Journal of Plastic, Reconstructive & Aesthetic Surgery (2008) **61**, 615–619

JPRAS
An International Journal of Surgical Reconstruction
www.JPRASurg.com

The role of larger osteotomy in long term success in external dacryocystorhinostomy

Atila Argin [a], Kemal Görür [b], Cengiz Özcan [b], Emrah Arslan [c,*], Cengiz Özmen [a], Yusuf Vayisoglu [b]

[a] *Department of Ophtalmology, School of Medicine, Mersin University, Mersin, Turkey*
[b] *Department of Otorhinolaryngolgy, School of Medicine, Mersin University, Mersin, Turkey*
[c] *Department of Plastic and Reconstructive Surgery, School of Medicine, Mersin University, Mersin, Turkey*

Received 23 February 2006; accepted 15 February 2007

KEYWORDS
External dacryocystorhinostomy;
Computed tomography;
Imaging;
Epiphora;
Restenosis

Summary *Aim:* This study aims to investigate whether it is possible to create a critical size bone defect in external dacryocystorhinostomy (DCR), and also at what size a defect can be considered as being critical for a successful surgical outcome.
Methods: Eighteen patients undergoing 19 external dacryocystorhinostomies, with the creation of wide osteotomies, were enrolled in this retrospective study. A 2×2 cm bone defect, which was considered as the critical size, was created. The postoperative structure of the bone gap was evaluated by computed tomography in axial and coronal planes at least two years after surgery. Functional patency of the ostium was confirmed with irrigation and nasal endoscopic examination.
Results: Thirteen female (72.2%) and five male (27.8%) patients underwent DCR. The patients were aged between 18 and 72 years old (mean $\pm$ S.D.: 45.3 ± 13.9). The follow-up time was between 24 and 48 months (mean 30.4 months). The areas of the gaps were between 1.21 and 4 cm^2 (mean $\pm$ S.D.: 2.26 ± 0.19).
Conclusion: The critical size bone defect (2×2 cm) might prevent restenosis in long term follow ups.

Epiphora is one of the most disturbing symptoms of lacrimal system obstruction. External dacryocystorhinostomy (DCR) is a well established standard surgical procedure for the treatment of a complete nasolacrimal duct obstruction in adults with a success rate as high as 90%.[1,2] This operation, first described by Addeo Toti[3] in 1904, has undergone several modifications. Dupuy-Dutemps and Bourguet[4] described a modification of mucosal anastomosis with suturing of the mucosal flaps. External DCR is still performed in the same way with some minor changes. However, occasional failures are also

* Corresponding author. Address: Mersin Universitesi Tip Fakultesi, Plastik ve Rekonstruktif Cerrahi, 33079 Mersin, Turkey. Tel.: +90 3243374300; fax: +90 324 337 43 05.
E-mail address: arslane@mersin.edu.tr (E. Arslan).

1748-6815/$ - see front matter © 2007 Published by Elsevier Ltd on behalf of British Association of Plastic, Reconstructive and Aesthetic Surgeons.
doi:10.1016/j.bjps.2007.02.029

experienced because of various conditions such as untreated common canalicular obstruction, fibrosis of a small anastomosis,[5] and obstruction of the bony window with new bone formation.[6] In order to increase the success rate, creating a large osteotomy is one of the suggestions; however, there is no agreed dimension regarding the iatrogenic defect to be opened.[4,7] Theoretically, the created defect should be large enough to expedite the flap anastomosis during the operation and maintain the long-term opening, but be narrow enough to ensure no facial and medial canthal deformity. Such a defect can be referred to as a 'critical size bone defect', which does not heal spontaneously.[8]

The purpose of this study is to determine whether it is possible to create a critical size bone defect in external DCR, and then determine at what size a defect can be considered as critical. In functional and structural evaluations, computed tomography (CT) and nasal endoscopy were used to follow up the patency structurally and functionally in certain periods.

Materials and methods

Thirteen female (72.2%) and five male (27.8%) patients underwent DCR. The patients were between 18 and 72 years old (mean $\pm$ S.D.: 45.3 $\pm$ 13.9). The patients with epiphora and chronic dacryocystitis were operated on, while canalicular or common canalicular blockage confirmed by probing, noticeable lid laxity, previous lacrimal surgey, patients younger than 16 years of age, suspicion of malignancy, radiation therapy, posttraumatic lids and bony deformity were the criteria used to decline the operation. Routine ophthalmic examination, in addition to lacrimal sac regurgitation test, syringing, probing and nasal examination, was performed preoperatively. CT measurement of the bony window and nasal endoscopic examination were carried out postoperatively to assess the patency of the anastomosis.

Surgical technique

All of the operations were performed by the senior author (AA) under general anaesthesia using the technique described by Dupuy-Dutemps and Bourguet.[4] During the operation, a 20 mm vertical skin incision 8 mm medial to the inner canthus was made. Orbicularis muscle was bluntly separated to identify the periosteum. The medial canthal ligament was found, and after marking the anterior crus with a suture material, this was detached with a periosteal incision, preserving the posterior crus undisturbed. The sac was exposed, and gently lateralised from the lacrimal fossa. The suture between the lacrimal bone and ethmoid bone was first bored and then, through the hole, a Kerrison's rongeur was used to create a bony gap. The entire defect was 2 cm in vertical plan and 2 cm in horizontal plan. Vertically, the upper border extended to the skull base 5 mm above the internal opening of the common canalicus, and the lower border extended to include the bony nasolacrimal canal and was 2 cm in length. In horizontal plan, the posterior surgical margin was the posterior lacrimal crest, which was precisely preserved, and the anterior border was 1 cm medial from the anterior lacrimal crest towards the anterior ethmoid bone leading to an anterior ethmoidectomy. Thus the entire defect became 2×2 cm (Fig. 1). Both the anterior and posterior nasal and sac flaps were anchored with 6/0 Vicryl® sutures to achieve a patency. The procedure was completed with the reinsertion of the previously marked anterior crus of the medial canthal ligament to the remaining periosteum on the opposite site. From a surgical point of view, the enlarged bony gap also expedited the anastomosis of posterior flaps.

Postoperative follow up

The patency of the lacrimal system was controlled with postoperative irrigation on the first day, and then continued at three month intervals for 2—4 years.

The coronal and axial sizes of the bony windows were measured with orbital CT measurements postoperatively for 2—4 years. Measurements were performed using a ruler and the results were interpreted with a scale on the tomogram.

Nasal endoscopic examinations were performed using rigid Hopkins 0° and 30° telescopes (Storz, Germany) at the same time as CT scannings, and the anatomic and functional patency of the anastomosis were evaluated by irrigation and disappearance tests, respectively.

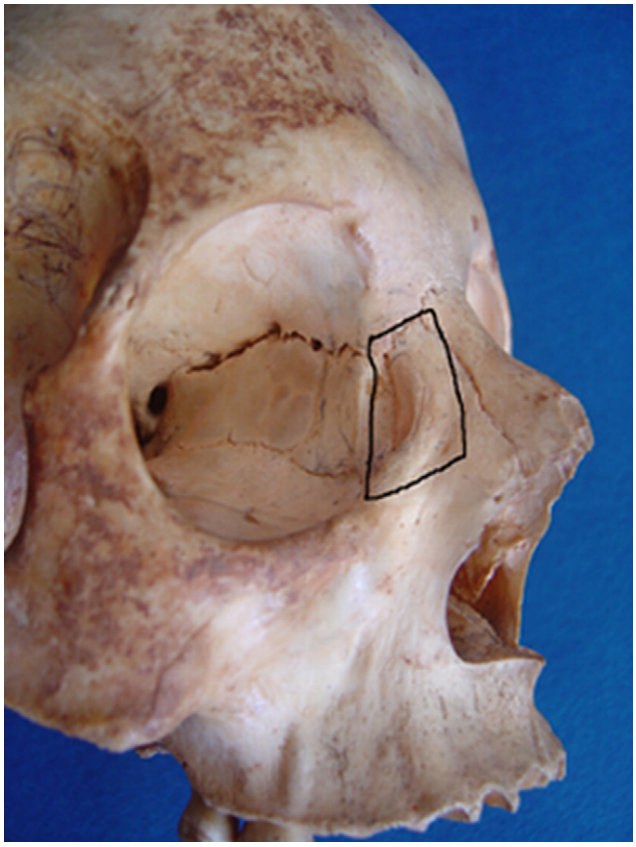

Figure 1 Demonstrative borders of a 2×2 cm bone defect in a skull.