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Pre-surgical Nasoalveolar Moulding in Cleft Lip and Palate Patient: A Case Report

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Case Report

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ABSTRACT

Cleft lip and palate (CLP) is the most common congenital deformity of the oral cavity. Recently, nasoalveolar moulding (NAM) has evolved as a presurgical technique which reduces the severity of the oronasal defect. NAM improves the facial appearance and function by moulding the nasal cartilages, premaxilla, and the alveolar ridges before the corrective surgical procedures. Utilization of the NAM technique has eliminated the surgical scars associated with the traditional columella reconstruction and it has reduced the number and cost of the revision surgical procedures. NAM for CLP should be used after the birth and continued till further specific corrective surgeries are performed.

INTRODUCTION

A Cleft lip and palate can arise with considerable variation in severity and form and are associated with the nasolabial deformity. More wider and extensive clefts are associated with more significant nasolabial deformity [1]. Severe form of these clefts present a significant surgical challenge to achieve a functional and cosmetic outcome due to deficient hard and soft tissue elements [2]. Even a mild incomplete unilateral cleft lip in the absence of a cleft palate can be associated with a nasal deformity. The principal objective of presurgical nasoalveolar molding (NAM) is to reduce the severity of the initial cleft deformity [3,4]. The nasoalveolar moulding technique has been shown to significantly improve the surgical outcome of the primary repair in cleft lip and palate patients compared to other techniques of presurgical orthopaedics [5].

CASE PRESENTATION

A 65-days-old male infant was presented with a bilateral cleft lip and palate (CLCP) with no significant medical history, family history or associated systemic illness. On clinical examination bilateral complete cleft of the lip and palate with nearly absent columella and everted premaxilla were noted. The alar base-width was significantly increased, and the lip segments were widely separated. The lower lateral alar cartilages were flared and the nasal tip was widened **(Figure 1)**. Intraoral view revealed the extension of the cleft till the posterior extent of the hard and the soft palate. A bilateral nasoalveolar molding appliance was planned before the surgical reconstruction of the defect.

Figure 1. Extraoral view impression making.

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The baby was held by one of his parent in the erect position in the presence of surgeon. The primary impression was made with compound followed by the final impression with irreversible hydrocolloid impression material.

Figure 2. Impression of the defect.

The impression material is allowed to set and then removed **(Figure 2)**. The mouth was checked for remaining impression material. The presence of the surgeon was important during the procedure to help in case of an airway emergency. A cast or model was poured with dental stone **(Figure 3)**.

Figure 3. Cast poured with dental stone.

Appliance Fabrication

Undercuts present on the cast were blocked out with utility wax to approximate the contour of an intact arch. Separating media was applied and the NAM moulding plate was fabricated on the dental stone model. It was made of hard clear acrylic and was lined with a thin layer of soft denture material. Care was taken to reduce the border of the plate in the area of the frenum attachments and other areas that may be likely to ulcerate.

Parents were instructed to use the moulding plate full time and to take it out for cleaning as needed, at least once a day. It was informed that initially, it may take longer to feed and adjust the infant with the plate in place. The appliance was secured extraorally with the help of retention arms and elastic bands. The elastics loop over the retention arm should extend from the anterior flange of the plate. The retention arm was positioned approximately 40° down from the horizontal plane to achieve proper activation and to prevent unseating of the appliance from the palate. The elastics used should have an inner diameter of 0.25 inch, and it should be stretched about two times the diameter for activation. The retention arm's vertical position should be at the intersection of the upper and lower lip **(Figure 4)**.

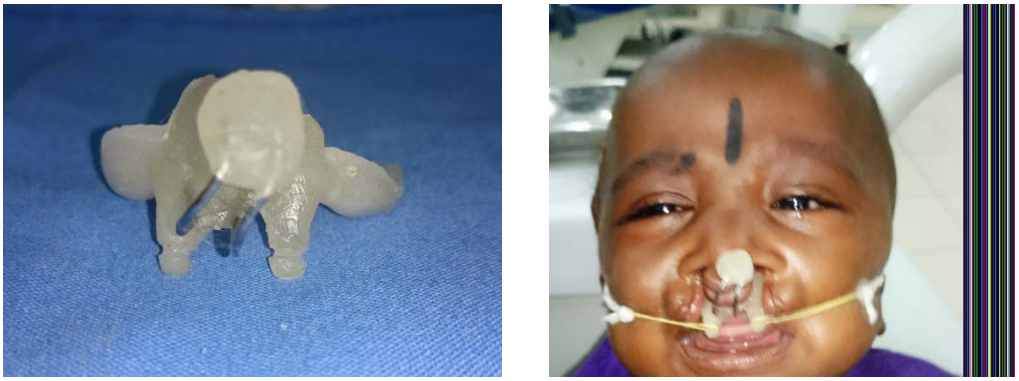

Figure 4. NAM appliance.

Appliance Insertion

The nasoalveolar moulding plate was examined for rough areas and then was inserted in the oral cavity. Appliance was

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checked for proper fitting and retention **(Figure 5)**. After the initial insertion, the baby was observed for several minutes to check the stability of the appliance in place against the palate. Bottle feeding was done to ensure proper suckling without gagging.

Figure 5. NAM appliance secured with elastics and retention arm.

Appliance Adjustment

The appliance was left for 24 hours in the mouth and parents were instructed to remove it only for cleaning purposes. After 24 hours patient was recalled to evaluate and correct sore spots or other problems with the appliance, if any. The recall appointments were scheduled weekly to modify the moulding plate by selective trimming and addition of acrylic to direct the alveolar fragments into the required location. As the alveolar gap come closure, the lip segments come together, reducing the nasal base width. Addition of nasal stent was delayed till laxity of the alar rim was achieved because it may result in the enlarged circumference of the nostril. The elastics should be changed regularly which ensures the efficiency of the appliance by maintaining the tension.

DISCUSSION

The NAM appliance helps to align the tissues before the primary lip and nose repair, thus enabling the surgeon to achieve a better and more predictable outcome with less scar tissue formation. Major surgical closure of the lip and nose are performed between 3-5 months of age. As the alveolar segments are in near approximation because of NAM, surgical correction is simple to perform. The incorporation of nasal stent is done when the alveolar gap width is decreased to 5 mm. It is fabricated from 0.036 gauge round wire and resembles kidney shape [6]. With the alveolar segments in a better position and increased bone bridges across the cleft, the teeth eruption would occur in a good position with adequate periodontal support [7,8].

CONCLUSION

NAM technique has been shown to improve the surgical outcome of CLP patients compared with other techniques of pre-surgical orthopedics. NAM has proved itself effective and simple adjunctive therapy for approximating hard and soft tissue cleft deformity before surgery. However, the members of the cleft lip and palate team should provide the parents and caregivers adequate training, education, active support, and encouragement during NAM treatment. Lack of parent's compliance and commitment results in less than ideal clinical outcomes.

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