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OBTURATOR-ASSISTED FUNCTIONAL ENHANCEMENT: NON1 SURGICAL SUCCESS IN PEDIATRIC POSTERIOR CLEFT PALATE 2 MANAGEMENT- CASE SERIES 3 ABSTRACT :Large posterior cleft palate defects in pediatric patients pose significant 4 challenges in speech, deglutition, and nasal regurgitation. Although definitive management is 5 primarily surgical, non-surgical prosthetic approaches can serve as effective interim solutions 6 when functional improvement is achievable, allowing surgery to be deferred when 7 appropriate. In this case series, two pediatric patients aged 10 years and 8.5 years with cleft 8 1 lip and palate are presented, both rehabilitated using palatal obturator prostheses. The first 9 case involved a 10-year-old boy with a large posterior palatal cleft fistula and a previously 10 managed anterior palatal tongue flap, who was rehabilitated using an interim acrylic obturator 11 incorporating a tongue-flap retention feature. The second case involved an 8.5-year-old boy 12 with a persistent posterior palatal fistula, managed with a conventional interim palatal 13 obturator. In both cases, prosthetic rehabilitation resulted in marked improvement in speech 14 clarity, swallowing, and overall oral function, with a significant reduction in nasal 15 regurgitation. These outcomes underscore that obturator prostheses can effectively re16 establish oronasal separation and improve articulation and feeding when surgical closure is 17 not immediately feasible, supporting their role as transitional functional therapy in complex 18 posterior cleft palate defects. 19 KEYWORDS: 20 posterior cleft palate, palatal fistula, tongue flap, interim palatal obturator, prosthetic 21 rehabilitation, speech improvement, nasal regurgitation 22 23 INTRODUCTION 24 1 Cleft lip and palate are congenital malformations that arise from disruptions in the embryonic 25 development of the craniofacial complex, resulting in the nasal and palatal processes failing 26 to fuse. 13 An obturator prosthesis is a specialized maxillofacial prosthetic device designed to 27 close congenital or acquired defects in the hard and/or soft palate.1Depending on the type and 28 extent of cleft, several functional and morphological aspects such as speech, hearing, 29 developing of occlusion and craniofacial growth may be damaged and required 30 intervention by multidisciplinary team at appropriate time for achievement of integral 31

rehabilitation.2 32 Children with CLP should be managed by a multidisciplinary team that can provide the best 33 possible care. In addition to diagnosis, treatment, and follow-up, the management team 34 should provide comprehensive guidance. The maxillofacial surgeon, plastic surgeon, 35 pediatric dentist, orthodontist, prosthodontist, speech therapist, audiologist, psychologist, and 36 pediatrician are frequently on the cleft team.3 37 In paediatric patients, obturators serve as a transitional prosthesis, accommodating growth38 related changes while improving function and facilitating social integration. This case report 39

highlights the prosthetic management of a child with recurrent palatal fistula following 40 multiple failed surgical repairs, emphasizing the role of a cold-cure acrylic palatal obturator 41 in improving speech, deglutition, and overall oral function. 42 43 CASE REPORT -1 44 45 A 10-year-old male patient presented to the Department of Paediatric and Preventive 46 Dentistry with a chief complaint of difficulty in speech, nasal regurgitation during 47 swallowing, and poor esthetics. The patient had a known history of Group III bilateral cleft 48 lip and palate, complicated by a large posterior palatal fistula and a previously constructed 49 anterior palatal tongue flap. According to the medical and surgical records, the patient had 50 undergone bilateral cleft lip repair on two occasions at 9 months of age. This was followed by 51 Veau–Wardill–Kilner (VWK) palatoplasty and palatal fistula closure attempts on three 52 separate occasions, all of which were unsuccessful due to recurrent graft rejection. No 53 relevant systemic illness or familial history was reported. 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 Extraoral examination revealed a Class II skeletal base, a mildly convex facial profile, and a 69 vertical growth pattern. A prominent surgical scar resulting from previous cleft lip repair was 70 evident in the upper lip region. Additional clinical features included a protrusive maxillary 71 premaxilla, hypernasal speech, oronasal breathing, and the presence of an abnormal sucking 72 habit, suggestive of long-standing velopharyngeal dysfunction. 73 Intraoral examination revealed an anterior palatal tongue flap and a large posterior palatal

74 fistula measuring approximately 4 × 4.5 cm, extending into the soft palate region. The defect 75 was associated with velopharyngeal insufficiency and incompetence, contributing to 76 significant speech impairment and nasal regurgitation. Dental examination showed a 77 proclined 9 right maxillary central incisor, a retroclined left maxillary central incisor, and pit 78 and fissure caries involving the permanent mandibular first molars (36 and 46). The patient 79 exhibited an Angle's Class I malocclusion with Dewey's Type V modification. . An 80 orthopantomogram (OPG) was taken to assess the extent and depth of the cleft defect and to 81 evaluate the dental status. 82 Figure 1a- large posterior palatal fistula and anterior tongue flap ; 1b- prominent premaxilla; 1c- OPG view 1a 1b 1c

Considering the patient's age, the size of the defect, multiple failed surgical interventions, 83 and the need for immediate functional improvement, a prosthetic obturator was planned as a 84 transitional treatment modality. A definitive impression was obtained using stock trays and 85 irreversible hydrocolloid (alginate). Prior to impression making, the palatal defect was 86 temporarily obturated using gauze and cotton pellets coated with lignocaine gel to prevent 87 displacement of the impression material 10 into the nasal cavity and to improve patient comfort. 88 The impression was poured in dental stone to obtain diagnostic and working casts, which 89 revealed a prominent premaxilla and an extensive posterior palatal defect 90 91 92 93 94 95 96 97 98 99 100 101 A palatal obturator fabricated using cold-cure acrylic resin was 102 designed to obturate the palatal defect and improve velopharyngeal 103 function. The prosthesis incorporated a retentive component 104 engaging the anterior tongue flap, enhancing stability and retention without impinging on the 105 surrounding soft tissues. The obturator was carefully contoured to ensure adequate extension 106 into the defect, while maintaining patient comfort and 14 ease of insertion and removal. 107 On insertion, the obturator demonstrated satisfactory adaptation and retention, effectively 108 sealing the palatal defect. The restoration of intraoral pressure resulted in a noticeable 109 reduction in nasal regurgitation during deglutition and a significant improvement in speech 110 resonance and

intelligibility.Maintenance and oral hygiene instructions were given to the 111 parents. The patient reported improved comfort during eating and speaking. Post-insertion 112 instructions were given regarding prosthesis hygiene and maintenance, and periodic follow113 up visits were planned to monitor adaptation, tissue response, and functional outcomes.The 114 obturator served as a transitional prosthetic rehabilitation, providing immediate improvement 115 in speech, swallowing, and overall oral function, while also offering soft-tissue support, 116 promoting healing, and enhancing the patient's self-confidence and psychosocial well-being 117 during the growth phase. 11 118 119 120 121 122 123 124 125 Figure 2a- palatal defecttemporarily obturated using gauze and cotton pellets coated with lignocaine gel; 2b- alginate impression Figure 3a- palatal obturator;3b- intraoral view 2a 2b 3a 3b

126 127 128 CASE REPORT-2 129 130 An eight-and-a-half-year-old male patient reported to the Department with the chief 131 complaint of nasal regurgitation of fluids. The patient had a known history 1 of cleft lip and 132 palate, for which primary surgical repair was initiated at approximately one year of age. 133 Subsequent staged surgical interventions included lip repair and palatal repair performed in 134 2017. An attempt at fistula closure was carried out in 2019, followed by pharyngoplasty in 135 2022. Despite multiple corrective procedures, the patient continued to present with a 136 persistent anterior palatal fistula, resulting in recurrent nasal regurgitation. Considering the 137 persistence of symptoms and to avoid further surgical intervention, prosthetic rehabilitation 138 with a palatal obturator was planned as a non-surgical treatment modality. 6 139 140 141 142 143 144 145 146 147 148 149 150 After a thorough clinical evaluation and interdisciplinary case discussion, a treatment plan 151 was formulated to fabricate a palatal obturator as a non-surgical management option. Prior to 152 impression making, the palatal fistula was temporarily obturated using sterile cotton gauze 153 coated with lignocaine gel to prevent the flow of impression material 10 into the nasal cavity. A 154 maxillary impression was then made using irreversible hydrocolloid (alginate). Based

on the 155 obtained impression, a palatal obturator was fabricated. Upon insertion, the appliance 156 exhibited satisfactory fit and retention. The patient reported immediate resolution of nasal 157 regurgitation and expressed satisfaction with the appliance. The patient was subsequently 158 referred to the Department of Plastic Surgery for further evaluation and long-term follow-up. 159 160 161 162 DICSUSSION 163 164 Prosthetic appliances play a key role in the treatment of patients with cleft palate by restoring 165 normal speech and swallowing and by preparing the patient for successful surgical 166 procedures.4The primary purpose of the obturator is to obstruct abnormal communication 167 12 between the oral and nasal cavities. However, in patients with cleft palate, velopharyngeal 168 insufficiency (VPI) can also be the cause of speech problems and affect their quality of life . 169 Figure 4a- palatal fistula; 4b- palatal obturator appliance

Both oronasal fistula and VPI can contribute to the speech dysfunction of the patient , so both 170 aspects should be considered during the manufacture of the obturator.5 171 The treatment goals in repairing a cleft palate are to restore the barrier between the oral and 172 nasal cavities and to rehabilitate the velopharyngeal function. Prosthetic palatal appliances 173 have long been used in the rehabilitation of cleft palate defects. The first obturation of a cleft 174 palate was done by Demosthenes (384- 323 B.C). Bien suggested that 5 the great Greek orator 175 used moderately sized pebbles to fill his palatal defect and improve his speech. Hollerius, 176 Petronius, and Pare 7 in the 16th century described prostheses for obturation of palatal defects 177 using sponges, wax, and silver as well as more modern materials and techniques. Snell, 178 Stearn, Kingsley, and Suerson in the 19th century described more current prosthetic designs.4 179 The palatal obturator is a prosthetic device that can be used to cover an open hard palate 180 defect. 2 This prosthetic appliance functions by closing off the nasal cavity from the oral 181 cavity. For speech, this can normalize resonance and improve the ability to impound intraoral 182 pressure. Additional acrylic extension superiorly will fit perfectly into the area of deficiency.6 183 In patients with cleft palate, the structure of oronasal fistula (ONF) is

much more complex 184 than that in patients with other problems, making the design and fabrication of obturators 185 difficult. Currently, digital ONF obturators appear to be destined to become the trend, and for 186 4 patients with cleft palate their fabrication is likely to be more challenging. 187 There are many advantages to digital technology in the treatment of ONF, such as avoiding 188 the inevitable errors associated with the impressions, plaster revisions, and restoration of cusp 189 misalignments in conventional manufacturing. In addition, the ONF obturator can be 190 fabricated in a much shorter time due to the removal of tedious steps. In the future, digital 191 techniques will be more widely used in this field, where virtual-reality design can interact 192 with 3D printing. Doctors may directly perform the 3D design of the restoration in the virtual 193 world, observe the 3D restoration products to better estimate the feasibility of the products, 194 and reduce the wastage of time and resources.5 195 An obturator must be carefully designed to suit the patient's specific oral and facial structure, 196 ensuring proper balance and function. Compared to most other restorations, an obturator 197 requires relatively less retention and support, while its weight and size should be minimized 198 to enhance comfort. It is essential that the obturator does not cause displacement of the 199 surrounding soft tissues. Additionally, the materials selected for its fabrication should be 200 cost-effective, allowing for easy repair, adjustment, or extension when needed. Obturators are 201 particularly indicated 4 for patients with a broad cleft or those exhibiting neuromuscular 202 deficits of the soft palate and pharyngeal region, as these conditions benefit significantly from 203 the functional and structural support provided by the appliance.7 204 8 A palatal obturator is a removable prosthetic device designed to cover an open palatal defect, 205 preventing nasal regurgitation during feeding and improving speech function. It is most 206 commonly used 5 to close a palatal fistula, which, although less frequent today, remains a 207 concern for some patients. Surgical closure of a fistula is often delayed to coincide with other 208 procedures, or when a patient is not ready for surgical correction, making the obturator a 209 practical interim solution. Typically made of acrylic, the obturator resembles a dental 210 retainer, with

additional acrylic shaped to fit snugly into the defect, effectively blocking the 211 passage of liquids and air into the nasal cavity. For larger defects, the obturator is flattened to 212 reduce weight and ensure proper retention. Specific types of obturators are also used 213

depending on the patient's needs: a simple base plate can aid swallowing and digestion by 214 closing the hard palate entrance, while an obturator with a tail functions primarily as a speech 215 appliance.7 216 Moreover, patient education and psychological support play a significant role in managing 217 these cases. Patients and their families should be well informed about the treatment plan, 218 expected outcomes, and the importance of compliance with orthodontic and surgical 219 interventions.8The complete care 1 of a child with a cleft lip or palate or both requires 220 multidisciplinary help and frequent assessment by the family physician. Such a coordinated 221 effort 3 enables the child to attain optimal habilitation, allows him or her to feel and be a useful 222 member of society and ensures optimal functioning of the family.9 223 224 CONCLUSION 225 In cases where surgical intervention has failed or is delayed, a palatal obturator serves as an 226 effective alternative to definitive surgical management for patients with cleft-related palatal 227 defects. Its use markedly improved functional outcomes, including speech, reduction of nasal 228 regurgitation, and feeding habits, demonstrating its value as a functional enhancer that 229 significantly improves quality of life in pediatric patients with 4 cleft lip and palate. 230 231 BIBLIOGRAPHY 232 233 1. Kultaş Kaleli MB. Prosthetic Rehabilitation of a Patient with a Cleft Lip and Palate 234 Using an Obturator Prosthesis: A Case Report. Online Türk SağlıkBilimleriDergisi 235 2025;10(4):419-422. doi: 10.26453/otjhs.1791114 236 2. Sowmya S, Shadakshari S, Ravi MB,Ganesh S, Gujjari AK. Prosthodontic Care for 237 Patients with CleftPalate. J Orofac Res 2013;3(1):22-27 238 3. Prasad V, Chhodon L, Aravindhan A, Zaidi SJ. Prosthetic rehabilitation of patients 239 1 with cleft lip and palate. J Cleft Lip Palate CraniofacAnomal 2022;9:189-96. 240 4. Artopoulou I-I, Higuera S, Martin JW, Stal S, Chambers MS. Postsurgical use of 241 prosthetic palatal appliances: two case reports. J Clin Pediatr Dent.2005;30(2):105– 242

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