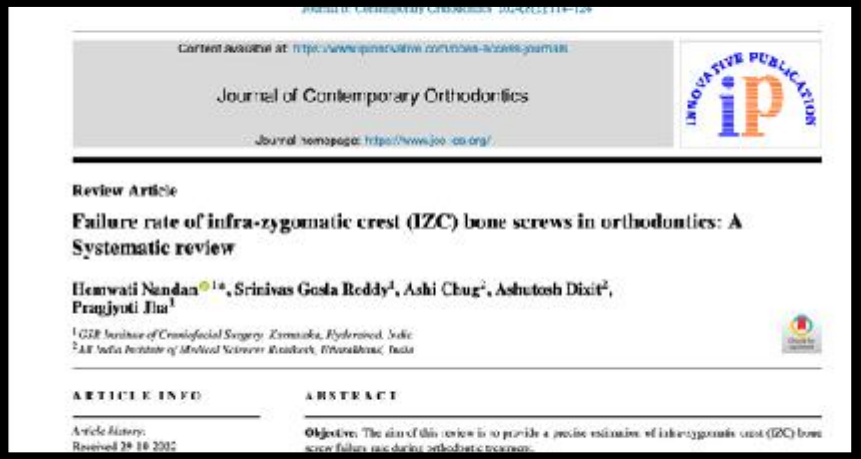

Journal of Contemporary Orthodontics

Review Article

Failure rate of infra-zygomatic crest (IZC) bone screws in orthodontics: A Systematic review

Hemwati Nandan, Srinivas Gosla Reddy, Ashi Chug, Ashutosh Dixit, Prajjyoti Jha

ARTICLE INFO

ABSTRACT

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EP039 The Hyderabad index to measure success of primary cleft lip repair

Victoria Vincent · Victoria Vincent · Srinivas Gosla Reddy · Anthony Markus

Affiliations & Notes · Article Info

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An approved and validated scoring system to assess post-operative primary cleft lip repair has long been awaited. Disfigurement is often the primary concern for patients and their families. Therefore, developing a universally accepted scoring system may be of benefit. The aim of this paper is to determine any disadvantages of previous systems to develop a new scoring formula.

Article metrics

Metric data currently unavailable

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Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology

Volume 37, Issue 1, January 2025, Pages 23-30

Review article

Comparison of Lefort-1 advancement by internal and external distraction osteogenesis in non-syndromic cleft lip and palate: A systematic review and meta-analysis

Sameer Pandey, Ashi Chug, Srinivas Gosla Reddy, Saurabh S. Simre

IP Indian Journal of Orthodontics and Dentofacial Research

Case Report

Breaking through mandibular barrier: A case report on orthodontic repositioning of an impacted tooth

Hemwati Nandan[1]*, Srinivas Gosla Reddy[1], Pragjyoti Jha[1]

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ABSTRACT

Tooth impaction is known to create various problems such as space loss, tipping of adjacent teeth, super-eruption of the antagonist teeth, and dislocation of the permanent tooth beneath the impacted primary tooth. In this case report, we present the treatment of a 14-year-old female patient who presented with a chief complaint of missing teeth in the lower left back jaw region. OPG finding reveal the exceptional

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ABSTRACT ONLY · Volume 62, Issue 10, E15-E16, December 2024

EP040 Comparing the socio-economic and emotional implications of distraction osteogenesis versus orthognathic surgery in a developing country for cleft patients

Victoria Vincent · Victoria Vincent · Srinivas Gosla Reddy · Anthony Markus

Affiliations & Notes · Article Info

DOI: 10.1016/j.bjoms.2024.10.037 · Also available on ScienceDirect

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Hypoplastic maxilla can be addressed through distraction osteogenesis (DO) or orthognathic surgery (OS), with DO preferred for severe deformity due to increased stability of long-term outcomes. This study aims to compare the economic and emotional implications of DO versus OS at an Indian institute.

Article metrics

Metric data currently unavailable

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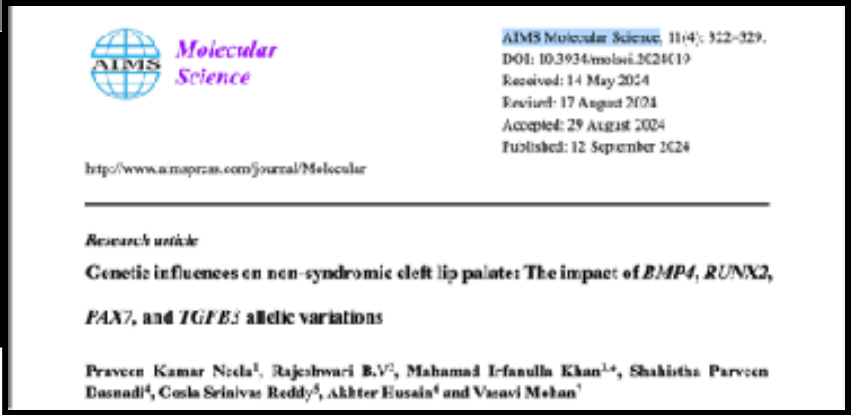

AIMS Molecular Science

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Received: 14 May 2024
Revised: 17 August 2024
Accepted: 29 August 2024
Published: 12 September 2024

http://www.aimspress.com/journal/Molecular

Research article

Genetic influences on non-syndromic cleft lip palate: The impact of *BMP4*, *RUNX2*, *PAX7*, and *TGFB3* allelic variations

Praveen Kumar Neela[1], Rajeshwari B.V[2], Mahamad Irfanulla Khan[3,4], Shahistha Parveen Basnadi[4], Gosla Srinivas Reddy[5], Akhter Husain[6] and Vasavi Mohan[7]

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Review > J Maxillofac Oral Surg. 2023 Dec;22(4):770-780.
doi: 10.1007/s12663-023-02057-5. Epub 2023 Nov 24.

Ocular Hypertelorism: Principles and Management

Srinivas Gosla Reddy [1], Adity Bansal [2], Hermann F Sailer [3], Likith V Reddy [4], Ghali E Ghali [5], Varsha Haridas Upadya [6]

Affiliations + expand

PMID: 38105836 PMCID: PMC10719204 (available on 2024-12-01)
DOI: 10.1007/s12663-023-02057-5

Abstract

Background: Ocular hypertelorism (OH) was initially considered as un-differentiated congenital cranio-facial deformity, however, I.T Jackson mentioned it as teleorbitism, considering it as increase in the inter-canthal width, inter-pupillary as well as inter-orbital distance as a result of lateralization of the orbital complex in total. Furthermore, Sailer further refined it and included the distance from the lateral orbital wall, i.e. he denoted increased inter-orbital distance along with the distance between lateral orbital walls as true hypertelorism. This condition is rare and is seen in association with midline congenital defects affecting the cranio-facial region.

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> Cureus. 2023 Feb 22;15(2):e35288. doi: 10.7759/cureus.35288. eCollection 2023 Feb.

Comparison of Maxillary Canine Retraction Using Split-Mouth Design With Dual Force Cuspid Retractor and T-loop Segmental Arch: A Split-Mouth Randomized Clinical Trial

Hemwati Nandan [1], Ch Sudheer Kumar [2], Pragjyoti Jha [1]

Affiliations + expand

PMID: 36968913 PMCID: PMC10037229 DOI: 10.7759/cureus.35288
Free PMC article

Abstract

Introduction This study was designed to explore the differences between two frictionless mechanics for canine retraction i.e., dual force cuspid retractor and T-loop segmental arch. T-loop for canine retraction creates a biomechanical system to deliver a predetermined force and a relatively constant moment-to-force ratio whereas dual force cuspid retractor uses power arms on

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Case Report

A Rare Case of Solitary Palatal Myofibroma in a Young Pediatric Patient

Abstract
Myofibroma (MF) is a benign spindle cell neoplasm rarely found in the oral cavity. It is common in males than females (2:1) and mostly seen to develop before 2 years of age with few cases reported in adults. This article reports a rare case of solitary MF of the hard palate in an 8-year-old female child; highlighting the clinical features, histopathology, differential diagnosis while emphasizing the importance of immunohistochemistry in establishing an accurate diagnosis and management of the same. The objective should be to differentiate benign versus malignant spindle cell lesions of smooth muscle, nerve tissue, fibrocytic, and histiocytic origin. Rapid growth of the lesion often raises suspicion of malignancy and may lead to misdiagnosis and inappropriate management.

Keywords: *Benign spindle cell tumor, hard palate, immunohistochemistry, myofibroma, pediatric dentistry, pediatric oral pathology*

Tulika Wakhloo, Gosla Reddy, Ashi Chug, Arvind Kumar[1]

Departments of Dentistry and [1]Pathology and Laboratory Medicine, All India Institute of Medical Sciences (AIIMS), Rishikesh, Uttarakhand, India

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ELSEVIER

Journal of Cranio-Maxillofacial Surgery
Volume 50, Issue 12, December 2022, Pages 894-909

Review

Nasal symmetry after different techniques of primary lip repair for unilateral complete cleft lip with or without cleft of the alveolus and palate: A systematic review

Adity Bansal [a], Srinivas Gosla Reddy [b], Ashi Chug [c], Anthony F. Markus [d],

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Smartphone and AI Workflow for 3D Printed Plate for Presurgical Therapy in Cleft Lip and Palate: Retrospective Evaluation of Outcomes

Prasad Nalabothu [1 2 3 4], Hemwati Nandan [5], Srinivas Gosla Reddy [5], Andreas A Mueller [1 3 4 6]

Affiliations + expand

PMID: 41313319 DOI: 10.1177/10556656251400877

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Indiacran: An Inter-Center Study of Nasolabial Esthetics Outcomes in Patients With Repaired Complete Unilateral Cleft Lip and Palate

Puneet Batra [1], Garima Arora [2], Abhinav Raj Gupta [3], Abhishek Bhamre [4], Amit Agarwal [5], Asif Masood [6], Hemwati Nandan [7], Himanshu Trivedi [5], Isha Jain [6], Jaideep Singh Chauhan [8], Kamlesh Singh [5], Krishnamurthy Bonanthaya [9], Nitin Bhola [10], Pallavi Daigwane [10], Pritham N Shetty [11], Ravi Kumar Mahajan [4], Samiksha Chopra [4], Shibani Das [12], Shruti Bijapur [9], Srinivas Gosla Reddy [7], Subodh Kumar Singh [3], Sukhdeep Singh Kahlon [4], S C Sood [13], Suryakant Das [14], Tarun Chaudhary [4], Virag Bhatia [15]

Affiliations + expand

PMID: 40589126 DOI: 10.1177/10556656251352604

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Technical insights on adjustable velar extension and safety mechanism in Tübingen palatal plate for Pierre Robin sequence

Hemwati Nandan [1], Bert Braumann [2], Teresa Kruse [3], Michael Wolf [4], Pragjyoti Jha [1], Srinivas Gosla Reddy [1], Prasad Nalabothu [5 6]

Affiliations + expand

PMID: 39897435 PMCID: PMC11782590 DOI: 10.1016/j.jobcr.2024.12.021

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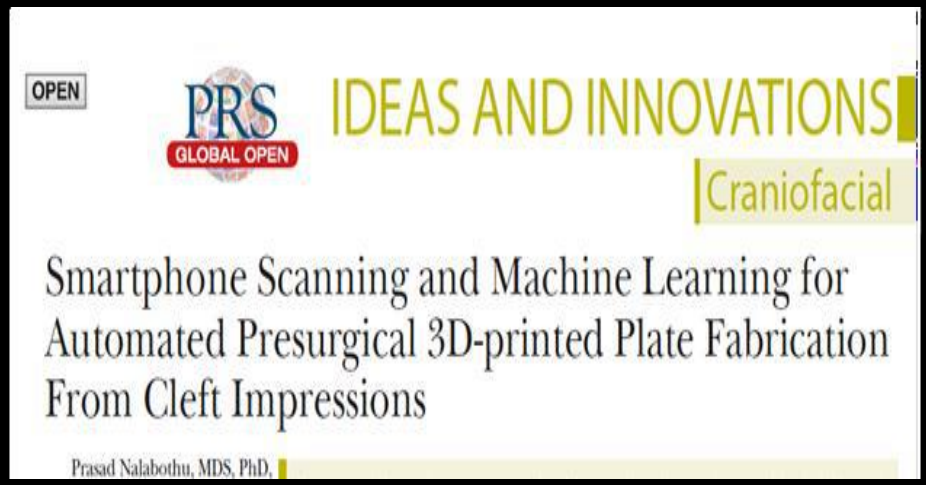

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Indiacran: An Inter-Center Assessment of Dental Arch Relationship for Patients with Repaired Complete Unilateral Cleft Lip and Palate

Puneet Batra [1], Garima Arora [1], Abhinav Raj Gupta [2], Abhishek Bhamre [3], Amit Agarwal [4], Asif Masood [5], Hemwati Nandan [6], Himanshu Trivedi [4], Isha Jain [5], Jaideep Singh Chauhan [7], Kamlesh Singh [4], Krishnamurthy Bonanthaya [8], Nitin Bhola [9], Pallavi Daigwane [9], Pritham N Shetty [10], Ravi Kumar Mahajan [3], Samiksha Chopra [3], Shibani Das [11], Shruti Bijapur [8], Srinivas Gosla Reddy [6], Subodh Kumar Singh [2], Sukhdeep Singh Kahlon [3], S C Sood [12], Suryakant Das [13], Tarun Chaudhary [3], Virag Bhatia [7]

Affiliations + expand

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Influence of Premaxillary Position on Oral Trauma in Early Childhood: A 10-Year Study of Cleft Lip and Palate Patients

Hemwati Nandan[1] | Prasad Nalabothu[2,3,4] | Pragjyoti Jha[1] | Srinivas Gosla Reddy[1] | Anand Marya[5]

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Demographic and clinical profiles of familial cleft lip and palate: A comprehensive analysis from a high-volume cleft center in Telangana, India

Kumar, M Praveen[1]; James, Jessie[1]; Reddy, Srinivas Gosla[2]; Mohan, Vasavi[3]; Neela, Praveen Kumar[4]; Krishnan, Nainika[2]; Khan, Fatema Ali[3]

Author Information

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Cancer Burden, Mortality, and Survivorship Care in India

MINI REVIEW | Published: 28 May 2025

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Arshad Ayub, Adity Bansal, Srinivas Gosla Reddy & Saurabh Varshney

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Intraosseous Hemangioma Mandible: Management and Potential Pitfalls of a Rare Entity

CASE REPORT | Published: 10 June 2025

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Adity Bansal ✉, Urmila Irom, Sommya Kumari & Srinivas Gosla Reddy

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Evaluating the impact of Matrilin-1 gene polymorphisms on mandibular prognathism: A meta-analysis

Pooja Kurmi [1], Prasad Nalabothu [2], Shubhasmita Sahoo [1], Henu Kumar Verma [3], Srinivas Gosla Reddy [4], L V K S Bhaskar [1]

Affiliations + expand

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Facial-palate correlation in unilateral cleft lip and palate: A data-driven 3D analysis

Prasad Nalabothu [a,b,c,1,*], Tobias Thomas [a,b,1], Praveen Ganesh [d], José W.M. Santos [a,b,e], Hemwati Nandan [f], Carlo Dieterle [a,b], Surya Rao Rao [d], Steven Cook [a,b,g], Gosla Srinivas Reddy [f], Andreas A. Mueller [a,b,g]

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[g] Pediatric Oral and Craniomaxillofacial Surgery, University Children's Hospital Basel, Basel, Switzerland

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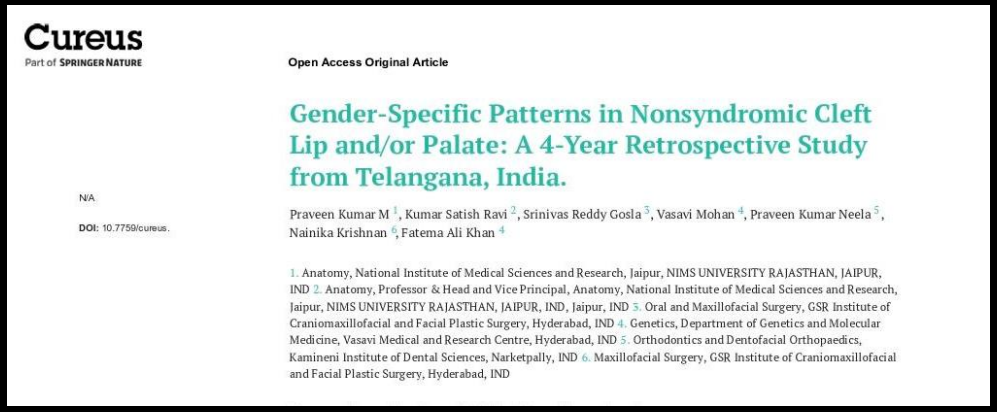

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Gender-Specific Patterns in Nonsyndromic Cleft Lip and/or Palate: A 4-Year Retrospective Study from Telangana, India.

N/A

DOI: 10.7759/cureus.

Praveen Kumar M [1], Kumar Satish Ravi [2], Srinivas Reddy Gosla [3], Vasavi Mohan [4], Praveen Kumar Neela [5], Nainika Krishnan [6], Fatema Ali Khan [4]

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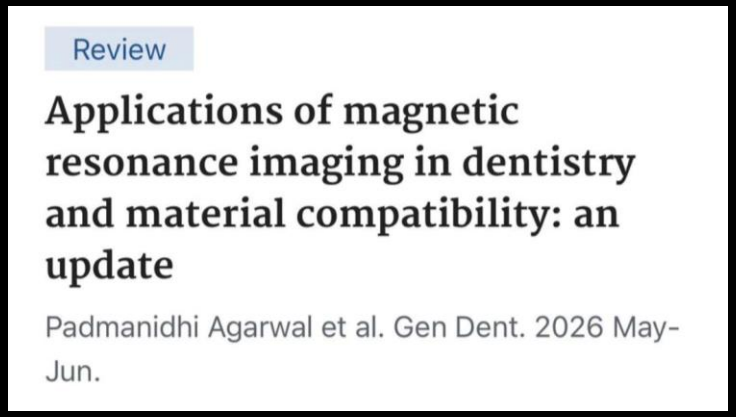

Review

Applications of magnetic resonance imaging in dentistry and material compatibility: an update

Padmanidhi Agarwal et al. Gen Dent. 2026 May-Jun.

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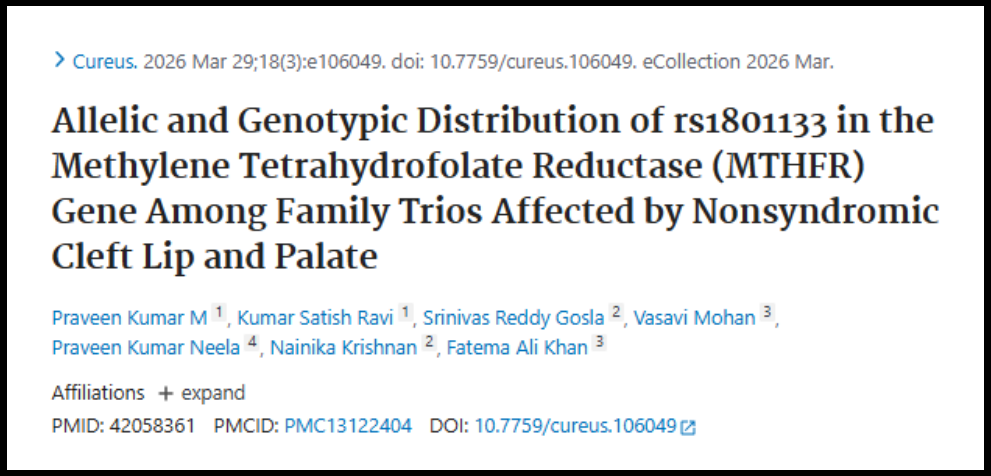

Cureus. 2026 Mar 29;18(3):e106049. doi: 10.7759/cureus.106049. eCollection 2026 Mar.

Allelic and Genotypic Distribution of rs1801133 in the Methylene Tetrahydrofolate Reductase (MTHFR) Gene Among Family Trios Affected by Nonsyndromic Cleft Lip and Palate

Praveen Kumar M [1], Kumar Satish Ravi [1], Srinivas Reddy Gosla [2], Vasavi Mohan [3], Praveen Kumar Neela [4], Nainika Krishnan [2], Fatema Ali Khan [3]

Affiliations + expand

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TOTAL PUBLICATIONS FROM 2008 TILL DATE: 91

Metric	All Time	Since 2021
Citations	1,718	954
h-index	23	16
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CONTRIBUTIONS TO THE CHAPTERS

De Novo Practice of Oral and Maxillofacial Surgery 43

Srinivas Gosla Reddy and Avni Pandey Acharya

43.1 Introduction

The exhilarating and exciting emotion of starting your own practice can also be a daunting experience to a freshly passed out maxillofacial surgeon. Student loans taken during the course of one's studies also play a significant role in determining one's ability to take on any additional financial burden.

As oral and Maxillofacial surgery is a bridge between medicine and dentistry, there is a continual national debate regarding the need to pursue a dual degree. The option to pursue a condensed medical degree as part of the current syllabus is still not available in India. Thus, new residents should always strive to do additional training [residency, fellowship and diplomas] in their fields of interest to expand their expertise prior to starting their own set-ups [1]. It is a well-known fact that it is easier to gain knowledge and skills during the starting of one's career rather than later in life. The goal is to aim high by keeping one's feet grounded in the soil of academics.

The fire of determination and passion should always be kept alive in order to truly succeed and excel in our field. The truly successful surgeon is the one who has thrived against all the odds and taken advantage of every opportunity that has come his or her way. This chapter aims to guide the freshly passed out maxillofacial surgeon regarding further avenues of learning and about the establishment and expansion of one's surgical practice.

43.2 Professional Skill and Learning

For the freshly passed out maxillofacial surgeon, the option of acquiring financial stability always appears alluring. However, it is a well-known fact that enhanced surgical skills and strong academic knowledge cannot be traded for the financial gains obtained by prematurely starting one's surgical practice. Thus, it is always advisable to pursue additional training in the form of a fellowship, residency or diploma in one's area of interests [2, 3]. This trend will help the surgeon establish a niche practice where they specialize in a particular domain of oral and maxillofacial surgery, which eventually leads to improved surgical results and credibility for our profession. This kind of surgical practice will also help to create an edge over the plastic surgeon and the otolaryngologist and establish a distinguishable specialty offering an unequivocal service to patients. Despite the prevailing circumstances governing one's decision to enter practice immediately or continue training, everyone will eventually contribute to the OMFS field with their skills and knowledge.

Loskin [4] made an organized attempt to tackle this problem by dividing the scope of oral and maxillofacial surgery into three categories: areas of expertise, competence, and familiarity. To be addressed as an oral and maxillofacial surgeon, one needs to include the areas of expertise and competence in their work profile.

- Areas of expertise include oral pathology/oral medicine, dentoalveolar surgery, implantology, pre-prosthetic surgery, and maxillofacial traumatology.
- Areas of competence involve orthognathic surgery, temporomandibular joint surgery, and local reconstructive surgery.
- Areas of familiarity are cleft lip and palate surgery, regional reconstructive surgery, oncologic surgery, craniofacial surgery, and cosmetic surgery.

The first step in learning a skill is to know how a skill is learned. Educationists have constructed many models attempting to outline the learning process. The most widely accepted was first documented by Noel Bunch and was subsequently re-worked by Abraham Maslow (Figs. 43.1 and

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Rare Facial Clefts 77

Srinivas Gosla Reddy and Avni Pandey Acharya

77.1 Introduction

Since ages, congenital deformities were considered evil and wizard, and infants were abandoned to die in isolation. Jean Yperman (1295–1351) valued the congenital origin of the clefts. He additionally characterized the different types of the condition and set out the standards for their treatment. Fabricius ab Aquapendente (1537–1619) and William Hu of college of Leiping independently researched and published embryological premise of clefts [1].

Laroche was the first to separate between common cleft lip or harelip and clefts of the cheek. Further qualification was made in 1864 by Pelvet, who isolated oblique clefts including the nose from the other cheek clefts, and drawing on Ahlfeld's work, in 1887 Morian gathered 29 cases from the writing, contributing 7 instances of his own. Morian perceived three unique groups of oblique facial clefts. From that point forward, astounding audits have been composed by Grünberg in 1913, Bow-Chai in 1970, Paul Tessier in 1976 [2] and Millard in 1977 [3].

Craniofacial cleft by definition is "a fissure of the soft tissues that corresponds as a general rule with a cleft of the bony structures." [1] The greatest research on craniofacial clefts was finished by Tessier and is credited for the formation of the craniofacial surgery for establishing the framework of the advanced craniofacial surgery by fundamentally breaking down facial clefts and portraying facial osteotomies [4].

Craniofacial clefts are significant clefts affecting the face, cranium, or both. These clefts cause distortion of the face and cranium with lacks or abundances of tissue that cleave anatomic planes in a straight fashion [2]. Craniofacial clefts exist in changing degrees of seriousness, and practically every one of them happens along the anticipated embryo-

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logic lines. These clefts can be either complete or incomplete and can seem alone or in relationship with other facial clefts. Seriousness of craniofacial clefts fluctuates extensively, running from a scarcely distinguishable indent on the lip or on the nose or a scar-like structure on the cheek to an extensive partition of all layers of facial structures. Notwithstanding one parted sort can show on one side of the face, while an alternate kind is available on the other side [2, 3].

Craniofacial clefts need comprehensive rehabilitation. Past the physical consequences for the patient, they have monstrous mental and financial impacts on both patient and family, prompting disturbance of psychosocial working and diminished nature of life [4, 5].

Cleft repair is a necessary part of the modern craniomaxillo-facial surgical spectrum and remains a challenge on account of inadequate and contorted tissue (minor to major) at the site of the deformity [6]. The outcomes are additionally impacted by the short and long haul aesthetic (soft tissue and facial skeletal appearance) [7] and useful (occlusal and discourse) outcomes [8]. What's more, the kind of careful fix, the specialist's abilities and the compliance of the patient likewise, affects the stylish [9] and utilitarian [10]outcomes. The real test isn't just understanding the hereditary qualities [11], in addition to plan the standard conventions for the surgery in these phenomenal kinds of clefts [12].

77.2 Incidence

Craniofacial clefts are a lot rarer than the simple cleft lip/palate deformity [13]. The precise occurrence of craniofacial clefts has not been exactly documented in view of their rarity. However, the reported frequency of craniofacial clefts is 1.5–6.0 per 100,000 live births [14]. The occurrence of uncommon craniofacial clefts contrasted with ordinary cleft lip and palate may vary from 9.5 to 34 for every 1000 [15].

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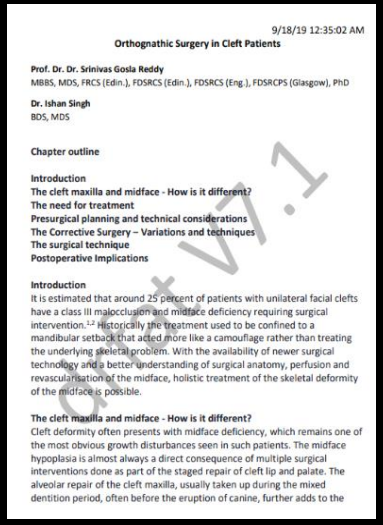

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Orthognathic Surgery in Cleft Patients

Prof. Dr. Dr. Srinivas Gosla Reddy
MBBS, MDS, FRCS (Edin.), FOSRCS (Edin.), FDSRCS (Eng.), FDSRCPS (Glasgow), PhD

Dr. Ishan Singh
BDS, MDS

Chapter outline

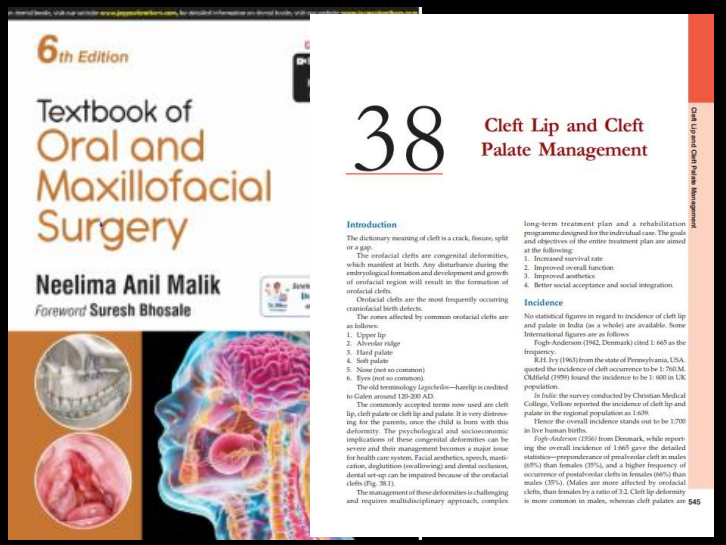
Introduction
The cleft maxilla and midface - How is it different?
The need for treatment
Presurgical planning and technical considerations
The Corrective Surgery – Variations and techniques
The surgical technique
Postoperative Implications

Introduction

It is estimated that around 25 percent of patients with unilateral facial clefts have a class III malocclusion and midface deficiency requiring surgical intervention.[1,2] Historically the treatment used to be confined to a mandibular setback that acted more like a camouflage rather than treating the underlying skeletal problem. With the availability of newer surgical technology and a better understanding of surgical anatomy, perfusion and revascularisation of the midface, holistic treatment of the skeletal deformity of the midface is possible.

The cleft maxilla and midface - How is it different?

Cleft deformity often presents with midface deficiency, which remains one of the most obvious growth disturbances seen in such patients. The midface hypoplasia is almost always a direct consequence of multiple surgical interventions done as part of the staged repair of cleft lip and palate. The alveolar repair of the cleft maxilla, usually taken up during the mixed dentition period, often before the eruption of canine, further adds to the



6th Edition

Textbook of Oral and Maxillofacial Surgery

Neelima Anil Malik

Foreword Suresh Bhosale

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Cleft Lip and Cleft Palate Management

Introduction

The dictionary meaning of cleft is a crack, fissure, split or a gap.

The orofacial clefts are congenital deformities, which manifest at birth. Any disturbance during the embryological formation and development and growth of orofacial region will result in the formation of orofacial clefts.

Orofacial clefts are the most frequently occurring craniofacial birth defects.

The zones affected by common orofacial clefts are as follows:

1. Upper lip
2. Alveolar ridge
3. Hard palate
4. Soft palate
5. Nose (not so common)
6. Eyes (not so common).

The old terminology *Leporchilos*—harelip is credited to Galen around 120-200 AD.

The commonly accepted terms now used are cleft lip, cleft palate or cleft lip and palate. It is very distressing for the parents, once the child is born with this deformity. The psychological and socioeconomic implications of these congenital deformities can be severe and their management becomes a major issue for health care system. Facial aesthetics, speech, mastication, deglutition (swallowing) and dental occlusion, dental set-up can be impaired because of the orofacial clefts (Fig. 38.1).

The management of these deformities is challenging and requires multidisciplinary approach, complex long-term treatment plan and a rehabilitation programme designed for the individual case. The goals and objectives of the entire treatment plan are aimed at the following:

1. Increased survival rate
2. Improved overall function
3. Improved aesthetics
4. Better social acceptance and social integration.

Incidence

No statistical figures in regard to incidence of cleft lip and palate in India (as a whole) are available. Some International figures are as follows

Fogh-Anderson (1942, Denmark) cited 1: 665 as the frequency.

R.H. Ivy (1963) from the state of Pennsylvania, USA. quoted the incidence of cleft occurrence to be 1: 760 M. Oldfield (1959) found the incidence to be 1: 400 in UK population.

In India: the survey conducted by Christian Medical College, Vellore reported the incidence of cleft lip and palate in the regional population as 1:639.

Hence the overall incidence stands out to be 1:700 in live human births.

Fogh-Anderson (1956) from Denmark, while reporting the overall incidence of 1:665 gave the detailed statistics—preponderance of prealveolar cleft in males (65%) than females (35%), and a higher frequency of occurrence of postalveolar clefts in females (66%) than males (35%). (Males are more affected by orofacial clefts, than females by a ratio of 3:2. Cleft lip deformity is more common in males, whereas cleft palates are

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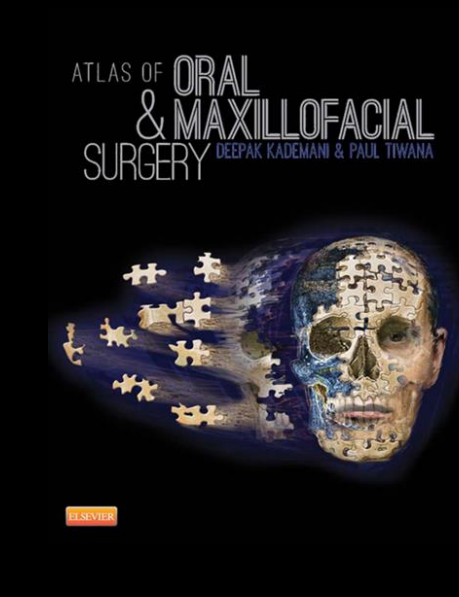
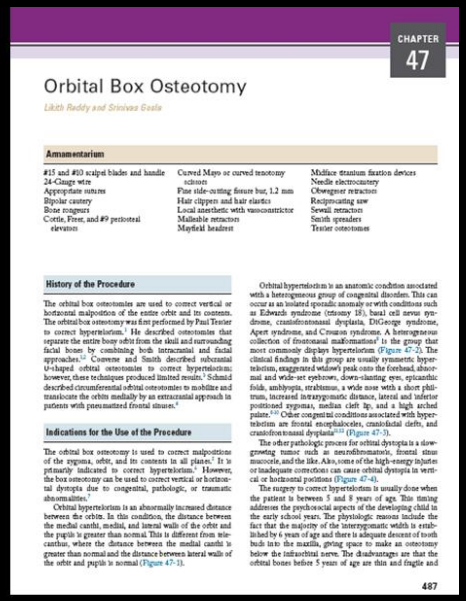


ATLAS OF ORAL & MAXILLOFACIAL SURGERY

DEEPAK KADEMANI & PAUL TIWANA

ELSEVIER



CHAPTER 47

Orbital Box Osteotomy

Likith Reddy and Srinivas Gosla

Armamentarium

#15 and #10 scalpel blades and handle
24-Gauge wire
Appropriate sutures
Bipolar cautery
Bone rongeurs
Cottle, Freer, and #9 periosteal elevators
Curved Mayo or curved tenotomy scissors
Fine side-cutting fissure bur, 1.2 mm
Hair clippers and hair elastics
Local anesthetic with vasoconstrictor
Malleable retractors
Mayfield headrest
Midface titanium fixation devices
Needle electrocautery
Obwegeser retractors
Reciprocating saw
Sewall retractors
Smith spreaders
Tessier osteotomes

History of the Procedure

The orbital box osteotomies are used to correct vertical or horizontal malposition of the entire orbit and its contents. The orbital box osteotomy was first performed by Paul Tessier to correct hypertelorism.[1] He described osteotomies that separate the entire bony orbit from the skull and surrounding facial bones by combining both intracranial and facial approaches.[1,2] Converse and Smith described subcranial U-shaped orbital osteotomies to correct hypertelorism; however, these techniques produced limited results.[3] Schmid described circumferential orbital osteotomies to mobilize and translocate the orbits medially by an extracranial approach in patients with pneumatized frontal sinuses.[4]

Indications for the Use of the Procedure

The orbital box osteotomy is used to correct malpositions of the zygoma, orbit, and its contents in all planes.[1] It is primarily indicated to correct hypertelorism.[1] However, the box osteotomy can be used to correct vertical or horizontal dystopia due to congenital, pathologic, or traumatic abnormalities.[2]

Orbital hypertelorism is an abnormally increased distance between the orbits. In this condition, the distance between the medial canthi, medial, and lateral walls of the orbit and the pupils is greater than normal. This is different from telecanthus, where the distance between the medial canthi is greater than normal and the distance between lateral walls of the orbit and pupils is normal (Figure 47-1).

Orbital hypertelorism is an anatomic condition associated with a heterogeneous group of congenital disorders. This can occur as an isolated sporadic anomaly or with conditions such as Edwards syndrome (trisomy 18), basal cell nevus syndrome, craniofrontonasal dysplasia, DiGeorge syndrome, Apert syndrome, and Crouzon syndrome. A heterogeneous collection of frontonasal malformations[5] is the group that most commonly displays hypertelorism (Figure 47-2). The clinical findings in this group are usually symmetric hypertelorism, exaggerated widow's peak onto the forehead, abaxial and wide-set eyebrows, down-slanting eyes, epicanthic folds, amblyopia, strabismus, a wide nose with a short philtrum, increased interpupillary distance, lateral and inferior positioned zygomas, median cleft lip, and a high arched palate.[6,10] Other congenital conditions associated with hypertelorism are frontal encephaloceles, craniofacial clefts, and craniofrontonasal dysplasia[10,11] (Figure 47-3).

The other pathologic process for orbital dystopia is a slow-growing tumor such as neurofibromatosis, frontal sinus mucocele, and the like. Also, some of the high-energy injuries or inadequate corrections can cause orbital dystopia in vertical or horizontal positions (Figure 47-4).

The surgery to correct hypertelorism is usually done when the patient is between 5 and 8 years of age. This timing addresses the psychosocial aspects of the developing child in the early school years. The physiologic reasons include the fact that the majority of the interzygomatic width is established by 6 years of age and there is adequate descent of tooth buds into the maxilla, giving space to make an osteotomy below the infraorbital nerve. The disadvantages are that the orbital bones before 5 years of age are thin and fragile and

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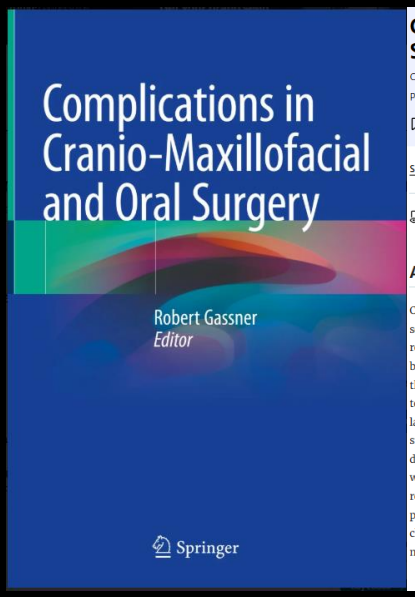

Complications in Cranio-Maxillofacial and Oral Surgery

Robert Gassner
Editor

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Complications in Cleft Lip and Palate Surgeries

Chapter | First Online: 01 August 2020

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Srinivas Gosla Reddy ✉ & Ashish Fanan

919 Accesses 1 Citation

Abstract

Cleft lip and palate is a multifactorial and three-dimensional anomaly involving hard and soft tissues of the face. The comprehensive treatment of cleft lip and palate deformities requires a thorough consideration of the complexities of the anatomical deformity and a balance between intervention and growth. Complications can occur in the management of the cleft patients due to lack of understanding of surgical principles and improper techniques. Poor outcomes were the result of nonexistent protocol, fragmented care, and lack of periodic assessment. Many of the developed countries of the world have a well-structured and organized cleft team practice. However, the situation in most of the developing countries is quite different, where they lack properly trained medical personnel which hinder a high quality team approach delivery to the orofacial cleft patients. The resource-poor nations are managed through surgical outreach programs funded by various philanthropic organizations around the world. This chapter consists of a detailed classification of complications in cleft lip and palate surgeries and its comprehensive multidisciplinary management.

TOTAL CHAPTERS: 6

FELLOWS

National : 47 fellows over last 15 years
International : More than 480 over last 15 years
More than 1000 post graduate trained in last 15 years

An average of 100 post graduate per year taken now.

Trained fellows in cleft and craniofacial surgery from GSR hospital : 47

GSR FELLOW ALUMNI

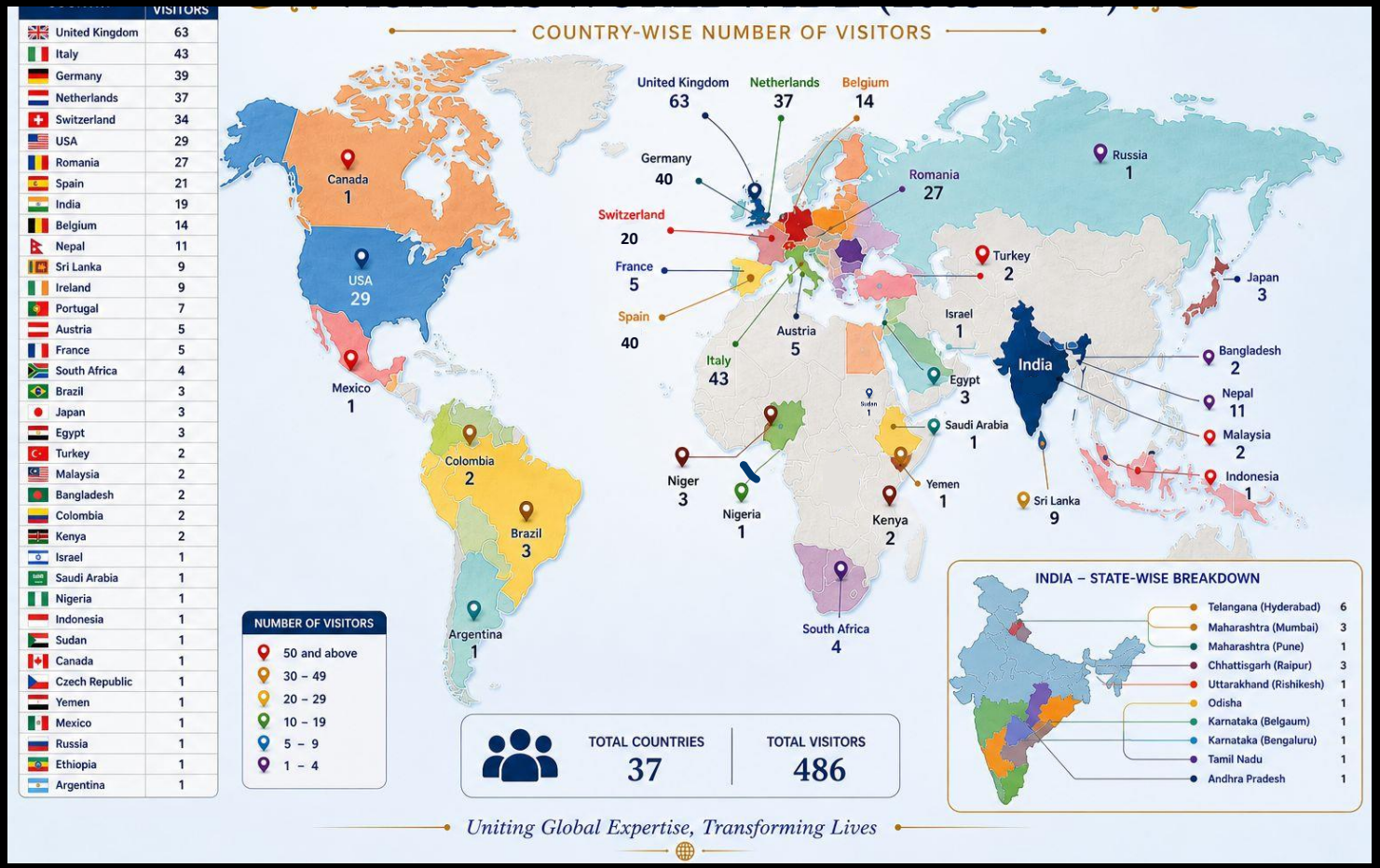
SL.No.	FELLOWS	YEAR
1.	Dr. Jogi Chungath (Abu Dhabi, UAE)	2001-2002
2.	Dr. Chetana Kumar (Bangalore, Karnataka)	2001-2002
3.	Dr. Rajesh Sabnis (Mumbai, Maharashtra)	2002-2003
4.	Dr. Shivanagendra Reddy (Vishakhapatnam, A.P.)	2002-2003
5.	Dr Ashok (Tumkur, Karnataka)	2002-2003
6.	Dr. G. S. Prasad Reddy (Hyderabad, A.P.)	2002-2003
7.	Dr. Nilesh Pagaria (Raipur, Chhattisgarh)	2008-2009
8.	Dr Sunila Rani (Canada)	2008-2009
9.	Dr. Vishalakshi (Hyderabad)	2009-2010
10.	Dr. Aszf Ansari (Saudi Arabia)	2010-2011
11.	Dr. Ashwini Amangad (Bangalore, Karnataka)	2010-2011
12.	Dr. Rupali Dhonnar (Mumbai, Maharashtra)	2010-2011
13.	Dr. Sumit Sheth (Mumbai, Maharashtra)	2011-2012
14.	Dr. Somshekhar Hiremath (Belgaum, Karnataka)	2011-2012
15.	Dr. Anita Vaidyanathan (Singapore)	2012-2013
16.	Dr. Ashwin Shah (Gulbarga, Karnataka)	2012-2013
17.	Dr. Himanshi Singla (Gurgaon, Haryana)	2012-2013
18.	Dr. Avni Shivdutt Pandey (Indore, M.P.)	2012-2013
19.	Dr. Rishi Bhatt (Surat, Gujrat)	2013-2014
20.	Dr. Nitin Prabhakar (Bhopal, Madhya Pradesh)	2013-2014
21.	Dr. Saruchi Aggarwal (Raipur, Chhattisgarh)	2013-2014
22.	Dr. Rajeev Pandey (New Delhi)	2014-2015
23.	Dr. Paina Kulkarni (Dharwad)	2010-2011
24.	Dr. Sidra Ansari (Mumbai)	2015-2016
25.	Dr. Kriti Jain (New Delhi)	2015-2016
26.	Dr. Ankita Midha (New Delhi)	2016-2017
27.	Dr. Sagar Satish Jangam (Raigad)	2016-2017
28.	Dr. Rishabh Naveen Shah (Ahmedabad)	2017-2018
29.	Dr. Monal Karkar (Pune)	2018-2019
30.	Dr. Madhav Rao Thumati J M (Davangere)	2018-2019
31.	Dr. Ishan Singh (Banaras)	2019-2020
32.	Dr. Shruthi Saralaya (Kolkatta)	2019-2020
33.	Dr. Sumit Singh Nepal)	2019-2020
34.	Dr Nisha Sharma (Ahmedabad, Gujarat)	2020-2021
35.	Dr. Megha Sahu (Gwalior, Madhya Pradesh)	2020-20 1
36.	Dr. Heena Sayed (Mumbai,Maharashtra)	2021-2022
37.	Dr. Bhaskar Roy (Tripura)	2021-2022
38	Dr. Raina Basu (Kolkata)	2021 2022
39.	Dr. Nishita Shah (Indore)	2021 2023
40.	D . Variyta (Chandigarh	2021-2023
41.	Priyanka Bhoi (Bhubaneswar	2022-2024
42.	Dr. Mrudul Ravindra Mulay (M harashtra)	2022-2024

GSR FELLOW ALUMNI

SL.No.	FELLOWS	YEAR
43.	Dr. R. Priyadharshini (Chennai, Tamil Nadu)	2023-2024
44.	Dr. A.R. Thennarasu (Krishnagiri, Tamil Nadu)	2023-2025
45.	Dr. Apurva (New Delhi)	2023-2025
46.	Dr. Merlyn Elizabeth Philips (Nagpur)	2024-2025
47.	Dr. Lavanya L (Chennai, Tamil Nadu)	2024-2026

INTERNATIONAL TRAINEES AND VISITORS

COUNTRY	NO. OF VISITORS
United Kingdom	63
Italy	43
Germany	39
Netherlands	37
Switzerland	34
USA	29
Romania	27
Spain	21
India	~20
Belgium	14
Nepal	11
Sri Lanka	9
Ireland	9
Portugal	7
Austria	5
France	5
South Africa	4
Brazil	3
Japan	3
Egypt	3
Niger	3
Turkey	2
Malaysia	2
Bangladesh	2
Colombia	2
Kenya	2
Israel	1
Saudi Arabia	1
Nigeria	1
Indonesia	1
Argentina	1
Sudan	1
Canada	1
Czech Republic	1
Yemen	1
Mexico	1
Russia	1
Ethiopia	1



INTERNATIONAL TRAINEES AND VISITORS – 480+

INTERNATIONAL GUESTS AND POST GRADUATES WITH OUR SURGERY TEAM

Partnership of Excellence

1. University of Timisoara, Romania.
2. Department of Craniofacial Surgery Radboud University
3. Nijmegen Medical Centre, The Netherlands
4. Department of Orthodontics and Craniofacial Biology Head, Cleft Palate Craniofacial Unit Radboud
5. University Nijmegen Medical Centre, The Netherlands.
6. Department of Otolaryngology & Facial Plastic Reconstructive Surgery ,Gooi Nord Hospital, The Netherlands.
7. Division of Maxillofacial and Facial Plastic Surgery University Hospital, Leipzig, Germany
8. Division of Maxillofacial and Facial Plastic Surgery University Hospital, Muenster, Germany
9. Department of Oral & Maxillo Facial Plastic Surgery, Martin-Luther-University, /Halle, Germany
10. Visiting professor Europian Face Centre, University, Ziekenhuls, Brussel
11. Director for OMFS at the University of Antwerp (UA), Belgium,
12. Medico en Maxilofacial Perfect, Murcia, Spain
13. Aga Khan Hospital, Kenya
14. Oral and Maxillofacial Surgery, Texas, A&M University Baylor College of Dentistry, Dallas, Texas
15. All India Institute Of Medical Sciences, Rishikesh
16. Manipal Academy of Higher Education, Manipal
17. Sharad Pawar Dental College, Datta Meghe University,Wardha
18. Juliu Hatieţganu"university of medicine and Pharmacy, Cluj-Napoca, Romania

Collaboration Centers Knowledge –Know-how Transfer

1. Lombok Indonesia
2. Janakpur Nepal
3. University of Ethiopia
4. Nigeria
5. Yemen
6. Somalia
7. South Africa
8. Dr. Alex Campbell , Cartagena ,Colombia
9. Dr.Nicolas , Oaxaca, Mexico
10. Dr.Daniel Velez ,Mediean Colombia
11. Mallige Hospital ,Bangalore
12. Yenepoya University, Mangalore
13. KLE Belgaum
14. Krishna Institute of Medical Sciences, Karad
15. Dr. Rishabh shah ,Anand Surgical Hospital Pvt Ltd Ahmedabad ,Gujrat
16. Dr. Rajgopal Athreya, Parmanand hospitals , New delhi
17. Dr. Rohit Punga , Sharda University ,Greater Noida

Training

UMC St Radboud

Research

Training

Universitätsspital Basel

HFZ HIGHTECH FORSCHUNGS ZENTRUM BASEL

www.craniofacialinstitute.org

Dr. TIMUR WATI, INDONESIA

Trained with us for one year and will now open a cleft center in Indonesia in association with Sumbing Bibir Foundation, The Netherlands.

Dr. NADIRA TRAORE and Dr. KAKA MAMANE, NIGER, AFRICA

Trained with us for six months and have now established a cleft center in Niamey, Niger with funding from Cleft Kinder Hilfe Schweiz.

Dr. Hope Salah, Sudan

Trained with us for 6 months and will now open a cleft center in Sudan.

Dr. Ahmed Makki, Iraq

Trained with us for 6 months and will now open a cleft center in Iraq.

Dr. Akinlade Akinwaleola, Nigeria

Trained with us for 6 months and is now practicing cleft in Nigeria.

Dr. Thushantha Indika, Srilanka

Works for the Srilankan Army, sent by the Srilankan Govt.

Trained with us for 1 year and is now practicing cleft in Srilanka.

Dr. Mbadda Abboud, Irael

Trained with us for 1 year and is now practicing cleft in Israel.

Dr. Kumaravelu Ahilan, Srilanka

Officially sent by the Srilankan Govt.

Trained with us for 1 year and is now practicing cleft in Srilanka.

Dr.Kim Pedro Beech, South Africa

Trained with us for a few weeks and is now practicing cleft in South Africa.

We are a recognized center for IAOMS, EACMFS and AO CMF to induct fellows for training in Cleft and Craniofacial Surgery

IAOMS

ADVANCING OMS WORLDWIDE

International Association of Oral and Maxillofacial Surgeons

April 17, 2015

Dr. Srinivas Gosla Reddy
GSR Institute of Craniofacial and Facial Plastic Surgery
17-1-383/55, Vinay Nagar Colony, I. S. Sadan, Saidabad, Hyderabad, 500059, Telangana, India

Dear Dr. Gosla Reddy:

The intent of this communication is to share with you the changes that the IAOMS Board of Directors, the Foundation Board of Trustees, and the Fellowship Committee will implement regarding the Fellowship program in the next few months. After carefully reviewing the GSR Institute of Craniofacial and Facial Plastic Surgery's impressive annual report, the Boards and Committee would like to officially invite you to serve as Program Director and host one Fellowship recipient specializing in cleft lip & palate and craniofacial surgery at the GSR Institute in Hyderabad, India for a period of six months each year starting in 2015-2016. The fellowship recipient will spend the other six months in Bangalore to complete a one year program. On behalf of the IAOMS Board of Directors and the Fellowship Committee, we thank you in advance for your hospitality and your devotion in advancing OMF surgery education.

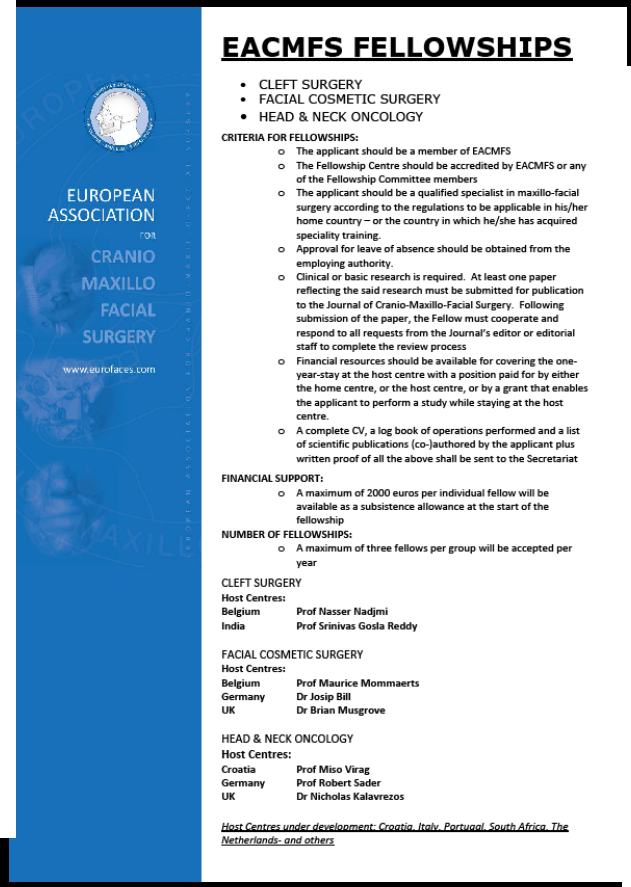
We look forward to hearing from you.

Best regards,

Piet Haers	Larry Nissen	G.E. GHALI
President, IAOMS	Chairman IAOMS Foundation	Chair IAOMS Fellowship Program

cc. IAOMS Board of Directors
Nabil Samman
Pierre Désy

5550 Meadowbrook Industrial Court, Suite 210, Rolling Meadows, Illinois 60008, USA Tel: 224 232-8737 Email: communications@iaoms.org



EUROPEAN ASSOCIATION for CRANIO MAXILLO FACIAL SURGERY

www.eurofaces.com

EACMFS FELLOWSHIPS

- CLEFT SURGERY
- FACIAL COSMETIC SURGERY
- HEAD & NECK ONCOLOGY

CRITERIA FOR FELLOWSHIPS:

- The applicant should be a member of EACMFS
- The Fellowship Centre should be accredited by EACMFS or any of the Fellowship Committee members
- The applicant should be a qualified specialist in maxillo-facial surgery according to the regulations to be applicable in his/her home country – or the country in which he/she has acquired speciality training.
- Approval for leave of absence should be obtained from the employing authority.
- Clinical or basic research is required. At least one paper reflecting the said research must be submitted for publication to the Journal of Cranio-Maxillo-Facial Surgery. Following submission of the paper, the Fellow must cooperate and respond to all requests from the Journal's editor or editorial staff to complete the review process
- Financial resources should be available for covering the one-year-stay at the host centre with a position paid for by either the home centre, or the host centre, or by a grant that enables the applicant to perform a study while staying at the host centre.
- A complete CV, a log book of operations performed and a list of scientific publications (co-)authored by the applicant plus written proof of all the above shall be sent to the Secretariat

FINANCIAL SUPPORT:

- A maximum of 2000 euros per individual fellow will be available as a subsistence allowance at the start of the fellowship

NUMBER OF FELLOWSHIPS:

- A maximum of three fellows per group will be accepted per year

CLEFT SURGERY
Host Centres:

Belgium	**Prof Nasser Nadjmi**
India	**Prof Srinivas Gosla Reddy**

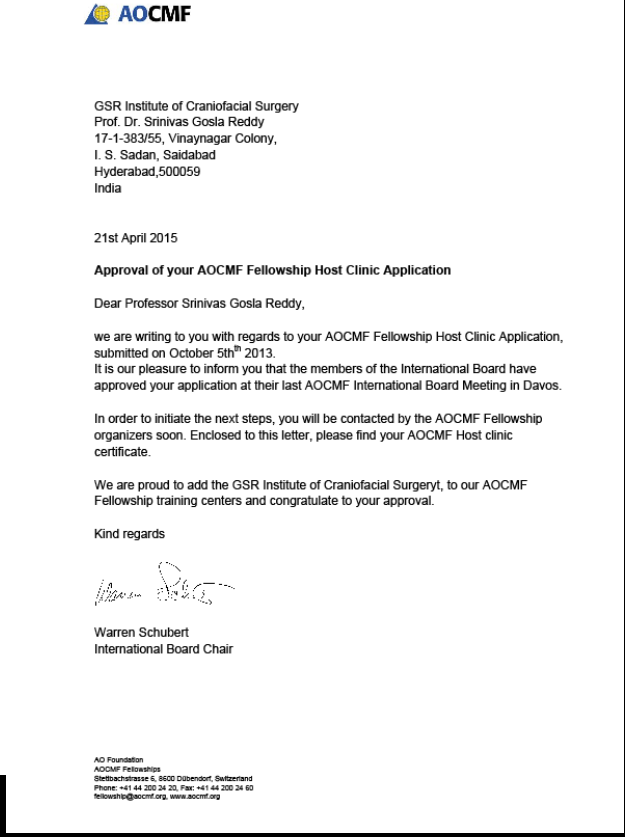
FACIAL COSMETIC SURGERY
Host Centres:

Belgium	**Prof Maurice Mommaerts**
Germany	**Dr Josip Bill**
UK	**Dr Brian Musgrove**

HEAD & NECK ONCOLOGY
Host Centres:

Croatia	**Prof Miso Virag**
Germany	**Prof Robert Sader**
UK	**Dr Nicholas Kalavrezos**

Host Centres under development: Croatia, Italy, Portugal, South Africa, The Netherlands- and others



AOCMF

GSR Institute of Craniofacial Surgery
Prof. Dr. Srinivas Gosla Reddy
17-1-383/55, Vinaynagar Colony,
I. S. Sadan, Saidabad
Hyderabad,500059
India

21st April 2015

Approval of your AOCMF Fellowship Host Clinic Application

Dear Professor Srinivas Gosla Reddy,

we are writing to you with regards to your AOCMF Fellowship Host Clinic Application, submitted on October 5th[th] 2013.
It is our pleasure to inform you that the members of the International Board have approved your application at their last AOCMF International Board Meeting in Davos.

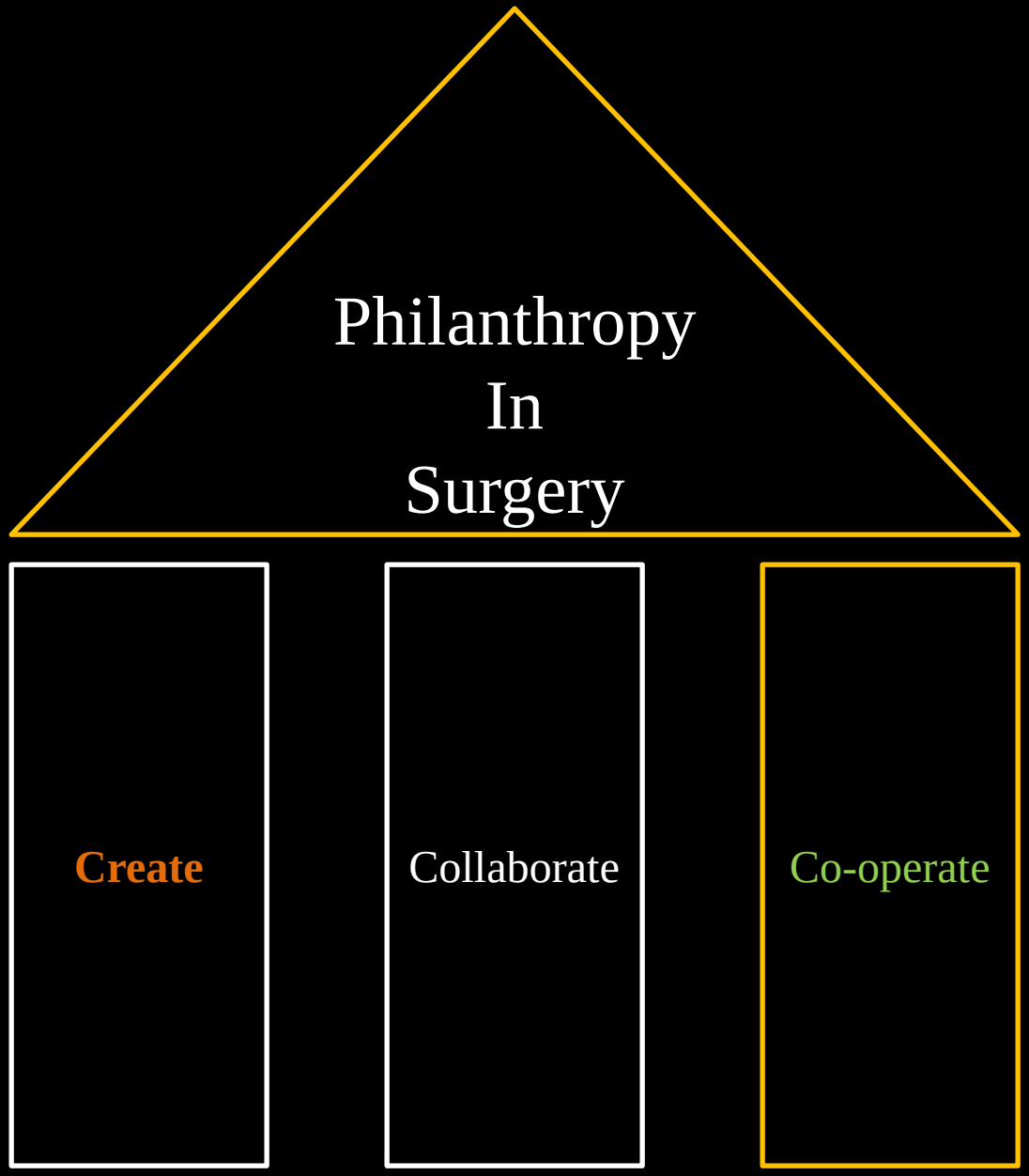
In order to initiate the next steps, you will be contacted by the AOCMF Fellowship organizers soon. Enclosed to this letter, please find your AOCMF Host clinic certificate.

We are proud to add the GSR Institute of Craniofacial Surgeryt, to our AOCMF Fellowship training centers and congratulate to your approval.

Kind regards

Warren Schubert
International Board Chair

AO Foundation
AOCMF Fellowships
Stettbachstrasse 6, 8600 Dübendorf, Switzerland
Phone: +41 44 200 24 20, Fax: +41 44 200 24 60
fellowship@aocmf.org, www.aocmf.org


Philanthropy
In
Surgery
Create
Collaborate
Co-operate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CLEFT-KINDER-HILFE Schweiz

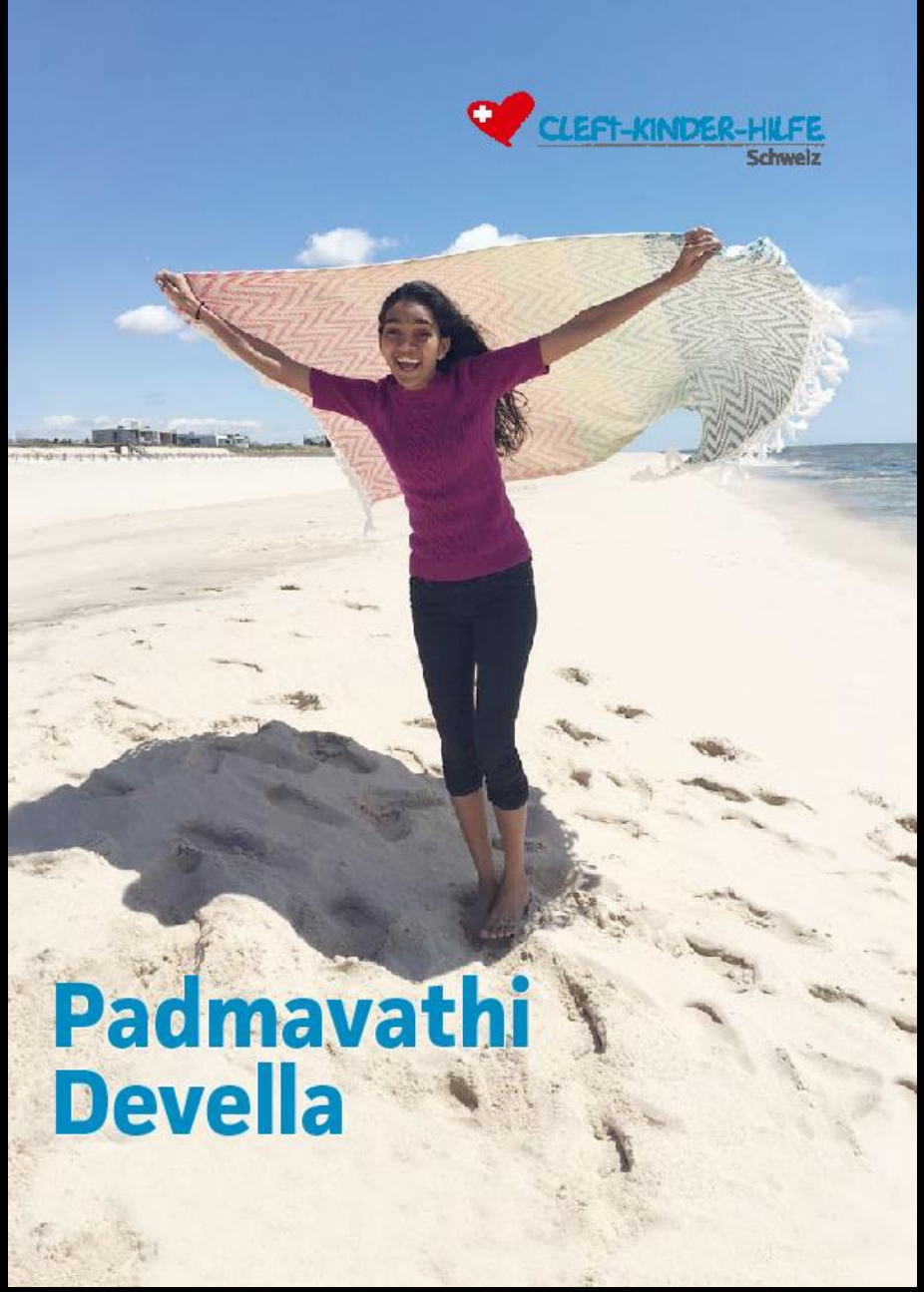
Jan 4th, 2009 – Official Launching of the 'Hermann Sailer and Erica Schwob Cleft School Project'.

Till now More than 250 Children with Cleft and facial anomalies have finished their higher education through this program.

Cleft Children Rehabilitation Building


KRISHNAVENI
TALENT SCHOOL
CHAMPAPET
R.R DIST

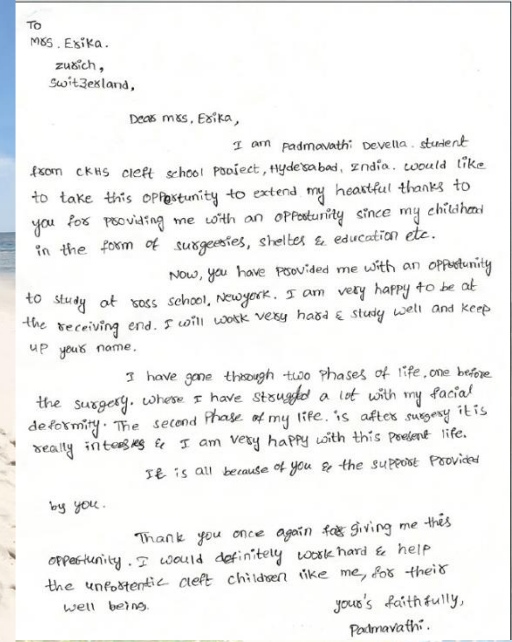

School Proj
for Cleft Children


CLEFT-KINDER-HILFE
Schweiz
Padmavathi
Devella

Padmavathi Devella, das Mädchen mit den wunderschönen grossen Augen, kam im Alter von vier Jahren in unser Cleft-Zentrum in Hyderabad, wo sie von Prof. Dr. Dr. Hermann F. Sailer und dem von ihm ausgebildeten Dr. Gosla Reddy operiert wurde.

Padmavathi Devella, the girl with the beautiful big eyes, arrived at just four years of age in our cleft centre in Hyderabad, where she was operated by Dr. Gosla Reddy and Prof. Dr. Dr. Hermann F. Sailer.

Padmavathi Devella



To
Mrs. Erika.
Zurich,
Switzerland.

Dear mrs. Erika,

I am Padmavathi Devella. student from CKHS cleft school project, Hyderabad. India. would like to take this opportunity to extend my heartful thanks to you for providing me with an opportunity since my childhood in the form of surgeries, shelter & education etc.

Now, you have provided me with an opportunity to study at Ross school, Newyork. I am very happy to be at the receiving end. I will work very hard & study well and keep up your name.

I have gone through two phases of life, one before the surgery. where I have struggled a lot with my facial deformity. The second phase of my life. is after surgery it is really interesting & I am very happy with this present life.

It is all because of you & the support provided by you.

Thank you once again for giving me this opportunity. I would definitely work hard & help the unfortunate cleft children like me, for their well being.

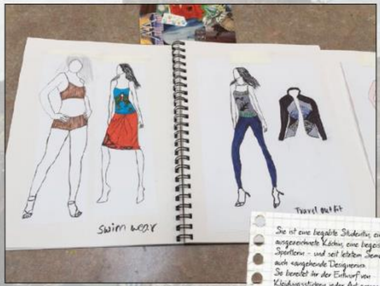
your's faithfully,
Padmavathi.

Bald war sie es, die den Neuankömmlingen wie der kleinen Durga half, sich in der Gruppe zurechtzufinden, und die in der Schule eines der grossen Vorbilder für die Jüngeren darstellte. Sie wurde eine der besten Schülerinnen der Krishnaveni Talent School und blieb trotz ihrer erstaunlichen Leistungen immer ein herzlicher und hilfsbereiter Mensch.

Before long, she was helping newcomers like Durga to find their place within the group, and was one of the outstanding role models for the younger pupils. She became one of the top students in the Krishnaveni Talent School and, in spite of her outstanding achievements, remained the same kind, helpful girl she had always been.

Der Schulalltag fordert hier noch mehr Einsatz von ihr als zuvor. Padmavathis Tage beginnen sehr früh, denn das Arbeitspensum der jungen Studenten sowie die Erwartungen an sie sind hoch. Aber natürlich bleibt manchmal auch Zeit für den Spass, den sie alle miteinander haben. Für einen kleinen Ausflug oder einfach nur Zeit mit Freunden.

The daily routine here is even tougher than it was in Hyderabad. Padmavathi starts her day very early because she knows she has to study hard to succeed, and to meet the very high expectations that have been placed on her. But naturally there is still time to enjoy herself with the other pupils, on class trips or just spending time with her friends.



Sie ist eine begabte Studentin, eine ausgezeichnete Köchin, eine begeisterte Sportlerin – und seit letztem Semester auch angehende Designerin. Sie bereitet ihr der Entwurf von Kleidungsstücken jeder Art grosse Freude.

She is a gifted student, a great cook, a very keen sports player – and, as of last semester, an up-and-coming designer too, taking great delight in designing all sorts of clothes.

Padmavathi machte nicht nur einen hervorragenden Abschluss, sondern erhielt aufgrund des unermüdlichen Engagements von Frau Dr. h.c. Erika Sailer, Stiftungsratspräsidentin der Cleft-Kinder-Hilfe Schweiz, ein Stipendium von Herrn und Frau Friedrich (JAF-Foundation), das ihr den Besuch der weiterführenden Ross School in den Hamptons (USA) ermöglichte.

After gaining her school graduation certificate with excellent marks, thanks to the tireless efforts of Dr. h.c. Erika Sailer, President of the Council of the Cleft-Kinder-Hilfe Schweiz, she was awarded a scholarship from Mr. and Mrs. Friedrich (JAF-Foundation) to continue her education at the prestigious Ross School in East Hampton (NY), USA.

It is easy to procure equipment and infrastructure

It is a little harder to employ trained personnel

It is impossible to formulate an ideology on your own

GIVE AND PASS ON THE KNOWLEDGE THAT YOU HAVE

ABSORB KNOWLEDGE THAT OTHERS CAN GIVE AND PASS ON

A SUCCESSFUL SURGEON CAN ONLY BE A CONFLUENCE OF IDEAS THAT EMPLOYS WELL TRAINED OTHER PERSONNEL AND IS WELL EQUIPPED TO DEAL WITH THE PROBLEM

CONCLUSION

- REACH demonstrates a sustainable model for equitable surgical care

- Community-integrated systems improve access in LMIC settings

- Aligns closely with Lancet Commission goals

- Potentially replicable model for strengthening global surgical systems

Bring the Smile Back

Thank You