

# Probing in adults with nasolacrimal duct obstruction

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## Abstract

**Aim:** To investigate the efficacy of probing in adults with epiphora due to nasolacrimal duct obstruction.

**Patients and methods:** A retrospective study was conducted to investigate the efficacy of probing and irrigation of 72 lacrimal systems in 60 adults with nasolacrimal duct obstruction where epiphora was the only symptom. At follow-up, the procedure was considered successful if the epiphora had been resolved or reduced to an acceptable level for at least 6 months, and if the lacrimal system was patent on irrigation.

**Results:** The patients comprised 44 women and 16 men with a mean age of  $48.2 \pm 12.9$  years (range, 19.0 to 70.0 years). The patients had had epiphora for 1.0 to 60.0 months (mean,  $18.5 \pm 17.5$  months). The treatment was successful in 77.8% of patients 6 months after the procedure. The follow-up period was 6.0 to 48.0 months (mean,  $9.2 \pm 7.0$  months).

**Conclusion:** Owing to the low morbidity rate, as well as the ease of use and low cost, probing can be recommended as an outpatient procedure for the initial treatment of adults with nasolacrimal duct obstruction who do not wish to undergo a surgical procedure.

**Key words:** Adults, Epiphora, Lacrimal duct obstruction, Probing

## Introduction

Epiphora due to nasolacrimal duct obstruction (NLDO) is a common problem in ophthalmological practice.<sup>1,2</sup> The causes of NLDO may be idiopathic, congenital, infectious, cicatricial, involutional, neoplastic, traumatic, or iatrogenic.<sup>3-5</sup> The most common form in adults, however, is idiopathic primary acquired NLDO.<sup>6,7</sup> Inflammatory and cellular debris

accumulated in the sac due to ineffective drainage can create an environment conducive to the development of infection, and long-standing infections can lead to fibrosis of the sac wall.<sup>6,8</sup> In this study, the efficacy of probing as an initial treatment for adults with NLDO was investigated.

## Patients and methods

The efficacy of probing was retrospectively investigated in patients attending the Cerrahpasa Medical Faculty in Turkey from October 1994 to March 1999 with the complaint of moderate to severe epiphora. Patients were aged 19 years or older and had either partial or complete NLDO in which epiphora was the only symptom. Obstruction was idiopathic in all patients.

The patients' records were evaluated, including detailed history, slit-lamp examination for eyelids and lacrimal puncta positions, and the presence of mucous secretions or pus. In addition to the dye disappearance test (DDT), Jones primary dye test and lacrimal irrigation were performed.

Partial NLDO was defined as a negative Jones primary dye test and lacrimal irrigation revealing simultaneous reflux through the opposing punctum and drainage into the nose.<sup>9</sup> Complete NLDO was diagnosed by lacrimal irrigation. Jones secondary dye test for 5 eyes, dacryoscintigraphy for 21 eyes, dacryocystography with lipiodol for 10 eyes, and digital subtraction macrodacryocystography for 13 eyes were carried out for the diagnosis of NLDO.

Exclusion criteria included stenosis or obstruction of the canaliculi or common canaliculi, acute dacryocystitis, peri-orbital cellulitis, lacrimal sac fistula, diverticulum, mucocele or tumor, and previous lacrimal surgery. In addition, patients with nasal cavity pathologies, epiphora due to cold and wind, eyelid deformities, lacrimal pump dysfunction, and congenital epiphora were excluded from the study. Nine

patients were excluded because of severe pain experienced during probing.

After the risks and benefits of the procedure were explained, informed consent was obtained. The procedure and irrigation were carried out under topical anesthesia with 4 drops of oxybuprocaine 0.4% at 5-minute intervals. In addition, 10 patients with severe resistance to the treatment were given local infiltrative anesthesia. Following punctal dilation, probing was done through the upper canaliculum with a Bowman Probe (No 1). The probe was held in the nasal cavity for 30 seconds to stop possible bleeding. After the probing, irrigation with saline solution was done to test the patency. After the procedure, antibiotic eye drops (4 times daily) and nasal decongestant drops (otrivine twice daily) were prescribed for 1 week. If there was no improvement, probing and irrigation were repeated 2 months after the first treatment. All probings were performed by the same surgeon.

Patients were followed up at 1 week, 1, 3, and 6 months, and 1, 2, and 4 years. During the checkups, the patients were asked whether or not they had been free of epiphora. The DDT test was conducted and, if necessary, Jones primary dye test was applied to the patients to differentiate whether epiphora was caused by hypersecretion. Treatment was considered successful if epiphora had not recurred for at least 6 months after the procedure, and if functional lacrimal patency was confirmed with lacrimal irrigation. The following stages were used for post-treatment evaluation of clinical improvement: stage 0 (no epiphora with patent lacrimal system), stage I (decreased epiphora, patent lacrimal system), stage II (relatively decreased epiphora, nasolacrimal duct not patent), stage III (epiphora persisting as before probing, nasolacrimal duct not patent). Stages 0 and I were considered successful, and stages II and III unsuccessful.

Patients were rated for laterality, follow-up time, efficiency, and complications of probing. The results were evaluated statistically by the Chi squared test.

## Results

The study group comprised 72 eyes of 60 patients (44 women and 16 men), and the mean age was  $48.2 \pm 12.9$  years (range, 19.0 to 70.0 years). NLDO was seen on the right side in 22 patients, on the left side in 26 patients, and bilaterally in 12 patients. Thirty four eyes (47.2%) had partial NLDO and 38 (52.8%) had complete NLDO. Epiphora had persisted for 1.0 to 60.0 months (mean,  $18.5 \pm 17.5$  months). **Table 1** shows the demographic features of the patients.

Fifty eyes (69.4%) were successfully treated by the first probing during the first 6 months' follow-up. In 7 eyes, symptomatic epiphora recurred 2 to 8 weeks after the first probing. After patient consent to a second intervention, 22 eyes (30.6%) in which probing failed or in which there was recurrence after the first probing (10 partial NLDO and 12 complete NLDO) were probed 2 months after the initial procedure. The overall success rate after the second probing

**Table 1. Demographic characteristics of patients.**

Number of patients	60
Men	16
Women	44
Number of eyes	72
Partial obstruction	34
Complete obstruction	38
Mean age $\pm$ standard deviation (years)	$48.2 \pm 12.9$ (range, 19.0-70.0)
Epiphora duration $\pm$ standard deviation (months)	$18.5 \pm 17.5$ (range, 1.0-60.0)
Follow-up duration $\pm$ standard deviation (months)	$9.2 \pm 7.0$ (range, 6.0-48.0)

**Table 2. Stage distribution of symptomatic improvement of probing after a follow-up period of at least 6 months.**

	Number of eyes (%)
Stage 0	49 (68.1)
Stage 1	7 (9.7)
Stage 2	2 (5.5)
Stage 3	14 (16.7)

of the 22 eyes increased the overall success rate to 77.8% (56 eyes) during the first 8 months of follow-up. **Table 2** shows the functional outcomes of probing. The follow-up period was 6.0 to 48.0 months (mean,  $9.2 \pm 7.0$  months).

Probing was successful in 24 of 34 eyes (70.6%) with complete NLDO and in 32 of 38 eyes (84.2%) with partial NLDO. There was no significant difference in the success rate for complete and partial NLDO ( $p > 0.05$ ; Chi squared, 1.93). Furthermore, age ( $p > 0.05$ ; Chi squared, 0.54) and sex ( $p > 0.05$ ; Chi squared, 0.02) were not related to the success rate. Statistically, there was a significant difference between the success rates of the first and the second probings ( $p < 0.01$ ; Chi squared, 12.44). However, there was no statistically significant difference in epiphora duration ( $p > 0.05$ ; Chi squared, 0.06). After the first probing, the recurrence rate for stage 1 disease was significantly higher than that of stage 0 ( $p < 0.05$ ; Chi squared, 4.40). The recurrence rate was 7.1% for eyes with epiphora of 6 to 12 months' duration, 12.0% for 12 to 24 months' duration, and 12.2% for more than 24 months' duration. There was no significant relationship between duration of epiphora and recurrence ( $p > 0.05$ ; Chi squared, 0.29). There was no significant difference between the recurrence rates of complete and partial NLDO ( $p > 0.05$ ; Chi squared, 0.06). The mean time to perform the procedure was 5 minutes (range, 3 to 7 minutes). Temporary lid edema after probing and irrigation was seen in 2 patients.

## Discussion

Epiphora can be due to partial or total obstruction in the canaliculus, common canaliculus, lacrimal sac, or nasolacrimal canal. Lacrimal pump disorders can also cause epiphora. The most common lacrimal drainage system

pathology is obstruction of the nasolacrimal canal. Since the nasolacrimal canal is longer and narrower in women, NLDO is seen more frequently among females.<sup>7</sup> Women comprised 73.3% of the study group, and 20.0% had bilateral involvement. Guinot-Saera and Koay stated that 60% of their study group was composed of females, who had a bilateral involvement rate of 30.7%.<sup>6</sup>

The objective of treatment of epiphora due to NLDO is to open the lacrimal drainage passage. The ideal treatment of NLDO may vary according to the ophthalmologist's preference. The options include probing, dilatation with balloon catheterization, metallic or plastic stents, silicone tube implantation, and external and internal dacryocystorhinostomy (DCR).<sup>10-17</sup>

Although external DCR is the most successful mode of treatment for NLDO, a high failure rate after primary external DCR has been reported by several authors.<sup>17-19</sup> This rate of failure has led surgeons to seek alternative treatment models. Silicone tube implantation has been recommended, but various complications have been reported with this method in 8% to 29% of patients.<sup>15,20</sup> The balloon catheter procedure is simple, but failure and recurrence rates are high.<sup>11,21,22</sup> In addition, during catheter placement or removal, canalicular damage, localized inflammation, and edema may occur.<sup>1,2,11</sup> Endoscopic endonasal DCR is another option for the treatment of NLDO. However, it is expensive and necessitates experienced surgeons, and has failure rates of 18% to 20%.<sup>23-25</sup>

Probing for NLDO was in common use until the 1920s.<sup>10</sup> However, there is a dearth of published reports on this procedure.<sup>26,27</sup> Bell reported a 75% subjective success rate 6 months after probing as a treatment for epiphora.<sup>10</sup> Guinot-Saera and Koay stated that patients with NLDO and those with

symptomatic epiphora had symptom improvement of 82% with the first probing.<sup>6</sup> Delcoigne and Hennekes successfully treated 40% of eyes with inferior lacrimal duct stenosis by catheterization in adults.<sup>28</sup> Tsai et al reported a patency rate of 94% 9 months after lacrimal probing with adjunctive mitomycin C for adults with blocked nasolacrimal ducts.<sup>29</sup> In our study, the symptomatic improvement rate was 69.4% with the first probing and 77.8% with the second.

Stenosis of the canaliculi or common canaliculus can be a possible cause of a false passage due to probing-related surgical trauma.<sup>30</sup> However, the other surgical treatment methods for NLDO are more expensive, difficult, and invasive.<sup>6</sup>

Probing has no cosmetic or psychological complications and, since the medial canthal ligament is not cut, it does not affect the lacrimal pump mechanism. It also can be easily performed following the anatomical passage. Our results were quite satisfactory, with minimal trauma to surrounding tissues. We believe that probing may be recommended, especially for patients with partial NLDO. The morbidity is low and the intervention time is short.

Since there are risks associated with general anesthesia, topical anesthesia is preferred for older and cooperative patients. Probing may be preferable as an outpatient procedure, as it is simple and economical and decreases the requirement for DCR. Furthermore, this method requires neither expensive and complex equipment nor sophisticated training.

We suggest that for the treatment of epiphora in patients with NLDO in which watering is the only symptom, probing can be considered an initial treatment, especially for those patients who are poor candidates for surgery. A considerable proportion of NLDO in adults is treatable with this simple and inexpensive method.

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