

EFFECT OF FEEDING OBTURATOR ON GROWTH PARAMETER IN A PATIENT WITH PIERRE-ROBIN SEQUENCE

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Abstract:

Pierre-Robin Sequence is a developmental anomaly characterized by the triad of mandibular micrognathia, cleft palate, and glossoptosis. Neonates born with a cleft palate have difficulty in feeding that is further complicated by nasal regurgitation of food, excessive air intake, choking and recurrent aspiration pneumonitis. Due to difficulty in feeding, child's growth can be affected. To combat these problems, different feeding interventions such as maternal advice and support, modified bottles, Orogastric/nasogastric tubes and feeding obturators, etc have been advocated. However, there is evidence of delay in the growth of children with a cleft as compared to those without clefting.

The article describes the importance of measuring growth parameters to evaluate the growth of cleft palate patients.

Key words: Cleft Palate, Feeding Plate, Pierre Robin Syndrome

Introduction

Cleft palate (CP) is a congenital abnormality of the secondary palate and may be complete or incomplete, unilateral or bilateral, or submucous. The risk of developing orofacial clefts has 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.¹

When infants have a cleft lip or palate, they have difficulty creating negative intraoral pressure when using a regular bottle and nipple. Unsuccessful breastfeeding has been seen in babies with CL and palate, due to dysfunctional musculature including the lips, cheeks, tongue, velum, and pharyngeal walls resulting in inappropriate oral cavity sealing.²

Growth alterations or deficiencies are recognized

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in cleft palate patients, and needs proper management. It is well recognized that in the early months of life, children with clefts appear to exhibit non-satisfactory growth. This deficiency in growth maybe apparent at a later stage through short stature or underdevelopment in weight.³

Feeding a child with Cleft lip and palate thus establishing a successful feeding pattern is a challenge for both the mothers as well as health care professionals. A range of feeding problems such as choking, gagging, excessive air intake, and prolonged feeds, the entrance of milk in the nasal cavity due to the short, fast, uncoordinated, and ineffective intraoral suction can occur that results in profound weight loss.⁴

The feeding plate obturates the cleft and restores the separation between oral and nasal cavities. It creates a rigid platform towards which the baby can press the nipple and extract the milk. It facilitates feeding, reduces nasal regurgitation, reduces the incidence of choking and shortens the length of time required for feeding. The obturator also prevents the tongue from entering the defect and interfering with the spontaneous growth of palatal shelves towards the midline. It also helps to position the tongue in the correct position to perform its functional role in the development of jaws and contributes to speech development. The obturator reduces the passage of food into the nasopharynx thus reducing the incidence of otitis media and nasopharyngeal infections. The feeding plate restores the basic functions of mastication, deglutition and speech production until the cleft lip and/or palate can be surgically corrected.⁵ Because of the increased frequency of infections and feeding difficulties after birth there is a growth lag in cleft children. In this article, we measure the effectiveness of the feeding plate on growth parameters. The pediatric protocol of care included serial examinations in growth measurements (weight, length, and head circumference).

Table 1

| Age | Weight in Kg | Height (inch) | Abdo- men Circum- ference (inch) | Head Circum- ference (inch) |
|----------|--------------|---------------|--|--------------------------------------|
| Birth | 2.7 | 22 | 15 | 14 |
| 1 Month | 2.3 | 23 | 14 | 14 3/4 |
| 2 Month | 2.7 | 23 1/4 | 15 | 15 |
| 3 Month | 3.0 | 23 1/4 | 15 1/2 | 15 1/2 |
| 4 Month | 3.8 | 23 1/2 | 15 1/2 | 15 1/2 |
| 5 Month | 4.4 | 23 3/4 | 16 | 16 |
| 6 Month | 5.5 | 23 1/4 | 16 | 16 1/2 |
| 7 Month | 6.5 | 24 | 16 1/4 | 17 |
| 8 Month | 6.9 | 24 3/4 | 17 | 17 1/2 |
| 9 Month | 7.2 | 26 1/4 | 17 | 17 1/2 |
| 10 Month | 7.9 | 26 1/2 | 17 1/2 | 18 |
| 11 Month | 8.5 | 26 1/2 | 17 1/2 | 18 |
| 12 Month | 8.8 | 27 | 17 1/2 | 18 |
| 13 Month | 9.2 | 27 | 18 | 18 |
| 14 Month | 8.8 | 27 | 19 | 18 1/2 |
| 15 Month | 9 | 27 1/2 | 20 | 18 1/2 |

Case description

A 2.5 months old male infant presented with a history of cleft palate associated Pierre Robin Syndrome with difficulty in feeding, recurrent respiratory tract infection, and nasal regurgitation.

The mother reported that the baby is not able to suckle milk properly and he was not gaining weight. At the time of reporting the patient's weight was 2.7kg. (Birth weight was also same) There was no history of craniofacial clefts in the maternal or paternal family of the child. The pregnancy of the mother was uneventful and there was no history of previous treatment or surgery for the defect. The patient was having micrognathia and glossoptosis. Intraoral examination revealed a cleft in the soft palate and uvula.

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Fabrication of feeding plate

A feeding plate was made for this patient. The infant's mother was instructed about the method of usage, function, cleaning, and maintenance of the feeding plate. A regular follow-up of the patient was done after 24 hours and 2 weeks follow-ups were scheduled. During the regular follow-up, neonate weight gain, height, waist, and head circumference were measured.

Measurement of Growth parameters

Growth measurement techniques were standardized. Weight was obtained by using standard infant and toddler scales. The length was measured with a horizontal anthropometer with the child in the supine position. An anthropometric tape that is flexible and non-extensible should be used for measuring the head and waist circumference of the patient. For measuring the head circumference, the patient's head is in the Frankfort Plane (an imaginary line joining the upper margin of the external auditory meatus and the lower border of the orbit of the eye). The tape was passed around the head and placed on the most anterior protuberance of the forehead and the most posterior protuberance of the back of the head (we aimed to measure the maximum head circumference).

For measurement of waist circumference firstly the lower rib margin was palpated (costal margin) and marked with a short horizontal line then the iliac crest was palpated and marked with a short horizontal line. Using the tape measure, the mid-distance between the two horizontal lines was measured and was marked with another short horizontal line in the middle. The tape was passed around the waist, making sure it was in level and positioned at the mid-distance mark on both sides. Measurements were made at the end of expiration. Three measurements were taken for both head and waist circumference. Mean (average) measurement was recorded by adding the values together and dividing them by three.

Length, weight, and head circumference were measured at each examination. During the one-year follow-up patient's weight and height, waist, and head circumference was increased and, in that duration, no history of recurrent infections was observed. (Table 1)

DISCUSSION

Pierre Robin syndrome (PRS) is a congenital condition of facial abnormalities in humans. The three main features are cleft palate, retrognathia (abnormal positioning of the jaw or maxilla), and glossoptosis (airway obstruction caused by the backward displacement of the tongue base). Pierre Robin sequence may be caused by genetic anomalies at chromosomes.⁶

Primary care plays a vital role in these patients, who often have numerous health care needs, including feeding difficulties, speech disorders, chronic ear infections, and dental & orthodontic problems. The early repair of the palate is associated with good cosmesis, better feeding, adequate velopharyngeal competence, and good speech & hearing development. The presence of a congenital anomaly affecting the orofacial structures such as cleft lip or palate, or both, maybe thought to have an adverse influence on the growth status and achievement of subjects affected with such an anomaly. One might expect that the more severe the cleft type, the more effect it may have on the physical development of these patients.⁷

A regular follow-up of the infant is required for the examination of oral mucosa which is very delicate and easily damaged by the obturator. Also, check up every 3-4 weeks at which the bilateral sides of the border are reduced to accommodate growing arches. A new obturator should be constructed every three months to accommodate the enlarged craniofacial sutures at growth. The mother should be advised to hold the infant in an upright or semi-upright position in feeding state so that the swallowed air can be expelled during the feeding process.⁸

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Comprehensive management of children born with cleft lip and palate is best accomplished by the multidisciplinary team approach. Dentists play an important role in the team which is working closely with medical and allied health specialties. However, prompt intervention by fabrication of feeding plate can eliminate the immediate problems i.e., proper nourishment and prevention of infections for the already debilitated infant.⁹

Growth deficiency observed during this period has been attributed to environmental factors including the high frequency of infectious diseases and the different degrees of difficulties encountered in feeding children with cleft palate.¹⁰

The majority of studies demonstrated that children with CLP presented with smaller body dimensions when compared with typical children. Some authors have suggested an association between the severity of intrauterine growth deficiency with the width of the cleft, with infants with CLP presenting a greater risk for low-birth-weight birth for gestational age.¹¹

CONCLUSION

The growth of cleft patient has been improved by the use of a feeding plate that has been evaluated by the monitoring of growth parameters.

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