doi:10.5368/aedj.2013.5.2.3.1

FEEDING OBTURATOR – A PRESURGICAL PROSTHETIC AID FOR INFANTS WITH CLEFT LIP AND PALATE - CLINICAL REPORT

[1] Narendra R — [1] Professor and Head
[2] Sashi Purna CR — [2] Assistant Professor
[3] Sashi Deepth Reddy — [3] Associate Professor
[4] Simhachalam Reddy N — [4] Associate Professor
[5] Sesha Reddy P — [5] Associate Professor
[6] Rajendra Prasad B — [6] Associate Professor

[1-5] Department of Prosthodontics, Government Dental College and Hospital , RIMS Campus, Kadapa. Andhra Pradesh, India.
[6] Department of Prosthodontics, Meghana Dental College, Nizamabad. Andhra Pradesh, India

ABSTRACT: Cleft lip and palate is a congenital deformity that may be associated with various craniofacial problems and crumbles the overall development of the child. Early surgical treatment is imperative but may need to be postponed until certain age and weight gain of the infant. The present article is a case report of an infant with cleft lip and palate for whom a feeding obturator was the treatment of choice. It describes various problems associated with cleft lip and palate, available treatment modalities; and advantages of the feeding obturator.

KEYWORDS: Cleft lip and Palate, Feeding Obturator,

INTRODUCTION

Cleft lip and palate is a congenital anomaly affecting the middle third of the face, characterized mainly by the presence of oronasal communication, malformation or agenesis of the teeth close to the cleft and deficient sagittal and transverse growth of the maxilla[1]. Prevalence varies from 1:500 to 1:2500 live births. The aetiology is complex and depends on genetic and environmental factors[2].

Neonates with a cleft palate have difficulty in feeding which may lead to failure to thrive.[3] The oro-nasal communication diminishes the ability to create negative pressure which is necessary for suckling.[4-7] To compensate, the baby presses the nipple between the tongue and the hard palate to squeeze the milk, but this mechanism is inadequate if cleft is wide and the nipple gets trapped inside the defect.[8] The feeding process is also complicated by nasal regurgitation of food,[3,4,6,9] excessive air intake that requires frequent burping and choking[3,6] Feeding time is significantly longer and fatigues both baby as well as mother[3,4,6,8,9] causing parental anxiety.[3,9]

The horizontal positioning of the eustachian tube, abnormal insertion of the levator and tensor veli palatine muscles into the posterior margin of the hard palate and muscular hypoplasia places the infant at greater risk for ear infections from food or liquid that refluxes upwards into the naso-pharynx.[10] Surgery may completely close the oronasal communication and resolve the problems associated with the cleft. However, timing of surgery will depend on age and condition of the patient.[3,9,11]

Literature suggests different approaches to resolve neonatal feeding problems. Specially designed nipples with enlarged openings can increase the ejection of milk with reduced effort.[4,9,12] Squeezable bottles appear easier to use than rigid feeding bottles.[13,14] However, these options are not sufficient for large clefts. Orogastric and nasogastric tubes can be effective but should be used only for a limited length of time.[9] The feeding obturator is a prosthetic aid which restores the separation between the oral and nasal cavities. The concept of early treatment of cleft palate patients with feeding obturator was pioneered by McNeil.[15] This article presents a case report of a neonate with cleft lip and palate in whom a feeding obturator was delivered.

Case Report

A 6-day-old healthy male neonate (weight: 2.715 Kg) was referred to the Department of Prosthodontics with the chief complaint of poor feeding ability. There was history of loss of weight since birth. The medical history of the child and parents was not significant. Extra-oral

Fig 1. Intra oral view showing cleft lip and cleft palate

Fig 2. Primary impression of the oral cavity with defect region

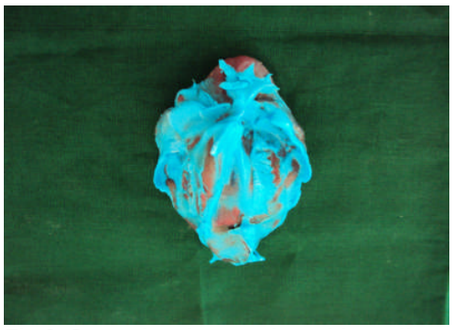

Fig 3. Secondary impression with medium body addition silicone showing precise details

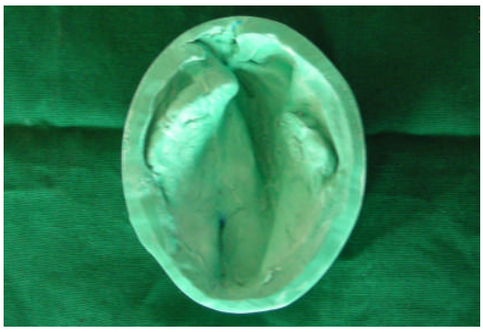

Fig 4. Definitive cast showing the defect region

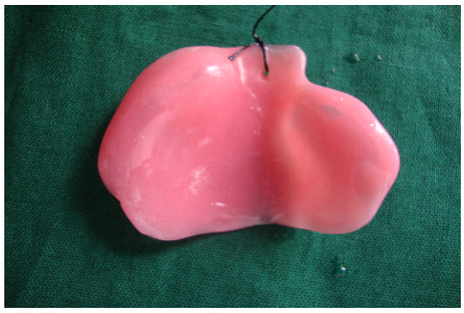

Fig 5. Highly polished feeding obturator with silk suture

Fig 6. Intaglio surface of the feeding obturator

Fig 7. Feeding the infant comfortably with obturator in place

Fig 8. Feeding obturator positioned in the oral cavity

examination of the child showed unilateral cleft lip-left side. Intra oral Examination of the baby revealed a large cleft on the left side of the hard palate that extended to the soft palate: Veau classification, Class III **(Fig. 1).** Since the baby was not scheduled for corrective surgery immediately, a treatment plan was developed with the aim of improving the functional ability (suckling) and developing proper tongue position with the help of a feeding obturator. The parents approved this treatment plan.

Prosthodontic procedure

Modeling plastic impression compound (Y-Dent; MDM Corporation, New Delhi, India) was used to make the primary impression of the maxilla. The impression material was held with two fingers, and the compound was adapted to the maxilla with the fingers. The infant was held upright with head bending down by mother. The baby was making suckling motions or was crying during the whole procedure which created the desired border molding and ensured a patent airway throughout the procedure.

The impression was removed from the mouth, before the material could completely harden. The impression was evaluated; it extended into the defect and vestibule **(Fig. 2)** which served as a special tray to make final impression. 0.5mm of the intaglio surface and impression extending into the undercut region was scraped with the help of BP blade. Impression was evaluated intraorally to determine the easiest path of insertion and removal.

Tray adhesive was painted onto the impression surface and allowed to dry. Final impression was made with medium body addition silicone impression material (Reprosil, Dentsply Caulk, Milford, DE) to record the precise details of the supporting structures and the defect. The material was mixed and placed as a thin layer on the impression surface. The loaded impression tray was inserted into the mouth while holding the baby face toward the floor while baby was suckling. Final impression was removed from the oral cavity and evaluated for its completeness **(Fig.3).** Beading and Boxing of the impression was done and master cast was prepared with the Type III dental stone (Kalstone-Karson Pvt Ltd, Mumbai, India) **(Fig. 4).**

Undercuts were blocked and the defect area was completely filled to make a normal palatal form with dental plaster. Wax form of the feeding obturator was prepared with modeling wax (Modelling Wax, Elite Dental Products, Nanded, India). Feeding obturator was processed with heat polymerizing acrylic resin material (DPI Heat cure; Dental Products of India). The prosthesis was retrieved; it had uniform thickness of 1.5-2mm. All the sharp edges were smoothened. Finishing and polishing of the prosthesis was done **(Fig. 5).** A small hole was prepared using a round bur at the labial flange. An 8-inch silk thread was passed through and tied to the eyelet of the feeding plate to provide a safety mechanism in case of gagging or accidental swallowing **(Fig: 6).**

The intaglio surface of the obturator was evaluated intraorally for excessive pressure areas, using a disclosing material (Fit Checker; GC Corp, Tokyo, Japan), and pressure areas were relieved. Final finishing and polishing of the feeding plate was done before delivering the prosthesis. Prosthesis was tried in the dental clinic and the patient's mother was asked to feed the baby and it was noted that there was no nasal regurgitation and child was successfully able to feed with the feeding obturator in place without any discomfort **(Fig.7).** Infant was able to hold the feeding obturator in mouth during sucking, swallowing and the resting state by the tongue and by mouth closure without an additional retention mechanism **(Fig. 8).** Instructions were given to the parents on how to insert, remove, and clean the prosthesis. A regular follow up of the patient was done after 24 hours, 1 week and monthly follow ups were scheduled. During the regular follow up, neonate weight gain was evident.

Discussion

Patients with cleft lip and palate malformations require coordinated care involving multiple disciplines from birth throughout adolescence. Primary care plays a vital role in these patients, who often have numerous health care needs, including feeding difficulties, speech disorders, dental problems, disturbed growth and development and chronic ear infections. The early surgical repair of the palate is associated with good cosmesis, better feeding, adequate velo-pharyngeal competence, growth and good speech and hearing development.[16] Until the cleft palate/lip can be surgically corrected, a feeding obturator is of great help in feeding as it effectively separates the oral cavity from the nasal cavity.

A major concern in treating these patients is obtaining good impressions which pose a unique set of challenges including the size constraints imposed by the infant's oral cavity, anatomical variations associated with the severity of cleft and a lack of ability of the infant to cooperate and respond to commands.

Various impression materials including thermoplastic materials,[4,5,9,17,18] alginate,[3,4,9,17,19] waxes,[5,18] elastomeric impression materials[9,20] have been routinely employed. Modeling plastic impression compound was used for making the primary impression. It has the advantage that it can be removed as a whole from the oral cavity, before it sets in case of any emergency and it is resistant to tearing. Proper tempering and handling is important to prevent overheating that can lead to scalding or burns of tissues, and leaching out of volatile components which may be harmful to the infant. Medium body addition silicone impression material was used for making secondary impression. It could be added as a thin layer

on the impression which served as special tray. It reproduces all the areas of interest with good surface details and resists tearing; as a result removal is atraumatic to the infant.

Feeding obturator can be prepared with various materials like acrylic resin, vaccum formed polyethylene [21], ethylene vinyl acetate[22]. Vaccum formed materials are light in weight, soft in nature with smoother surface, and don't require any retentive wire. But they are not economical and oral hygiene is also a concern because it is a plastic appliance, which can cause irritation to the palate.[22]

Auto-polymerizing acrylic resin material was choosen to fabricate feeding obturator as it was cost effective and simple to fabricate, hygienic and served the purpose. It creates a rigid platform, towards which the child can press the nipple and feed thus reducing feeding time.[3,4,6,23,24] It reduces the incidence of choking.[3] It reduces nasal regurgitation thus inhibiting nasopharyngeal and ear infections.[3,4,5,6,17] It helps position the tongue away from the cleft area in its correct position to allow spontaneous growth of palatal shelves towards each other,[3,4,6,17] thus aiding in pre-surgical naso-alveolar molding or infant orthopeadics.[20,25,26,27] This depends on the inherent plasticity and moldability of the neonatal cartilaginous tissues due to the increased levels of hyaluronic acid found circulating in the neonatal tissues till about 45 days after birth.[27] It greatly improves the final outcome after surgical treatment and also limits the number of surgeries[28]. Normalizes tongue position resulting in better speech[4,29] and aids in better esthetics. Provides positive psychological impact on the parents.[4,17]

SUMMARY AND CONCIUSION

This article describes a method for the fabrication of a feeding obturator for a cleft palate baby. Feeding obturator promotes neonatal weight gain, which is important in preparing the baby for corrective surgery.

References

1. Shah CP, Wong D (1980) Management of children with cleft lip and palate. CMAJ 122:19–24.
2. Sujoy Banerjee, Usha M. Radke, Rajlakshmi Banerjee, Darshana Mundhe. Pre-Surgical Management of Unilateral Cleft Lip and Palate in a Neonate: A Clinical Report. J Indian Prosthodont Soc 2011;11:71–76.
3. Goldberg WB, Ferguson FS, Miles RJ. Successful use of a feeding obturator for an infant with a cleft palate. Spec Care Dentist 1988;8:86-9.
4. Osuji OO. Preparation of feeding obturators for infants with cleft lip and palate. J Clin Pediatr Dent 1995;19:211-4.
5. Samant A. A one-visit obturator technique for infants with cleft palate. J Oral Maxillofac Surg 1989;47 :539-40.
6. Jones JE, Henderson L, Avery DR. Use of a feeding obturator for infants with severe cleft lip and palate. Spec Care Dentist 1982;2:116-20.
7. Choi BH, Kleinheinz J, Joos U, Komposch G. Sucking efficiency of early orthopaedic plate and teats in infants with cleft lip and palate. Int J Oral Maxillofac Surg 1991;20:167-9.
8. Shprintzen RJ. The implications of the diagnosis of Robin sequence. Cleft Palate Craniofac J 1992;29:205-9.
9. Saunders ID, Geary L, Fleming P, Gregg TA. A simplified feeding appliance for the infant with cleft lip and palate. Quintessence Int 1989;20:907-10.
10. Paradise JL, Bluestone CD, Felder H. Universality of otitis media in fifty infants with cleft palate. Pediatrics 1969; 44: 35-42.
11. Prahl-Andersen B. Dental treatment of predental and infant patients with clefts and craniofacial anomalies. Cleft Palate Craniofac J 2000;37:528-32.
12. Beumer J, Curtis TA, Marunick MT. Maxillofacial rehabilitation: prosthodontic and surgical considerations. St. Louis: Medico Dental Media Intl; 1996. p. 339.
13. Brine EA, Rickard KA, Brady MS, Liechty EA, Manatunga A, Sadove M, et al. Effectiveness of two feeding methods in improving energy intake and growth of infants with cleft palate: a randomized study. Journal of the American Dietetic Association 1994;94(7):732-8.
14. Shaw WC, Bannister RP, Roberts CT. Assisted feeding is more reliable for infants with clefts - a randomized trial. Cleft Palate-Craniofacial Journal 1999;36(3):262-8.
15. McNeil CK. Congenital oral deformities. Br Dent J 1956;101:191.
16. Nunn DR, Derkay CS, Darrow DH, Magee N, Stresnick B. The effect of very early cleft palate closure on the need for ventilation tubes in the first year of life. Laryngoscope 1995; 105: 905-8.
17. Oliver HT. Construction of orthodontic appliances for the treatment of newborn infants with clefts of the lip and palate. Am J Orthod 1969;56:468-73.
18. Finger IM, Guerra LR. Provisional restorations in maxillofacial prosthetics. Dent Clin North Am 1989;33:435-55.
19. Adisman IK. The continuing role of the prosthodontist in the treatment of patients with cleft lip and palate. J Prosthet Dent 1976;36:186-92.
20. Taylor TD. Clinical maxillofacial prosthetics. Chicago: Quintessence; 2000. p. 63-84.
21. P Chandna, VK Adlakha, N Singh Feeding obturator appliance for an infant with cleft lip and palate. J Indian Soc Pedod Prev Dent 2011;29:71-3

22. Abhay Agarwal, Vivek Rana, Shabina Shafi A feeding appliance for a newborn baby with cleft lip and palate. Natl J Maxillofac Surg 2010;1:91-93.
23. Kogo M, Okada G, Ishii S, Shikata M, Iida S, Matsuya T. Breast feeding for cleft lip and palate patients, using the Hotz-type plate. Cleft Palate Craniofac J 1997;34:351-3.
24. Turner L, Jacobsen C, Humenczuk M, Singhal VK, Moore D, Bell H. The effects of lactation education and a prosthetic obturator appliance on feeding efficiency in infants with cleft lip and palate. Cleft Palate Craniofac J 2001;38:519-24.
25. Yang S, Stelnicki EJ, Lee MN (2003) Use of nasoalveolar molding appliance to direct growth in newborn patient with complete unilateral cleft lip and palate. Pediatr Dent 25:53–56
26. Jacobson BN, Rosenstein SW (1984) Early maxillary orthopedics for the newborn cleft lip and palate patient: An impression and an appliance. Angle Orthod 54:247–26.
27. Grayson B, Santiago P, Brecht L, Cutting C (1999) Presurgical nasoalveolar molding in infants with cleft lip and palate. Cleft Palate Craniofac J 36:486–498.
28. Prahl C, Kuijpers-Jagtman AM, van't Hof MA, Prahl-Andersen B. Infant orthopedics in UCLP: effect on feeding, weight and length: a randomized clinical trial (Dutchcleft). Cleft Palate-Craniofacial Journal 2005;42(2):171-7.
29. Delgado AA, Schaaf NG, Emrich L. Trends in prosthodontic treatment of cleft palate patients at one institution: a twenty-one year review. Cleft Palate Craniofac J 1992;29:425-8.
30. Igal Savion, Michael L. Huband A feeding obturator for a preterm baby with Pierre Robin sequence. J Prosthet Dent 2005;93:197-200.

Corresponding Author

Dr. R. Narendra M.D.S.
Professor and Head
Department of Prosthodontics
Government Dental College and Hospital
Hyderabad
Andhrapradesh
Ph. No:-9701501051
Email: drnarendra_77@rediffmail.com