



PRESURGICAL ORTHOPAEDIC NASOALVEOLAR MOLDING

DR. LE THANH BINH
DR. TRAN VINH HUNG

CONTENTS

I. INTRODUCTION

Nasoalveolar molding (NAM)

Nasoalveolar molding works

Nasoalveolar molding goals

II. RESEARCH

III. CONCLUSION



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J Maxillofac Oral Surg. 2013 September; 12(3): 273–288. Published online 2012 September 18. doi: 10.1007/s12663-012-0434-y

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2. Prashanth Sadashiva Murthy, Seema Deshmukh, A Bhagyalakshmi, KT Srilatha

J Int Oral Health. 2013 April; 5(2): 70–80. Published online 2013 April 21.

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[Modified Presurgical Nasoalveolar Molding in the Infants with Complete Unilateral Cleft Lip and Palate: A Stepwise Approach](#)

3. Ajay Bajaj, K. S. Rao, S. M. Sharma, Vikram Shetty

J Maxillofac Oral Surg. 2011 September; 10(3): 275–280. Published online 2011 May 10. doi: 10.1007/s12663-011-0232-y

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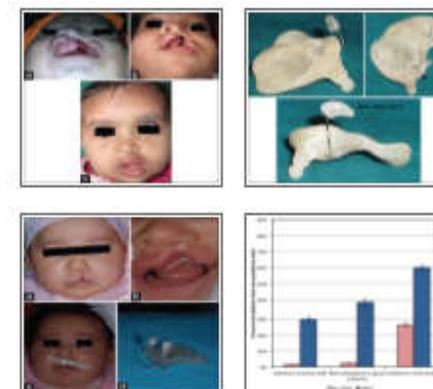
4. Brijesh Mishra, Arun K. Singh, Javed Zaidi, G. K. Singh, Rajiv Agrawal, Vijay Kumar

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I. INTRODUCTION

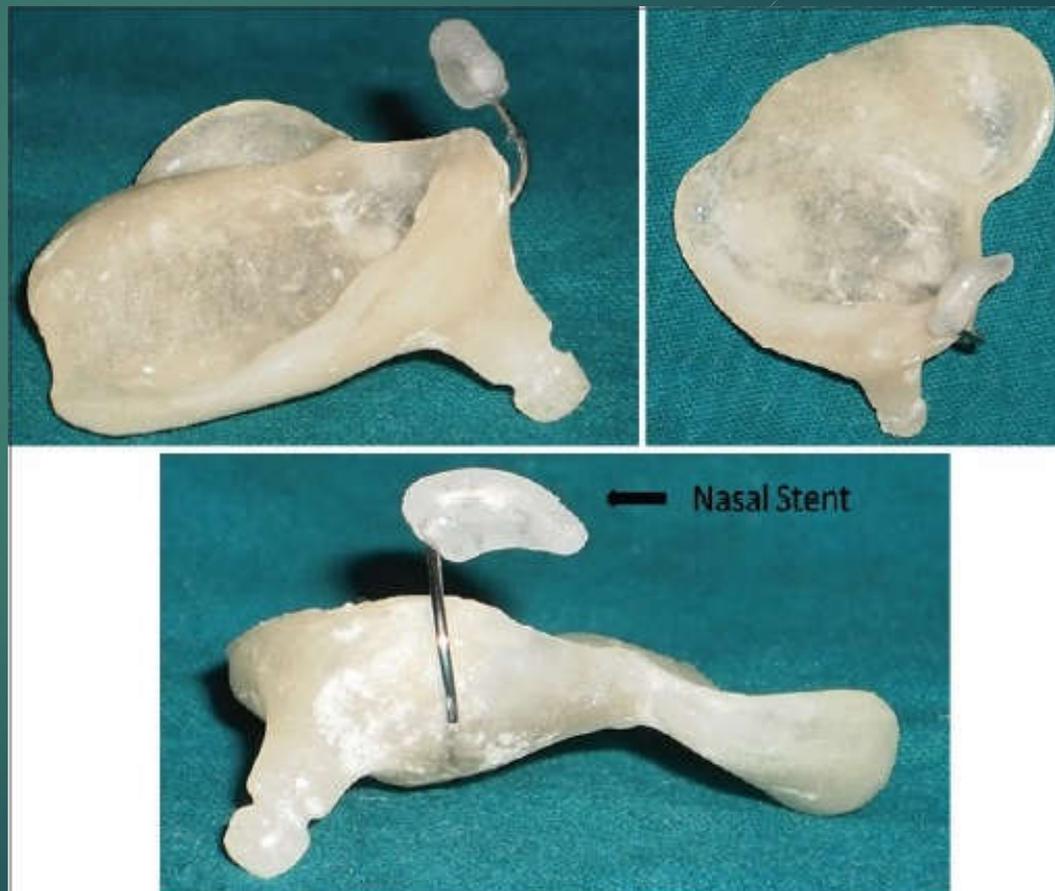
- ▶ Cleft lip and palate can present with considerable variation in severity and form.
- ▶ These clefts, deficient in both hard and soft tissue elements, present a significant surgical challenge to the achievement of a functional and cosmetic outcome.
- ▶ The affected lower lateral nasal cartilage results in a depressed dome, the appearance of an increased alar rim, an oblique columella, and an overhanging nostril apex.
- ▶ There have been numerous techniques documented over the centuries to improve the position of the cleft alveolar segments such as Hoffman (1968) and Georgiade (1975). In 1993, Grayson adapted his nasal stent to extend from the anterior flange of an intraoral molding plate. This new technique was called nasoalveolar molding (NAM)

What is nasoalveolar molding (NAM)?

- ▶ Nasoalveolar molding (NAM) is a nonsurgical way to reshape the gums, lip and nostrils with a plastic plate before cleft lip and palate surgery.
- ▶ Uses of NAM:
 - ❖ It reduces the cleft inside the mouth.
 - ❖ It reduces the gap in the upper lip.
 - ❖ It lifts and narrows the nose.
- ▶ NAM is used mainly for children with large or wide clefts, and has greatly changed cleft repair.

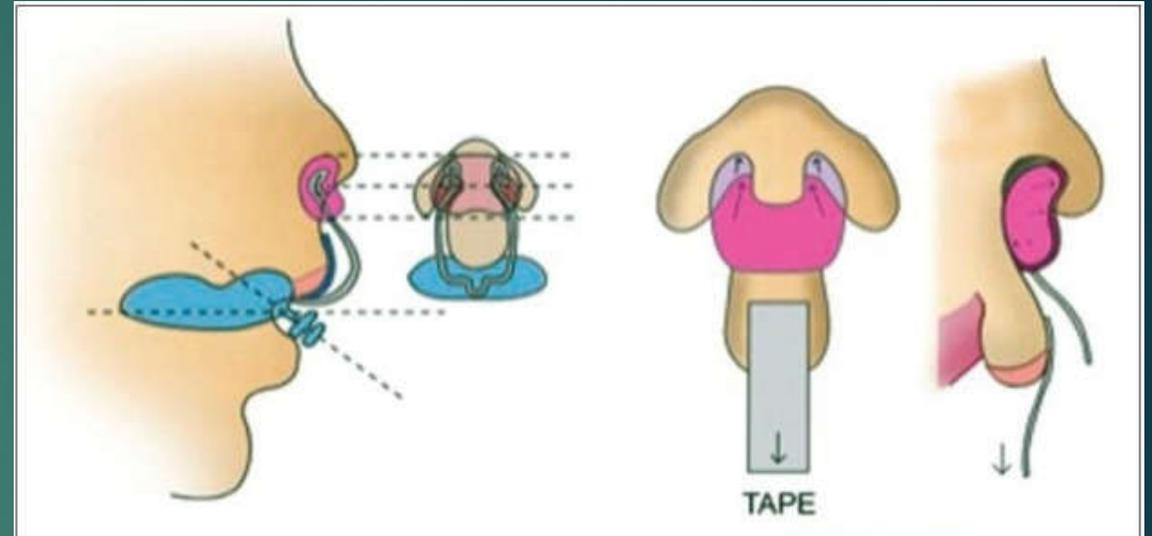


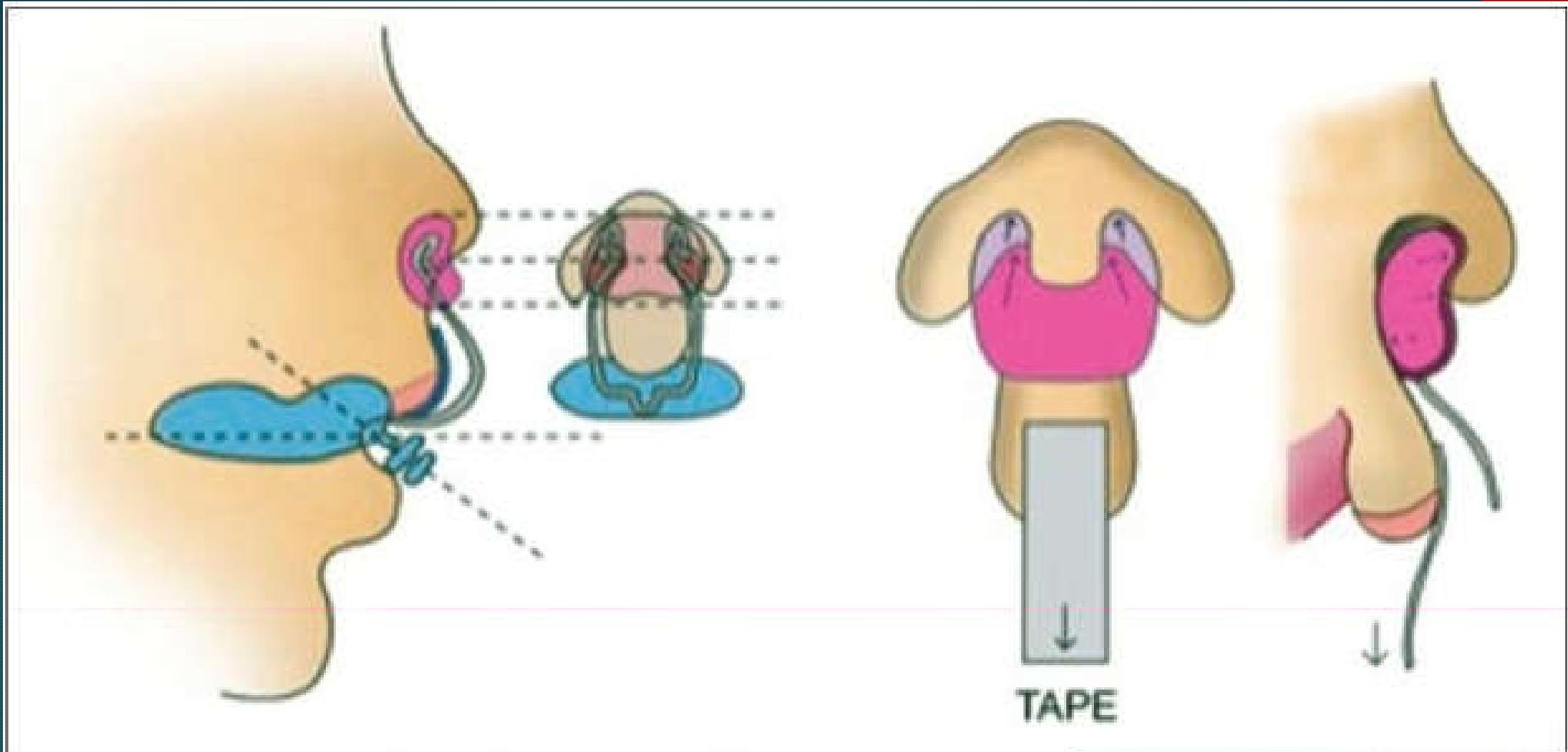
**Nasal stent added to the
intraoral molding plate.**



How does NAM work?

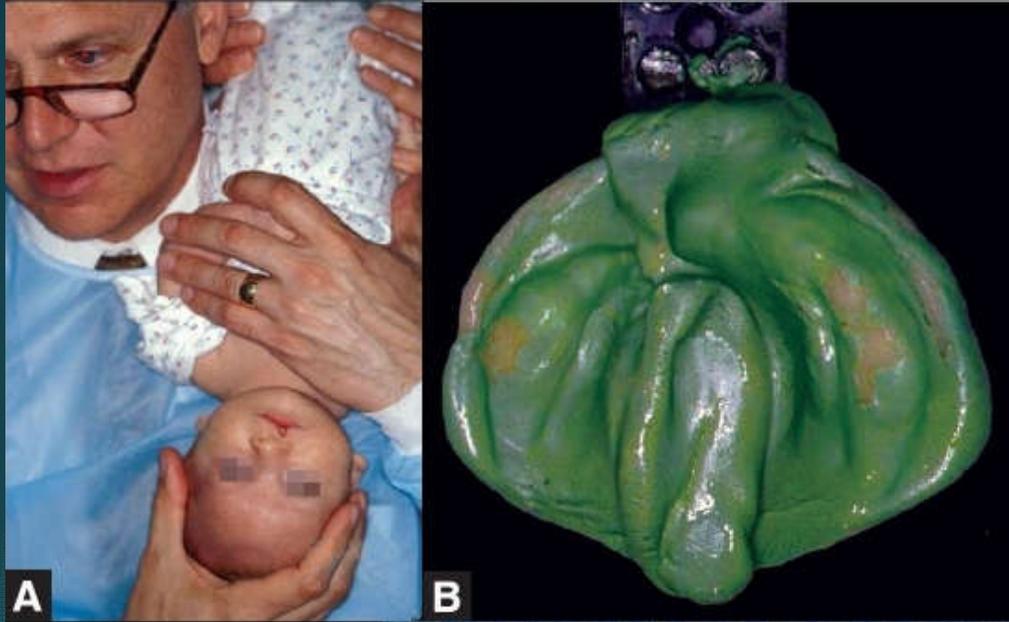
- ▶ NAM is used the best at the first few months after birth, when these tissues are soft and easy to mold.
- ▶ The baby wears the molding plate 24 hours a day, 7 days a week, including when they are feeding.
- ▶ Every 1 to 2 weeks, the orthodontist makes small changes to the shape of the molding plate to guide the baby's gums as they grow.
- ▶ Once the gap in the gums is small enough, the orthodontist adds a nasal stent covered with smooth, rounded plastic to the front of the molding plate. It slowly lifts up the nose and shapes the nostril on the side of the cleft.



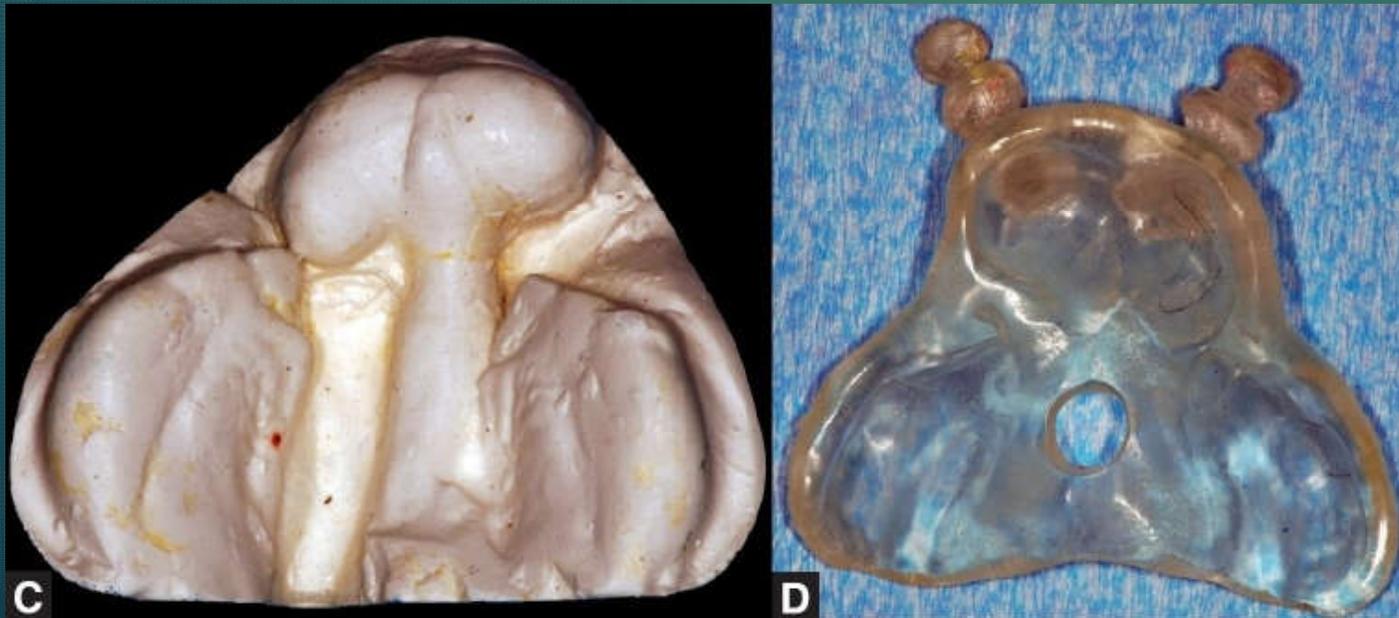


The design of the nasal stent and the position of the nasal stent in the nostril.

Initial impression of the cleft lip and palate infant



- A. Infant held in an inverted position during the impression process to prevent the tongue from falling back and to allow fluids to drain out.
- B. Impression of a unilateral cleft patient using a custom tray & heavy-body silicone impression material.



- C. Plaster stone working model of a bilateral cleft patient for appliance fabrication.
- D. Bilateral nasoalveolar molding plate with retention buttons fabricated using self-cure acrylic resin



A. Broader base tapes secured onto the infant's cheeks

B. Orthodontic elastics incorporated into loops of thinner tapes

C. Thinner tapes secured to the base tapes with backward and upward pull

D. Lip taping to approximate the alveolar segments in midline

NAM Treatment Goals

1. To restore the correct skeletal, cartilaginous and soft tissue relationship pre-surgically.
2. To align and approximate the intraoral alveolar segments (greater/lesser segments).
3. To correct the malposition of the nasal cartilages.
4. To correct the nasal tip and the alar base on the affected side(s), as well as the position of the philtrum and columella.

II. RESEARCH

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Presurgical nasoalveolar moulding treatment in cleft lip and palate patients

[Barry H. Grayson](#) and [Pradip R. Shetye](#)

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Abstract

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Presurgical infant orthopedics has been employed since 1950 as an adjunctive neonatal therapy for the correction of cleft lip and palate. Most of these therapies did not address deformity of the nasal cartilage in unilateral and bilateral cleft lip and palate as well as the deficiency of the columella tissue in infants with bilateral cleft. The nasolaveolar molding (NAM) technique a new approach to presurgical infant orthopedics developed by Grayson reduces the severity of the initial cleft alveolar and nasal deformity. This enables the surgeon and the patient to enjoy the benefits associated with repair of a cleft deformity that is minimal in severity. This paper will discuss the appliance design, clinical management and biomechanical principles of nasolaveolar molding therapy. Long term studies on NAM therapy indicate better lip and nasal form, reduced

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- Simplifying cleft surgery by presurgical nasoalveolar molding (PNAM) for infant born with unilateral cl [J Prosthodont Res. 2013]
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Case Report

Presurgical nasoalveolar moulding: A boon in the management of cleft lip and palate

Lt Col Dinesh Chander Chaudhary^{a,*}, Lt Col Rohit Sharma^b,
Brig Vineet Sharma^c, Simrat Kaur^d

^a Classified Specialist (Orthodontics), Army Dental Centre (R&R), Delhi Cantt, New Delhi 110 010, India

^b Associate Professor (Oral and Maxillofacial Surgery), Dept of Dental Surgery, Armed Forces Medical College, Pune 411040, India

^c Commandant and Command Dental Adviser (Northern Command), C/O 56 APO, India

^d Associate Professor (Prosthodontics), SGRD Institute of Dental Sciences & Research, Amritsar, Punjab, India

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Case report

Simplifying cleft surgery by presurgical nasoalveolar molding (PNAM) for infant born with unilateral cleft lip, alveolus, and palate: A clinical report

Vaibhav D. Kamble MDS^{a,*}, Rambhau D. Parkhedkar MDS^b, Soumil P. Sarin MDS^c,
Pravinkumar G. Patil MDS^d, Bhavesh Kothari MDS^e

^a *Department of Prosthodontics, VSPM's Dental College and Research Centre, Nagpur, Maharashtra, India*

^b *Department of Prosthodontics, Saraswati Dhanwantari Dental College, Parbhani, Maharashtra, India*

^c *Department of Prosthodontics, Post Graduate Institute, Chandigarh, Punjab, India*

^d *Department of Prosthodontics, Government Dental College and Hospital, Nagpur, India*

^e *Department of Orthodontics and Dentofacial Orthopedics, Pacific Dental College and Hospital, Udaipur, Rajasthan, India*

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Abstract

Patient: A 2-day-old female infant with complete unilateral cleft lip, alveolus, and palate (left side) was presented to the Department of Prosthodontics, Government Dental College and Hospital, Nagpur for evaluation and treatment with presurgical nasoalveolar molding (PNAM) prior to surgical intervention.

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Cleft Lip Repair: Trends and Techniques

Guest Editor Joseph K. Williams M.D., F.A.C.S., F.A.A.P.

Nasoalveolar Molding for Infants Born with Clefts of the Lip, Alveolus, and Palate

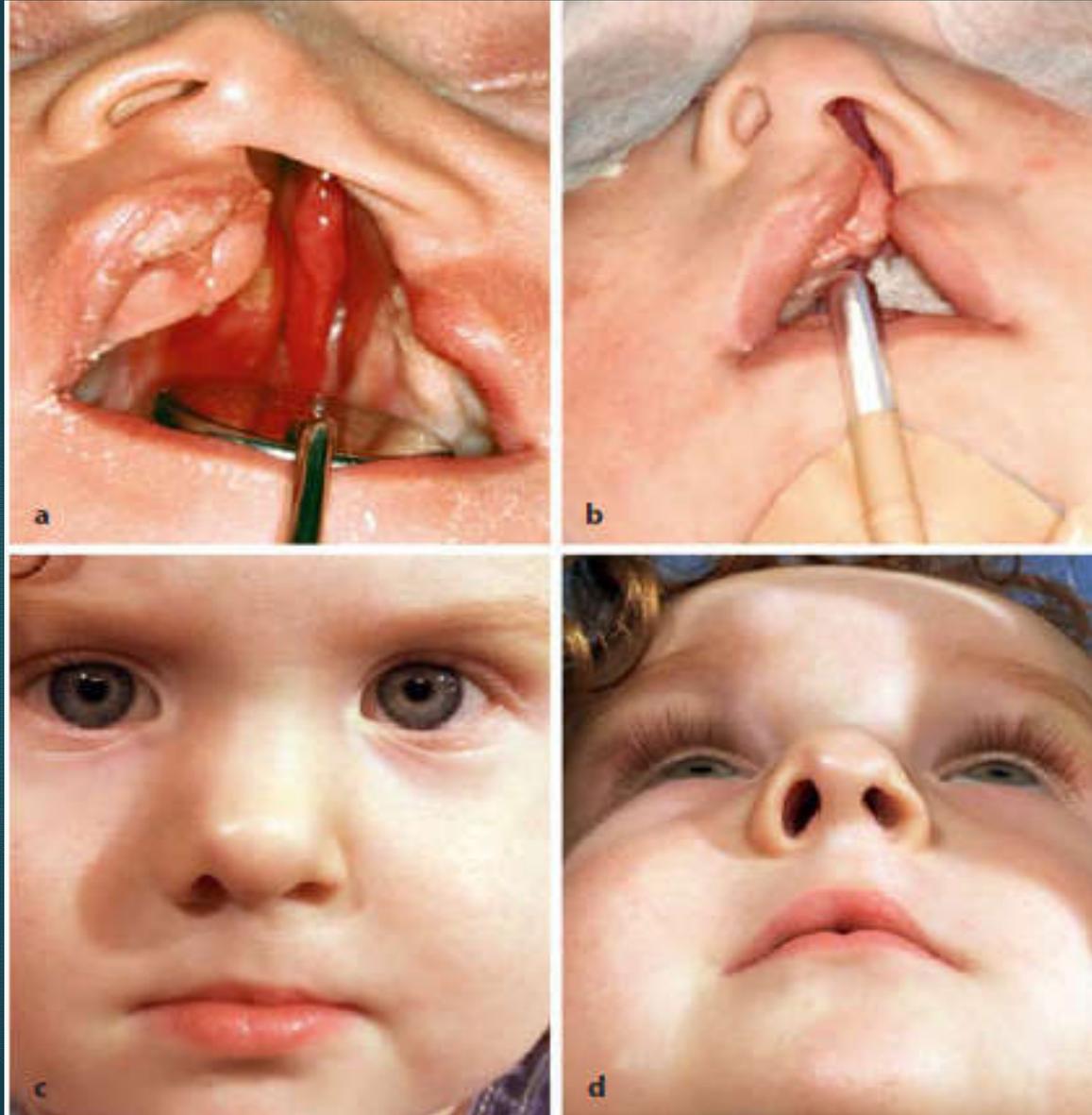
[Barry H. Grayson](#), D.D.S.^{1,2} and [Deirdre Maull](#), D.M.D.³

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ABSTRACT

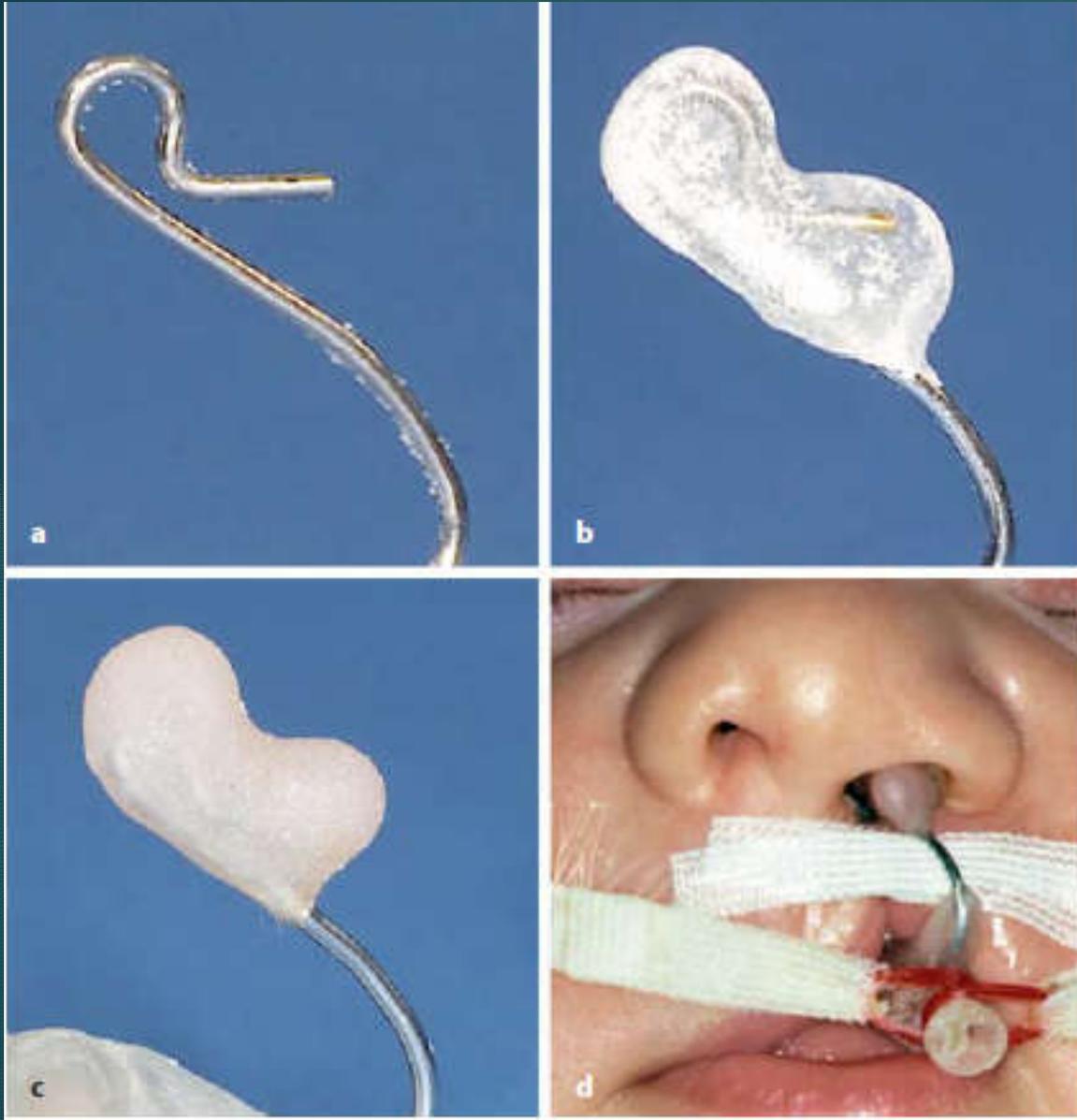
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Presurgical infant orthopedics has been employed since the 1950s as an adjunctive neonatal therapy for the correction of cleft lip and palate. Nasoalveolar molding represents a paradigm shift from the traditional methods of presurgical infant orthopedics. One of the problems that the traditional approach failed to address was the deformity of the nasal cartilages in unilateral, as well as bilateral, clefts of the lip and palate and the deficiency of columella tissue in infants with bilateral clefts.



Presurgical nasoalveolar molding in reducing severity of the initial cleft deformity

- A. Patient before implementation of nasoalveolar molding.
- B. Patient after nasoalveolar molding and just before primary surgical repair.
- C. Frontal view and (D) base view of a patient at 2 years, 5 months of age showing a minimally detectable lip scar and good nasolabial esthetics.

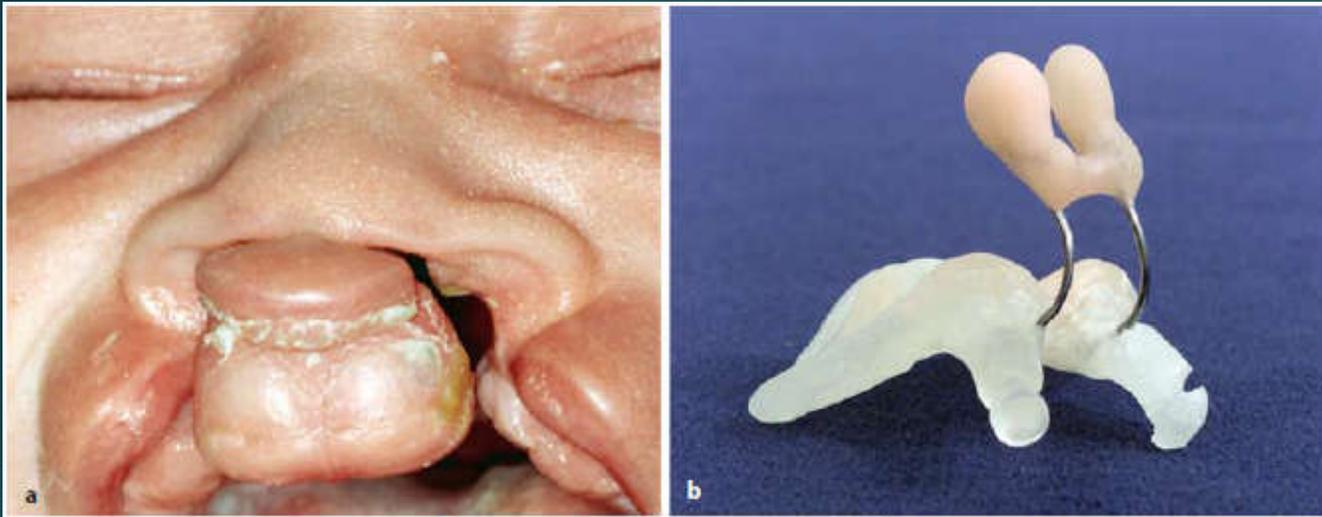


A. The nasal stent.

B. Hard acrylic is applied

C. The hard acrylic nasal stent is coated with a thin layer of soft denture liner for comfort

D. The upper lobe of the nasal stent enters the nose and gently lifts the dome. The lower lobe of the nasal stent lifts the nostril apex and defines the top of the columella.



A. Bilateral complete cleft with nearly absent columella, wide nasal tip, everted premaxilla, and widely separated lip segments.

B. The bilateral nasoalveolar molding plate appliance.

C. Appliance NAM to infant.

D. After 4 months of NAM therapy and before the primary surgical repair.

E. Patient at 1 year, 6 months of age.

Benefits

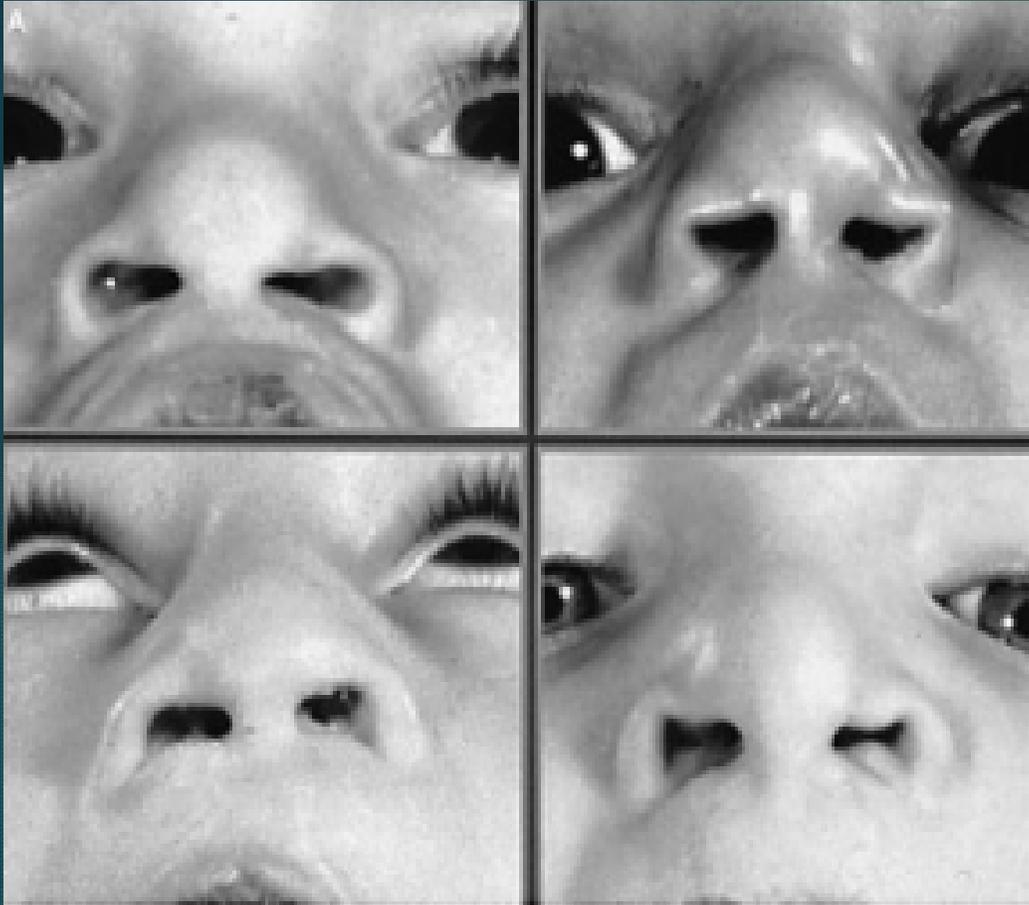
1. Short-term

Achieve a better and more predictable outcome with less scar tissue formation.

2. Long-term

The change in nasal shape is stable with less scar tissue and better lip and nasal form.

3. This improvement reduces the number of surgical revisions for excessive scar tissue, oronasal fistulas, nasal, and labial deformities.



(A) Before the initiation of NAM and the associated surgical technique.



(B) After the introduction of NAM and presurgical columella elongation.

Comparison of Early Onset Nasoalveolar Molding With Patients Who Presented for Molding up to 1 Year of Age

*Vikram Shetty, MBBS, MDS, DNB, *Ankur Thakral, MDS,†
and Chandni Sreekumar, MDS‡*

Purpose: To compare the effectiveness of nasoalveolar molding (NAM) in infants with complete unilateral cleft lip and palate presenting before and after 6 months of age and justify its use in older infants presenting for treatment.

Materials and Methods: The university NAM protocol was followed for 150 patients who were included in the study. NAM was performed by 1 month of age (group I, n = 50), at 1 to 6 months of age (group II, n = 50), and at 6 months to 1 year of age (group III, n = 50). Seven linear anthropometric measurements were compared using dentofacial models.

Results: Statistical analysis before and after NAM showed that group I had 83, 176, 69, and 142% improvement in intersegment distance, nasal height, nasal dome height, and columella height, respectively. Group II had 53, 44, 30, and 67% improvement. Group III had 45, 38, 28, and 62% improvement.

Conclusion: Patients in all 3 groups showed improvement with the NAM protocol. Although patients who presented for treatment before 1 month of age benefited the most, those who presented at 6 months to 1 year of age benefited as much from NAM as those who presented at 1 to 6 months, thus validating its use in these patients.

Table 2. MAXILLARY ARCH AND LINEAR NASAL MEASUREMENTS FOR GROUPS I, II, AND III AT T1, T2 AND T3

Measurements	Side	T1, Mean ± SD			T2, Mean ± SD			T3, Mean ± SD		
		Group I	Group II	Group III	Group I	Group II	Group III	Group I	Group II	Group III
Intersegment distance		12.15 ± 3.569	9.19 ± 2.788	7.61 ± 1.44	2.07 ± 1.588	4.31 ± 1.259	4.18 ± 1.12	0.92 ± 0.875	1.99 ± 0.796	2.37 ± 0.93
Alveolar width		41.57 ± 9.824	39.42 ± 6.07	40.23 ± 5.16	42.36 ± 9.359	41.11 ± 5.49	40.56 ± 4.94	43.38 ± 9.192	42.50 ± 6.12	41.63 ± 4.91
Nasal base width	C	17.18 ± 1.777	19.31 ± 3.215	19.29 ± 3.476	14.11 ± 1.608	17.59 ± 3.057	17.27 ± 3.153	12.76 ± 2.128	13.23 ± 2.463	12.90 ± 2.052
	NC	7.06 ± 1.623	8.84 ± 2.908	9.91 ± 3.196	10.07 ± 1.735	9.79 ± 2.696	10.14 ± 2.720	12.89 ± 2.163	11.27 ± 2.424	11.75 ± 1.828
Nostril width	C	14.52 ± 2.464	15.88 ± 2.347	15.78 ± 2.423	11.55 ± 2.559	14.55 ± 2.758	14.67 ± 3.134	8.75 ± 2.562	8.90 ± 2.434	9.13 ± 2.526
	NC	4.21 ± 1.728	5.36 ± 2.009	6.08 ± 2.003	6.06 ± 1.598	6.38 ± 2.232	7.18 ± 1.814	9.18 ± 4.277	7.57 ± 1.543	7.93 ± 1.254
Nostril height	C	2.37 ± 0.826	4.13 ± 1.842	4.09 ± 1.841	6.55 ± 1.361	5.93 ± 2.184	5.62 ± 2.379	7.86 ± 2.579	6.18 ± 1.909	6.03 ± 2.015
	NC	5.76 ± 1.311	7.31 ± 2.326	7.98 ± 2.443	8.22 ± 1.334	9.13 ± 2.435	8.82 ± 2.061	8.29 ± 2.244	8.70 ± 2.057	8.78 ± 1.565
Nasal dome height	C	7.14 ± 1.704	9.44 ± 2.903	9.29 ± 2.329	12.04 ± 1.695	12.27 ± 2.761	11.88 ± 2.511	14.39 ± 3.151	12.77 ± 2.360	12.55 ± 1.610
	NC	10.43 ± 1.515	12.19 ± 3.310	12.75 ± 2.899	13.09 ± 1.531	14.61 ± 3.175	13.61 ± 2.271	15.37 ± 2.368	13.90 ± 2.824	14.68 ± 1.236
Columella height	C	1.13 ± 0.565	1.34 ± 1.518	1.15 ± 0.498	2.72 ± 0.695	2.23 ± 0.744	1.86 ± 0.386	2.47 ± 0.633	2.15 ± 0.614	1.82 ± 0.449
	NC	3.28 ± 0.733	2.98 ± 0.704	3.01 ± 1.287	3.56 ± 0.453	3.49 ± 0.645	3.17 ± 0.515	2.98 ± 0.567	2.58 ± 0.518	2.49 ± 0.617

Abbreviations: C, cleft; NC, non-cleft; SD, standard deviation; T1, initiation of nasolabial molding; T2, completion of nasolabial molding; T3, 18 months of age.

Typical results in infants treated before 1 month of age

(a)



(b)



(a) and (b)

Before initiation of NAM.
Child's age 21 days.

(c)



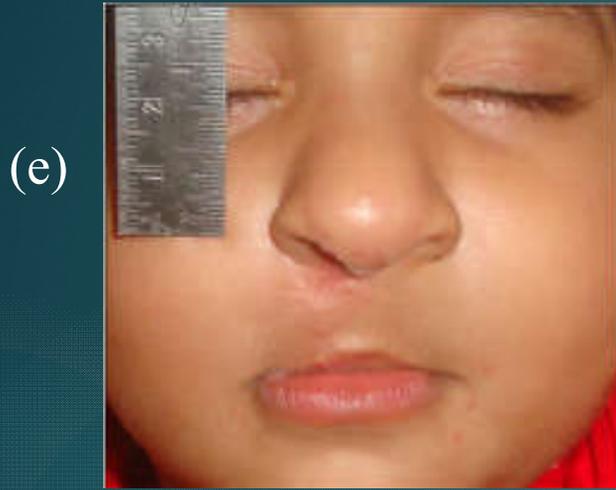
(d)



(c) and (d)

After completion of NAM

Typical results in infants treated before 1 month of age (cont.)



(e) and (f)
At 18 months of age



(g) Progressive changes in alveolar morphology following NAM

COMPLICATIONS

1. Irritation of the oral mucosal or gingival tissue. Common areas of breakdown are the frenum attachments, the anterior premaxilla, or the posterior fauces as the molding plate is retracted. Besides, cheeks are the most common area of tissue irritation.
2. Poor compliance by the parents can cause loss of valuable treatment time.
3. Molding plate will become dislodged and obstruct the airway.
4. The greater cost of NAM process.

III. CONCLUSION

I. Advantages

1. To restore the correct skeletal, cartilaginous and soft tissue relationship pre-surgically.
2. To align and approximate the intraoral alveolar segments (greater/lesser segments).
3. To correct the malposition of the nasal cartilages.
4. To correct the nasal tip and the alar base on the affected side(s), as well as the position of the philtrum and columella.

II. Disadvantages

1. Irritation of the oral mucosal or gingival tissue.
2. Poor compliance by the parents.
3. Obstructing the airway.
4. The greater cost of NAM process.

Thank you for your attention !