Review Article

Feeding considerations in infants born with cleft lip and palate

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Abstract

Infants born with the congenital deformity of cleft lip and or palate suffer from varieties of complications since the day 1 of their life. The most important of which is the feeding difficulty which leads to insufficient food intake and thereby causing deleterious effects on their overall development leading to malnutrition and death in some cases. However, research into the anatomical variations of these infants in the region of lip and palate has led to the development of several types of feeders and their modifications which would help them thrive well in the initial days and also for later. Hence, it is worth important to know about them in detail and help these infants and their families psychologically so that the infants do not suffer from feeding difficulties anymore.

Key words: Cleft lip and palate, feeding techniques, malnutrition, modified feeders

INTRODUCTION

A cleft lip is a craniofacial malformation that occurs during the embryonic stage of life.[1] The embryonic stage of life occurs from implantation of the fertilized egg until about the 10th week of pregnancy, when the embryo becomes a fetus. The cleft lip and palate association in the UK describes a cleft lip as "an opening in the upper lip between the mouth and the nose. It can range from a slight notch in the colored portion of the lip to the complete separation in one or both sides of the lip extending up into the nose."[2] A cleft lip can be unilateral or bilateral, and can be partial or extend all the way up into the nose.

Cleft lips can, and usually do, negatively affect the feeding process of infants.[2] Without adequate closure around the nipple, the infant may have problems producing a suck powerful enough to extract milk from the breast or bottle nipple. Infants with bilateral cleft lips sometimes have problems with intraoral muscular movements.[3] However, with a mild unilateral cleft lip, closure can generally be obtained, and feeding can be successful. Appropriate feeding techniques need to be used for the different severities of a cleft lip to assure adequate nutrition for development and growth of the infant born with this problem.

A cleft palate is another type of craniofacial malformation that occurs during the embryonic stage of life, also described as occurring when "the roof of the mouth is not joined completely. This can range from just an opening at the back of the soft palate to a nearly complete separation of the roof of the mouth (soft and hard palate)." This type of opening can cause many problems with the infant's feeding and swallowing. Sometimes, infants are born with a cleft lip and palate (i.e., cleft lip + palate). This type of

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cleft extends from the lip to the hard or soft palate. Infants with this type of cleft normally have extensive feeding difficulties and are often unable to breast-feed successfully. A cleft of the lip and palate will usually result in an inability to form a complete seal, and negative air pressure cannot be generated efficiently enough to expel the milk and trigger a successful swallow.[3]

There is great variability in feeding abilities of infants with a cleft palate. This variability can range from little or no feeding problems at all to extensive feeding problems with nasopharyngeal reflux, choking, prolonged feeding time, and slow or little weight gain. A primary feeding concern associated with cleft palate is the formation of negative air pressure, necessary for adequate swallowing.[4] Without negative air pressure, a swallow cannot be properly triggered and aspiration or choking may occur.

Reports of feeding difficulties, as a result of cleft lip and palate, date back to 1619 by Fabricus of Aquapendente.[5] It was recognized when children with a cleft lip, cleft palate, or a combined cleft lip and palate were unable to adequately suck and often died of malnutrition. Some authors have presented short catalogs of feeding equipment or techniques that may help infants with a cleft.[6-8] others have advocated specific feeders for use in some or all clefting conditions.[9-16] Unfortunately, no specific method has been found to be optimal for all the babies. In such circumstances, the role of speech-language pathologists is found to be helpful.

ROLE OF EARLY INTERVENTION PROVIDERS

Speech-language pathologists and early intervention providers can assist in training families to utilize techniques for facilitating feeding. For many mothers, breastfeeding is the goal. Success of breast-feeding depends on many factors, including the size of the breast, the size of the baby, and the severity of the infant's cleft.[17] To start the flow of milk when breast-feeding, the feeder should massage out a little milk before feeding begins. In some instances, "plugging" the cleft may prove to be effective.[3] To help create the needed suction, a mother can gently hold the upper lip together while breast-feeding. When successful breast-feeding cannot be achieved with these infants, an artificial nipple with a large soft base may be desirable.

Supplementary nursing systems can also be used. This means that the mother may pump, and the milk may be used for bottle feeding, along with direct attachment to the breast. Advantages for this technique include: (a) Assurance of food for the infant whether or not the nursing is actually successful, (b) no confusion about nipples since all feeding occurs at the breast, and (c) the infant improves the sucking technique because the sucking urge is satisfied with the expulsion of milk.[4] It is also stated that "these babies often use more of a chewing action on the nipple than a sucking one." In many instances, these infants need supplementary nutrition to ensure proper growth and development. Many bottle nipples may be used with infants who have a cleft lip ± palate. These infants need a nipple that will respond to compression without the need to build-up intraoral pressure for feeding. Popular options for nipples appropriate for infants with cleft lip ± palate includes: A standard nipple with a fairly large cross-cut at the tip, the Mead Johnson cleft palate nurser, and the Haberman feeder[4] [Figures 1-3].

The Haberman feeder is specifically designed for cleft lip ± palate use. Its elongated nipple can be compressed if the infant has difficulty in applying adequate negative pressure.[18] Nipples with a Y-cut on the end, and a long and wide shaft are also useful for infants with cleft lip and palate [Figure 4]. The Haberman feeder has been proven to be helpful with feeding because it has flow lines on the nipple that assist in helping the infant achieve optimal flow from the nipple. It is also popular because the flow can be monitored without the necessity of squeezing the bottle. Finally, it is popular because of the valve that prevents back flow, which reduces the excessive air build-up. The excessive air build-up can cause uncomfortable gas and stomach problems as well as burping. It is important to burp your baby frequently to relieve excessive air build-up. In conjunction with proper nipple selection, positioning and pacing during feeding are utilized to promote oral feeding. Infants should be in an upright position with good head neck and trunk support [Figure 5]. According to a study by Reid,[19] feeding times should be limited so that infants do not experience hunger and unsatisfactory feeding. These feeding techniques listed above can be helpful in ensuring that the infant is getting appropriate nutrition and is feeding in a safe and timely manner.

Different techniques work for individual infants with cleft lip ± palate. However, each of these infants has an increased risk of feeding difficulties. The most appropriate feeding technique would be any type of device that delivers adequate milk into the mouth, and allows the infant time to swallow. When bottle feeding, a soft plastic bottle would be effective, because the feeder would be able to control the amount of milk expelled into the infant's mouth. When breast feeding is desired, the mother should express milk by placing the infant in a supine position and expressing milk directly into the infant's mouth. The device, "Lact-aid"[3] [Figure 6], was used for infants in whom mothers wanted to keep the infant approximating breast feeding. The"Lact-aid" delivers milk into the baby's mouth through a small tube while the infant is placed at the breast.

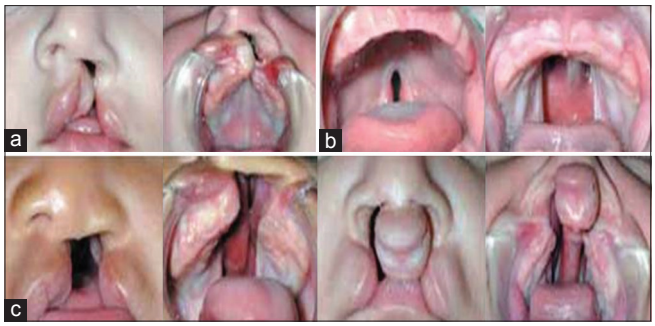

Figure 1: (a-c) Cleft of the lip alone, palate alone, lip, and the palate (Unilateral and bilateral)

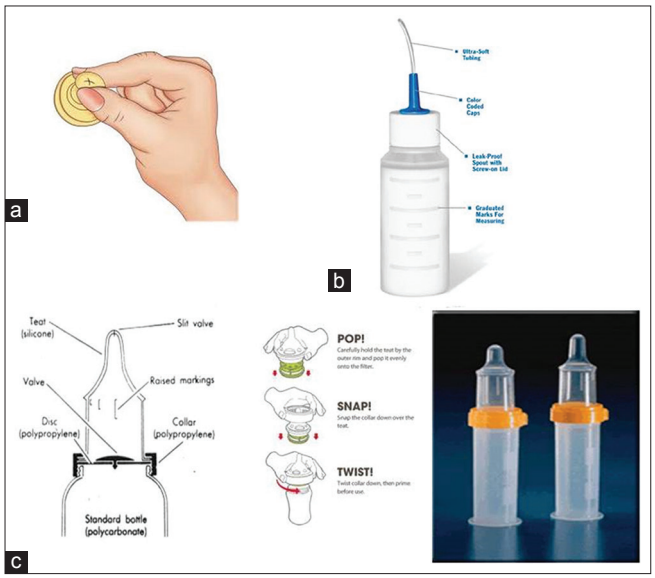

Figure 3: (a-c) Cross-cut at the nipple, Mead Johnson feeder, and Haberman feeder

Figure 5: The lact-aid device

This may be helpful in improving the infants sucking ability by satisfying their sucking action. Feeding is not the only activity that infants with cleft lips ± palates require special care. Oral care after feeding is also very important. Once

Figure 2: Different types of feeders or nipples available for cleft lip and palate infants

Figure 4: Proper positioning of the cleft lip and or palate infant during feeding

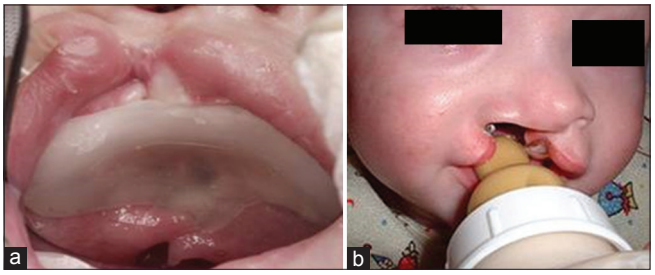

Figure 6: (a and b) Palatal obturator and infant feeding with obturator placed intraorally

the infant is finished feeding, the areas around the cleft should be cleaned. If food is left to accumulate it can mix with mucous secretions from the mouth and nose and form a hard crust that becomes a potential source for infection. To clean these areas, you can use clean water, or water with hydrogen peroxide. Place it on a wash cloth or gauze. If the cleft lip becomes dry, it can be moistened using mineral oil externally, without letting the mineral oil get into the infants mouth. Sugar intake of babies old enough to have teeth with cleft lip and palate is also a reason oral care is important. In patients with a cleft lip and palate it is more difficult to properly clean the maxillary incisors due to the clefting.[20] Cleaning after surgery may also be a problem due to scar tissue and immobility.

TRANSITIONING TO SOLID FOODS

Spoon feeding for infants with a cleft lip ± palate should begin at approximately 6 months of age just as it would for children without a cleft lip and/or palate. Strained, thin pureed foods should not be a problem for infants with clefts. These infants should be introduced to spoon feeding to enhance normal development in the use of spoon feeding. When spoon feeding, avoid thickened foods to ensure that these consistencies do not get lodged in the cleft area. Furthermore, spicy foods should be avoided, due to the sensitivity of the nasal mucosa. Specific foods to avoid when spoon feeding is used are: Peanut butter, cooked cheese dishes (because of the sticky consistency. By avoiding these types of foods, spoon feeding can be successful for infants with cleft lip and/or palate preoperatively as well as postoperatively.

It may be appropriate to introduce and practice cup drinking preoperatively. If cup-drinking is desired postoperatively it should be introduced preoperatively even if it is at an early age. The infant should be help in an upright position, and an open cup should be used to release liquid into the infant's mouth. The infant may do better handling a thickened liquid rather than their formula or juice. This should be practiced frequently and at short durations to be beneficial for the infant with a cleft condition. For some infants with a cleft palate ± lip, a prosthetic piece may be beneficial. A prosthetic appliance is used to cover the open space in the cleft of the infant's mouth. Many claims have been made that both bottle and breast feeding improved with the use of a presurgical orthopedic, and that the orthopedic relieves low and frustrated feeding, reduces choking episodes, improves growth, and improves parent's psychosocial well-being.[21,22] In a study by Turner *et al.*,[23] five infants were studied to examine the effect of lactation education and the use of palatal obturation in regard to decreasing time to feed, increasing intake, and to measure the infants' growth. A prosthetic obturator [Figure 6] appliance was used with these children. Results showed that with the combined use of the palatal obturator and lactation education, feeding time was reduced, volume intake increased. This resulted in appropriate growth for these infants. Mothers who wanted to breast-feed were able to do so using this appliance. The obturator supported high-volume intake, decreased infant fatigue, and provided breast milk for nutrition. The amount of feeding information regarding cleft lip ± palate may be overwhelming for a new parent. Amstalden-Mendes *et al.*[1] advocated, "Specific neonatal attention for cleft babies should be included as routine training of all health professionals of primary care as part of the health care policy."

CONCLUSION

Early intervention for infants with cleft lip ± palate is very important. According to Reid *et al.*[5] there was a significant decrease in failure-to-thrive rates for infants with cleft palate after an early intervention feeding program was implemented. This program included domiciliary visits, breast-feeding support, feeding education, and monitoring of growth. Early intervention can come in many forms including feeding equipment, feeding techniques, prostheses, and nutrition/lactation advice. Early education combined with a nutrition intervention protocol can improve outcomes including: Weight gain, feed velocity, and fluid intake for infants with clefts. Infants with cleft lip ± palate are a significant population born with congenital defects that will likely require the services of early intervention providers, including speech-language pathologists. They are at risk for many health difficulties including malnutrition that can lead to morbidity and failure to thrive. They are also at a high risk for laryngeal penetration and aspiration that can lead to pneumonia. However, evidence-based practice shows that with intervention techniques oral feeding can be successful and infants can thrive. Until infants are ready for surgery, care that will enhance their quality of life is critical for early development. This can be done by using feeding modifications, or using actual prosthetics. Feeding modifications can range from consistency modifications given to the infant, adapting breast-feeding techniques, to nipple shape. These modifications are vital in assuring that the infant is getting proper nutrition prior to cleft palate surgery.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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