

Presurgical nasoalveolar molding: A technical note with case report

Dubey RK*, Gupta DK*, Chandraker NK*.

*Dept. of Prosthodontics, Government Dental College, Raipur

ARTICLE INFO

Keywords:

Cleft lip, Cleft Palate, Orthopedic Molding, Nasoalveolar Molding.

Corresponding Author:

Dr R.K. Dubey

Professor,

Dept. of Prosthodontics,

Government Dental College, Raipur

Contact: +919229927756

Email: rkubey2005@yahoo.co.in

ABSTRACT

Cleft of the lip, alveolus and palate (CLAP), is a complex facial deformity, which requires multiple surgeries and bone grafting to correct the defect. Active or passive Pre surgical Orthopedic Molding reduces the deformity and thus reduces number of surgeries to achieve superior post surgical esthetic. Pre-surgical nasoalveolar molding (PNAM) is passive molding which align and approximate the alveolar cleft segments, at the same time improve the contour of columella-philtrum region and nose. A case report with bilateral cleft of lip and alveolus showing significant reduction in the defect and improvement in contour of lip-nose region with application of Pre-surgical nasoalveolar molding (PNAM) is described.

Introduction

Cleft of the lip, alveolus and palate (CLAP) are the most common congenital malformations of the head and neck [1] with incidence rate of 1.3:1000 (Combined or alone) among Indian population.[2] A child born with CLAP faces a vast array of problems like feeding difficulty, hearing loss (ear infections), missing or malformed teeth and speech defects along with psychosocial stigma (lowered self esteem & difficulty in social interaction) influencing social development & rehabilitation of CLAP patients.[2] Pre-surgical nasoalveolar molding (PNAM) has shown promising results in solving the problems associated with CLAP to a great extent.

McNeil (1950)[3] introduced a pre-surgical infant orthopedic (PSIO) appliance, to aid only in reducing the size of cleft and palate prior to surgery. Mylin (1968)[4] developed PSIO molding plates (retained with pin) for connection of bilateral and unilateral clefts. Latham (1980)[5] in developed Latham appliance which is surgically fitted in palate to improve the large cleft. The Pnam was begun at New York university medical centre in 1992-93 by Dr. Berry H. Grayson [6], an orthodontist.

PNAM is a non surgical method of reshaping the gums, lips and Nostrils before cleft lip and palate surgery, thus lessening the severity of the cleft. Before introduction of concept of nasoalveolar molding, repair of a large cleft required multiple surgeries between birth and 18 years of age, putting the child at risk for psychological and social adjustment problems. With advent of Pnam, the dentist can reduce the size of the cleft and mould the alveolar and nasal tissues in the correct anatomic position. This helps to attain a better shape of the alveolus, palate and nose, and a thinner scar in the subsequent surgical intervention. Need of multiple surgical procedure is bypassed and better results are obtained, with only one or two surgeries.[7-11]

PNAM works on the principle of 'negative sculpturing'

and 'Passive molding' of the alveolus and adjacent soft tissues. In Passive molding, a custom made molding plate of acrylic is used to gently direct the growth of the alveolus to get the desired result later on. While in negative sculpturing serial modifications are made to the internal surfaces of the molding appliance with addition or deletion of material in certain areas to get desired shape of the alveolus, and nose.

Evaluation of the infant for Pnam is started as soon as possible after birth. The clinical procedures and fabrication of Pnam plate should be started in first week or early second week after the birth. Molding of tissues is easier because of raised level of hyaluronic acid [12] and maternal circulating estrogen [8] in neonates. Pnam should ideally be completed before six months of age.

Case Report

A six days old baby with bilateral cleft lip and palate was referred to our dental institute for feeding appliance. After a thorough evaluation nasoalveolar molding appliance was planned for the patient (Figure 1). The parents were counseled properly about the procedure, duration and prognosis of treatment, and their active involvement during the Pnam process was explained.

Primary impression of the cleft region/ upper arch was made using ice cream stick and impression compound, in presence of surgeon and necessary armamentarium to manage emergency. While making impression baby was kept in mother lap with head facing downward and her hands supporting baby's chest and lap region. Cast poured from impression was used to fabricate special tray.

Using special tray and putty consistency polyvinyl elastomeric impression material final impression was made, with same technique as of primary impression (Figure 2).

The working cast was recovered by pouring the impression in dental

stone. In the cleft region of the cast, undercuts were blocked out with wax. The molding appliance was then fabricated with self cure clear acrylic resin. Retentive button with wire loops was developed in the antero-inferior cleft region of the molding plate at an angle of 45° to the imaginary occlusal plane.

Appliance is checked for proper fitting and retention. The primary retention of the appliance is through extra-oral facial tapes and elastics. 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.

Patient was recalled after 24 hours to evaluate and correct sore spots or other problem with the appliance, if any. The recall appointments were scheduled weekly. In these visits the serial modification of appliance was done by selective trimming and addition of acrylic, depending on the direction in which bone movement is required.

Once the cleft gap in the alveolar region was acceptably small enough, a stent was attached to the oral molding plate. Nasal stent with a projection of acrylic supported by wire (gauze 18) was attached to the plate above the retentive button in the cleft area (Figure 3). It was inserted passively into the nostril and covered with a thin veneer of soft acrylic to apply positive elastic pressure. This pressure aids to lift the collapsed nostril & in molding the nasal tissue (Figure 4). During follow up visits the nasal stent was modified by serial addition of soft acrylic to get the desired shape of nostril and ala form.

Discussion

PNAM reduces the number of surgeries and need of alveolar bone grafting, hence saving the child from pain and psychological trauma. The parents are also eased of the mental stress associated with surgical repair. The process is cost effective. When PNAM is employed, the results are far more aesthetic as opposed to when only the surgical approach is used. The PNAM molding serves dual function by acting as a feeding appliance. The combined strategy of PNAM & surgical repair presents excellent clinical outcomes, which helps to boost the psychology of the growing child to face the society.[9,13-15]

The process requires a high degree of compliance of parents during treatment. It may not be practical in situations where parents must travel a great distance for weekly care (multiple visits). The technique is very labor intensive for first 4-6 months & requires committed team of the dentist and surgeon. To produce optimal results, PNAM must begin as soon as possible after the birth.

The complication which may occur are tissue ulceration, nostril over expansion-mega-nostril, misdirected molding of the alveolar segment, failure to retain appliance during molding, irritation and over stretching of skin where tapes are adhered.[16]

Conclusion

In India about 32000-35000 children are born with CLAP deformity every year. It is thus imperative to develop procedures which can



Fig. 1 : Pretreatment



Fig. 3 :Nasal alveolar molding appliance



Fig. 2 : Final Impression



Fig. 4 :PNAM appliance retained with adhesive tape.

alleviate the problems associated with CLAP. The goal of PNAM technique is to stretch and align the tissues so that the surgical repair of cleft is technically easier and ultimately creates a better appearance of the repaired lip and nose. A well executed PNAM process by a committed team of dentist and surgeon supported by good compliance of the parent may prove to be a boon for child cursed with CLAP.

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Source of Support: Nil. **Conflict of Interest:** None