Case Report

Nasoalveolar molding for the rehabilitation of newborns with cleft

ABSTRACT

The success of repair in cleft lip and palate depends on the extent of disfigurement and the size of disfigurement which guides the surgical repair. With the popularization of nasoalveolar molding (NAM), the results of primary surgery in such patients have greatly improved due to the presurgical correction of the deformities leading to a better approximation of the tissues and hence reduced scarring. Thus, today, the knowledge of pre-surgical nasoalveolar molding should be a part of any orthodontist's armamentarium to enhance the results of surgical lip repair and reduce the extent of nasal deformity minimizing the need for revision surgeries. The current report describes the use of NAM in a newborn with unilateral cleft lip and palate and demonstrates the excellent results thus achieved after surgical repair.

Keywords: Nasoalveolar molding, NAM, unilateral cleft lip and palate

INTRODUCTION

Orofacial clefts are the second most common birth anomaly. Incidence of cleft lip/palate in India-27,000–33,000/year, i.e., 78 infants/day or 3/h.[1,2] With the popularization of nasoalveolar molding (NAM), the orthodontist today plays a pivotal role in managing cleft patients as early as immediately after birth. The first pre-surgical NAM (PNAM) appliance was given by Grayson *et al*. in 1999.[3] The principles of PNAM therapy are based on Matsuo's research that the nasal cartilage continues to develop and is subject to repositioning till the first 6 weeks of life.[4] This is due to the presence of maternal estrogen in the infant till 6 weeks which increases the cartilage content of hyaluronan, a component of the proteoglycan extracellular matrix,[5] thus increasing the moldability of the nasal cartilage.

The present case demonstrates the success of NAM in the management of a newborn with unilateral cleft lip and palate and stability of results 2 years postsurgery.

CASE REPORT

A male child, 1 months 18-day-old, was referred to the outpatient department for presurgical orthopedics to facilitate the surgical repair of the cleft of lip and palate [Figure 1]. The patient had a unilateral cleft lip and palate on the right side with simonart's band traversing through the cleft. The right alar dome was depressed and the nose was flattened on the right side. The nasal septum was deviated, and right nostril was elongated. Thus, NAM was planned for the patient to reduce the distance between the cleft alveolar segments, bring lips in closer approximation for ease of surgical repair, upright the deviated septum and improve the right nasal contour.

An impression was made with putty in the Pediatric Intensive Care Unit as a precaution to manage any airway emergency. The patient was held in mother's lap with the face at a lower level than the rest of the body. The impression was made after waiting for 1½ hours of feeding to avoid emesis of milk. An alveolar molding appliance was fabricated with cold

Neha, Tulika Tripathi, Priyank Rai

Department of Orthodontics and Dentofacial Orthopedics, Maulana Azad Institute of Dental Sciences, New Delhi, India

Address for correspondence: Dr. Neha, Department of Orthodontics and Dentofacial Orthopedics, Maulana Azad Institute of Dental Sciences, New Delhi - 110 002, India.
E-mail: augustneha@yahoo.com

Access this article online	
Website: www.orthodrehab.org	Quick Response Code
DOI: 10.4103/ijor.ijor_19_17	

How to cite this article: Neha, Tripathi T, Rai P. Nasoalveolar molding for the rehabilitation of newborns with cleft. Int J Orthod Rehabil 2017;8:119-22.

cure acrylic resin and instructions were given for appliance wear [Figure 2]. The appliance was retained in place with bilateral elastics taped onto the cheeks. To save the patient's skin from any ulceration due to repeated placement and removal of the surgical tapes, a protective layer of Tegaderm (3M) was placed on the cheeks over which retentive tapes were placed [Figure 3]. The parents were instructed to increase the time of wear of the appliance gradually from 4 to 6 h to full-time wear for easy adaptation by the infant in 3 days. The patient was recalled after 3 days to assess for any ulceration or resolve any difficulty in the use of the appliance. This was followed by weekly appointments in which sequential addition of the silicone based relining material was done along with trimming of the acrylic of the appliance where the alveolus had to be molded [Figure 4]. Furthermore, expansion of the arches was done simultaneously in the same way. After 3 weeks, the larger segment was molded into proximity to the lesser segment and at this stage, nasal stent was planned to be added to the appliance. However, the molding appliance was refabricated due to loss of the layer of silicone material in part and a nasal stent was added to this new appliance [Figure 5]. The nasal stent lifted the right nasal dome with horizontal taping to allow for stretching of the columella and uprighting of the nasal tip. The presurgical approximation of oral tissues demonstrating the success of NAM therapy are given in Figure 6 after which the surgical repair of the lip was done [Figure 7] The results of the lip repair were excellent with good stability 2 years after surgery [Figure 8].

DISCUSSION

The main objectives of the NAM technique involve repositioning of the deformed nasal cartilage and alveolar segments. Thus, segments can come in closer approximation resulting in reduction in the volume of which facilitates surgical repair and lesser resultant scarring.[6] In the case of the bilateral cleft, columellar elongation is another important aim of the NAM.[3] Hence, the benefits of PNAM or similar orthopedic appliances include to be the improvement in

Figure 1: Pretreatment photographs

Figure 2: Alveolar molding plate

Figure 3: Taping

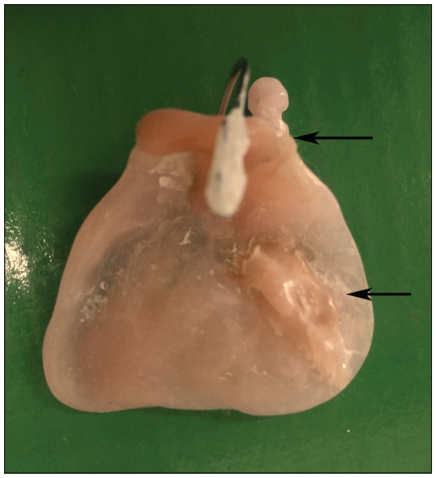

Figure 4: Molding appliance with arrows showing areas of addition of silicone material

Figure 5: Nasoalveolar molding appliance with nasal stent

Figure 7: Postsurgical repair of lip

arch form, ease of surgical repair, better aesthetic outcome, facilitation of feeding, and improvement of speech.[7-9] The long-term benefits of NAM include better arch form, improved chances of tooth eruption with good periodontal support,[10] reduced need for revision surgeries and most importantly better psychosocial status of the patient.

The timing for initiation of NAM therapy has been advocated to be within the 1st week of birth. However, in this case, NAM was carried out successfully in a 1½-month-old infant. This is supported by a study by Mishra *et al*. who have reported good results of carrying out NAM in infants from 10 to 360-day-old though the amount of changes brought about reduce with increasing age.[11] Thus, the child was not denied the presurgical NAM the beneficial results of which are evident even 2 years after the surgical repair.

CONCLUSION

The current case describes in detail the steps for presurgical NAM for a case of unilateral cleft lip and palate in a newborn male patient with excellent postsurgical results. Hence, it helps the orthodontists in practicing this technique for attaining better postsurgical results of cleft lip repair in their patients.

Figure 6: Presurgical photographs

Figure 8: Two years follow up photograph

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Niranjane PP, Kamble RH, Diagavane SP, Shrivastav SS, Batra P, Vasudevan SD, *et al.* Current status of presurgical infant orthopaedic treatment for cleft lip and palate patients: A critical review. Indian J Plast Surg 2014;47:293-302.

2. Mossey P, Little J. Addressing the challenges of cleft lip and palate research in India. Indian J Plast Surg 2009;42 (Suppl):S9-18.
3. Grayson BH, Santiago PE, Brecht LE, Cutting CB. Presurgical nasoalveolar molding in infants with cleft lip and palate. Cleft Palate Craniofac J 1999;36:486-98.
4. Matsuo K, Hirose T. Preoperative non-surgical over-correction of cleft lip nasal deformity. Br J Plast Surg 1991;44:5-11.
5. Singh GD, Moxham BJ, Langley MS, Waddington RJ, Embery G. Changes in the composition of glycosaminoglycans during normal palatogenesis in the rat. Arch Oral Biol 1994;39:401-7.
6. Neha, Tripathi T, Rai P, Bhandari PS. Nasoalveolar molding: Use of reverse expansion screw in retraction of cleft premaxilla in a case of bilateral cleft lip and palate. J Cleft Lip Palate Craniofacial Anomalies 2015;2:143-6.
7. Ross RB, MacNamera MC. Effect of presurgical infant orthopedics on facial esthetics in complete bilateral cleft lip and palate. Cleft Palate Craniofac J 1994;31:68-73.
8. Kuijpers-Jagtman AM, Ross EL Jr. The influence of surgery and orthopedic treatment on maxillofacial growth and maxillary arch development in patients treated for orofacial clefts. Cleft Palate Craniofac J 2000;37:527-39.
9. Konst EM, Prahl C, Weersink-Braks H, De Boo T, Prahl-Andersen B, Kuijpers-Jagtman AM, *et al.* Cost-effectiveness of infant orthopedic treatment regarding speech in patients with complete unilateral cleft lip and palate: A randomized three-center trial in the Netherlands (Dutchcleft). Cleft Palate Craniofac J 2004;41:71-7.
10. Ezzat CF, Chavarria C, Teichgraeber JF, Chen JW, Stratmann RG, Gateno J, *et al.* Presurgical nasoalveolar molding therapy for the treatment of unilateral cleft lip and palate: A preliminary study. Cleft Palate Craniofac J 2007;44:8-12.
11. Mishra B, Singh AK, Zaidi J, Singh GK, Agrawal R, Kumar V. Presurgical nasoalveolar molding for correction of cleft lip nasal deformity: Experience from Northern India. Open Access J Plast Surg 2010;10:443-57.