

Pressure-molded Modified Feeding Plate for Cleft Palate in a Two-month-old Infant: A Case Report

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ABSTRACT

Aim and objective: This article describes a pressure-molded modified feeding plate with retentive arms for retention in a 2-month-old infant with a cleft palate (uvula, soft palate, and secondary hard palate). The main goal of this technique was to cater the infant with a properly functioning feeding plate, thereby reducing the anxiety of the parents related to nasal regurgitation and the infant not gaining weight.

Background: Cleft palate has anatomical and morphological alterations correlated with difficulty in suckling, presence of nasal regurgitation while feeding, deficiency in facial growth, dental as well as aesthetic problems, and velopharyngeal inadequacy leading to not only speech and hearing defects, but also psychological complications.

Case description: The present case reports a 2-month-old, female infant diagnosed with cleft palate (Veau's class II) with a chief complaint of having difficulty while suckling milk and nasal regurgitation while feeding. Thus, a pressure-molded modified feeding plate with retentive arms was devised with the help of Biostar using pressure molding technique to help feed the infant and gain sufficient weight that would be a must to undergo the cleft palate reconstructive surgery.

Conclusion: The modified feeding plate with retentive arms showed high efficiency in feeding the infant and presented a high level of acceptance by both the parents and the infant. This also improved the health status of the infant, which was a requirement for rehabilitation.

Clinical significance: The pressure-molded modified feeding plate with retentive arms was a favorable feeding option as it had better retention and was much more stable in the infant's oral cavity. Moreover, it created a separation between the oral and nasal cavities and thus helped in creating a negative intraoral pressure during suckling, thereby effectively sealing the cleft palate.

Keywords: Biostar, Cleft palate, Modified feeding plate, Pressure molding technique, Retentive arms.

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BACKGROUND

Cleft lip and palate (CLP) is a congenital anomaly that affects particularly the middle third of the face. It has hallmark characteristics of oronasal communication, malformation or agenesis of the teeth associated with the regions of the cleft and maxilla with deficiency in growth in transverse and sagittal directions.¹

Globally, the incidence of CLP is 0.28–3.74 per 1,000 live births. In India, it is 0.25–1.56 per 1,000 live births.² While CLP accounts for 50% of cases approximately, isolated cleft lip and cleft palate (CLCP) is present in about 25% of cases.³

Cleft palate is correlated with difficulty in suckling, presence of nasal regurgitation while feeding, deficiency in facial growth, dental problems including aesthetics, and velopharyngeal inadequacy leading to speech, hearing, and psychological complications. Among all the issues mentioned above, feeding is an utmost prime concern in infants born with clefts as there is a delay in their normal growth and development. The communication between the oral and nasal cavities is unable to create a negative pressure that is required for suckling. As a compensatory mechanism, the infant pushes the nipple between the tongue and the hard palate to try to suckle by squeezing the milk; however, this is ineffective if there is a wide cleft and there is entrapment of the nipple inside for the defects mentioned above.⁴ Moreover, this can be a major problem for infants who will be undergoing reconstructive surgery for cleft correction that is performed at 18 months for cleft palate. Therefore, to overcome the hurdle of feeding, a feeding plate is advised, which restores

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the functions of suckling, swallowing, and speech until the cleft palate is corrected surgically.⁵

Conventional feeding plates cover the entire hard palate and have posterior extensions to come in contact with the soft palate. Nevertheless, due to the synchronized movement of the soft palate during suckling, it is not possible to extend posteriorly and the feeding plate material is rigid, which implies that there will be a lack of retention as well.⁶

The present case report describes a pressure-molded modified feeding plate with retentive arms for retention in a 2-month-old infant with a cleft palate (uvula, soft palate, and secondary hard palate).

CASE DESCRIPTION

A 2-month-old, female infant, with noncontributory medical as well as family history, came to the Department of Pedodontics and Preventive Dentistry, Bapuji Dental College and Hospital, Davanagere, Karnataka, with a chief complaint of difficulty while feeding and the presence of nasal regurgitation since birth. The mother also stated that the infant was having difficulty while suckling milk and was not gaining weight. No history of treatment or surgery for the defect was mentioned.

On examining intraorally, a cleft was seen, which was involving the uvula, soft palate, and secondary hard palate (Veau's classification: type II) (Fig. 1).

To overcome the hurdle of feeding the infant, a feeding plate was designed, which would act as a barrier between the two cavities (nasal and oral cavity), thus preventing nasal regurgitation.

Fabrication of the Feeding Plate

In this case, a preliminary impression was made with polyvinyl siloxane rubber-based putty material (3M ESPE). The patient was advised to be NPO (nil per oral) for 3 hours prior to the procedure. During the procedure, the patient was held with her face toward the floor (facedown position) to avoid aspiration of the impression material by the infant and prevent the tongue from falling back, thereby allowing fluids to drain out of the oral cavity. The tray

was placed in the infant's oral cavity until the impression material adequately covered the upper gum pads. As soon as the impression material was set, it was removed and the oral cavity was examined for any residual impression material (Fig. 2).

The impression was then poured with type IV dental stone to obtain an accurate cast. Then, the final cast was obtained, and all the undercuts were blocked using the dental stone. A 2-mm ethylene vinyl acetate (EVA) sheet (soft plate) was used for the fabrication of the appliance using the Biostar device (Scheu-Dental GmbH, Iserlohn, Germany). It was done using the pressure molding technique. The excess material was trimmed, finished, and polished to avoid any impingement of soft tissues.

Modification in the Feeding Plate

Two retentive arms with dimensions of 8×4 mm were fabricated with cold cure acrylic. The exact location of the retentive arms was ascertained clinically and adequately secured to the feeding plate with cold cure acrylic and positioned anteriorly at 40° angulation to the plate. To help in added retention of the elastics, 2-mm-deep grooves were placed on the retentive arms at a distance of 1 mm each. The feeding plate was then placed in the infant's mouth and retained with the help of orthodontic elastics (inner diameter of 0.25 inch) and horizontal skin barrier tapes (3M Transpore) that had dimensions of 1/4 inch in width and about 4 inches in length (Fig. 3).



Figs 1A to C: Extent of the cleft: (A) Frontal view; (B) Lateral view; (C) Intraoral view



Fig. 2: Impression made with polyvinyl siloxane rubber-based material



Fig. 3: Pressure-molded modified feeding plate with retentive arms



Figs 4A and B: (A) Delivery of feeding plate; (B) Modified feeding plate in final position

Delivery of the Feeding Plate

The parents with the infant were recalled to receive the feeding plate after 2 days. The feeding plate was securely placed in the infant's mouth, and then thorough observations were done by asking the parents to give the infant a feed.

Initially, a minimal amount of gagging was observed. The feeding plate was trimmed and checked for a smooth finish. The plate was again placed and checked for any discomfort. There was no level of discomfort with the feeding plate. Most importantly, parents were given instructions regarding feeding, which included the position of the baby and the mother during and after the feed and good oral hygiene. Parents were also demonstrated on how to place the feeding plate in the baby's mouth and were asked to demonstrate it as well. They were also explained on maintaining the cleanliness of the feeding plate (Fig. 4).

After giving the instructions, the parents were informed to visit for a follow-up appointment.

At the end of 1-month follow-up, the infant had gained weight normally and also was comfortable and adjusted to the feeding plate.

DISCUSSION

Majority of parents are traumatized when their infant is born with an orofacial cleft as there is an increased financial, social, and personal impact prior to primary treatment completion. Hence, infants with CLP malformations require coordinated care that involves multidisciplinary approaches from birth to adolescence.⁷

The main objective is to ensure that there is adequate nutrition for the infant during the first few months of the procedure.⁸ Often infants with CLP experience feeding difficulties that increase the problems in providing adequate nutritional intake, which includes nasal regurgitation, poor suction, excessive air intake, frequent burping, and prolonged feeding time.⁹ To overcome these feeding problems, various feeding methods have been recommended, while some others have advocated specific feeder for use in some or all cleft conditions.¹⁰

Another challenging task in these children is breastfeeding with cleft palate as the infant has nasal regurgitation. To achieve the right breastfeeding, the mother needs to implement some modifications such as modified football hold (infant is held at 45° angle in the

mother's protected hands) position that can be used during feeding the infant, which minimizes nasal regurgitation.¹¹ There are various treatment modalities that can successfully facilitate the feeding in an infant with a CLCP.

The feeding bottle is placed to facilitate the infant's ability to create sufficient negative pressure. This would allow adequate suckling and decrease the flowback of fluids out through the nasal cavity rather than being swallowed, thereby decreasing the feeding time with an increased amount of intake of every feed.¹⁰ One major advantage of using the feeding plate is to enhance the child's ability to obtain nourishment during an early stage of life.

In our case, we had the advantage of using a modification in the feeding plate with the help of retention arms that were attached to the feeding plate. This helped in the stabilization of the feeding plate during the feeding process.

Impression-making procedures in cleft infants pose a unique set of challenges that include size constraints imposed by the infant's oral cavity, anatomical variations that are associated with the severity of clefts, and a lack of ability of the infant to cooperate and respond to commands. Rubber base was the choice of impression material as it has the advantage to reproduce all the areas of interest with good surface details and resists tearing; moreover, its removal is traumatic to the infant. Additionally, the material has excellent dimensional stability and permits multiple casts to be poured.¹²

Traditionally, the feeding plate is made using conventional methods (clear acrylic). However, the fabrication of such a plate is time-consuming, and injuries to the soft tissues are observed due to the rigidity of this material.¹³ In our present case, A double-layered EVA material was used, which was a rapid and easy method to fabricate a feeding plate. It has many advantages, such as an easy and less time-consuming smooth feeding plate is fabricated; no allergic ingredient is present, which can harm the tissues of the infant; and moreover, it provides excellent retention to the infant.¹⁴

Overall comprehensive management of infants born with CLP is accomplished by a multidisciplinary team approach, thereby benefiting the patient and providing a significant avenue for the understanding of diagnosis and considerations in managing the infant. Pediatric dentists are frequently involved in the care of CLP.⁹ Thus, being responsible for the overall dental care of the patient, early referral should always be encouraged in these children as they demonstrate higher dental needs.

CONCLUSION

Early intervention helps to overcome the factors that act as stumbling blocks during the milestones of normal growth and development. This should begin as early as possible after birth. It not only helps in feeding the infant but also modifies the growth and prevents future complications. It prepares the infant for early surgical intervention by facilitating the growth and development. Thus, the pressure-molded modified feeding plate with retentive arms bridged the gap that existed between a malnourished and an adequately nourished newborn infant.

CLINICAL SIGNIFICANCE

The pressure-molded modified feeding plate with retentive arms was a favorable feeding option as it had better retention and was much more stable in the infant's oral cavity. Moreover, it created a separation between the oral and nasal cavities and thus helped in creating a negative intraoral pressure during suckling, thereby effectively sealing the cleft palate.

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