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Case Report

Feeding obturator as an adjunct to prevent recurrent bronchitis in infant with cleft palate: a case report

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Abstract: Congenital cleft palate is one of the leading cause of recurrent or persistent pneumonia in newborn . Difficulty in feeding, nasal regurgitation can lead to failure to thrive. Feeding obturator facilitates feeding and act as a barrier for nasal regurgitation of food. Making an impression for feeding obturator fabrication become challenging in these infants due to a risk of aspiration and choking during impression making. The purpose of the present case series is to show stepwise laboratory and clinical procedure and precautionary measures to be taken during fabrication of feeding obturator for the infant suffering from recurrent pneumonia and cleft palate.

Keywords: Cleft palate, palatal obturator, recurrent bronchitis.

INTRODUCTION

Cleft lip and palate (CLP) is diagnosed as one of the most common congenital orofacial defects in mankind with the incidence of 1 in 750 live globally. Cleft palate is inherited as an autosomal dominant condition with variable penetrance. Family history in a first-degree relative increases the risk by a factor of 20 percent. Environmental factors include maternal epilepsy, certain drugs like steroids, diazepam, phenytoin and folic acid deficiency (Derijcke, A. *et al.*, 1996). It also occurs in many syndromes, including Down's syndrome and Treacher Collin's syndrome.

Swallowing reflex is although present but remain ineffective, due to deficient intraoral negative pressure caused by cleft palate lead to alteration in feeding activity. Communication between nasal and oral cavity predispose the infant to airway infection and recurrent bronchopneumonia due to deficient filtering and insufficient humidification of inspired air (Derijcke, A. *et al.*, 1996). Food reflux and horizontal position of auditory tube lead to recurrent middle ear infection and auditory dysfunction in long term.

However, the feeding plate obturates the cleft and restores the separation between oral and nasal cavities and facilitates feeding, reduces nasal regurgitation and incidence of choking (Glenny, A. M. *et al.*, 2004). The procedure of impression making for fabrication of feeding obturator in infant suffering with recurrent bronchitis predisposes the infant to dyspnea (Brecht, L. E. *et al.*, 2000).

Although, literature is there on the fabrication of feeding obturatornone has specified the precautionary measure to be taken during impression making of an infant suffering with recurrent pneumonia as aspiration of a foreign body.

CASE DETAIL

An infant with male gender and diagnosis cleft palate, was 25 days old when his mother and his grandparents came to our department. The patient was admitted in Department of Paediatrics, as a patient was suffering from bronchopneumonia with the history of recurrent pharyngeal infection and weight loss. The patient was on feed with help of nasogastric intubation. The Infant was the firstborn of related healthy young parents with unmarketable family history and was born

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after normal pregnancy with 2.04 kg weight (figure 1 a).

Intraoral examination revealed a defect involving hard palate and soft palate (Veau classification, class II). Counseling of parents was done to reduce emotions and anxiety and explained the goal of treatment to increase parents cooperation and coordination during the procedure. The mother was instructed to not feed the child at least 4 hours before the impression procedure to avoid regurgitation and aspiration.

- The primary impression was made by manipulating modelling wax sheet of approximate size and shape of the maxillary arch in lukewarm watering and adapted in infant's mouth by the support of two gloved fingers .making sure infant should cry during impression taking procedure to ensure airway patency. the wax impression is adapted to the palatal contour and muco-buccal fold by operating doctor (figure 1 b) During impression making the mother is instructed to position child vertical (half seated tilted at a downward angle of 15 degrees).This position reduces the risk of choking and prevent aspiration of impression material to the nose or auditory tube, which is horizontal at this age.

- A stone model (cast) was then prepared to fabricate custom impression tray. The cast was prepared by high strength to die stone. (figure 1 c).

- A custom tray was made with the help of self-polymerizing polymethyl methacrylate resin.

- The custom made impression tray was evaluated intraorally to determine the easiest path of insertion and withdrawal.

- PVS adhesive was applied over the intaglio surface The secondary impression was made with polyvinyl siloxane (PVS)(putty consistency) rubber base impression material (Flexeed GC Co. LTD.) to record precise detail of defect and supporting structure(FIGURE 1d). To handle any airway emergencies impression making was done in neonatal intensive care unit in presence of critical care paediatric surgeon. The impression was withdrawn with a snap movement on a set of material. The final impression was poured with high strength gypsum stone to make a stone model(FIGURE 2).
  Undercut was blocked by modelling wax

- The feeding plate was fabricated with heat activated acrylic resin with conventional flashing, dewaxing, curing method for obturating the defect in hard palate(figure 3). A floss was tied to prevent swallowing of obturator by the infant.

- Parent was instructed to re-visit for follow up after 3 months to evaluate facial growth (figure 4).

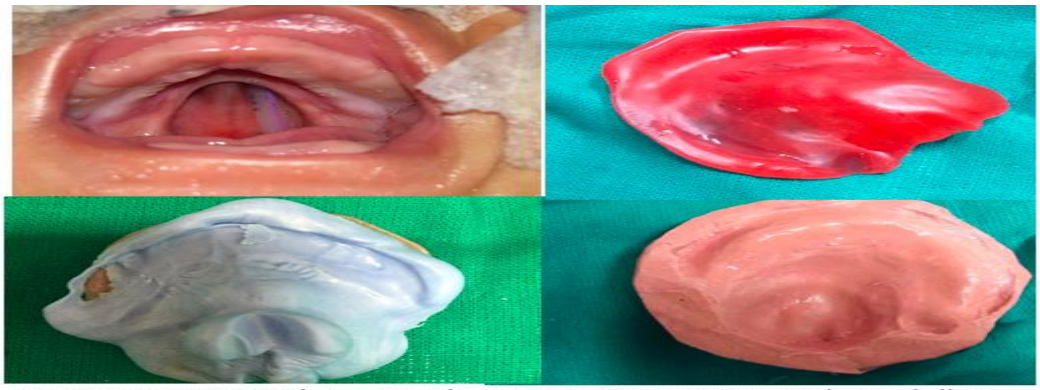

Figure 1 a: Intraoral picture ;b :primary impression with modelling wax ;c: primary model stone cast: d secondary impression with additional silicon

Fig.2

Fig.3

Fig.4

DISCUSSION

Dental therapy starts in the first 48 hours after the birth of the child with making an acrylic feeding obturator device. This device has multiple roles:

- Facilitates the feeding of a child by obliterating the defect and separating the nose from the mouth of the cavity, and thus allows sucking;
- Brings the tongue into a normal position, allowing normal development of speech at a later age;
- Helps in the orientation of the alveolar segments of the upper jaw to the optimum position before surgery,
- Contributes to achieving a beneficial psychological effect in parents, positive communication between the child and the parent.
- Prevent recurrent or persistent pneumonia and middle ear infection by preventing nasal regurgitation.

Making the impression in cleft palate patient with bronchopneumonia for fabrication of feeding obturator is challenging clinical step due chance of aspiration and choking due to the already congested airway. Moreover, lack of cooperation, small size oral cavity and availability of cleft as undercut add difficulty to this. Appropriate emergency equipment, including forced oxygen, suction, and standard airway management equipment, should be available during the impression process due to the risk of impression material swallowing and aspiration or even being lodged in the undercuts of the defect.

In literature, the different author has used different material to take primary impression like wax,

irreversible hydrocolloid, low fusing impression compound heavy putty elastomeric impression material. Shatkin and Stark (Brecht, L. E. *et al.*, 2000) In present clinical situation preference was given to waxes due to least health and thermal hazard to the infant and less chance of a tear. With irreversible hydrocolloid, handling is quite difficult with uncooperative child and low tear strength can lead to dislodgement (Reichert, F. *et al.*, 2017) in defect during removal. Impression compound possesses good strength but during heating leach out product can have health hazard for the child. Elastomeric rubber base heavy body Impression material due to high tear strength and the good record of anatomical details can be used as the secondary impression infant's head is tilted 15 to 45 degrees to provide direct visibility and for patent airway maintenance.

For feeding appliance, one can use self-cure acrylic material, heat cure acrylic or bioplastic sheet. Every material has their pro and cons. With heat cure acrylic retention is good but with thermoplastic resin sheet irritation chances are less (Gupta, R. *et al.*, 2012).

CONCLUSION

Feeding appliance is of great help to both child and mother. (Turner, L. *et al.*, 2001) As cleft palate corrective surgery has to take place at 10 months or 12 months, till that time maintenance of child weight is important. Feeding obturator help in nourishment and allows normal growth of the child.

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