

Oral Molding Plates a Boon to Cleft Lip and Cleft Palate Patients: A Series of Case Reports and Review

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Abstract

Feeding is a family's biggest concerns when a child is born with cleft lip and/or palate. The goal for that child is to have as near normal feeding as possible. The cleft palate is associated with feeding difficulties, eustachian tube dysfunction, middle ear effusions, middle ear infections, hearing loss, speech disorders, dental and orthodontic problems. Feeding plate is a prosthetic aid that is designed to seal the cleft and restore the separation between oral and nasal cavities. This article presents a series of case reports presenting fabrication of feeding plates in three infants born with cleft lip and palate using three different materials used for making impressions of the defect.

Key Words

Cleft lip; cleft palate; feeding plate; impressions

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INTRODUCTION

A feeding appliance may be a favorable option for babies that are having feeding problems. The feeding appliance functions as an obturator in the cleft area. The feeding plate obturates the cleft and restores the separation between oral and nasal cavities. It creates a rigid platform towards which the baby can press the nipple and extract the milk.^[1,2] It facilitates feeding,^[3,5] reduces nasal regurgitation,^[3-6] reduces the incidence of choking^[3] and shortens the length of time required for feeding.^[3,1,5,7] The obturator also prevents the tongue from entering the defect^[3,1,5,6] and interfering with the spontaneous growth of palatal shelves towards the midline.^[6] It also helps to position the tongue in correct position to perform its functional role in the development of jaws,^[6] and contributes to speech development. The obturator reduces the passage of food into the naso-pharynx thus reducing the incidence of otitis media and naso-pharyngeal infections.^[1,2,6-9] Feeding plate restores the basic functions of mastication, deglutition and speech production until the cleft lip and/or palate can be surgically corrected. The procedure for fabrication

of feeding obturator is described. There are numerous problems associated with individuals with a cleft lip or palate, which affects the functions performed by the oral and nasal cavities. The foremost problem would be feeding the infant as there will be no sufficient negative intraoral pressure to prevent regurgitation of food into the nasal cavity. Addressing these problems necessitates a multidisciplinary approach, requiring a team of experts to facilitate care for these individuals. The basic goal of any approach to cleft lip, alveolus, and palate repair, whether for the unilateral or bilateral anomaly is to restore normal anatomy.^[10] If the palatal defect is wide and complete, an obturator may be required to close the defect and prevent regurgitation of the food into the nasal cavity.^[11] Many appliances exist for use in the cleft infant for maxillary orthopedics and may be broadly grouped under active, semi-active, or passive categories.^[12] In addition are the presurgical nasoalveolar molding plates.^[13] Presurgical nasoalveolar molding is an evolving technique in the treatment of cleft lip and palate. Used properly, molding can create improved nasal symmetry in



Fig. 1: Preoperative



Fig. 2: Putty Impression



Fig. 3: Spacer on Cast

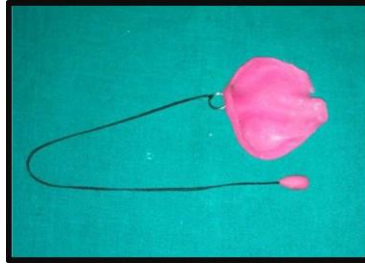


Fig. 4: Oral Molding Plate

Fig. 5: Reline With Tissue
Conditioning Material

Fig. 6: Molding Plate Intraorally



Fig. 7: Post-operative



Fig. 8: Pre-operative



Fig. 9: Cocktail Impression

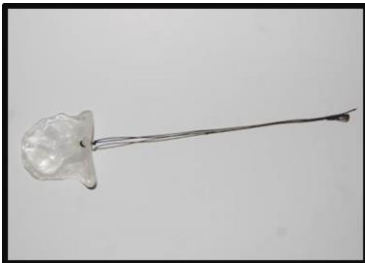


Fig. 10: Molding Plate

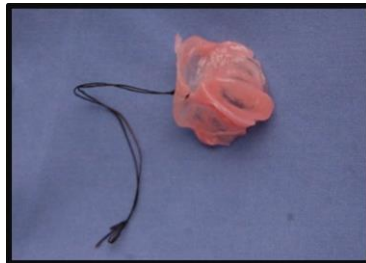


Fig. 11: Reline with Soft Liner Material



Fig. 12: Molding Plate Intraorally



Fig. 13: Preoperative



Fig. 14: Cocktail Impression



Fig. 15: Molding Plate & Cast

unilateral cases and columellar lengthening in bilateral cases. So the first stage of management would be the fabrication of a feeding plate or passive maxillary obturator. The crucial step in fabrication of any appliance or obturator is the impression procedure. Patient positioning, tray, and impression material selection are the important factors to consider in any impression procedure.

Case Report

Three infants (3-day old: case-I, 6-day old: case-II, 6-month old: case-III) with cleft lip and palate were referred from Department of Pediatrics of Navodaya Medical College, Raichur to our Department Of Prosthodontics Navodaya Dental College, Raichur for prosthetic management at different times as they were to be operated after few

months. On examination all the three infants were found to be of same classification i.e., Veau's-3. After consulting with the respective parents it was decided to fabricate feeding appliances for both the cases.



Fig. 16: Molding Plate Intraorally

Impression Making

The patient along with one of the parents were seated facing forwardly in the dental chair. A cocktail impression was made using a mixture of 50 percent type 2 green stick tray compound and 50 percent type 1 impression compound for case I. Hand molded putty elastomeric impression was made making sure that patient did not choke for case II and an irreversible hydrocolloid impression was made for case III.

Master Cast Fabrication

The impressions were poured and casts retrieved. The master cast was then coated with a thin coat of separating media.

Feeding Plate Fabrication

For fabrication of obturator or oral molding plate or feeding plate, we followed "Sprinkle method" where small controlled portions of powder and liquid of clear acrylic were incrementally added to the cast for case II and case III and light cure resin material for case I. An orthodontic loop along was incorporated into the feeding plate and suture material was tied to this loop for case I and only suture material for case II.

Relining

At the delivery appointment, the oral molding plate was carefully fitted in the infant's oral cavity. The feeding plate for case I was relined using tissue conditioning material and silicone based relining material for case II. Initial attention was given to the retention of the appliance. Care was taken to prevent the acrylic resin from impinging on any muscle attachment or extending to the depth of the buccal vestibule. Parents were instructed on placement and removal of the appliance and its daily cleaning. The infant was seen for adjustments a week after initial delivery of the appliance. The oral cavity was examined for any possible sores or

ulcerations in areas other than where molding force was applied.

DISCUSSIONS

Feeding appliance restores palatal cleft and aid in creating sufficient negative pressure which allows adequate sucking of milk. It helps child to compress the nipple easily because it provides a contact point and helps the infant to express milk. It facilitates feeding, reduces nasal regurgitation. Impression procedures in cleft infants pose a unique set of challenges in infants, including the size constraints imposed by the infant's oral cavity, anatomical variations associated with the severity of clefts and a lack of ability of the infant to cooperate and respond to commands. A comprehensive management of children born with cleft lip and palate is best accomplished by the multidisciplinary team approach. Dentist plays an important role in the team which is working closely with medical and allied health specialties. However, prompt intervention by fabrication of feeding plate can eliminate the immediate problems i.e. proper nourishment and prevention of infections for the already debilitated infant.^[14] Inadequate nourishment due to difficulty in feeding affects the health and acts as obstacle in the process of normal development.^[15] Use of tissue conditioning as a relining material helps in providing a cushioning effect to the tissues as well soft and resilient quality helps it to get engaged into undercuts and enhance the retention. The suture material attached to the feeding plate helps in stabilization of the feeding plate during the feeding process as the mother engages it into her fingers. The advantages of the different impression materials used for the three different cases are elastomeric putty and cocktail impression compound can be hand molded it doesn't require custom tray while making impressions for neonates, The advantage in cocktail impressions is type II tray compound i.e. green stick gives the desired flow and type I impression compound gives the desired stability. Elastomeric impression material is superior to impression compound and irreversible hydrocolloid as impression compound is manipulated at a higher temperature the impression procedure can cause inconvenience to the neonate and it's quite difficult to control flow of irreversible hydrocolloids. Whereas elastomeric material is resilient this makes the impression procedure for the neonate comfortable.

PRECAUTIONS

The age old myth, 'prevention is better than cure' and the same applies to impression making in cleft infants. A dental mouth mirror is an effective tool for depressing the tongue during the impression procedure, thereby maintaining airway patency. Clean cotton tipped ear buds may be used to clean the infant's oral cavity before impression making and remove any intra oral remnants of impression material after the procedure.^[16] The impressions for neonate/infants with clefts need to be taken in a hospital setting which is prepared to handle airway emergencies, with a surgeon present at all times. The impression is made when the infant is fully awake, without any anaesthesia or premedication.^[17-20]

Infants should be able to cry during the impression procedure and absence of crying may be indicative of airway blockage. A finger motion may be used to clear the unset material which is posterior to the tray, to prevent the infant from closing down on the tray and compromising the airway. High volume suction should also be ready at all times, in case of regurgitation of the stomach contents. It is preferable that the infant has not had food for at least two hours prior to the procedure.^[17] The management of complications during the impression procedure.^[21-24] The aspiration of the fragments of the impression material that inadvertently tear during the procedure may cause airway obstruction in infants. The obstruction may be partial or complete. Three stages of symptoms result from the aspiration of any object into the airway.

Initial Event

Violent paroxysms of coughing, choking, gagging and possibly airway obstruction occur immediately when the foreign body is aspirated to prevent this while making impression with irreversible hydrocolloids a cause piece is used as a barrier.

Asymptomatic Interval

The foreign body becomes lodged, reflexes fatigue, and immediate irritating symptoms subside.

Complications

The obstruction, erosion or infection may develop. The signs of complete airway obstruction include effective cough, increased respiratory difficulty accompanied by stridor, the development of cyanosis and the loss of consciousness. The maneuvers which are used to relieve foreign body obstruction in infants include back blows, chest thrusts, and finger sweeps. When conscious, the infant is straddled over the arm with face down and with head lower than the trunk. The infant's head is

supported with the rescuer's hand around the chest and the jaw.

CONCLUSION

Cleft lip and palate forms a part of many syndromic and non-syndromic disorders like the Pierre-Robin sequence, etc. Early intervention provides a positive impact on the development of the infants with clefts. Adequate knowledge of the appliances which are available and the impression procedures which should be followed, leads to a better understanding, preparation and coordination of the efforts of the various specialties which are involved in cleft lip and palate care. A basic knowledge on managing complications makes us better equipped in handling emergencies if they arise.

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