

## Double Flap or Single Flap? Long Term Results

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### Abstract

**Purpose:** To compare the clinical outcomes of external dacryocystorhinostomy (DCR) by using two different methods, a double flap method (both anterior and posterior flap) or a single flap method (only anterior flap).

**Methods:** A retrospective, comparative, single-center clinical trial of two hundred ninety-five patients who received external DCR with anterior and posterior flap (Group A) and only anterior flap anastomosis (Group B). The demographics, clinical findings, and the nasolacrimal canal function were evaluated before and after the surgery during follow-up. The function of the nasolacrimal canal was evaluated with inferior punctum irrigation/lavage. The successful surgical outcome was defined objectively by irrigation of the punctum without regurgitation or force and subjectively by the absence of the closure.

**Results:** At the end of the average  $33 \pm$  six months follow-up period, the overall success rate of DCR was %90.2. There was no significant difference in the success rate between the two groups (p-value 0.45,  $p > 0.05$ ), with %91.03 in Group A and %89.37 in Group B. No significant intraoperative or postoperative complications were noted.

**Conclusion:** We believe that anastomosis of posterior flaps does not affect the success rate of external DCR in long-term follow-up. The single flap is easier and quicker to perform than the double flap method and has the advantage of double flaps DCR.

**Keywords:** Dacryocystorhinostomy (DCR); Italy; Flap

### Introduction

Epiphora or abnormal tearing are the most common manifestations of blockage in the lacrimal drainage system. If the backup does not resolve after an extended period, it may cause fistulization by itself as a complication, or external dacryocystorhinostomy (DCR) may be needed. A successful DCR involves surgical fistulization of the lacrimal sac into the nasal cavity, which may alleviate the symptoms permanently. Toti (1904, Italy) first described the technique of external DCR [1].

External DCR is a highly successful procedure in adults with epiphora due to nasolacrimal duct obstruction [2,3]. In the literature, the reported success rate varies between 85% and 99%, depending on the time of the surgery, age, and the initiation of the medical or surgical treatment [2]. However, external DCR is not technically easy and requires considerable experience and operative time. In addition to previously described parameters, the success of DCR depends on creating a mucosa-lined anastomosis that prevents the post-op adhesions and its remaining patent. Granulation tissue

formation around the anastomosis is the natural inflammatory response of the body as a part of the healing process, which occurs immediately following tissue damage. Unfortunately, this healing response results in fibrous scar tissue from the granulation tissue. The adhesion of the anterior to the posterior flaps or any part of the lacrimal sac, obstruction in the common canalicular end, excessive tissue formation around the flap anastomosis, and the closure of the osteotomy site may be the possible underlying causes of postoperative closure of the nasolacrimal pathway [4-10].

Since double flap techniques take a long time and need more surgical experience, the purpose of this study was to compare the surgical outcomes of external DCR for nasolacrimal duct obstruction using two different methods; anastomosis of both the anterior and posterior flaps, or anastomosis of only the anterior flap with the long term results.

**Methods**

**Patient selection and study design**

This retrospective chart review of 295 patients seen in Dr. Lutfi Kırdar Kartal Training and Research Hospital from August 2006 to December 2010. All patients underwent preoperative ophthalmic examination and irrigation (nasolacrimal lavage). The patients with punctual anomalies, canalicular obstruction or physiological pump failure, secondary epiphora (the eyelid, punctum, conjunctiva, globe, and tear film abnormalities), re-DCR operations, and the patients with nose anomalies by the consultant of ear nose throat specialists (ENT) or systemic disorders which can affect the healing process were excluded from our study. Additionally, the patients with any complications during the procedure were also excluded. The success of the surgical outcome was defined objectively by irrigation of the punctum without regurgitation or force and subjectively by the absence of the closure. The study was conducted per the tenets of the Declaration of Helsinki and approved by the institutional ethics committee.

**Surgical technique**

All operations were conducted under general anesthesia by the same surgeon. With the patients under anesthesia, the nasal cavity of the operable side was decongested for 10 minutes with cotton pledgets soaked in 2% lidocaine with adrenaline (1:200000) and 0.025% xylomethazoline. A curved 11 mm skin incision was placed 3.5 mm nasal to the medial canthus. Next, the orbicularis

muscle was bluntly dissected, and the anterior limb of the medial canthal tendon and periosteum were exposed. A squared-shaped osteotomy of approximately 15 × 15 mm was then made with Kerrison punch. An H-shaped incision was created in the lacrimal sac and the nasal mucosa. The lacrimal sac incision was passed through the lower canaliculus to tent the medial sac wall.

For both groups, the surgical technique was identical besides the presence. Of double flap/single flap. In group A, the anastomosis of posterior and anterior flaps was done (double flap technique), and in group B, only anterior flaps were sutured(single flap technique). Finally, the orbicularis muscle and skin were closed. 6/0 polyglactin absorbable sutures were used for flap anastomosis and all incision closures. Corticosteroids and antibiotic eye drops were administered four times daily for ten days after surgery to prevent local inflammation and adhesions for both groups.

Follow-up examinations were performed on the first week and first month and after 6, 12, 24, and 36 months from the surgery date. Subjective epiphora, if any, was evaluated with Munk’s score [Table 1]. Criteria for failure were non-patency on irrigation and, most importantly, subjective epiphora beyond Munk’s score [12].

Grade 0	No epiphora
Grade 1	Occasional epiphora requiring dabbling less than twice a day
Grade 2	Epiphora requires dabbling two to four times per day
Grade 3	Epiphora requires dabbling 5-10 times per day
Grade 4	Epiphora requires dabbling more than ten times per day
Grade 5	Constant tearing

**Table 1:** Munk’s score of epiphora [12].

**Statistical analysis**

Statistical analysis was performed by using SPSS 16.00. The Chi-square test was used to compare groups regarding categorical variables. Statistical significance was set at p < 0.05.

**Results**

The study included two hundred ninety-five patients with a mean age for Groups A 57 ±6 and Group B 59 ±4 were included in

the study, with a mean follow-up of  $33 \pm$  six months. There was no statistical difference between groups by age. The overall success rate of DCR was %90.2, consistent with the previously published data. There was no significant difference in the success rate between the two groups (p-value 0.45,  $p > 0.05$ ), with %91.03 in Group A and %89.37 in Group B. No significant intraoperative or postoperative complications were noticed.

## Discussion and Conclusion

Epiphora or nasolacrimal duct obstruction is more common than other ocular pathologies in adults. To manage nasolacrimal duct obstruction, a few traditional strategies can be performed. Dacryocystorhinostomy (DCR) remains one of the most successful and long-lasting surgeries to treat nasolacrimal duct obstructions in adults [2-7]. There are some contributing factors to the success of DCR, such as depending on creating a successful mucosa-lined anastomosis and the newly created anastomosis remaining patent. Possible postoperative occlusion of the new track, either by granulation tissue or by adhesion between the flaps, is a complication of this surgical procedure. It has been widely suggested that the creating and suturing of both anterior and posterior mucosal flaps increases the success of possible primary healing of the new track and reduces abnormal mucosal scarring with the help of the general surgical principle of edge-to-edge approximation of tissues [14-17].

Even though the double flap procedure appears to achieve this goal better, alternative techniques of external DCR were also proposed to provide similar outcomes in many different studies. The variations in the mucosal flap design have been described, and success rates have been reported to be comparably high [18].

Despite the disagreement regarding using single or double flaps, the overall success rate of external DCR has been reported to be as high as 93-100% [8,10,19-21]. In surgical techniques, performing the anastomosis by suturing only anterior flaps and excision the posterior flaps is more manageable. It does not appear to affect the outcome of DCR surgery adversely. Like our study, Erdogan G., *et al.* demonstrated a high success rate in a randomized study by doing DCR with single vs. double-flap anastomosis. In their research, DCR with double flaps had no advantage over DCR with only anterior flaps, having success rates of 93.75 and 96.67%, respectively [22].

There have been few other studies comparing the success rate of different techniques, and they have examined the difference in outcomes of the method of mucosal anastomosis, mainly. Baldacci, *et al.* compared the three other forms of mucosal flap design (anterior and posterior, extended anterior with posterior and only anterior) in external DCR. Interestingly, they found that the success rates among the three groups differing in flap design were similar [8]. In another study, the single flap with an inferior flap design showed that it simplified success rates with those found in conventional DCR [23].

Another study has shown that the DCR procedure with or without excision of the posterior mucosal flaps provided similar surgical outcomes at the end of the 11-month follow-up [10]. In a similar study, two different flap designs involving the anastomosis of both anterior and posterior mucosal flaps or only the anterior anastomosis had similar outcomes. (93.75% and 96.67%, respectively) [20].

Based on our data, our patients with nasolacrimal duct obstruction had similar clinical outcomes. Our study reached a similar success rate in both groups. (Group A %91.03, Group B %89.37).

Our study has some limitations, such as retrospective design and the relatively small patient population. However, our analysis remains essential, demonstrating the comparison of two main DCR techniques' outcomes in the long term.

Many ophthalmologists intend to perform the double-flap technique, owing to its accordance with surgical principles; however, there is no strong evidence showing its advantage over alternative flap techniques. Anastomosis of only the anterior flap is technically more straightforward, and having a single flap does not seem to affect the outcome of DCR surgery negatively or significantly.

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