

# A Review on Nasoalveolar Molding

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## ABSTRACT

A common hereditary defect of the oral cavity with grave socioeconomic problem is cleft lip and palate. Although the defect varies in forms and severity, the individuals presented with glitches regarding functions and esthetics. Authors claim that nasoalveolar molding improves facial esthetics and function and has gained more attention. The objective of presurgical nasoalveolar molding comprises improving lip segment, inferior lateral alar cartilages, and alveolar cleft segments. Outcomes of presurgical nasoalveolar molding are promising and hence are encouraged immediately after birth and continued until further corrective surgery is planned. The rationale of presurgical nasoalveolar molding is approximation of the alveolar segments, wherein the surgeon has to perform gingivoperiosteoplasty followed by corrective lip surgery.

**Keywords:** Cleft, Gingivoperiosteoplasty, Nasoalveolar molding.

*Journal of Scientific Dentistry* (2020): 10.5005/jp-journals-10083-0922

## BACKGROUND

Cleft lip, alveolus, and palate are the common congenital defects of head and neck. The prevalence of cleft lip and palate are 27,000–33,000 of the 24.5 million births per year.<sup>1</sup> The incidence of cleft lip and palate is 1 in 781 live births. Comparing the type of clefts, unilateral clefts are nine times as common as bilateral clefts, and tail two times frequently on the left than on the right. Males have a high risk of cleft lip and palate, whereas females are at risk of isolated cleft palate.<sup>2,3</sup>

The patients with cleft lip and palate should be approached in a multidisciplinary setup. In the recent decades, it has evolved due to the availability of advanced surgical techniques. The rudimentary management objective is to reinstate normal function and structure.

Presurgical nasoalveolar molding is an atraumatic way of preparing the gums, lips, and nostrils prior to the surgery, thus eliminating the severity of the cleft. Several surgeries were planned for correcting cleft lip and palate before the introduction of presurgical nasoalveolar molding.

## Principles of Presurgical Nasoalveolar Molding

Negative sculpturing and passive molding of the alveolus and adjacent soft tissues are the main principles of presurgical nasoalveolar molding. The passive molding is carried out by molding a custom-made acrylic plate that directs the growth of the alveolus. Simultaneously internal surfaces are modified to get the anticipated form of the alveolus and nose by either adding or removing the material in specified areas termed as negative sculpturing.

## AIMS AND OBJECTIVES

- Prime objective is to reduce the severity of cleft malformation and to aid in surgery.
- Nonsurgical broadening of columella.
- Estimating the closure of lip segments.
- To aid in additional bone formation.

## MATERIALS AND METHODS

In newborns with bilateral cleft lip and palate, the goal is to lengthen the columella nonsurgically and to center the premaxilla

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**How to cite this article:** Manivannan P, Alexander L, Vijaykumar V. A Review on Nasoalveolar Molding. *J Sci Dent* 2020;10(2):49–50.

**Source of support:** Nil

**Conflict of interest:** None

along the midsagittal plane. The nasoalveolar molding involves the lengthening of columella by moving the ala of nasal vaults anteriorly in a sagittal direction.<sup>4</sup>

## Steps

Evaluation of presurgical nasoalveolar molding should be started at birth. The scientific procedure and construction of the presurgical nasoalveolar molding plate should be started on the first week. Since the level of the circulating estrogen and hyaluronic acid in infants is higher, molding of the tissues is comparatively easier in infants. Hence, presurgical nasoalveolar molding should be done before 6 months of age.<sup>5,6</sup>

## Impression Technique

The first impression is made with heavy-bodied silicone impression material as soon as the child is born, as the cartilage is flexible and formable. A novel technique was performed by holding the newborn upside down, so that the tongue is in the forward position.<sup>7</sup> The constructed plate must be in place till the silicon-bodied material begin to extrude from the posterior border. Yang et al. used a pretrimmed pediatric tray with the infant in the erect position being held by the parent. Prashanth et al. and Mishra et al. made impression when the newborn was in upright position placed on the lap of the parent. A new technique to make impression using ice-cream sticks and impression compound was also explained by various authors.<sup>8</sup> The impression will be allowed to set and the cast is poured with which the custom trays are fabricated and

secondary impression is made. An acrylic plate is fabricated with the secondary impression cast.

### Appliance Fabrication

Undercuts have to be blocked with utility wax. The plate as mentioned by Grayson and Maull is made of rigid, self-cure acrylic. It has to be creased with a thin layer of a denture wax. The holding arm should be made up to 40° to get the suitable stimulation and to elude dislodgment. The arm must be placed at the junction between the upper and lower lips.<sup>9</sup> The holding buttons with the aid of elastics and masking tape fortify the molding plate in the oral cavity.

### Appliance Insertion

The masking tapes are used to retain the plates in the oral cavity. The elastics of 0.25 inch can be used by stretching two times their length. In case of unilateral clefts, one retention arm is used and is placed on the anterior end of the appliance.<sup>10</sup> The upper and lower lip segments are approximated without the lower lip being obstructed when the retention arm is in position or in the junction of upper and lower lips. The infant is bottle fed to ensure good suckling without gagging. Close fitting of lip segments with masking tape aids in holding the plate and advancing the position of the nasal base area by carrying the columella near the midsagittal plane.

The review appointments are planned every week to adjust the molding plate by marking trim or addition of acrylic. As the alveolar gap closes, the lip segments also close reducing the nasal base width.<sup>11</sup>

### Nasal Stents

Nasal stents are incorporated when the alveolar gap width is less than 5 mm. It resembles the shape of a kidney and is added to the vestibular shield of the appliance. The tip of the nasal stents is to be pointy in the way of the medial wall of the defective nostril.<sup>12</sup> The upper lobe elevates the dome until blanching is evident and the inferior part raises the nostril tip and outlines the top of columella. Major surgical closure has to be planned between 3 months and 5 months of age.<sup>13</sup>

### Complications

- Irritation of oral mucosa.
- More force application causes inflammation.
- The plate when dislodged accidentally can cause airway obstruction.
- Nasoalveolar molding appliance may drop down to the floor of the mouth when the holding arms are tapped horizontally.

### Benefits

It provides healthier result with minor scar. It reduces the cleft side nasal warps, upsurgs the length of columella, and makes the prolabium visible. Literature suggests that the shape of the nose is stable with better lip and nasal form.<sup>14</sup> Nasoalveolar molding reduces the amount of revision surgeries. Studies have shown that patients treated with nasoalveolar molding and

gingivoperiosteoplasty did not necessitate secondary bone graft. Studies have shown nasoalveolar molding to be cost-effective.<sup>15</sup>

### CONCLUSION

Nasoalveolar molding has significantly improved the surgical outcome of cleft lip and palate patients. Studies have proved that molding used to decrease the cleft abnormality does not constrain midfacial growth. Despite a lot of research and high-level evidence, nasoalveolar molding still deserves further study.

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