

CASE REPORT

TREATMENT OF UNILATERAL COMPLETE CLEFT LIP AND PALATE USING PRE-SURGICAL NASOALVEOLAR MOLDING (PNAM) THERAPY: A CASE REPORT

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ABSTRACT:

Cleft lip and cleft palate is one of the most common congenital malformation involving the middle third of face. The children affected with cleft lip and palate are handicapped right from birth for breastfeeding, swallowing, inappropriate growth and development of maxilla and overall development of the face affecting the overall wellbeing of the individual. Treatment of patients with a cleft lip and palate should be started at the earliest to deal with esthetic, functional, and psychological concerns. Excellent results are achieved when Nasoalveolar molding is initiated immediately after birth. In this clinical report presurgical management of an newborn with a complete unilateral cleft of the lip and palate on left side is described had favorable results, with a hope that it will minimize the extent of resultant scarring after surgery.

Key Words: Infant orthopedics, Presurgical Nasoalveolar Alveolar Molding, Unilateral Cleft Lip and Palate

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INTRODUCTION

Congenital defect such as cleft lip and palate limits the patient ability with normal speech and deglutition. Parents of a new born child with such a defect faces difficulties to feed the newborn directly affecting the speech and overall growth. The unilateral cleft defect is usually characterized by a wide nostril base and divided lip segments on the cleft side. The affected lower lateral nasal cartilage is displaced laterally and inferiorly, which resulted in a depressed dome, form an increased alar rim, an oblique columella, and an overhanging nostril apex.¹ In 1950 McNeil forwarded the modern concept of presurgical maxillary infant orthopedics by using various plates to mold the alveolar segments into its proper place.²

Presurgical nasoalveolar molding (PNAM) was by Barry Grayson, Orthodontist in 1993 which provides the surgeon with an superior basis for the repair of the defect. It helps in by reducing the size of intraoral alveolar cleft by active molding and positioning of the bony segments and soft tissues surrounding the cleft and therefore helps in

repositioning the cartilage in the cleft nose which depends on the inherent plasticity and moldability of the cartilaginous tissues of newborn. So, to get it excellent results with PNAM, treatment of infant should started early after birth.³

CASE REPORT

A six day old female infant with unilateral cleft lip and palate was referred to our dental department for feeding appliance. After thorough examination presurgical Nasoalveolar Molding Therapy was planned for the patient. The complete protocol of PNAM, along with the recall appointment schedule was described to the parents. After general physical checkup by the pediatrician and the plastic surgeon, and a written informed consent was taken from the parents to start the therapy actively within the first week of birth. Initial examination revealed unilateral cleft lip and cleft palate on the left side (Figure 1a,1b). The distance between the two alveolar segments was 8 mm. The medical and family history of the parents was noncontributory.



Fig 1a & 1b: 20 day old patient with unilateral cleft lip and palate of left side along with nasal deformity on left side.

PROCEDURE

A heavy-bodied silicone impression material (Speedex; Coltene Whaledent, Mumbai) is used to take the initial impression at the earliest after birth as possible, when the cartilage is plastic and moldable in the presence of an anesthetist and necessary armamentarium to manage the emergency if any encountered. Infant was on NPO (nil per oral) for four hours before impression making and was kept in mother's lap with her head facing downward and mother's hands supporting infant chest and lap region while making the impression.

As soon as impression material sets tray was removed and the oral cavity examined for any residual impression material in deeper section of the cleft. Wax beading of the impression was done and poured with dense dental stone (Kalstone; Kalabhai Karson, Mumbai, India) to obtain a cast/ model. Duplicate cast was also obtained from the same impression as a permanent patient record for future reference. All the undercuts in the cleft space on the cast were blocked with wax.

The NAM plate as described by Grayson and Shetye was fabricated with hard, clear self cure acrylic (Dental Products of India (DPI) self cure-clear, Mumbai, India) and is lined with a denture soft material.

Retentive button was made in the molding plate at an antero-inferior region, at an angle of 30-45° to the imaginary occlusal plane. Nasal stent made of round stainless steel wire of 0.036-gauge with acrylic component which is shaped into a bi-lobed form resembling a kidney was attached to the plate taking the shape of a "swan neck" (Figure 2b). Before delivering the base tape, a type of hydrocolloid bandage (Tegaderm; 3M ESPE, St. Paul), was placed over the cheeks and lips to avoid irritation to tissues. the plate, and then the lip segments were approximated by applying micro pore tape/surgical tape from greater segment towards the lesser segment; the molding plate was then inserted into the mouth. Extraorally the NAM appliance is then secured to

the base tapes on the cheeks and bilaterally by steri tapes (0.25 X 4 inch) with orthodontic elastic bands at one end. The elastic on the surgical tape were looped on the retention button of the molding plate; the strips were then pulled and secured to the cheeks. The elastics were stretched twice to their inactive diameter to obtain appropriate force, and then the retentive tapes and elastics were directed superiorly and posteriorly to get proper direction of force and finally secured with the horizontal tapes. (Figure 2a). Before inserting nasal stent into the nostril, stent was covered with a thin layer of soft acrylic (Permasoft; Dentsply) for comfort and to apply positive elastic pressure; thus aids to lift the collapsed nostril and defining the top of the columella.

On recall appointment after 1 week, the plate was activated by selectively adding 0.2-0.5 mm of the soft resilient liner material on the palatal aspect of the lesser segment and buccal aspect of the greater segment. Trimming on the palatal aspect of the greater segment and buccal aspect of the lesser segment was done to aid in movement of the segments to desired position. In follow up visits, nasal stent was modified appropriately by addition of soft acrylic or bending wire using three prong plier for getting the desired shape of nostril. The patient was evaluated every 15 days, and the appliance was activated as per necessity. At the end of nasoalveolar molding, there was reduction in the alveolar cleft from 8 mm to 3 mm, the length of columella increased and its position was changed from oblique to upright and having more midline orientation, which certainly improved the projection of nasal tip and alar cartilage symmetry (Figure 3a & 3b). Repair of cleft lip through surgery (Chelioplasty) was performed at 6 months of age. Postsurgically pictures the contour of the nostril on the cleft side showed improvement and resembles the nostril on the normal side and the alar tissue was molded into a normal convex shape (Figure 3c & 3d). Success of PNAM therapy thus eliminating need for rhinoplasty is visible in post surgical pictures.



Figure 2a: Placement of tapes and position of nasal stent and handle. Handle is attached at 30-45 degree to alveolar plate. Elastic secured tapes are directed posteriorly and superiorly from handle in moulding plate towards cheeks. Image 2b shows completed PNAM plate assembly with nasal stent.

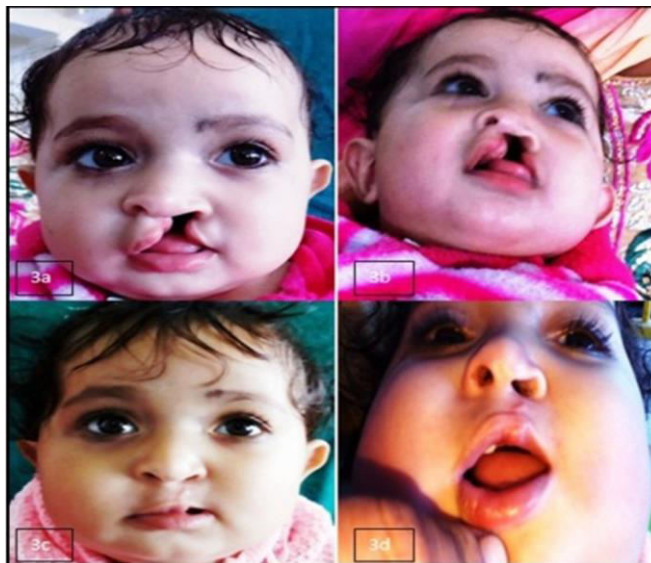


Figure 3a & 3b shows results of PNAM therapy in 5.5 month old infant one week before surgery, there is reduction in cleft space, increase in columellar length and reduction in bialar width. Image 3c & 3d shows 1 month post surgical results of PNAM therapy. Nasal symmetry is evident

DISCUSSION

Millard described the unilateral and bilateral cleft deformity resulted as a result of failure of mesenchymal tissue to migrate from the maxillary process into the medial processes of nose.⁴

The PNAM technique was first introduced by Grayson et al. in 1993 and the same technique followed by us.⁵

As in this case the intersegmental distance was found to be 8mm so, the molding of alveolar and nasal tissue were started simultaneously, the rationale behind this may be that the estrogen acquired from mother before birth increases hyaluronic acid which resulted in decrease in elasticity and increase in plasticity of cartilages.⁶ Hyaluronic acid, a component of the proteoglycan intercellular matrix, can be found circulating in the infant for several weeks after birth.^{7,8}

At the completion of the PNAM therapy significant reduction of the alveolar and palatal gap was observed. Significant improvement in nasal symmetry and columellar length was observed, hence increased the nasal aesthetics. Nostril height was increased significantly along with decrease in nostril width and therefore improved the nasal tip projection.

CONCLUSION

PNAM has proved to be an efficient adjunctive therapy for reducing hard and soft tissue deformity in infants with cleft lip and palate before surgery. Therefore, to get desired result from PNAM, it is equally important that parents or caregivers to participate actively in the treatment plan. Presurgical naso alveolar molding has showed potential to

achieve nasal symmetry by reducing bialar width, increased height and width of columella and contouring alar cartilages thereby reducing the need for soft-tissue revision surgeries later to achieve esthetic results.

Hence, finally concluding that this therapy should be advocated in all patients with unilateral cleft lip and palate patients as a routine procedure in the treatment protocol, to improve the surgical results and enhance the aesthetics and function with minimal surgeries.

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