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Otolaryngol Clin N Am
39 (2006) 1019–1036

OTOLARYNGOLOGIC
CLINICS
OF NORTH AMERICA

Mechanical Endonasal Dacryocystorhinostomy with Mucosal Flaps

Angelo Tsirbas, MD[a,*], Peter John Wormald, MD[b]

[a]*Department of Orbital and Ophthalmic Surgery, Jules Stein Eye Institute, David Geffen School of Medicine at the University of California at Los Angeles, 100 Stein Plaza, Los Angeles, CA 90095, USA*
[b]*Department of Otolaryngology, 28 Woodville Road, Woodville, SA 5011, Australia*

Initial surgical approaches to treating nasolacrimal duct obstruction (NLDO) were intranasal [1]. These attempts were made at the end of the nineteenth century but were abandoned because surgeons had difficulty visualizing the surgical site. In the twentieth century, external dacryocystorhinostomy (DCR) was described, and with a few modifications it has been the treatment most commonly used for the last 100 years [2–5]. In the 1980s the advent of endoscopic techniques revolutionized rhinologic procedures as precise mucosa-preserving surgical techniques were introduced with the aim of restoring nasal and sinus function. Since the first endoscopic DCR procedures in the late 1980s and early 1990s [6–8] there has been further improvement in instruments and endoscopes. In addition, the development of medical lasers also has allowed this technology to be used for lacrimal surgery.

The long-term success rate of external DCR in dedicated oculoplastic surgical centers is very high (90%–95%) [9–12]. These success rates have been replicated many times in centers around the globe. Until recently, the success rate of endonasal DCR had not matched that achieved with external DCR. As with any new surgical technique, however, endoscopic DCR has been modified and improved [13–17]. The authors believe that the key to

Portions of this article are reprinted from: Tsirbas A, Wormald PJ. Mechanical Endonasal Dacryocystorhinostomy. In: John J. Woog, Ed. Manual of Endoscopic Lacrimal and Orbital Surgery. Philadelphia: Butterworth/Heineman, 2004; with permission.

* Corresponding author. Jules Stein Eye Institute, David Geffen School of Medicine at the University of California at Los Angeles, 100 Stein Plaza, Box 957006, Room 2-267, Los Angeles, CA 90095.

E-mail address: angelotsirbas@hotmail.com (A. Tsirbas).

0030-6665/06/$ - see front matter
doi:10.1016/j.otc.2006.07.007

improving the success rate of endonasal DCR is to attempt to replicate the external procedure as closely as possible. As such, the creation of a large bony rhinostomy and mucosal flaps is the key tenet of this mechanical endonasal DCR (MENDCR) procedure [18,19]. To achieve complete lacrimal sac exposure and correct siting of the rhinostomy, an understanding of the nasal anatomy and its relationship to the lacrimal sac is vital [20–23]. Research into the intranasal anatomy of the lacrimal sac has shown that the rhinostomy needs to be larger and higher on the lateral wall than previously thought [20,22]. To expose the lacrimal sac fully, a large rhinostomy is created. Creating this large rhinostomy requires removal of bone from the frontal process of the maxilla anterior to the middle turbinate, the lacrimal bone, as well as the bone above the insertion of the middle turbinate into the lateral nasal wall (the so-called ''axilla'' of the middle turbinate). This rhinostomy includes the agger nasi cell and extends posteriorly to the insertion of the uncinate, exposing the whole lacrimal sac. The size of this rhinostomy is similar to that created in external DCR. Another key factor in the MENDCR procedure is mucosal preservation. Previously described endonasal approaches involved the removal of both nasal mucosa and the mucosa of the medial lacrimal sac. MENDCR involves the conservation of nasal mucosa and the fashioning of lacrimal sac flaps to achieve mucosal apposition of the marsupialized sac and nasal mucosa. Experience in endoscopic nasal surgery is important to the success of this procedure, because the amount of bone removal and intranasal manipulation is greater than in most other endoscopic DCR techniques. Once expertise is gained, MENDCR can be used as a reproducible and successful way to treat NLDO.

Assessment before mechanical endonasal dacryocystorhinostomy

The preoperative assessment of patients who have epiphora is vital to the planning of a solution. In most cases seen in the clinic with a complaint of epiphora, the problem does not lie in a blockage in the nasolacrimal system. The balance of tear production and drainage is vital, especially in the older patient. In this article discussion is limited to patients in whom an assessment has revealed an obstruction to nasolacrimal drainage. It is important to be able to assess the level of obstruction of the nasolacrimal duct system and, if patent, to assess the function of the system. The authors' protocol, therefore, includes both a dacryocystogram (DCG) and lacrimal scintillography. The DCG allows anatomic assessment of the canaliculi, sac, and nasolacrimal duct, whereas scintillography allows functional assessment of the lacrimal pump and provides additional information on the level of functional obstruction of the nasolacrimal duct system if the system is anatomically patent. Part of the authors' protocol for preoperative assessment includes nasal endoscopy with a rigid nasal endoscope. This procedure allows septal deviation to be detected and any additional nasal or sinus pathologic conditions to be evaluated. If additional nasal or sinus