OBTURATOR-ASSISTED FUNCTIONAL ENHANCEMENT: NON-SURGICAL SUCCESS IN PEDIATRIC POSTERIOR CLEFT PALATE MANAGEMENT- CASE SERIES

ABSTRACT :Large posterior cleft palate defects in pediatric patients pose significant challenges in speech, deglutition, and nasal regurgitation. Although definitive management is primarily surgical, non-surgical prosthetic approaches can serve as effective interim solutions when functional improvement is achievable, allowing surgery to be deferred when appropriate. In this case series, two pediatric patients aged 10 years and 8.5 years with cleft lip and palate are presented, both rehabilitated using palatal obturator prostheses. The first case involved a 10-year-old boy with a large posterior palatal cleft fistula and a previously managed anterior palatal tongue flap, who was rehabilitated using an interim acrylic obturator incorporating a tongue-flap retention feature. The second case involved an 8.5-year-old boy with a persistent posterior palatal fistula, managed with a conventional interim palatal obturator. In both cases, prosthetic rehabilitation resulted in marked improvement in speech clarity, swallowing, and overall oral function, with a significant reduction in nasal regurgitation. These outcomes underscore that obturator prostheses can effectively re-establish oronasal separation and improve articulation and feeding when surgical closure is not immediately feasible, supporting their role as transitional functional therapy in complex posterior cleft palate defects.

KEYWORDS:

posterior cleft palate, palatal fistula, tongue flap, interim palatal obturator, prosthetic rehabilitation, speech improvement, nasal regurgitation

INTRODUCTION

Cleft lip and palate are congenital malformations that arise from disruptions in the embryonic development of the craniofacial complex, resulting in the nasal and palatal processes failing to fuse. An obturator prosthesis is a specialized maxillofacial prosthetic device designed to close congenital or acquired defects in the hard and/or soft palate.[1]Depending on the type and extent of cleft, several functional and morphological aspects such as speech, hearing, developing of occlusion and craniofacial growth may be damaged and required intervention by multidisciplinary team at appropriate time for achievement of integral rehabilitation.[2]

Children with CLP should be managed by a multidisciplinary team that can provide the best possible care. In addition to diagnosis, treatment, and follow-up, the management team should provide comprehensive guidance. The maxillofacial surgeon, plastic surgeon, pediatric dentist, orthodontist, prosthodontist, speech therapist, audiologist, psychologist, and pediatrician are frequently on the cleft team.[3]

In paediatric patients, obturators serve as a transitional prosthesis, accommodating growth-related changes while improving function and facilitating social integration. This case report

highlights the prosthetic management of a child with recurrent palatal fistula following multiple failed surgical repairs, emphasizing the role of a cold-cure acrylic palatal obturator in improving speech, deglutition, and overall oral function.

CASE REPORT -1

A 10-year-old male patient presented to the Department of Paediatric and Preventive Dentistry with a chief complaint of difficulty in speech, nasal regurgitation during swallowing, and poor esthetics. The patient had a known history of Group III bilateral cleft lip and palate, complicated by a large posterior palatal fistula and a previously constructed anterior palatal tongue flap. According to the medical and surgical records, the patient had undergone bilateral cleft lip repair on two occasions at 9 months of age. This was followed by Veau–Wardill–Kilner (VWK) palatoplasty and palatal fistula closure attempts on three separate occasions, all of which were unsuccessful due to recurrent graft rejection. No relevant systemic illness or familial history was reported.

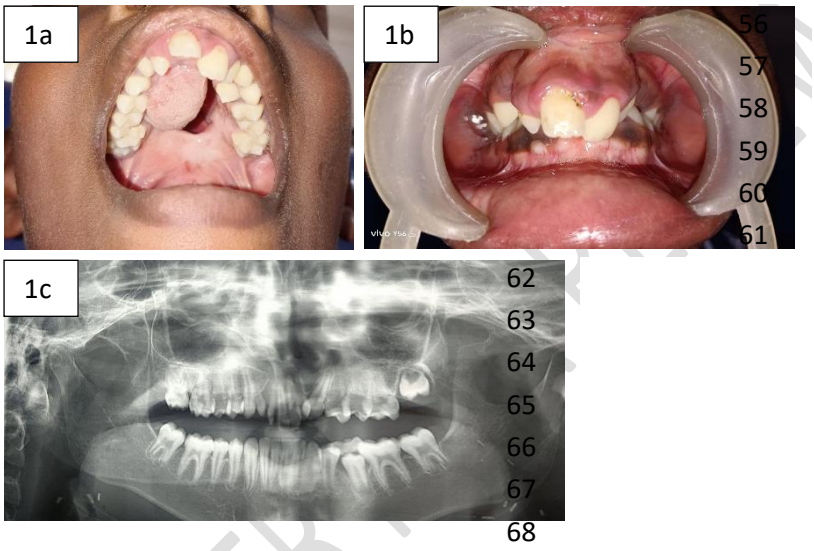


Figure 1a- large p
palatal fistula and
tongue flap ; 1b-
premaxilla; 1c- C

Extraoral examination revealed a Class II skeletal base, a mildly convex facial profile, and a vertical growth pattern. A prominent surgical scar resulting from previous cleft lip repair was evident in the upper lip region. Additional clinical features included a protrusive maxillary premaxilla, hypernasal speech, oronasal breathing, and the presence of an abnormal sucking habit, suggestive of long-standing velopharyngeal dysfunction.

Intraoral examination revealed an anterior palatal tongue flap and a large posterior palatal fistula measuring approximately 4 × 4.5 cm, extending into the soft palate region. The defect was associated with velopharyngeal insufficiency and incompetence, contributing to significant speech impairment and nasal regurgitation. Dental examination showed a proclined right maxillary central incisor, a retroclined left maxillary central incisor, and pit and fissure caries involving the permanent mandibular first molars (36 and 46). The patient exhibited an Angle's Class I malocclusion with Dewey's Type V modification. . An orthopantomogram (OPG) was taken to assess the extent and depth of the cleft defect and to evaluate the dental status.

Considering the patient's age, the size of the defect, multiple failed surgical interventions, and the need for immediate functional improvement, a prosthetic obturator was planned as a transitional treatment modality. A definitive impression was obtained using stock trays and irreversible hydrocolloid (alginate). Prior to impression making, the palatal defect was temporarily obturated using gauze and cotton pellets coated with lignocaine gel to prevent displacement of the impression material into the nasal cavity and to improve patient comfort. The impression was poured in dental stone to obtain diagnostic and working casts, which revealed a prominent premaxilla and an extensive posterior palatal defect

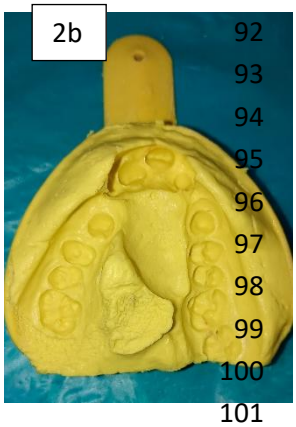
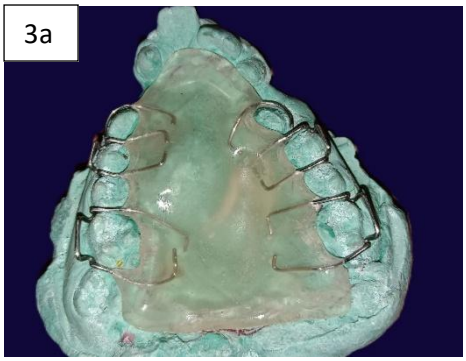


Figure 2 obturate pellets c 2b- algi

A palatal obturator fabricated using cold-cure acrylic resin was designed to obturate the palatal defect and improve velopharyngeal function. The prosthesis incorporated a retentive component engaging the anterior tongue flap, enhancing stability and retention without impinging on the surrounding soft tissues. The obturator was carefully contoured to ensure adequate extension into the defect, while maintaining patient comfort and ease of insertion and removal.

On insertion, the obturator demonstrated satisfactory adaptation and retention, effectively sealing the palatal defect. The restoration of intraoral pressure resulted in a noticeable reduction in nasal regurgitation during deglutition and a significant improvement in speech resonance and intelligibility.Maintenance and oral hygiene instructions were given to the parents. The patient reported improved comfort during eating and speaking. Post-insertion instructions were given regarding prosthesis hygiene and maintenance, and periodic follow-up visits were planned to monitor adaptation, tissue response, and functional outcomes.The obturator served as a transitional prosthetic rehabilitation, providing immediate improvement in speech, swallowing, and overall oral function, while also offering soft-tissue support, promoting healing, and enhancing the patient's self-confidence and psychosocial well-being during the growth phase.



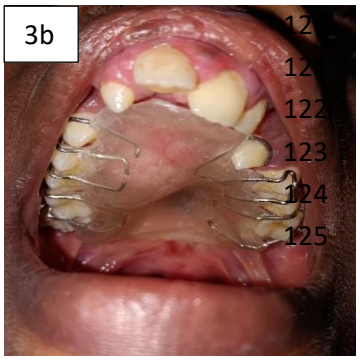


Figure 3a- palatal obturator;3b- intraoral view

CASE REPORT-2

An eight-and-a-half-year-old male patient reported to the Department with the chief complaint of nasal regurgitation of fluids. The patient had a known history of cleft lip and palate, for which primary surgical repair was initiated at approximately one year of age. Subsequent staged surgical interventions included lip repair and palatal repair performed in 2017. An attempt at fistula closure was carried out in 2019, followed by pharyngoplasty in 2022. Despite multiple corrective procedures, the patient continued to present with a persistent anterior palatal fistula, resulting in recurrent nasal regurgitation. Considering the persistence of symptoms and to avoid further surgical intervention, prosthetic rehabilitation with a palatal obturator was planned as a non-surgical treatment modality.

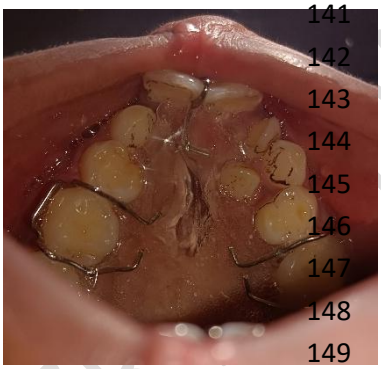


Figure 4a- palatal fistula;

4b- palatal obturator appliance

After a thorough clinical evaluation and interdisciplinary case discussion, a treatment plan was formulated to fabricate a palatal obturator as a non-surgical management option. Prior to impression making, the palatal fistula was temporarily obturated using sterile cotton gauze coated with lignocaine gel to prevent the flow of impression material into the nasal cavity. A maxillary impression was then made using irreversible hydrocolloid (alginate). Based on the obtained impression, a palatal obturator was fabricated. Upon insertion, the appliance exhibited satisfactory fit and retention. The patient reported immediate resolution of nasal regurgitation and expressed satisfaction with the appliance. The patient was subsequently referred to the Department of Plastic Surgery for further evaluation and long-term follow-up.

DICSUSSION

Prosthetic appliances play a key role in the treatment of patients with cleft palate by restoring normal speech and swallowing and by preparing the patient for successful surgical procedures.[4]The primary purpose of the obturator is to obstruct abnormal communication between the oral and nasal cavities. However, in patients with cleft palate, velopharyngeal insufficiency (VPI) can also be the cause of speech problems and affect their quality of life .

Both oronasal fistula and VPI can contribute to the speech dysfunction of the patient , so both aspects should be considered during the manufacture of the obturator.[5]

The treatment goals in repairing a cleft palate are to restore the barrier between the oral and nasal cavities and to rehabilitate the velopharyngeal function. Prosthetic palatal appliances have long been used in the rehabilitation of cleft palate defects. The first obturation of a cleft palate was done by Demosthenes (384- 323 B.C). Bien suggested that the great Greek orator used moderately sized pebbles to fill his palatal defect and improve his speech. Hollerius, Petronius, and Pare in the 16th century described prostheses for obturation of palatal defects using sponges, wax, and silver as well as more modern materials and techniques. Snell, Stearn, Kingsley, and Suerson in the 19th century described more current prosthetic designs.[4]

The palatal obturator is a prosthetic device that can be used to cover an open hard palate defect. This prosthetic appliance functions by closing off the nasal cavity from the oral cavity. For speech, this can normalize resonance and improve the ability to impound intraoral pressure. Additional acrylic extension superiorly will fit perfectly into the area of deficiency.[6]

In patients with cleft palate, the structure of oronasal fistula (ONF) is much more complex than that in patients with other problems, making the design and fabrication of obturators difficult. Currently, digital ONF obturators appear to be destined to become the trend, and for patients with cleft palate their fabrication is likely to be more challenging.

There are many advantages to digital technology in the treatment of ONF, such as avoiding the inevitable errors associated with the impressions, plaster revisions, and restoration of cusp misalignments in conventional manufacturing. In addition, the ONF obturator can be fabricated in a much shorter time due to the removal of tedious steps. In the future, digital techniques will be more widely used in this field, where virtual-reality design can interact with 3D printing. Doctors may directly perform the 3D design of the restoration in the virtual world, observe the 3D restoration products to better estimate the feasibility of the products, and reduce the wastage of time and resources.[5]

An obturator must be carefully designed to suit the patient's specific oral and facial structure, ensuring proper balance and function. Compared to most other restorations, an obturator requires relatively less retention and support, while its weight and size should be minimized to enhance comfort. It is essential that the obturator does not cause displacement of the surrounding soft tissues. Additionally, the materials selected for its fabrication should be cost-effective, allowing for easy repair, adjustment, or extension when needed. Obturators are particularly indicated for patients with a broad cleft or those exhibiting neuromuscular deficits of the soft palate and pharyngeal region, as these conditions benefit significantly from the functional and structural support provided by the appliance.[7]

A palatal obturator is a removable prosthetic device designed to cover an open palatal defect, preventing nasal regurgitation during feeding and improving speech function. It is most commonly used to close a palatal fistula, which, although less frequent today, remains a concern for some patients. Surgical closure of a fistula is often delayed to coincide with other procedures, or when a patient is not ready for surgical correction, making the obturator a practical interim solution. Typically made of acrylic, the obturator resembles a dental retainer, with additional acrylic shaped to fit snugly into the defect, effectively blocking the passage of liquids and air into the nasal cavity. For larger defects, the obturator is flattened to reduce weight and ensure proper retention. Specific types of obturators are also used

depending on the patient's needs: a simple base plate can aid swallowing and digestion by closing the hard palate entrance, while an obturator with a tail functions primarily as a speech appliance.[7]

Moreover, patient education and psychological support play a significant role in managing these cases. Patients and their families should be well informed about the treatment plan, expected outcomes, and the importance of compliance with orthodontic and surgical interventions.[8]The complete care of a child with a cleft lip or palate or both requires multidisciplinary help and frequent assessment by the family physician. Such a coordinated effort enables the child to attain optimal habilitation, allows him or her to feel and be a useful member of society and ensures optimal functioning of the family.[9]

CONCLUSION

In cases where surgical intervention has failed or is delayed, a palatal obturator serves as an effective alternative to definitive surgical management for patients with cleft-related palatal defects. Its use markedly improved functional outcomes, including speech, reduction of nasal regurgitation, and feeding habits, demonstrating its value as a functional enhancer that significantly improves quality of life in pediatric patients with cleft lip and palate.

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