Nasoalveolar Molding: Part 1- A General Overview

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ABSTRACT

Presurgical Nasoalveolar Molding (NAM) was introduced to reshape the alveolar and nasal segments prior to surgical repair and improve the surgical outcome of the primary repair in cleft lip and palate patients. This review of literature attempts to represent a general overview and values of this technique.

KEYWORDS: Cleft lip and palate, Nasoalveolar molding

INTRODUCTION

Based on embryological view, origin of some of craniofacial structure are as follows:

Lip: Development of lips occurs from the 4th to 7th weeks of gestation. Fronto nasal prominence: it forms from mesenchymal tissue ventral to the forebrain and took part the development of the medial and lateral nasal prominences.

Maxillary and mandibular prominence: the paired maxillary and mandibular prominences are formed from neural crest cells migrating from the first pharyngeal arch.

Primary palate: the primary palate or the premaxilla forms from the fusion of the medial palatine processes.

Secondary palate: the secondary palate develops in the 6th to 12th weeks of gestation.

Embryology of the normal palate is illustrated in Fig. 1.

Orofacial clefts, occurs because of failure the fusion of different processes. Failure of complete fusion of advancing maxillary prominence and medial nasal prominences on one side lead to unilateral cleft lip. If medial palatine processes fail to fuse also, the cleft lip will extend to incisive foramen through the maxillary dentoalveolar process. When there is an incomplete fusion of lateral palatine processes with the medial palate process and/or the nasal septum, a cleft palate will be seen.

Features of unilateral cleft lip are nasal deformity, rotation of lateral nasal cartilage and depression toward cleft side, short and deviated columella. In the palatal region, the deviation of nasal septum shifts the base of the nose to unaffected side.

Treatment Options: The philosophy of treatment is restoring physiology and anatomy of the lip, nasal and alveolar components. An early evidence from the 16th century shows attempts for retraction of protrusive premaxilla in bilateral cleft lip and palate (BCLP) patients in order to reduce the severity of the deformity before primary surgical repair. Pre-surgical molding techniques aim to align and prepare skeletal and soft tissues for definitive surgical repair. Some methods to do that in current practice include lip adhesion, triangular repair, rotation-advancement; Millard technique and modifications, anatomic subunit repair, maxillary plates, the Latham device, lip taping, and nasoalveolar molding (NAM).
Pre-surgical Nasoalveolar Molding: The NAM appliance consists of two parts: removable alveolar molding plate that is made of orthodontic acrylic and nasal stent made of 0.032-inch stainless steel wire that is embedded into the anterior portion of acrylic molding plate (Fig. 2-5). The appliance is adjusted weekly or biweekly to correct the nasal and alveolar deformity gradually.

NAM can be used for a wide range of cleft deformities, including complete clefts without an intact nasal floor.

The objectives of pre-surgical NAM are:

- Active molding, providing symmetry and repositioning of nasal and alveolar processes;
- Non-surgical lengthening of the columella;
- Facilitating lip repair without scarring by placing the lip segments in a more anatomically position and reducing the distance between cleft lip segments;
- Improving nasal correction and providing projection for a flat nasal tip;
- Reducing the number of surgical procedures;
- Reducing the need for secondary alveolar bone graft;
- Serving as an obturator to help infant in sucking.

ADVANTAGES

In a study performed by Barillas et al., NAM treated infants showed more symmetric nasal cartilages after 9 years follow-up than the group who were undergone surgery alone.

Garfinkle et al., observed two groups: BCLP patients and non-cleft samples up to 12 years. The BCLP group was treated with NAM and primary lip and nose surgery. The anthropometry nasal measurements were near to normal non-cleft group.

Dec W. et al., examined the incidence of postoperative oronasal fistulae after preoperative NAM with a retrospective study design with the sample size of 178 patients. Four palatal fistulas occurred, three were healed spontaneously, and one required surgical repair. They concluded that although palatal fistulae may be related to surgeon experience and type of pre-surgical techniques, NAM with nasal floor closure has a low incidence of oronasal fistulae.
COMPLICATIONS

Levy-Bercowski D. et al., categorized complications of pre-surgical NAM in the following format:

1. Soft tissue complications including mucosal ulceration, intraoral bleeding, tissue fungal infections, tissue irritation, mega nostril, impingement of nasal epithelium, and nasal bleeding; Tissue irritation was the most and nasal bleeding was the least common complication.

2. Hard tissue complications like asymmetric T-shaped arch

3. Compliance issues consist of broken appointments, removal of the appliance by tongue or hands; The most prevalence was broken appointments once or more, and the least was the removal of the appliance by hands.

Compliance issues were of greater concern, so compliance of the patient, parents or caregivers is a key factor for successful outcomes. Hard and soft tissue complications can be managed by the clinician without the need for suspending the treatment.25

REFERENCES


Source of Support: Nil
Conflict of Interest: Nil