REVIEW ARTICLE

Prosthetic Management of Cleft Lip and Cleft Palate Patients - An Overview

Rajneesh Kumar

ABSTRACT

Overall incidence of cleft lip and palate is 1:700 in live human births. Cleft lip occurs in 20–30% of cases, cleft lip and palate in 35–50%, and cleft palate alone in 30–45%. Sex prediction shows male-to-female ratio as 3:2. Etiology could be either hereditary or environmental. A congenital orofacial cleft that manifests at birth affects facial esthetics, speech, mastication, and deglutition and ultimately leads to impairment in dental occlusion. Problems caused by abnormal growth and development require early medical and surgical intervention. Surgical treatment starts at around the age of 2–3 months, to shift the protruding premaxilla to a more distal position that aids in sucking. Meantime, prosthetic treatment is planned to facilitate feeding by developing normal sucking reflex and to prevent any abnormal tongue and oral habits which may affect normal speech development. This review article discusses the prosthetic management of cleft lip and cleft palate patients.

Keywords: Cleft lip, Cleft palate, Feeding obturator, Nasoalveolar cleft.

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INTRODUCTION

Overall incidence of cleft lip and palate is 1:700 in live human births. Cleft lip occurs in 20–30% of cases, cleft lip and palate in 35–50%, and cleft palate alone in 30–45%.[1] Sex prediction shows male-to-female ratio as 3:2. Etiology could be either hereditary or environmental.[1-3] A congenital orofacial cleft that manifests at birth affects facial esthetics, speech, mastication, and deglutition and ultimately leads to impairment in dental occlusion. Abnormal oral habit such as tongue thrusting is commonly associated as compensatory mechanism to seal the defect. The management of cleft lip and palate represents a commitment to the care of the afflicted child over the course of the child's development into adulthood. The role of a qualified team in this population of patients is obvious; however, the special needs of children with clefts are best served by the participation of a craniofacial team. This team is composed of an array of specialists including nurses, dentists, orthodontists, oral surgeons, otolaryngologists, geneticists, prosthodontists, speech therapists, radiologists, psychologists, feeding specialists, and plastic surgeons. The family is integrated as an important part of this team. A road map of surgical and non-surgical care that is needed for each patient from the initial visit is created.[4,5] Problems caused by abnormal growth and development require early medical and surgical intervention. Surgical treatment starts at around the age of 2–3 months, to shift the protruding premaxilla to a more distal position that aids in sucking.[6] Meantime, prosthetic treatment is planned to facilitate feeding by developing normal sucking reflex and to prevent any abnormal tongue and oral habits which may affect normal speech development. This review article discusses the prosthetic management of cleft lip and cleft palate patients.

Ex Assistant Professor

Department of Prosthodontics, Government Dental College and Hospital, Aurangabad, Maharashtra, India

Corresponding Author: Rajneesh Kumar, Department of Prosthodontics, Government Dental College and Hospital, Aurangabad, Maharashtra, India. e-mail: drrknaharwal@gmail.com

THE PRENATAL VISIT

With advances in early detection using ultrasound and the increasing frequency with which this modality is being used, partially due to an aging childbearing population, many cleft diagnoses are being made in the prenatal period. Now, it is not uncommon to consult with the family regarding the cleft of their unborn child. This does afford several advantages to the prosthodontist and family. Time can be spent with the family discussing the plan of management in the prepartum time period before the upheaval of the postpartum time is upon them.[7]

INITIAL POSTPARTUM VISIT

The first visit to the clinic for a cleft child and family can be a very busy one. This is often the first opportunity for the family to meet the team and the team to meet the family. Feeding issues are often first on the list to be addressed. Most babies with a cleft lip with or without palate have some degree of difficulty nursing. The limitations of sucking, usually due to (1) an inability to create a seal or vacuum

and (2) an abnormally arranged oral and velopharyngeal musculature, must be bypassed. The feeding specialist can counsel parents on the use of, especially, designed bottles and nipples for babies with clefts. The common denominator among these special bottles and nipples is that they ease the passage of milk from the bottle into the child's mouth so that minimal sucking is required.[8]

SURGICAL EVALUATION

The initial visit may also be the first opportunity for the prosthodontist to grade the cleft and counsel parents on what is involved in cleft surgery and what to expect in the 1st year of life. The initial consultation is the first of many conversations that involve descriptions of surgical procedures and the risks and benefits of surgery. Photographic documentation should be obtained early and is an important part of the medical record. Following the initial consultation, a decision can be made along with oral surgeons regarding the need for taping a lip or a palatal device before lip surgery.[7-9]

PRE-SURGICAL EVALUATION

When dealing with a particularly wide cleft or protrusive premaxilla, early interventions are used to assist in maximizing tissue positions before lip repair. Lip taping, lip adhesion, and palatal devices are options that can be used depending on the clinical situation. If taping or a palatal device is employed before lip surgery, this intervention occurs early in the treatment plan. Taping does not interfere with feeding; it is simple and inexpensive and is continued up to the time of lip repair. Taping is often combined with other techniques such as pre-surgical molding for wider clefts. If the alveolar gap is quite wide or the premaxilla protrudes significantly, we employ devices to assist in moving the palate and retruding the premaxilla. The prosthodontist uses either a passive molding device or an active device (requiring attachment), such as a Latham. The appliance may or may not be secured to the nasal septum, depending on whether or not the premaxilla needs to be retruded. In an active appliance, the device functions with a screw that moves the palatal segments, bringing the alveolar ridges nearer to approximation. A passive appliance works in a similar manner but requires intermittent modification. Moving the palatal segments closer together has a secondary effect of bringing the lip segments closer. Appliances are also the principal method by which patients are prepared for a gingivoperiosteoplasty. An alveolar gap of 1–2 mm can be closed using such a device. A temporary lip adhesion is an alternative to taping or a palatal device to narrow the cleft; however, we rarely use it.[10,11]

CLEFT LIP REPAIR

Often, the first surgical procedure a child with a cleft, is the lip repair. This can be both very exciting and anxiety inducing for the family. The timing of the lip repair is generally between 2 and 3 months of age, calculated from the expected due date. Limitations regarding the timing of lip repair are often related to the age and size of the baby. Although not absolute, a general and easy rule for timing of cleft lip repair is a rule of 10s: At least 10 pounds and at least 10 weeks of age. The vast majority of unilateral clefts are treated with Millard's advancement rotation technique. Bilateral clefts are most often treated in a single stage using either a variation of the rotation advancement technique or the one described by Black and Scheflan.[8] All children stay overnight in the hospital, with the vast majority going home the next day. Elbow flexion restraints are used for 1 week. We do not use a Logan bow, although there is no contraindication to doing so.

CLEFT PALATE REPAIR

There is general agreement that cleft palate repair should occur between 6 and 12 months of age. In our practice, the majority are treated in the 7–8 months of age range. Timing is dictated by the thought that function of the velum and palate should be optimized before the beginning of speech development and pressure formation of the mouth. The majority of our cleft palate repairs are done using the two-flap palatoplasty technique using bilateral palatal flaps based on the greater palatine vessels to close at the midline. Elbow restraints are used for 1 week. Diet is limited to soft foods and liquids for 2 weeks. The majority of patients receiving myringotomy tubes have this done at the time of palate repair.[10]

ORONASAL COMMUNICATION

Cleft lip and palate is not merely a surgical problem and its management involves multidisciplinary approach starting from obturator placement, surgical repair of the defect, orthodontic treatment to speech therapy. Surgical repair of the cleft lip and palate may completely close the lip defect and oronasal communication and is associated with better feeding, adequate velopharyngeal competence, and good speech and hearing development. Infants with cleft lip and palate are low birth weight, and malnourished therefore may not be able to withstand the surgical stress immediately after birth. The timing for the corrective surgical procedure for cleft lip and palate repair varies with a limitation to the age, size, and weight of the neonate. This pre-surgical period is used to meet and maintain the adequate

nutritional demand, promotes weight gain, prepares the child to combat infection, and helps to build strength to meet the stress of major corrective surgical procedure. Various feeding methods have been used in the past to resolve the feeding difficulties. Feeding appliance is a favorable feeding option in infants with cleft lip and palate as it creates a separation between oral and nasal cavities and provides a rigid surface to oppose the breast or nipple during suckling. This article presents a case report of feeding appliance placement in infant with cleft lip and palate and also reviews in detail about the use of feeding appliance in orofacial clefts. Surgical delay is sometimes inevitable in cases with cleft lip and palate, mainly due to the health of the baby. Prosthetic rehabilitation becomes imperative to facilitate feeding and to improve baby's health. Factors that complicate such prosthetic intervention are as follows:

- Difficulty in impression making due to lack of cooperation of the baby and restricted size of the oral cavity.
- Retention of the prosthesis.
- Psychological aspect involving the parents.

The use of elastomeric impression material is advantageous due to its high viscosity, its non-irritant nature, and adequate setting time. Heat cure acrylic resin is preferred over self-cure acrylic resin due to its long polymerization cycle that allows minimizing the amount of residual monomer content and makes it hypoallergenic in nature. Retention of prosthesis in newborn is always a problem considering the age of the patient and the risk of aspiration; therefore, mechanical means of retention are a must in these cases. In these cases, prosthesis was tied with nylon thread.[11-13]

CONCLUSION

Cleft patients are considered patients of the prosthodontists for life. Any issues with regard to clefts are managed through the clinic. Every attempt is made to achieve good continuity of care and adequate follow-up. Some realities of life can interfere, however, with consistency in care. Families may move to other parts of the country, and their care needs to be followed up by another center. Physicians as well may move, and a patient's care may be transferred to another specialist. A thorough record keeping is paramount. A patient's detailed history should be able to be reviewed in its entirety as a story of the patient's experience navigating the road of cleft care.[14]

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