



## Nasoalveolar moulding of bilateral cleft lip and palate

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### Abstract

Cleft lip and palate is a serious congenital facial deformity that includes aesthetic and functional problems. This needs a number of surgical procedures which also includes bone grafting to correct. The process of pre-surgical nasoalveolar moulding not only decreases the required number of surgeries but also improves the aesthetic result of the surgery. Pre-surgical nasoalveolar moulding is passive moulding procedure in which we align and approximate the cleft segments and also improve the contour of columella-philtrum region and nose. A similar case report of a patient with bilateral cleft lip and palate is described in which application of pre-surgical nasoalveolar moulding decreased the defect and vastly improved the anatomy of lip-nose region.

**Keywords:** substituted Li ferrite, magnetostatic and spin waves, microstrip array antenna, X-band frequency range

### Introduction

Cleft of lip and palate is one the most common congenital deformations of head and neck <sup>[1]</sup> with incidence rate of 1.3:1000 in South-East Asia <sup>[2]</sup>. As the deformity surrounds the lip, nose and palatal area, a great number of aesthetic and functional problems arise with it including feeding, hearing, malformed teeth and lowered self-esteem with difficulty in social interactions <sup>[2]</sup>.

McNeil <sup>[3]</sup>, Georgiade <sup>[6]</sup> and Hotz *et al.* <sup>[5]</sup> were the first to suggest the idea of alveolar moulding. Pin retained moulding plates were created for connection of bilateral and unilateral clefts by Mylin <sup>[7]</sup>. The major problem still remained the aesthetic challenge due to nasal deformity. To improve the aesthetic result of surgically corrected cleft lip and palate, a technique to mould the alveolus lip and nose was introduced by Grayson *et al.* <sup>[4]</sup>.

Nasoalveolar moulding is a presurgical orthopedic technique that reshapes the gums, lips and nostrils before the surgery and helps reduce the cleft. The basic principle used in the nasoalveolar moulding technique is based on the break of intercellular matrix of the nasal cartilage. This happens due to increased levels of hyaluronidase during first 6-8 weeks of the infant. This increase in hyaluronidase is because of high maternal estrogen levels in the infant<sup>8</sup>. This is the reason that the procedure should be started as soon after the birth as possible and should be finished before the age of 6 months.

Custom moulding acrylic plate is made and used to direct alveolar growth for later desired results. Further serial modifications can be made with addition or depletion of material in the moulding device to achieve desired shape in nose and alveolus.

A similar case study is discussed below.

### Objectives

In alveolar segment <sup>[9, 10]</sup>,

- Reduction of severity of cleft of alveolar segments.
- Alignment of lesser and greater alveolar segments.
- Approximation of alveolar cleft without maxillary arch constriction on alveolar segments <sup>[5, 6]</sup> • Reduction

of severity of cleft of alveolar segments. • Alignment of lesser and greater alveolar segments. • Approximation of alveolar cleft without maxillary arch constriction. • Reduction of severity of cleft of alveolar segments. • Alignment of lesser and greater alveolar segments. • Approximation of alveolar cleft without maxillary arch constriction.

- Reduction of severity of cleft of alveolar segments.
- Alignment of lesser and greater alveolar segments.
- Approximation of alveolar cleft without maxillary arch constriction.
- In lips <sup>[4, 11]</sup>
- Nonsurgical columella lengthening.
- Approximation of lip segments prior to surgery to reduce tension in the lip tissues and hence minimize lip scar.
- Medialization of the premaxilla (in bilateral cleft lip [BCLP]) along the midsagittal plane and hence aide surgeon to form uniform Cupid's bow
- On nose
- Reduction of nasal tip width.
- Improve nasal tip projection.
- Decrease nasal alar base width.
- Improve nostril shape.

### Case report

A male patient of age 1 week was referred to Department of Orthodontics and Dentofacial Orthopedics, Federal Government Hospital Islamabad, Pakistan. On clinical examination it was a case of bilateral cleft lip and palate. After a detailed study of the case a nasoalveolar moulding appliance was planned for the patient.

On the first visit thorough history and examination of the patient was carried out, to rule out any other issues/syndromes. The patient was then recalled the next day for the start of treatment.

The parents of the patients were counseled properly about the treatment planning and the required compliance by them. The first step in the treatment procedure was taking the primary impression which was made using heavy putty

in the presence of proper armamentarium to manage emergency. The patient was kept upright in the mothers lap with his head facing downward during the procedure.

A cast was then poured and custom tray was made. The custom tray was then used to take secondary impression of the patient by taking heavy body putty and layering it with light body putty. A working cast was then made using this impression and undercuts in the cleft region were blocked to make the appliance patient compatible.

After that the appliance was constructed and inserted into the patient’s mouth, retention was observed and additional extraoral retention was given using Steri tapes. The patient was observed for sometime after insertion to check for problems or irritations.

Parents were taught the insertion of device and were advised to take special care for any movement or anything hitting the device. Common complications were irritation from device and extraoral tapes including sore spots and ulcers.



Fig 4: Use of Appliance



Fig 1: Pre-treatment



Fig 5: Pre-Surgical



Fig 6: Post Surgery\ After lip repair



Fig 2: Impression



Fig 3: NAM Plate

**Discussion**

Pre-surgical nasoalveolar moulding decreases the surgical needs and bone grafting in the treatment process of cleft lip and palate patients. This is helpful as it saves patient from suffering of the surgical procedure while both patient and parent’s psychological trauma from the surgery can be reduced significantly. The process is more cost friendly, yields more aesthetic results and gives dual function as it also can be used as a feeding appliance. As a result of combined efforts from pre-surgical nasoalveolar moulding and surgical procedure, the outcomes are excellent and patient is better suited to face the society.

As mentioned earlier the principle on which this works is application of low-grade continuous pressure. There is increased level of estrogen in the infant’s blood which in return causes increased level of hyaluronic acid, this hyaluronic acid increases the plasticity and malleability of the cartilage. Our idea is to take benefit of this elastic property and start the treatment as soon as possible.

Studies showed increasing width in ala and columnar length giving better aesthetic results. The treatment requires high degree of compliance from the patient’s parents and high determination from both the parents and dental team because multiple frequent are required for better results. Some common complications from this treatment include tissue lesions, over expansion of the nostrils, difficulty in

retention of the appliance and dermal irritation from the tapes

### Conclusion

Cleft lip and palate is a very common deformity in the subcontinent region, and presurgical nasoalveolar moulding is proving to be very effective in the treatment of this problem. After using the appliance, surgery becomes more effective especially when a team of dedicated doctors is supported by good and compliant parents\patients.

### References

1. Habel A, Sell D, Mars M. Management of cleft lip and palate. *Archives of disease in childhood*. 1996; 74(4):360-6.
2. Bailey BJ, Johnson JT, Newlands SD, editors. *Head & neck surgery-otolaryngology*. Lippincott Williams & Wilkin, 2006.
3. McNeil CK. Orthodontic procedures in the treatment of congenital cleft palate. *Dent Rec*. 1950; 70:126-32.
4. Grayson BH, Cutting CB. Presurgical nasoalveolar orthopedic molding in primary correction of the nose, lip, and alveolus of infants born with unilateral and bilateral clefts. *The Cleft palate-craniofacial journal*. 2001; 38(3):193-8.
5. Hotz M, Perko M, Gnoinski W. Early orthopaedic stabilization of the praemaxilla in complete bilateral cleft lip and palate in combination with the Celesnik lip repair. *Scandinavian Journal of Plastic and Reconstructive Surgery*. 1987; 21(1):45-51.
6. Georgiade NG, Latham RA. Maxillary arch alignment in the bilateral cleft lip and palate infant, using the pinned coaxial screw appliance. *Plastic and reconstructive surgery*. 1975; 56(1):52-60.
7. Mylin WK, Hagerty RF, Hess DA. The Pin-Retained Prothesis in Cleft Palate Orthopedics. *The Cleft palate journal*. 1968; 5(3):219-27.
8. Matsuo K, Hirose T. Nonsurgical correction of cleft lip nasal deformity in the early neonate. *Annals of the Academy of Medicine, Singapore*. 1988; 17(3):358-65.
9. Shetty V, Vyas HJ, Sharma SM, Sailer HF. A comparison of results using nasoalveolar moulding in cleft infants treated within 1 month of life versus those treated after this period: development of a new protocol. *International journal of oral and maxillofacial surgery*. 2012; 41(1):28-36.
10. Spengler AL, Chavarria C, Teichgraeber JF, Gateno J, Xia JJ. Presurgical nasoalveolar molding therapy for the treatment of bilateral cleft lip and palate: a preliminary study. *The Cleft palate-craniofacial journal*. 2006; 43(3):321-8.
11. Yang S, Stelnicki EJ, Lee MN. Use of nasoalveolar molding appliance to direct growth in newborn patient with complete unilateral cleft lip and palate. *Pediatric dentistry*. 2003; 25(3):253-6.