



# Overview of Epiphora Referred to Oculoplastic Surgery Clinic in Adults

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## Abstract

**Objectives:** The aim of the study was to evaluate etiological and demographic characteristics of the adult patients referred to the oculoplastic surgery clinic of the tertiary care center with the complaint of epiphora.

**Methods:** The medical records of the patients who applied to the oculoplastic surgery clinic with a complaint of epiphora between January 2014 and July 2021 were reviewed retrospectively. Etiology of epiphora, age, gender, duration of symptom, and follow-up period were evaluated. According to the etiological factors, nasolacrimal system disorders such as punctal stenosis, canalicular stenosis, canaliculitis, and acquired nasolacrimal system obstruction, respectively; the causes of epiphora were grouped as eyelid abnormalities such as entropion and ectropion, and hypersecretory tear secretion due to causes such as dry eye, allergy, and inflammation. The patients with epiphora over the age of 18 with at least 6 months of follow-up were included in the study. Patients with congenital or tumor-related nasolacrimal duct obstruction (NLDO) and epiphora due to trauma-related eyelid or canaliculi injury were not included.

**Results:** A total of 595 medical fields were evaluated. Epiphora was present in 747 eyes of 595 patients. Of the patients, 221 (37%) were male and 376 (63%) were female. According to etiological evaluation of frequency, 372 (62.5%, 432 eyes) patients with NLDO, 63 (10.5%, 123 eyes) patients with punctal stenosis, 44 (7.3%) patients with ectropion, 38 (6.3%) patients with entropion, 37 (6.2%, 69 eyes) patients hypersecretory causes (dry eye, allergy, inflammation, etc.), 24 (4%) patients had primary canaliculitis, and 17 (2.8%) patients had epiphora due to canalicular occlusion.

**Conclusion:** Epiphora is an important complaint that may occur due to different etiologies. A detailed examination of the anterior segment, lacrimal system and eyelids, and taking a history are the most important steps in the management of the patient.

**Keywords:** Canaliculi, Epiphora, Etiology, Lacrimal system, Nasolacrimal duct, Punctum

## Introduction

Epiphora is one of the most common complaints in ophthalmology clinics. It significantly impairs the patients' quality of life. Watering occurs when the balance between tear production and absorption is disrupted for some reason. Primary tear hypersecretion is rare and may be caused by aber-

rant regeneration (crocodile tears) after facial nerve injury or hyperfunction of the lacrimal gland. Dry eye, inflammation, allergy, and other ocular surface conditions may cause secondary tear hypersecretion. Epiphora may be caused by an abnormal eyelid position, a dysfunctional tear pump, and a partial or complete obstruction of the nasolacrimal duct (1). In addition, all of these reasons can be seen together as well.

**How to cite this article:** Serbest Ceylanoglu K, Acar A, Sen E. Overview of Epiphora Referred to Oculoplastic Surgery Clinic in Adults. *Beyoglu Eye J* 2023; 8(1): 45-49.

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**Submitted Date:** May 05, 2022 **Revised Date:** January 03, 2023 **Accepted Date:** January 06, 2023 **Available Online Date:** March 01, 2023

*Beyoglu Eye Training and Research Hospital - Available online at [www.beyoglueye.com](http://www.beyoglueye.com)*

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In the literature, some studies have documented the etiology, follow-up, and treatment options for patients with epiphora who are referred to oculoplastic surgery clinics (2-4). In this study, we aimed to retrospectively evaluate the etiology and demographic characteristics of epiphora patients.

## Methods

A retrospective and chart review was conducted on patients with epiphora, who were referred to the oculoplastic surgery clinic of the tertiary ophthalmology hospital between January 2014 and July 2021. Due to the retrospective nature of the study, an informed consent form was not obtained from the patients. The study was planned in accordance with the Declaration of Helsinki and ethics committee approval has been obtained (March 09, 2022, E22–922).

This study included patients over the age of 18 who complained of epiphora and was followed up in the oculoplastic surgery clinic for at least 6 months. Patients with epiphora due to congenital nasolacrimal duct obstruction (NLDO), tumor-induced NLDO, and trauma-related eyelid or canaliculi injury were not included in this study.

Data regarding age, gender, etiology, duration of symptoms, and follow-up periods of all patients were retrospectively recorded. In our clinic, a routine approach is applied to determine all etiological causes for the evaluation of epiphora. For every tearing patient referred to oculoplastic surgery clinic, lacrimal irrigation is performed to analyze for functional/anatomical obstructions of the punctum, canaliculi, lacrimal system, and Schirmer test, tear break-up time, corneal and conjunctival staining is performed to evaluate for dry eye. Furthermore, we assessed eyelid diseases such as entropion, ectropion, and trichiasis. These patients were categorized into lacrimal system diseases (e.g., punctal stenosis, canaliculitis, canaliculi obstruction, and NLDO), eyelid malpositions (e.g., entropion and ectropion), and hypersecretory causes (e.g., dry eye, superficial corneal diseases, allergy, and inflammation).

Statistical analyses were performed with Statistical Package for the Social Sciences (SPSS Inc., Chicago, Illinois, USA) version 22.0. Continuous variables were presented as the mean±standard deviation, and quantitative variables were presented as frequency (%). For categorical variables, the Chi-square test was used. The mean age, follow-up period, and symptom duration of more than two groups were compared using analysis of variance (ANOVA), Independent-t test was used to compare between two groups.  $P < 0.05$  was considered statistically significant.

## Results

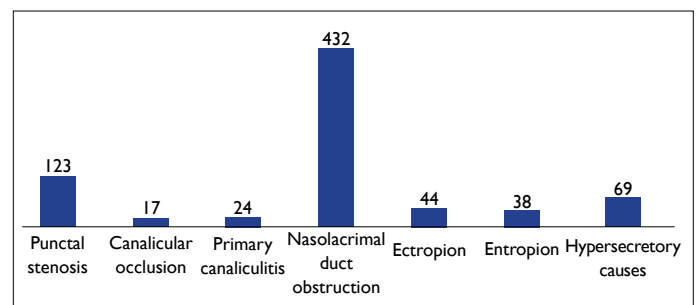
According to a retrospective chart review, there were epiphora complaints in 747 eyes of 595 patients. Epiphora

was present in both eyes of 152 patients. There were 221 males (37%) and 374 females (63%) in the study. The female male ratio was higher in the patients with epiphora due to punctal stenosis (68%), canalicular occlusion (59%), acquired NLDO (70%), and entropion (53%). The mean age of all patients was 57.9 years (between 21 and 85 years). The mean age of patients with epiphora due to lacrimal system disorders, eyelid malpositions, and hypersecretory causes was  $52.3 \pm 5.06$  years,  $72.15 \pm 1.05$  years, and  $51.2 \pm 10.2$  years, respectively. The patients with eyelid malpositions were significantly older than the other groups (lacrimal system diseases and hypersecretory causes) ( $p = 0.012$ ). There was no statistical difference between the mean ages of patients with epiphora due to lacrimal disorders and hypersecretory causes. There were 123 (16%) eyes with punctal stenosis, 17 (2%) eyes with canalicular occlusion, 24 (3%) eyes with primary canaliculitis, 432 (58%) eyes with NLDO, 44 (6%) patients with ectropion, 38 (5%) patients with entropion, and 69 (9%) patients with hypersecretory epiphora (dry eyes, allergies, inflammation, etc.). Figure 1 shows the distribution of patients based on the etiology of epiphora. Acquired NLDO was the most common cause of epiphora (432 eyes, 58%), followed by punctal stenosis (123 eyes, 16%). Demographic characteristics of patients referred for epiphora are given in Table 1.

## Discussion

Epiphora is a common complaint in ophthalmology clinics. The most critical step in treating epiphora is to determine the underlying cause, as it can be caused by a wide range of etiological factors. In this study, we evaluated the etiology and demographic characteristics of epiphora patients applied to the oculoplastic surgery clinic of a tertiary eye hospital.

There are few studies evaluating the etiology of epiphora in the literature (2-5). Based on these studies, acquired NLDO was most frequently observed as the etiological cause, which is similar to our findings (2-5). The mean annual incidence of NLDO is 30.47/100,000 (6). It is observed



**Figure 1.** Etiological distribution and number of patients referred for epiphora.

**Table 1.** Demographic characteristics of patients referred for epiphora

Etiology	Gender (M/F)	Mean age (year±SD)	Symptom duration (month±SD)	Follow-up duration (month±SD)
Lacrimal system diseases				
Punctal stenosis	20/43	58.72±11.2	19±9.4	39.9±12.4
Canalicular occlusion	7/10	52.4±5.2	14.2±4.5	6.2±2.3
Primary canaliculitis	17/7	50.4±12.1	19.1±10.1	24.5±17.1
Acquired NLDO	111/261	48.6±12.2	25.1±19.2	37.2±18.1
Eyelid diseases				
Ectropion	27/17	71.1±10.7	16.7±5.6	42.3±19.8
Entropion	18/20	73.2±10.6	9.1±2.3	36.5±15.2
Hypersecretory causes (dry eye, superficial corneal diseases, allergy, inflammation)	21/16	51.2±10.2	9.2±3.2	15.2±7.8

M: Male; F: Female; SD: Standard deviation; NLDO: Nasolacrimal duct obstruction.

3 times more frequently in women than in men (7). Consistent with literature, our study found a high proportion of female patients with NLDO (70%). Another important cause of epiphora is eyelid malpositions. Impaired pump function as a result of age-related loosening of the eyelids makes it difficult for the tears to pass into the lacrimal drainage system. In trichiasis or entropion, inward-turning cilia disrupt the ocular surface, causing epiphora. Contrary to other studies in the literature, Nemet (8) reported that the most common cause of epiphora was lower lid malposition (33.3%), followed by NLDO. In that study, the mean age of the patients was relatively higher than in other studies, which may be contributing to this hypothesis (69.4±15, between 15 and 96 years) (8). In the current study, the mean age of the patients was 57.9 years (between 21 and 85 years), whereas the mean age of patients with eyelid malposition was 73.2±10.6 years for entropion and 71.1±10.7 years for ectropion, respectively. The mean age of patients with eyelid malposition was significantly higher according to other groups ( $p=0.012$ ). Increasing prevalence of eyelid malpositions with advancing age may result in an increase in epiphora complaints. According to the literature, a relatively high incidence of eyelid malposition in the elderly population corresponds to our finding (9,10). Patients with epiphora should be examined for eyelid laxity even if there is no ectropion or entropion to elucidate the etiology, especially in the elderly.

Epiphora can also be caused by acquired punctal stenosis, which is caused by involution, inflammation, infection, or topical medication (11). A prospective study has shown that it is frequently observed in elderly or female patients, though the incidence is unknown (12). In the literature,

epiphora is observed in approximately half (42%) of patients with punctal stenosis (13). The rate of punctal stenosis in patients with epiphora ranges from 11% to 37.8% (5,8,14). We were unable to determine the prevalence of epiphora in patients with acquired punctal stenosis because asymptomatic patients were not referred to our clinic and therefore were excluded from this study. However; acquired punctal stenosis was the second most common cause of epiphora (16%). In addition, it was found to be more common in females, which is consistent with the literature (M/F: 20/43). The causes of punctal stenosis were not evaluated, which is one of the shortcomings of our study.

One of the most important causes of epiphora that should be considered in the differential diagnosis is lacrimal gland hypersecretion with dry eye. In the literature, the frequency of epiphora due to hypersecretory causes is approximately 22–52% (3-5,15,16). In our study, this rate was 9%, which is quite low compared to the literature. The reason for this is that when patients with epiphora were referred to our hospital, blepharitis was treated in the general ophthalmology outpatient clinic while dry eye was treated in the cornea clinic. Despite the fact that the rate of epiphora due to hypersecretory causes was low in our study, our general ophthalmological experience suggests that this rate is high, which is consistent with the literature. Epiphora caused by hypersecretory reasons and nasolacrimal system pathologies appeared at a younger age than epiphora caused by eyelid pathologies, according to our findings. The reason for this may be the increased incidence of eyelid malpositions due to involutional changes in advanced age.

In the literature, duration of symptoms is given at quite different periods (between 1 and 62 months) (5,13,16).

A study reported that the longest symptom duration in epiphora was due to eyelid malpositions (62 months) and the mean duration of symptom was 41 months (16). In our study, it was found that the mean duration of symptoms was  $25.1 \pm 19.2$  months for NLDO,  $19.1 \pm 10.1$  months for canaliculitis, and  $19.4 \pm 9.4$  months for punctal stenosis. In patients with primary canaliculitis, the duration of symptoms was longer. The reason may be the rare occurrence of the disease and delays due to missed diagnoses or mistreatment of the patients. The duration of symptoms in entropion and epiphora due to hypersecretory causes was shorter (mean 9 months) compared to other causes. The reason for this was thought that the patients may have applied earlier due to ocular surface defect.

Detailed history taking and ophthalmological examination are important steps in the management of epiphora. Conditions that require medical treatment, such as excessive secretion of reflex tears secondary to dry eye, inflammation, allergies, or other ocular surface diseases, should also be considered in the differential diagnosis. In a study by Ulusoy et al., evaluating 163 patients who applied to the general ophthalmology outpatient clinic with epiphora in our country, NLDO (48.4%) was the most common cause, followed by hypersecretory causes due to dry eye (38.7%) (5). However, considering the treatment rates, it was stated that 69.3% of the patients did not receive any treatment, 28.8% received medical treatment, and only 1.8% received surgical treatment. In our study, the treatment outcome was not provided, since the purpose was to emphasize the importance of detailed assessment in the management of epiphora.

There are some missing aspects of this study. Due to its retrospective design, only the patients referred to the oculoplastic surgery outpatient clinic were evaluated. Further studies with prospective designs evaluating patients admitted to the general ophthalmology clinic are needed to categorize all etiologies of epiphora. Another limitation was that due to our retrospective design, we were unable to use objective tests such as the fluorescein dye disappearance test, which is critical for distinguishing between a delay in lacrimal drainage and hypersecretion. In addition, since our institution is a specialty hospital, patients whose nasolacrimal system was impacted by factors such as chemotherapy, radiotherapy, or tumor-induced obstruction that would necessitate a multidisciplinary approach were excluded from the study.

## Conclusion

Epiphora is a general ophthalmological problem that can involve the anterior segment, eyelids, and lacrimal system. It can negatively affect patients of all ages in terms of daily

activities by impairing their visual functions. Even though NLDO is the most common cause of epiphora, other etiological causes should also be considered. However, after a detailed history and examination, the correct management of the patients can be achieved through the choice of medical or surgical treatment based on the etiology.

## Disclosures

**Ethics Committee Approval:** The study was planned in accordance with the Declaration of Helsinki and ethics committee approval has been obtained (March 09, 2022, E22–922).

**Peer-review:** Externally peer-reviewed.

**Conflict of Interest:** None declared.

**Authorship Contributions:** Concept: K.S.C., A.A.; Design: K.S.C., A.A.; Supervision – K.S.C.; Data collection and/or processing: A.A., K.S.C.; Analysis and/or interpretation: K.S.C., E.S.; Literature search: K.S.C., E.S.; Writing: K.S.C., E.S., A.A.; Critical reviews: K.S.C., E.S.

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