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Surgical Treatment for Palatoglossal Arch Cicatrix and Velopharyngeal Insufficiency After Adenotonsillectomy

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Abstract

Postadenotonsillectomy velopharyngeal incompetence/insufficiency/dysfunction (VPI) is an uncommon but potentially surgically challenging problem. We report a child without cleft palate who developed severe palatoglossal arch cicatrix and VPI after adenotonsillectomy, and describe bilateral palatoglossal arch z-plasty to restore palatal function and speech.

Keywords

velopharyngeal incompetence, velopharyngeal insufficiency, palatal lengthening, z-plasty, palatoglossal arch

Introduction

Velopharyngeal incompetence/insufficiency/dysfunction (VPI) is a potential complication after adenotonsillectomy (Van Gelder, 1967; Lawson et al., 1972; Peterson-Falzone, 1985; Witzel et al., 1986; Pigott, 1994; Fernandez et al., 1996; Hu et al., 2008). Neither nasopharyngoscopy nor videofluoroscopy can preoperatively predict the influence of tonsillectomy on velopharyngeal function (Hu et al., 2008). Speech therapy cannot correct hypernasality due to an anatomic abnormality (Croft et al., 1981; Witzel et al., 1986; Fernandez et al., 1996). Surgical intervention is usually reserved for patients who fail conservative treatment with speech therapy and have an anatomic deformity (Fernandez et al., 1996). When an operation is necessary, multiple surgical options have been described (Witzel et al., 1986; Graivier et al., 1992; Fernandez et al., 1996; Hu et al., 2008). The choice for palatoplasty versus pharyngeal flap or sphincter pharyngoplasty is generally dictated by the dynamics and pattern of velopharyngeal port closure (Hu et al., 2008). In patients without a cleft palate, a less-invasive technique may be warranted. For example, Graivier and colleagues (1992) described the palatoglossus myomucosal flap pharyngoplasty for post-tonsillectomy VPI with thick scarring. Our purpose is to describe an alternative technique to correct palatoglossal arch cicatrix and velopharyngeal insufficiency after adenotonsillectomy.

Case Report

A 4-year-old girl was evaluated for sleep-disordered breathing/obstructive sleep apnea secondary to adenotonsillar hypertrophy. She had a history of articulation problems but no hypernasality. She was treated surgically with adenotonsillectomy. Intraoperatively her palate was inspected and palpated, and no submucous cleft palate was detected. There were no complications with surgery and postoperatively she had a marked improvement in her breathing with no further signs of sleep apnea. Nevertheless, as early as her first postoperative visit, she was noted to have hypernasal speech. Initially the patient was managed conservatively, with expectation that the hypernasality was transient. Nevertheless, the hypernasal resonance

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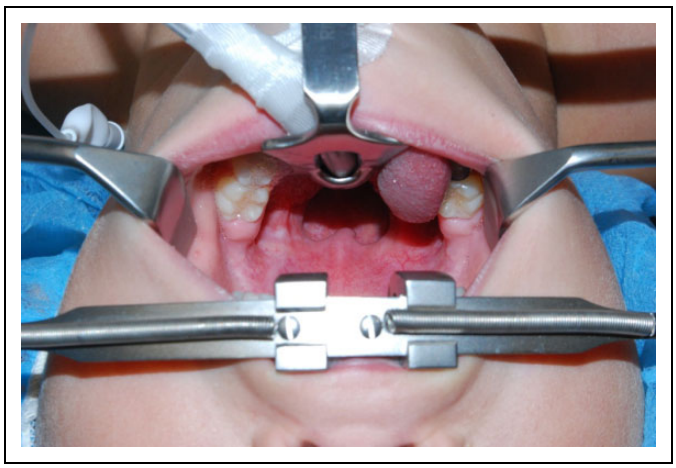

Figure 1. Tonsillectomy complicated by scar contraction of the anterior tonsillar pillar and palatoglossus muscle, which tethers the palate to the tongue, limits palatal motion, and causes velopharyngeal insufficiency.

persisted. She was enrolled in speech therapy, but over the course of 2 years there was no improvement in her speech. She was then referred for evaluation and treatment in our multidisciplinary cleft and craniofacial center. On physical examination, she had contracture with thick scarring of the bilateral palatoglossal arches with resultant tethering of the soft palate to the tongue. Palatal and tongue movements were both limited by the contracture; the palate was pulled inferiorly and anteriorly and the velopharyngeal port opened when she extended or moved her tongue and the tongue retracted posteriorly and superiorly with attempted palatal elevation (Figure 1). Videofluoroscopy demonstrated a Golding-Kushner rating of 1.0 (complete lateral pharyngeal wall closure) in the sagittal closure pattern with a large central velopharyngeal gap. She had no evidence of occult submucous cleft palate. A nasoendoscopy revealed incomplete contact of the soft palate with the posterior pharyngeal wall resulting in a large midline gap. Her Pittsburgh Weighted Value for Speech Symptoms Associated with Velopharyngeal Incompetence was 11, indicating an incompetent velopharyngeal mechanism (Neiman and Simpson, 1975; McWilliams et al., 1981).

She was taken to the operating room and under general anesthesia the firm contracture of the anterior tonsillar pillars was palpated. A z-plasty was designed on each of the palatoglossal arches to allow release and lengthening of the contracted mucosa and palatoglossus muscles (Figure 2). The palatoglossus muscle and the scar between the pillars and soft palate were released and the z-plasty limbs were transposed and sutured (Figure 3). At 14 months postoperatively, she showed clinical resolution of the scar contracture with improved and independent motion of the tongue and palate (Figure 4). The Pittsburgh Weighted Value improved to 3.

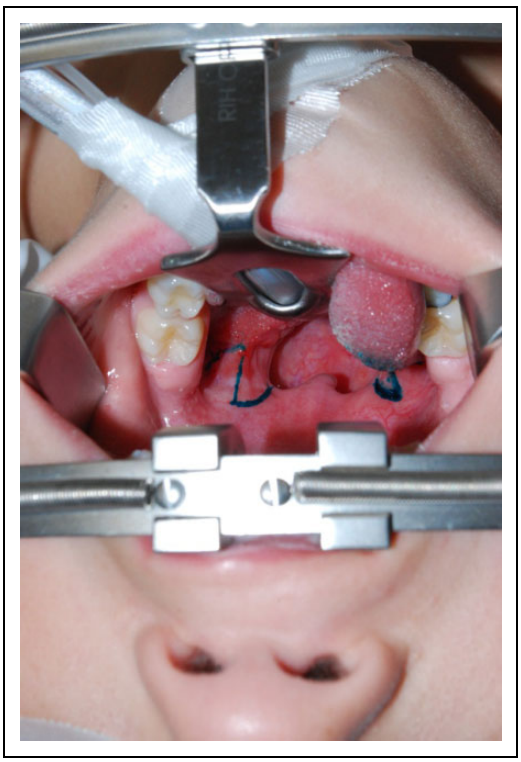

Figure 2. Bilateral anterior tonisllar pillar z-plasty to release the scar contracture and lengthen the pillar.

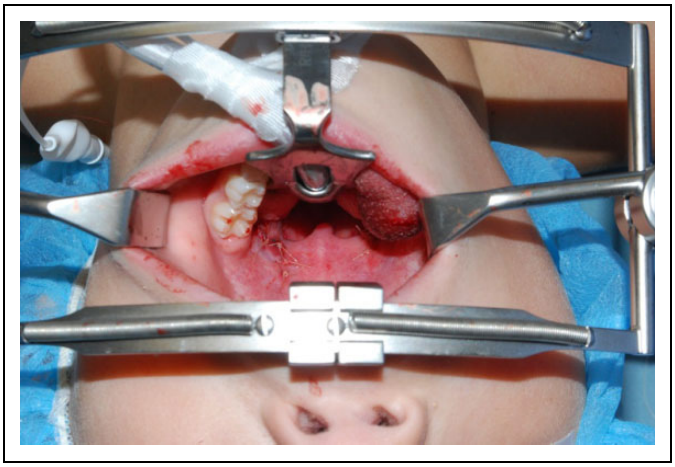

Figure 3. Anterior tonsillar pillar z-plasty and palatoglossus muscular release lengthens the pillars.

Discussion

Velopharyngeal incompetence/insufficiency/dysfunction after adenotonsillectomy can be due to the gap created by the removal of the adenoids (Croft et al., 1981) or as a result of scar contracture between the tonsillar pillars, the soft palate and the tongue (Croft et al., 1981; Graivier et al., 1992). Adenotonsillectomy necessitates compensation by the soft palate, which must stretch further and traverse a greater distance to obturate the velopharyngeal port (Neiman and Simpson, 1975; McWilliams et al., 1981). Videofluoroscopy and nasopharyngoscopy are valuable investigations in assessing velopharyngeal port closure, but are not predictors of the effects of adenotonsillectomy on the potential for postoperative VPI, and

Figure 4. Improved palatal movement and speech at 14-month follow-up.

are therefore not usually part of a preoperative evaluation for children with sleep-disordered breathing/obstructive sleep apnea (Hu et al., 2008). In patients without a cleft palate, it is also important to rule out genetic or neurological disorders as a cause of VPI and articulation problems (Davison et al., 1990; Swanson et al., 2011). Speech therapy is usually recommended as a first treatment option for patients with VPI following adenotonsillectomy (Witzel et al., 1986). When conservative treatment fails and an anatomic deformity is confirmed, surgical approaches are considered and less invasive operations with lower risks of morbidity should be given priority. Pharyngeal flap complications such as airway obstruction and sleep apnea have been well documented and should therefore be reserved as a second line of treatment (Graham et al., 1973; Thurston et al., 1980; Barot et al., 1986; Orr et al., 1987; Witt et al., 1996; Swanson et al., 2011). Although the use of palatoglossus myomucosal transposition flaps have been described to achieve successful pharyngoplasty in patients without cleft palate, pharyngoplasty procedures also have well-known complications as described in the literature (Graivier et al., 1992; Witt et al., 1995; Witt et al., 1996).

We describe a successful method to address posttonsillectomy scar contracture of the palatoglossal arch with z-plasty. Through release and lengthening of the palatoglossal arches with bilateral z-plasty, our patient was able to achieve adequate velopharyngeal competence without more extensive procedures or morbidity noted in previous reports (Graivier et al., 1992). This technique could also be used when previous tonsillectomy has damaged the posterior tonsillar pillar.

Declaration of Conflicting Interests

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