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Feeding plate prosthesis for an infant with cleft lip and palate: a case report

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Abstract

Cleft lip and palate are congenital anomalies that manifest at birth, leading to a range of complications such as feeding challenges, dysfunction of the eustachian tube, middle ear infections and effusion, hearing loss, speech disorders, and dental and orthodontic issues. A feeding plate is a prosthetic solution crafted to address these challenges by effectively sealing the cleft and restoring the separation between the oral and nasal cavities. This case report details the procedure for fabricating a feeding plate specifically designed for neonates with cleft lip and palate.

Keywords: Implants, Cleft lip and palate, Feeding prosthesis, Infant.

1. Introduction

Cleft Lip and Palate represent the most prevalent craniofacial congenital anomalies, with a global incidence ranging from 0.28 to 3.74 per 1000 live births [1,2]. According to GPT [3], a feeding prosthesis serves as an adjunctive device designed for newborns affected by cleft palate, enabling normal sucking and feeding patterns. Its application proves instrumental in facilitating feeding processes, mitigating nasal regurgitation, minimizing choking incidents, and expediting the overall feeding duration [3]. Additionally, the obturator component acts as a preventive measure, averting the intrusion of the tongue into the cleft defect and thereby preserving the spontaneous convergence of palatal shelves toward the midline [4].

Furthermore, the obturator's role extends to appropriately positioning the tongue, facilitating its functional contribution to jaw development, and fostering speech proficiency [4]. The feeding plate, encompassing the obturator, reinstates fundamental oral functions such as mastication, deglutition, and speech production, providing a temporary solution until surgical correction of the cleft lip and/or palate can be pursued [5]. This case report delineates the procedural intricacies involved in fabricating the feeding obturator.

2. Case Report

A neonate, merely one day old, was referred to the Department of Prosthodontics, G Pullareddy Dental College, Kurnool, Andhra Pradesh, India, by a pediatric private practitioner. The primary complaint involved challenges in feeding. Upon examination, it was determined that the infant was with a congenital cleft lip and palate (Figure 1). After a comprehensive discussion with the child's parents, it was revealed that breastfeeding posed difficulties for the mother. The immediate focus, therefore, centered on addressing the feeding issue, leading to the decision to construct a specialized feeding appliance within the Department of Prosthodontics. The procedural details were thoroughly explained to the parents, and their informed consent was duly obtained.

Figure 1. Pre-operative image of the infant with Cleft-lip and palate

2. Technique

The primary impression (Figure 2) was made using a disposable plastic spoon as a tray. A thin layer of vinyl polysiloxane adhesive was painted over the spoon and loaded with putty-boy vinyl polysiloxane (VPS) impression material (Aquasil, Putty; Dentsply USA). Both the base and catalyst pastes were mixed as per the manufacturer's

recommendations. The impression-making procedure was performed with careful attention to prevent any hindrance to the infant's breathing.

The impression was poured with a mix of dental plaster and water to make the primary cast. The cleft in the palatal region on the cast was filled with wax to approximate the contour. A custom tray was prepared with cold cure acrylic resin (DPI-RR Cold cure, Dental Products of India, India) using a sprinkle-on method. The final impression was made with light body VPS impression material (Aquasil ultra-LV, USA). Both base and catalyst pastes of light body VPS were mixed according to the manufacturer's recommendations, and the final impression was made. Then, the impression was poured with a mix of dental stone (Kalstone, India) and water with the water: powder ratio of 36 ml of water per 150 grams of powder and a master cast was made (Figure 3). Then, the undercuts were blocked on the master cast, and the feeding plate was prepared with cold cure acrylic resin and monomer (DPI-RR Cold cure, Dental Products of India, India) by sprinkle-on method.

The prosthesis was retrieved and trimmed to remove the excess and ensure uniform thickness. The prosthesis was polished using conventional procedures to provide smooth surfaces. After finishing and polishing, a small hole was made using a round bur at the labial flange. A bead of resin was added to make a labial button to which a ligature as shown in Figure 4 was tied and secured on both cheeks with tape for easy removal of the plate by parents in an accidental swallowing or in case of gagging. Parents were instructed on the proper techniques for inserting, removing, and cleaning the prosthesis.

Figure 2. Putty impression, 3. Master cast, and 4. Feeding appliance with thread.

4. Discussion

The optimal management of children born with cleft lip and palate involves a comprehensive, multidisciplinary team approach. Within this collaborative framework, a dentist plays a crucial role, working closely with medical and allied health specialists [6]. Nevertheless, timely intervention through the fabrication of a feeding plate can address immediate issues, such as ensuring proper nourishment and preventing infections in the already vulnerable infant.
The feeding appliance serves to rectify the palatal cleft, enabling the generation of sufficient negative pressure essential for effective milk suction. This, in turn, aids the child in easily compressing the nipple by providing a contact point, facilitating milk expression. Moreover, the feeding plate contributes to improved feeding dynamics and a reduction in nasal regurgitation [7].

Precision is crucial when making impressions, necessitating specific precautions. To ensure the airway remains unobstructed throughout the process, a mouth mirror should be employed to depress the tongue continuously. Following impression-making, the infant's mouth must be meticulously cleansed with wet cotton to eliminate residual impression material.

It is important to note that engaging undercuts can complicate the removal of the impression, potentially leading to fragmentation and, in severe cases, aspiration, resulting in airway obstruction. In the event of inadvertent aspiration, vigilant monitoring for signs of airway obstruction is imperative. Remedial measures such as back blows, chest thrusts, and finger sweeps should be applied to alleviate the obstruction. However, it is crucial to avoid blind finger sweeps, as they pose the risk of further pushing fragments into the airways [7].

Feeding appliances offer various advantages. They contribute to maintaining sufficient nutrition by covering the cleft palate, providing a stable platform for the infant to press against during breastfeeding, and facilitating the extraction of milk. Additionally, these appliances support normal suckling, fostering the development of typical oromotor and swallowing reflexes. This, in turn, diminishes feeding challenges such as nasal regurgitation and choking, while also reducing the overall feeding duration. The proper positioning of the tongue prevents it from entering the cleft, promoting the growth of the maxilla and maxillary shelves toward each other. Furthermore, the feeding appliance helps minimize the passage of milk into the nasopharynx, thereby decreasing the likelihood of nasopharyngeal infections and otitis [8-10].

5. Conclusion

The insertion of the feeding obturator is recommended at the earliest possible time following birth. This device assists the infant in breastfeeding, promotes oral-facial development, contributes to the development of the palatal shelves, prevents distortion of the tongue, and minimizes irritation to the nasal septum. Additionally, it plays a role in reducing the occurrence of ear infections, expanding the collapsed maxillary segment, and constricting the expanded anterior part of the maxilla. These effects collectively aid the

cleft palate healthcare professionals and provide psychological support to the parents.

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