Case Report

JRAD Journal of Research and Advancement in Dentistry

J Res Adv Dent 2019;9:3:72-77.

An Easy and Simplified Technique for Fabrication of a Feeding Obturator

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ABSTRACT

Background: The article describes a simple and cost-effective clinical and laboratory technique for the fabrication of a feeding obturator for an infant with cleft palate. The technique gives emphasis for the quick fabrication of a preliminary custom tray using simple materials available in every dental office without causing any difficulty to the patient. By using this technique the clinician can avoid the danger of airway obstruction or foreign body aspiration during impression procedures carried out for the fabrication of a feeding obturator. A feeding obturator is useful in overcoming many of the feeding problems associated with cleft lip and palate.

Keywords: Cleft palate, infant, feeding obturator.

INTRODUCTION

Cleft lip and cleft palate are common congenital abnormality seen in craniofacial region. Cleft lip and cleft palate craniofacial anomalies have an incidence of 0.28 to 3.74 per 1000 live births globally. Non-syndromic cleft lip and palate is reported to occur in approximately 1 in 700 live births, but may vary according to parental race/ethnicity and geographic origin, infant sex and the socio-economic status of the family.[1,2] There are many syndromes which include cleft lip and/or cleft palate as a component in them. [3] The etiology of cleft lip and/or palate is still largely unknown. The majority of clefts of the lip and palate are believed to have a multifactorial etiology with several genetic and environmental factors interacting with the morphogenesis of the primary and secondary palates, resulting in cleft [4,5] Patient with cleft palate will have impaired facial growth, dental anomalies, and speech and hearing problems. Physiological alteration in function of tongue and oral pharynx also add up to these difficulties.

Babies born with cleft may present with a variety of feeding problems. Poor growth and difficulties in oral feeding may be a source of parental anxiety. This may affect the parent's ability to adjust to the need of the infant.[6,7] Difficulty in suckling seen in neonates born with a cleft palate may lead to failure to thrive.[8] In fact, most babies who present late with a diagnosis of cleft palate usually come via the paediatric ward where they are admitted with failure to thrive. [9] The ability to create negative pressure, which is necessary for suckling is diminished due to the presence of oronasal communication.[10-13]Attempts by the baby to compensate by pressing the nipple between the tongue and the hard palate to squeeze out the liquid may prove insufficient if the cleft is wide and the nipple gets trapped inside the defect. [14]Nasal regurgitation of food and excessive air intake that

Received: Feb. 17, 2019: **Accepted**: Apr. 10, 2018
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pISSN 2278-0076
eISSN 2321-9270

requires frequent burping, and choking will further complicate the feeding process. [10,12,14,15]

Fig 1: Median Cleft Of The Hard Palate.

Fig 2: Invested Wax Tray.

Fig 3: Acrylic Resin Individualized Tray.

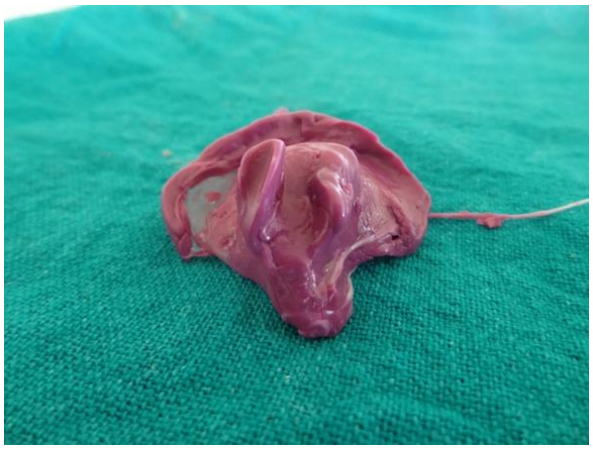

Fig 4: Definitive Impression.

Fig 5: Definitive Cast.

Fig 6: Feeding Obturator.

The prolonged time required for feeding fatigues both baby and parent. [10,12,14,] These feeding complications can be a source of parental anxiety[8,15]and even delay the development of the mother-infant bond in which feeding constitutes a significant role.[8] Different approaches are suggested in the literature to address these problems such as specially designed nipples with enlarged openings, Orogastric and nasogastric tubes and surgery.[8,15,16] Infants with a cleft quickly learn to reject the breast if a teat is used in these early days and this may subsequently lead to a mother moving to formula milk.[17]Orogastric and nasogastric tubes can be effective but should be used only for a limited length of time. Oral aversion and dependency upon nasogastric or orogastric feeding tube can result if there is a delay in achieving adequate oral intake. It may also affect the proper development of the orofacial structures .[15] Surgery may be the ultimate treatment option for complete closure of the oronasal communication and for resolving the problems associated with the cleft. However, timing of surgery differs significantly between medical centers and may be as early as 10 to 12 weeks of ageor 12 to 18 months or even well past 12 months of age.[18]

A prosthetic device such as a feeding obturator can be of great help in feeding a baby with cleft. The obturator can separate the oral and nasal cavity and can aid in creating a negative pressure to facilitate suckling. The use of obturator reduces nasal regurgitation and makes feeding more effective. The obturator decreases feeding time and can create a positive attitude in parents towards treatment. The baby can use it as a rigid base against which the nipple can be pressed to extract milk. [8,10,12]The obturator reduces the passage of food into the nasopharynx, reducing the incidence of nasopharyngeal infections.[10] [19]Feeding obturator contributes to weight gain and a thriving state of health which is required for surgical repair of the defect.[20] The obturator thus helps in relieving parental anxiety to a great extent. It also corrects tongue position, prevents it from entering the defect and promotes growth of palatal shelves towards midline. The proper positioning of tongue helps in proper development of the jaw. It also contributes to speech development.[21]

CASE REPORT

A 65 days old female baby was referred by a Paediatric surgeon to the department of Prosthodontics for the fabrication of a feeding obturator due to failure to thrive. The baby was not scheduled for an early corrective surgery. The baby weighed 3.400 kg at birth but was only 3.100kg on the day of presentation and the parents were in a state of frustration due to the feeding problems. Intraoral examination revealed a large median cleft of the hard palate that extended to the soft palate **(Figure1)**. After discussing with the parents it was decided to construct a feeding obturator for the patient.This article describes a simple and effective technique for the fabrication of a feeding obturator using materials found in every dental office and without the danger of causing foreign body aspiration.

TECHNIQUE

1. A preliminary custom impression tray can be fabricated by cutting a sheet of modeling wax (Hindustan Dental Products, Hyderabad, India) and shaping it approximately to the patient's maxillary arch. Wax is softened in warm water bath and adapted to the patient's maxillary arch with gentle finger pressure . The wax must cover the hard palate and should extend into the vestibules as much as possible. Care should be taken not to overheat the wax sheet to avoid thermal trauma to oral tissues. The wax is immediately cooled in cold water bath. Invest the wax tray in quick setting plaster (Dentico; Neelkanth Healthcare Pvt Ltd, Rajasthan, India). It is not required to cover the wax tray with plaster on both sides **(Figure2).** Once the plaster sets remove the wax tray and eliminate any remaining wax residue with warm water. A Separating medium (Acralyn-H; Asian Acrylates, Mumbai,India) is then applied to the mold space . The mold space is then packed with autopolymerizing acrylic resin (Rapid Repair; Dentsply Intl, Milord, Dei) and allowed to polymerize.

2. The tray is retrieved from the mold, the excess resin is trimmed and the borders polished. **(Figure3).** The tray is evaluated intraorally for necessary modifications. A handle is

adapted to the tray and a piece of dental floss which is long enough to extend out from the mouth is attached so that it can be used to retrieve the tray in case of an emergency .

3. The tray is painted with vinyl polysiloxane tray adhesive (CAULK Tray Adhesive Dentsply, Intl) and the definitive impression made with an elastomeric impression material of medium body consistency or a monophase material (Aquasil Smart Wetting Impression Material Monophase; Dentsply, Intl) **(Figure 4).**. The baby's face is held towards the floor to prevent aspiration in the event of vomiting and asphyxiation due to airway obstruction. Oxygen level of the baby is monitored throughout the impression-making process to prevent accidental hypoxia. The baby's suckling motions will create the desired border molding. At this time the baby's ability to perform nasal breathing is also ensured.

4. The definitive impression is poured with Type III dental stone (Dental Stone; Whip Mix Corp, Louisville, Ky) after boxing the impression. **(Figure 5).** The definitive cast is inspected and any significant undercuts present in the area of the cleft is blocked out with wax before fabricating the prosthesis. A wax pattern of uniform thickness is prepared on the cast with modeling wax (Hindustan Dental Products, Hyderabad, India). The definitive cast along with the wax pattern is then invested in a dental flask and wax is then eliminated after complete setting of the investment material to get the mold space.

5. Separating medium (Acralyn-H; Asian Acrylates, Mumbai,India) is then applied to the mold space. The mold space is then packed with heat polymerizing clear or light pink acrylic resin which would easily visualize the pressure spots (Lucitone 199 Denture Base Resin; Dentsply, Intl) and polymerized.

6. After retrieving the prosthesis it is trimmed and polished to make the borders smooth and have a uniform thickness. **(Figure6).**A disclosing material (Fit Checker; GC Corp, Tokyo, Japan), is used to evaluate the intaglio surface of the obturator intraorally for excessive pressure areas. A ligature is attached to the labial flange to facilitate easy retrieval of the prosthesis**.**

7. Parents are given instructions on how to insert, remove, and clean the prosthesis. The obturator is used only during feeding time which on removal should be cleaned thoroughly and stored in a container . The baby's oral cavity and cleft should be cleaned with a soft cloth soaked in warm water.

DISCUSSION

The literature contains numerous articles describing the methods of fabricating feeding obturators. In most case the clinician uses a prefabricated impression tray to make the preliminary impression of the cleft. Obtaining the correct size to suit the small palate is the main challenge with these trays. This problem is even worse if the cleft is associated with micrognathia as seen in Pierre Robin sequence. To overcome the size problem of impression tray many authors suggested the use of thermoplastic materials such as impression compounds [10,12,15,22]or elastomeric impression material of putty consistency as the tray material for making preliminary impression. Common problems with these materials are the inadvertent risk of impression material getting trapped in the defect or in the nasal cavity causing airway obstruction. Heat softened thermoplastic impression material carries an additional risk of causing thermal trauma to oral soft tissue due to its high viscosity and variable surface and core temperature. Some have also suggested the use of light-polymerizing acrylic resin to make the special tray.[21]But this material is expensive and needs additional equipments, which may not be available in all dental offices. The careful use of soft modeling wax can overcome these problems.

Literature also suggests the use of different impression materials for making definitive impression, including alginate, [8, 10, 15]waxes, [11, 23]polysulfide impression material and putty type vinyl polysiloxane.[21] A medium body or monophase type vinyl polysiloxane is the material of choice as it is viscous enough to reduce the danger of aspiration or swallowing and capable of duplicating better details then alginate, putty or any other commonly used material can do.

The proper extension of the flanges and the pressure the tongue exerts on the prosthesis are enough to have a satisfactory retention. It is possible to use denture adhesives to enhance retention. [24]Engaging the undercuts in the defect with resilient denture liners is another option to improve retention. [10,12,21] A 48 hour recall appointment is scheduled to check for areas of ulceration or overextention. A new prosthesis is considered after 3 months to accommodate the facial growth of the baby.

CONCLUSION

This article describes a simple method for the fabrication of feeding obturator using cost effective materials, which are easily available in every dental office. A feeding obturator is useful in overcoming many of the feeding problems associated with cleft lip and palate. The obturator can make the feeding time a pleasurable experience for both mother and baby. It improves neonate weight gain and overall health of the baby. It is necessary for the infant to have sustained weight gain prior to surgery to correct the cleft lip and/or palate. Moreover, the positive physical and physiological effect created by the feeding obturator can influence the parents and families attitude towards further treatment in societies where there are many prejudices and superstitions associated with cleft.

CONFLICTS OF INTEREST

The authors declare they have no potential conflict of interests regarding this article.

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