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Overcoming Feeding Issues in Children with Orofacial Clefts: A Review

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A B S T R A C T

Cleft lip and palate are one of the most common form of Craniofacial deformities in the world, affecting one out of every 940 infants. The aim of the review was to explore the effective feeding techniques and devices for children with different types of cleft lip and palate and also to find out its relationship in weight gain. The selected search criteria included English language articles written between 2007 and 2015 using the keywords, Cleft lip and palate, feeding techniques and devices, weight gain and feeding difficulties. The major findings reveal that infants with cleft lip and palate are to be fed with specific successful feeding techniques and devices for adequate weight gain and specialized professionals are to be involved in the direct care of these infants. Choosing best treatment, support, education, integrated professional care and regular follow up is required for achieving successful early feeding in children with cleft lip and palate.

Introduction

Cleft lip and palate are one of the most common form of Craniofacial deformities in the world, affecting one out of every 940 infants (Centre for Disease Control and Prevention, 2012).The prevalence of CL/P among males is approximately twice than that of females (Watkins, 2014). Cleft lip (CL) is defined as an inherited abnormality of the primary palate. It may be complete, incomplete or microform, unilateral or

bilateral, and may involve a palatal cleft. A cleft palate(CP) is a congenital abnormality of the secondary palate and may be complete or incomplete, unilateral or bilateral, or sub mucous. Cleft lip with palate is epidemiologically and etiologically distinct from isolated CP (Goodacre, 2008). The risk of developing orofacial clefts have a multifactorial origin, whereby involving a combination of genetic and environmental

factors. like folate antagonists, anticonvulsants, White non-Hispanic race, Maternal first-trimester, heavy alcohol consumption, Maternal age, Pre pregnancy diabetes mellitus, Maternal smoking, and Maternal obesity(Watkins, 2014).

Unsuccessful breastfeeding is seen in babies with cleft lip and palate, due to dysfunctional musculature including the lips, cheeks, tongue, velum, and pharyngeal walls resulting in inappropriate oral cavity sealing(Peters, 2013). When infants have a cleft lip or palate they have difficulty creating negative intraoral pressure when using a regular bottle and nipple (Masarei, 2007) .

Feeding a child with CLCP thus establishing a successful feeding pattern is a challenge for both the mothers as well as the health care professionals.. A range of feeding problems such as choking, gagging, excessive air intake, and prolonged feeds(de Vries, 2014), entrance of milk in the nasal cavity due to the short, fast, uncoordinated, and ineffective intraoral suction (da Silva Freitas, 2012), can occur resulting in profound weight loss (Beaumont, 2008).

Even though different feeding devices like specialized feeding bottles, such as the Haberman feeder and Mead Johnson bottle, spoon feeding (Peters, 2013), use of palatal plates(da Silva Freitas, 2012), palatal obturator are available, identifying the type of cleft and planning appropriate feeding techniques play an important part in the weight gain of these children. For an adequate weight gain in children, the parents' feeding skills needs to be supported in the initial months by the specialized professionals. An inexorable support system under the guidance of specialized health care team is required during the initial period of feeding. In order to prepare these children

for the corrective surgeries in the initial period of life, a healthy weight gain to combat infection and surgery stress (da Silva Freitas, 2012), is essential. The objective of this study is to review the different types of feeding techniques and devices and their significances in the weight gain of these children.

Materials and Methods

The aim of the review was to explore the effective feeding techniques and devices for children with different types of cleft lip and palate and also to find out its relationship in weight gain. The selected search criteria included English language articles written between 2007 and 2015 using the keywords, Cleft lip and palate, feeding techniques and devices, weight gain and feeding difficulties. Methodological pathway is depicted in Fig- 1.

Inclusion criteria: Original research studies, Primary data with full text, Studies including feeding techniques & devices in cleft lip and palate and weight gain in children, Published in English between 2007 and 2015.

Exclusion criteria: Unpublished manuscripts or doctoral dissertations & Review or opinion articles about cleft lip and palate children

Analysis of the findings: Three authors reviewed the papers and independently selected the articles eligible for the review. If multiple published reports from a same study were available, we included only one with the most comprehensive information, or published more newly. Data were mined by three investigators and differences were resolved by discussion.

Results and Discussion

A total of 11 studies conducted across 8 countries and published between 2007 - 2015 meeting the inclusion criteria were selected (Table:1) Researchers used questionnaires and medical records to assess the effective feeding facilitations for infants with cleft lip and palate for an adequate weight gain. The major findings reveal that infants with cleft lip and palate are to be fed with specific successful feeding techniques and devices for adequate weight gain during the initial few months of birth. Specialized professionals are to be involved in the direct care of these infants and to provide support and guidance to the parents.

In a study conducted by Britton, K. F. M., McDonald, S. H., & Welbury, R. R. (2011) in West Scotland investigated the feeding practices in children born with Cleft lip and cleft palate. The study reported that mothers who shifted from breast feeding to specialized techniques with bottles found it easier. The study also highlighted the use of NGT to assist feeding for infants with a severe cleft. Neonatal Oral Motor Assessment Scale (NOMAS) and Great Ormond Street Measurement of Infant Feeding (GOSMIF) measured the sucking pattern in infants with unrepaired cleft lip and palate reported less and different sucking pattern than the healthy non cleft infants. These infants need to use assistive feeding devices and to follow safe swallowing strategies (Masarei, 2007).

Pre-surgical orthopedics did not improve feeding efficiency before the palate repair at 3 months and also reported oral thrush, minor ulcerations too. Use of adaptive bottles like Mead-Johnson and or soft plas, Evansville, IN in combination with vented NUK orthodontic teats and other strategies like positioning and frequent burping also has remarkable impact (Masarei, 2007). The

weight gain of the infants on paladai feeding was more than the bottle feeding and spoon feeding (Ravi, 2015). The common type of feeding practice noted was the spoon feeding and none of the subjects had feeding practice by glass and straw. Breast feeding was the commonest feeding practice among children between births to 6 months, whereas bottle feeding was the commonest feeding practice among children between 6 to 2 years of age (Goyal, 2012).

Majority of the children used a combination of breast milk and formulae feed and a very few had exclusive breast milk. Average duration of breast feeding was 46 days. Children with cleft palate weigh less than regular children at one month than the normal children and the gap diminishes and reaches a normal pattern towards the end of the first year of life (da Silva Freitas, 2012). Mothers were taught to feed their babies with breast milk and formula feeds using cup and spoon. Despite of these measures, the weight-for-age Z scores with the WHO anthropometric calculator revealed that there was a lower Z scores in cleft lip and palate group and malnutrition was well associated with cleft lip and palate (Cubitt, 2012).

An adequate weight gain of children with CLCP during the first year of life displays a great support & counselling about hospitalization, tube feeding and duration of breast feeding and weight gain pattern provided by the health visitors. Majority (92%) of the infants received breast milk but for a shorter duration of 15 weeks after birth (Smedegaard, 2008). Educational programs, regular pediatric follow up by specialized professional team approach are essential to achieve an active weight gain for infants with cleft lip and/or palate (Amstalden, 2007).

Infants with CLCP had lower birth weight and had greater levels of FTT at the time of

primary surgery. Feeding support provided by the clinical nurse specialist either as bottle feeding using breast milk and formulae feed or as NG feeding, and their knowledge of infants at particular risks of poor growth had definitely improved the outcome(Beaumont, 2008).

Feeding infants with CL/CLP poses an immediate concern for health professional and parents. The initial goal of management of these infants is to maintain nutrition and to find a feeding technique as normal as possible.

Infants with CLP used shorter sucking bursts and a faster sucking rate, indicating an insufficient suck (Masarei, 2007).A study conducted in Uganda, reported malnourishment in cleft lip and palate group than the cleft lip group of infants prior to the initial surgery(Cubitt, 2012). In another study conducted in UK, infants with palatal clefts and low mean birth weight had greater levels of failure to thrive at the time of primary surgery (Beaumont, 2008). In infants with cleft lip and palate, any feeding device that delivered sufficient volume of milk and allowed the infant time to swallow was effective. A soft plastic bottle was effective in this situation (Beaumont, 2008) & (Masarei, 2007). Devices like Ascepto feeder, Ross cleft palate nipple on an Even Flo bottle and a Mead-Johnson cleft palate feeder all deliver milk directly into the infant's mouth and minimize the need for sucking.

In Isolated cleft palate, especially of hard palate, bottle feeding using soft nipple with enlarged outlet worked best and in cleft of soft palate, correctly shaped regular nipple is used besides breast feeding. In cleft lip only, artificial nipples with a large soft base were effective besides breast feeding which is the ideal method(Masarei, 2007).In a study

conducted in India in infants with orofacial cleft, the traditionally used devices like Paladai was well tolerated (Ravi, 2015). and other feeding devices like cup and spoon feeding are also common effective methods((Goodacre, 2008) &(Cubitt, 2012). The effective approaches reduce the prolonged feeding time and energy drain on the infant which can precipitate failure to thrive. Feeding positions also enhances the quality of feeding. For unilateral cleft the use of modified football method or straddle position and in bilateral clefts 'Dancer hand position' is recommended(Jindal, 2013)&(Peters, 2013).

In a study conducted in Scotland, children with CL/CLP, 52% of mothers of cleft palate children, decided to change their feeding method from breast feeding to bottle feeding using formula, whereas 67% of children with cleft lip were fed with breast milk for 6 months or more(Britton, 2011). In another study for cleft palate only children, over half of the parents reported expressed breast milk using feeders was successful in these children(de Vries, 2014). All most all the literatures reviewed described a combination of breast milk and formulae milk supplementation to these children through various feeding techniques. Whereas, a study conducted in Denmark reported that, with the counseling and support of specialized health visitors, 92% of mothers were successful in providing breast milk to CL/CLP infants for a median duration of 15 weeks(Smedegaard, 2008).

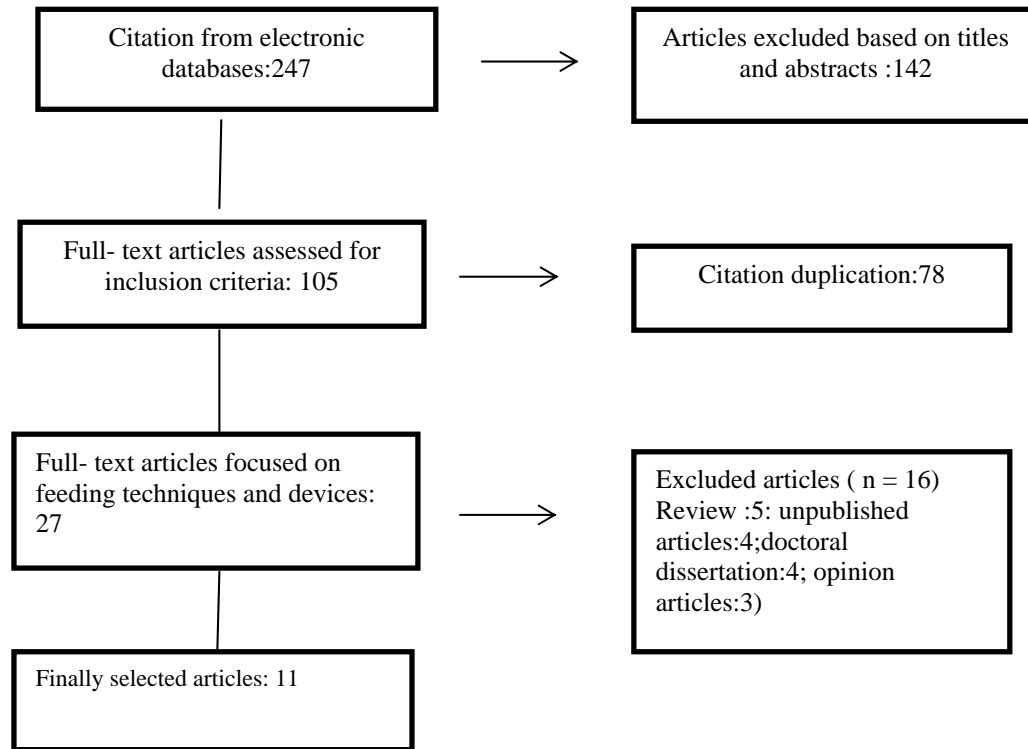
Specialized professionals are involved in direct care of these infants and provides support and guidance regarding feeding resources, child's feeding posture and oral hygiene pre & post feeding and burping (Smedegaard, 2008);(Britton, 2011);(Ravi, 2015)&(Beaumont, 2008).

Table.1

S. No	Year	Methodology				Study Purpose	Major findings
		Participants	Design	Setting	Tools		
1	2011	90 infants born with cleft lip and palate	Descriptive survey	Department of Pediatric Dentistry, Glasgow Dental Hospital and School, Glasgow, Scotland	Face to face interview method	Investigate feeding practices in infants born with a cleft lip or palate	Majority of the mothers changed their method of feeding from breast feeding to formula milk and use of bottle. Specialized cleft Nurses services positively influenced in implementing the proper feeding technique.
2	2012	112 children with cleft lip & palate	Retrospective study	Center for Integral Assistance of cleft lip & palate (CAIF), Curitiba, Brazil	Medical records	Weight Gain in Children with Cleft Lip and Palate without Use of Palatal Plates	None of the children with cleft lip and palate used palatal plates and majority of the children used a combination of breast milk and formulae feed and a very few had exclusive breast milk.
3	2014	60 children with cleft lip & palate	A retrospective Study	Wilhelmina Children Hospital, Utrecht, Netherlands	Questionnaire and medical records	Prevalence of feeding disorders in children with cleft lip palate only	Children with cleft lip and palate are at high risk of developing feeding difficulties and nasogastric feeding is often required.
4	2008	115 parents of children with cleft lip & palate	Prospective data collection	Health center in Denmark	Self-structured registration chart.	Hospitalization, Breast milk feeding and growth in infants with cleft palate and cleft lip and palate born in Denmark	Adequate weight gain attained by children with CLCP during the first year of life displays a greater support & counselling provided by the health visitors.
5	2015	150 infants with cleft of both lip and palate	Cohort prospective Study	Plastic surgery department, Sri Rama Chandra University, Chennai	Interview method, medical records and weight measurement using standardized technique	Compare the efficacy of the three feeding techniques in improving the weight gain pattern of children with orofacial cleft.	Infants fed with paladai performed better than those fed with bottle feeding and spoon feeding in terms of weight gain
6	2008	241 infant with cleft lip and palate	Retrospective review	Hospital at Yorkshire, England	Medical records	To find out the level of failure to thrive in a group of infants with cleft lip and palate who had clinical nurse specialist support	Cleft lip palate children had low birth weight and elevated levels of failure to thrive and the feeding management provided by the clinical nurse specialist's ensured adequate nutrition for optimal growth.
7	2012	321 children with cleft lip and palate	Retrospective analysis	Comprehensive Rehabilitation Services in Uganda hospital	WHO anthropometric calculator and demographic data tool	Investigate the nutritional status of patients with cleft lip and palate when compared to non-cleft patients.	Cleft lip & palate group were more malnourished than cleft lip and non-cleft group. Malnutrition was found associated with cleft lip and palate as these children are unable to feed adequately.
8	2007	50 newborns with cleft lip and palate	Comparative study	North Thames Regional Cleft Centre, west Middlesex University Hospital	Neonatal Oral Motor Assessment Scale(NOMAS) & Great Ormond Street	Compare the patterns of feeding in infants with unrepaired cleft lip and palate with healthy non-cleft	The nature of feeding difficulties is more complex than the non-cleft infants. The sucking pattern differs from the non-cleft infants because of their short sucking period.

					Measurement of Infant Feeding(GOSMIF) measured the sucking pattern in infants.	infants of similar age.	
9	2007	26 parents of cleft babies	Descriptive study	Non-specialized tertiary Hospital, Campinas, Sao Paulo ,Brazil	Semi structured Guide Book, & spontaneous reports.	To assess the feeding orientation received during the postnatal period by the parents of cleft babies.	Majority of the children had difficulty in gaining adequate weight despite the guidance for feeding provided in the postnatal period. Guidance and follow up by specialized professional team approach are essential to achieve an active weight gain for infants with cleft lip and/or palate.
10	2007	50 Infants with cleft lip and palate	Randomized control trial	North Thames Regional Cleft Centre, west Middlesex University Hospital, and great Ormond Street Hospital for children, U.K.	Neonatal Oral Motor Assessment Scale (NOMAS) & Great Ormond Street Measurement of Infant Feeding (GOSMIF), Weight, length and head circumference by standardized technique, Videofluoroscopic assessment of feeding.	Investigate the effects of presurgical orthopedic on feeding in infants with cleft lip and or palate	Application of Pre-surgical orthopedics did not improve feeding efficiency before the palate repair at 3 months.
11	2012	155children less than 2years of age with cleft lip and palate.	Descriptive explorative study	Cleft Palate Clinic, Oral Health Sciences Centre, Post Graduate Institute of Medical Education and Research, Chandigarh.	Interview method	To find out the nature of feeding practices among children with cleft lip and palate.	Spoon feeding was found as the most common feeding method practiced by the parents of cleft lip and palate children and breast feeding is the second most common method among the groups.

Figure.1 Flow chart showing methodological pathway



Specific feeding technique or devices under specialized professionals can be utilized to provide essential nutrition to the children with CL/CLP to attain optimal weight gain. The effective approach reduces the lengthy feeding time and tiring the infant.

Implications in Nursing practice

The children with cleft lip and palate are at the risk of malnutrition and failure to thrive if adequate weight gain is not attained during the initial three months of life prior surgeries. Guidance and support of specialized nursing professionals is a necessity in educating the parents in the use of specialized feeding bottles, general knowledge and awareness of cleft condition, their treatment and outcomes. These recommendations will provide a positive outlook for parents involved in the care of infants during the initial challenging phase.

Conclusion

Feeding cleft lip and palate children is complex and needs multi-disciplinary team approach. This requires lot of skills, experience and knowledge regarding the proper feeding techniques. Cleft lip and cleft palate children will have difficulty in swallowing, speaking and breathing. These children will also have ear infections, facial and dental deformities. Adequate nutritional intake is mandatory to increase the confrontation to infection, to encourage appropriate weight gain, to tolerate for surgical interventions, to help build strength to meet the stress of surgery and to encourage healing after the surgery is completed. Weight monitoring need to be routinely advised to these children to detect those with poor growth. Choosing best treatment, support, education, integrated professional care and regular follow up is

required for achieving successful early feeding in children with cleft lip and palate.

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