

Fabrication of feeding plate prosthesis for a six days old neonate: a case report

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INFORMATION

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ABSTRACT

Feeding a newborn baby with complete cleft lip and palate is a problematic pursuit because of the association between the oral cavity and the nasal cavity. A multidisciplinary approach is needed to manage the complex problems involved in the case of such neonates and their families. The present case is of a 6-day-old neonate having complete right unilateral cleft lip and palate (Veau class C) for which palatal obturator was constructed. In this case report a stepwise simple, secure, and uncomplicated procedure for making accurate impressions, maxillary cast, and fabrication of palatal obturator in infants with cleft lip and palate have been presented.

1. Introduction

Most common congenital craniofacial anomalies that are seen in a newborn are Cleft lip and palate with an incidence of 0.28 to 3.74 per 1000 live births globally [1]. Cleft palate is a gap within the roof of the mouth caused due to failure of palatal shelves to fuse throughout the first months of development as an embryo [2]. The challenges and problems of cleft lip and palate patients include physiological activities such as swallowing, speech, etc. which are performed by the oral and nasal cavities. Oro-nasal communication i) diminishes negative pressure, necessary for suckling [3-6] ii) causes nasal regurgitation of food, frequent burping, and choking because of excessive air intake. Because of this, communication time for feeding is usually significantly longer and fatigues for both baby as well as mother [7].

Treatment of cleft lip and palate involves the teamwork of a surgeon, prosthodontist, paediatrician, and speech therapist. Lip repair is done at 2 to 6 months age, and palatal repair is done from 12 months to 2 years of age. Early repair of the palate may have a negative effect on the growth and development of the maxilla due to the resulting scar tissue formation [8]. Until the surgical correction, maintenance of adequate nutrition is essential for the healthy growth of the newborn and to prepare the infant for the corrective surgery, which requires a feeding plate. There are different approaches to feed babies with cleft palate. Orogastric and nasogastric tubes may be effective but should be used only for a limited time. Specially designed nipples with enlarged openings can be used to allow the flow of fluids with minimum effort, but this option may not be the right choice for some patients.

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The feeding plate occludes the cleft and restores the separation between oral and nasal cavities. According to GPT-9, feeding prosthesis is an ancillary prosthesis constructed for newborns with cleft palates to permit normal sucking and feeding. Cleft plate prosthesis facilitates feeding, reduces nasal regurgitation, reduces the incidence of choking, and shortens the length of time required for feeding. Further, the obturator also prevents the tongue from entering the defect and interfering with the natural growth of palatal shelves towards the midline. This prosthesis also helps to position the tongue in the right position to accomplish its functional role in the growth of jaws and contributes to speech development. The obturator helps in reducing the passage of food into the nasopharynx, thus reducing the incidence of otitis media and nasopharyngeal infections. The feeding plate restores the essential functions of mastication, deglutition, and speech production until the cleft lip and/or palate can be surgically corrected [8].

2. Case report

The department of paediatrics referred a six-day-old female child, who weighed 2.5 kg to the department of Prosthodontics and crown & bridge for the fabrication of feeding plate. On examination, it was observed that the child was born with right unilateral cleft lip and palate with approximately 1.5 – 2.0mm communication openings. After a complete examination of the patient, it was decided to fabricate a feeding plate for the patient, so that it reduces the feeding problem (figure1).

3. Procedure

The preliminary impression of the maxillary arch was made with polyvinyl siloxane putty material washed with medium body addition silicone with the help of a plastic ice cream spoon. The infant was held upright by the mother to prevent the aspiration of impression material. The putty addition silicone (GC Flexceed Kit) was adapted until the impression material adequately covered the anatomy of the upper gum pads. Once the impression material was set, the putty tray was removed, wash impression with medium body addition silicone (Aquasil monophasic tube refill 180mL) was made (Figure2), and the mouth was examined for residual impression material. The impression was then poured with Type IV dental stone (Pearl stone) to obtain an accurate cast (Figure3). The feeding plate was

made up of an adapted vacuum-formed thermoplastic sheet of 5mm (Soft Eva Keystone Industries).

The suturing thread (Silk suture braided, Non-absorbable Teleflex medical OEM) was attached to the feeding appliance because it prevents swallowing and aids in easy retrieval of the appliance (Figure 4). Finally, the appliance was inserted in the child's oral cavity, necessary corrections were done, and the child was fed.

Instructions were given to the parents about using and cleaning the plate. Initially, it may take longer to feed the child with the plate, and even it is uncomfortable for the child, gradually, it should be adjusted.

4. Discussion

Maintenance of adequate nutrition is essential for the growth and development of the infant because gaining weight is important for the preparation of the baby for the corrective surgery. However, a cleft palate creates an opening in the roof of the mouth, and the infants have difficulties in sucking because the necessary negative pressure cannot be produced in the oral cavity. Additionally, the expressed milk tends to escape to the nose [8].

So to prevent such nasal regurgitation various feeding devices are used like traditional feeding bottle which may be rigid or squeezable with two types of nipples (a regular Nuk or a cleft nuk), a squeezable cleft palate nurser, a traditional feeding bottle with a crosscut nipple, the Hotz plate, the Haberman feeder, a prosthetic obturator appliance, a nasogastric tube, cup and spoon-feeding, and syringe feeding[9]. In the presented case, a modified feeding plate was constructed using soft vacuum formed Biostar materials that permitted active feeding and healthy weight gain.

Impression procedure is critical in the fabrication of obturator and should be carried out in the presence of a paediatrician in the neonatal intensive care unit. Patient positioning, tray, and impression material selection are important factors to consider. A number of different positions of the infant have been adopted for CLP impression making in infants, including face down, upright, horizontal raised to sitting as the impression sets, and even inverted upside down. Addition poly silicone is the material of choice for making a cleft impression due to its good elastic behaviour, high



Figures: 1. Pre-operative photograph 2. Impression with Putty & Medium Viscosity Elastomer 3. Master Cast
4. Vacuum-formed Feeding Plate with attached Silk Suture thread
5. Try-in of the feeding plate 6. Post-Insertion photograph

tear strength, accurate reproduction of surface details, and long-term dimensional stability which allows multiple pours [10].

The multidisciplinary approach or teamwork is essential for success in the treatment of those patients.

There should be a whole team of experts of various specialities in which the dentist is also involved: phoniatrist, audiologist, speech therapist, psychologist, a social worker [11].

Feeding appliance restores palatal contour and cleft,

which helps in creating sufficient negative pressure that allows adequate sucking of milk. It helps the 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 [12, 13].

5. Conclusion

The Feeding plate overcomes the hindrances which occur during the normal growth and development of a cleft patient and thus should be advised as early as possible after birth. It acts as an important tool for feeding, oral-facial development, development of palatal shelves, prevention of tongue distortion, nasal regurgitation and nasal septum irritation, and avoiding ear infections. It also prevents the expansion of the anterior part of the maxilla, which helps the surgeon provide proper reconstructive treatment.

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