An Alternative Impression Technique for an Infant with Cleft Palate

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Abstract

Aim: This article describes an alternative preliminary impression technique for an infant with cleft palate.

Methodology: A 3 day old male infant with cleft palate was referred to clinic for the fabrication of feeding plate, for the first impression a sterilized tea-spoon modified with a hole in the middle of spoon was used as a tray.

Results: Modified spoon tray is easily accessible, cost effective appliances that prevents flow of impression material to the posterior airway region and provides more controlled impression technique.

Conclusions: This procedure could consider as an alternative method for the first impression process.

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Introduction

Non-syndromic orofacial clefts are congenital deformities that include cleft lip and/or palate (1, 2). Depending on the extent of clefting, these conditions cause some degree of challenge in feeding, mastication, deglutition, and speech, issues with facial growth and dentition, and social and psychological problems (1, 3). Among these difficulties, inadequate feeding in infants is a serious problem and has been documented over many year (4, 5).

An orofacial cleft may consist of an opening in the roof of the mouth that leads an infant to have difficulty sucking because of the inability to produce the necessary negative pressure in the oral cavity (6). To compensate, the infant presses the nipple between the tongue and hard palate to express the liquid, but this mechanism is insufficient when the cleft is wide enough to entrap the nipple. The feeding process is also complicated by nasal regurgitation of food and excessive air intake (7-9).

Rehabilitation of such infants involves the surgical closure of the defect. However, the timing of surgery can range from 3 to 18 months of age, depending on the severity of the defect(s) (2). Until surgical intervention, sufficient nutrition is essential to allow normal growth of the infant and to prepare him/her for surgery (6). For this purpose, feeding plates have been used to cover the cleft and establish separation between the oral and nasal cavities (10, 11). This technique also prevents cleft widening due to the activity of the tongue and corrects tongue function, leading to the development of speech, providing positive guidance for growth and development of the maxillary segments, and having a positive psychological effect, at least on the parents (4, 6, 12, 13).

In the fabrication of a feeding plate, the impression procedure is a crucial step. Patient positioning and tray and impression material selection should thus be considered carefully in any impression procedure (12, 14, 15). The transverse dimension of the tray should be sufficiently large to
include the lateral maxillary segments, provide posterior cover up to the maxillary tuberosities, and enable accurate reproduction of the mucobuccal folds.

The use of an individualised impression tray is required to obtain an accurate impression of the cleft area and anatomical structures; thus, a preliminary impression should be taken to aid tray customisation. A prefabricated commercial tray may be used for this purpose; (16), however, this type of tray is not always useful for obtaining an impression of the infant's maxillary arch due to anatomical variation associated with cleft severity (17). Thus, the use of several alternative tray designs, such as those based on ice-cream sticks, 2 stock poly (methyl methacrylate) impression trays (18, 19), wax (15), and light-polymerising acrylic resins, has been reported for obtaining impressions in infants with cleft lip and palate (10).

In the present case report, we describe an alternative technique for obtaining preliminary impressions in infants with cleft palate.

**Case Report**

A 3-day-old male infant with cleft palate, weighing 2.5 kg, was referred by a paediatrician to the Department of Prosthetic Dentistry at Gazi University, Ankara, Turkey. The infant's medical history was taken from his parents, who reported no similar congenital or genetic anomaly in the family. The parents reported the infant's poor feeding ability. Intra-oral examination revealed a cleft involving the uvula and soft palate exclusively. After a detailed examination of the infant, fabrication of a feeding plate was decided on to improve his vital functions and bring the tongue into normal position. The parents approved this proposed treatment plan.

The parents were instructed not to feed the infant for at least 2 h prior to the impression procedure. First, the infant was placed in a prone position to avoid aspiration of the impression material, choking, and airway obstruction. Stock poly (methyl methacrylate) impression trays are typically used for initial impressions in our clinic, but the available trays were not appropriate for the infant's oral cavity. Thus, a sterilised teaspoon with a hole in the middle was used for the first impression (Fig. 1). Heavy-body impression material (Zetaflow; Zhermack, Badia Polesine, Italy) was loaded into the modified spoon tray; after the material had set fully, the tray was removed from the oral cavity (Fig. 2). During the impression procedure, the infant's crying was observed as a measure of the absence of airway blockage.

Dental plaster was poured into the initial impression to produce a dental cast model for construction of a truly individualised poly (methyl methacrylate) impression tray. A second impression was then taken with the individualised tray using a putty wash impression technique. A feeding plate was then fabricated from heat-polymerised polymethacrylate resin (Acron Duo, Swindon, UK; Fig. 3).
Discussion

Feeding plates improve feeding, contributing to weight gain and a thriving state of health, which are prerequisites for subsequent surgical repair of orofacial defects (8). A precise impression of the cleft maxilla is required to obtain a plate that is well adapted to the patient's anatomical structures (17). Impression procedures in infants with cleft defects present several challenges, including anatomical variation in cleft size, lack of infant cooperation, the need to obtain an impression within a short period of time, retention of the impression material in the tray, and the selection of an impression material with tear strength.

In the present study, a perforation in the middle of a spoon enabled retention of the impression material in the tray. It also allowed excess impression material to pass through the perforation without pressure from oral tissue, preventing the flow of impression material to the posterior airway region. In this way, the possible risk of airway blockage with impression material, the most important potential complication of the impression procedure, was eliminated. Additionally, an impression material that resists tearing during removal of the impression is needed. Heavy-body silicone impression material, polyvinyl siloxane impression material, low-fusing impression compound, and alginate are used routinely to obtain impressions in neonates with orofacial clefts. However, alginate tend to tear during the removal of the tray and impression material from the mouth, especially when the material extends deep into the cleft undercuts. In the present study, putty C-silicone impression material was used; it can produce accurate impressions with good reproduction of details. The advantages of this material also include greater tear strength and the ability to make multiple casts from the same impression (2). The modified metal spoon tray can be sterilised easily, preventing any risk of cross infection. This characteristic is an advantage over stock poly (methyl methacrylate) impression trays, which can become deformed with autoclave sterilisation. The modified spoon tray described in this report is readily accessible and cost effective, prevents the flow of impression material into the posterior airway region, and provides a controlled impression technique. In addition, the modified spoon tray can be sterilised in an autoclave to avoid the risk of cross infection. Although this procedure is not applicable in all infants, it can be considered an alternative method of obtaining an initial impression.

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References