

# Endoscopic Dacryocystorhinostomy: 'Operative Problems in the Initial Cases'

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## Endoskopik Dakriosistorinostomi: 'İlk Olgulardaki Cerrahi Zorluklar'

Aynı kulak burun boğaz ve göz cerrahisi tarafından endoskopik dakriosistorinostomi uygulanan ilk 34 olgudaki (31 hasta, 3'ü çift taraflı) intraoperatif cerrahi zorluklar ve çözüm yollarının irdeelenmesi amaçlandı. İki olguda lakrimal kesenin intranasal lokalizasyonunun tespitindeki zorluk ve aşırı kanama nedeniyle eksternal metoda dönüldü. İlk olgulardaki en önemli problemlerden biri olan kesenin intranasal lokalizasyonu, transkanaliküler fiberoptik ile yapılan intranasal transillüminasyon ile aşıldı. Bu intranasal transillüminasyon olguların yaklaşık yarısında optik kullanarak monitörde gözlemlenemezken, optik kullanmadan anterior rinoskopi ile tüm olgularda başarılı olundu. Osteotomi, çekiç guj kullanılan bir olgu dışında dril kullanılarak gerçekleştirildi. Dril işlemi sırasında oluşan kemik talaşlar sık sık nazal optiğin kirlenmesine yol açtı. İki olgu dışındaki tüm olgular genel anestezi altında opere edildi. Genel anestezi altında yapılan operasyonlar kanama nedeniyle uzadı. Otuz dört olgunun son 22'sinde mukozal insizyon izole edilmiş orak bıçak ile hem kesi hem koterizasyon aynı anda uygulanarak yapıldı. Bu uygulama ile genel anestezi altında opere edilmelerine rağmen olguların çoğunda minimal kanama ile işlem sonuçlandırıldı. Sonuç olarak, ilk endoskopik dakriosistorinostomi olgularında karşılaşılan problemlerin standart araç gerece ek olarak birkaç enstrüman ile çözülebileceği düşüncesine varıldı.

**Anahtar Sözcükler:** Dakriosistorinostomi, endoskopi, lakrimal kanal tıkanıklığı, intraoperatif zorluk.

## Abstract

Of all the cases operated in our clinics by the same otorhinolaryngologist and ophthalmologist, the first 34 cases (thirty-one patients, three of which are bilateral) were evaluated to investigate the difficulties in endoscopic dacryocystorhinostomy operations and their solutions. In 2 cases, we had to perform the external method because of overbleeding and failure to find intranasal projection of the lacrimal sac. One of the most important problems in the first cases, the determination of intranasal projection of the sac was achieved by intranasal transillumination of the transcanalicular fiberoptic. Although the transillumination in half of the cases couldn't be projected onto the monitor with the video camera, the red reflection could be observed in all cases by direct vision. Postoperative periorbital ecchymosis occurred in one case. Osteotomy was performed by drilling in all cases except one patient, in which a hammer gauge was used. The bone dusts frequently causing the staining of endoscope during drilling resulted in a visual problem. All cases were operated under general anesthesia except two who were operated under local anesthesia. The endoscope in the cases operated under general anesthesia was frequently stained due to bleeding, which extended the operation time. While an isolated sickle blade was used for mucosal incision in the last 22 of the cases operated under general anesthesia to decrease the hemorrhage, the monopolar cauterization was applied to the mucosa at the same time. With this method, the process was performed with minimal bleeding in most of the cases who were operated under general anesthesia, though. In conclusion, it is believed that the problems encountered in the first endoscopic dacryocystorhinostomy cases may be solved by standard devices along with some other instruments.

**Key Words:** Dacryocystorhinostomy, endoscopy, lacrimal duct obstruction, intraoperative difficulty.

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## Introduction

Described in 1904 and modified later external dacryocystorhinostomy (EDCR) has been accepted as a standard surgical technique in the treatment of obstructions in the lacrimal drainage system. Intranasal approach was reported 11 years before this description.<sup>1-4</sup> Although the technique was modified later with bone resection on the lacrimal sac,<sup>5</sup> this approach was not put into practice as a routine application because of some technical difficulties encountered at that time. The risk of injury to the medial canthal ligament and lacrimal pump mechanism, the need for skin incision in EDCR as well as recent technical developments in nasal endoscopy have again brought the EDCR into agenda because of some superiorities such as low risk of surgical trauma, achievement of intraoperative hemostasis, decreased postoperative morbidity, and elimination of skin incision resurrected. The first intranasal endoscopic dacryocystorhinostomy (IEDRC) was performed on the cadavers in 1988 and the technique was described with endoscopic instruments.<sup>6</sup> Satisfactory results were reported using conventional surgical instruments, drills and nasal endoscopes.<sup>7,8</sup> Because of the problems encountered in creating a bony opening and in bleeding during the removal of nasal mucosa, argon, carbon dioxide, PTP (potassium titanyl phosphate) and holmium YAG laser were started to be used in IEDRC. Hence, it was reported that the bleeding decreased and operation time shortened.<sup>9-13</sup> Performed only by ophthalmologists by external method for a long period of time, dacryocystorhinostomy, when performed by intranasal approach, has become a team work of ophthalmologists and otorhinolaryngologists. Although IEDRC theoretically seems to be applicable by all otorhinolaryngologists experienced in endoscopic surgery, it is a fact that, in practice, many surgeons face with some problems while practicing it on the initial cases.<sup>14</sup> This study aims at discussing the intraoperative problems we experienced in the first 34 IEDRC cases in our clinics and the solutions suggested.

## Materials and Methods

In this study, first 31 patients who admitted to department of ophthalmology, outpatient clinics and were diagnosed as primary acquired nasolacrimal sac or duct obstruction according to the following criteria, were included. All patients had one or more of the following symptoms:

1. Continuous epiphora for at least 1 year,
2. Purulent discharge from the canaliculi when the lacrimal sac region was compressed
3. A mass below the inner canthus.

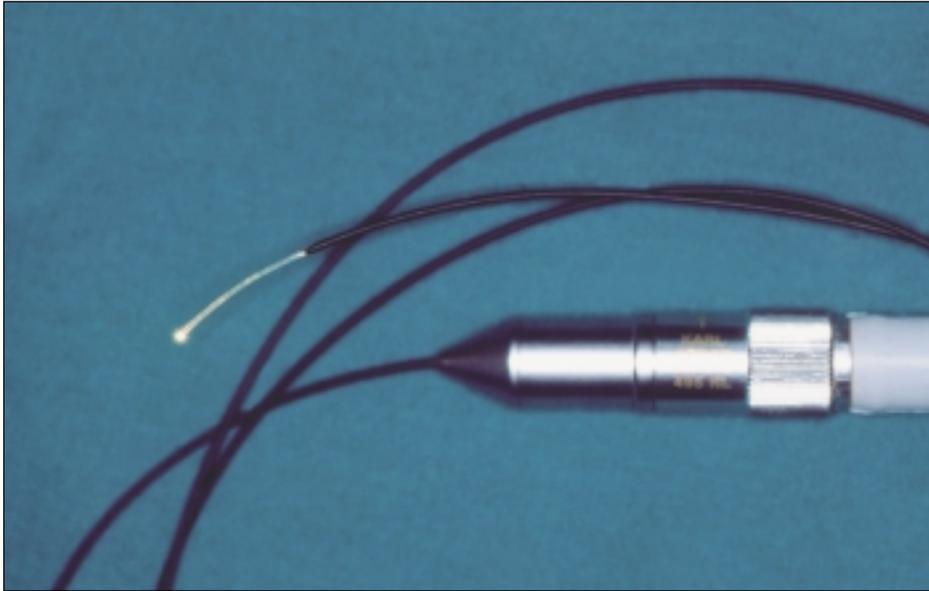
Lacrimal drainage system of each patient was evaluated by inspection, palpation, pressure on the lacrimal sac localization, irrigation of lacrimal sac and dacryocystography with computerized tomography. Six of the subjects were male (19%) and 25 were female (81%), with age range of 18-59 (mean 32.7). Thirty-four primer IEDRC, three of which were bilateral, was performed to 31 patients.

- Patients,
- a. with canalicular or common canalicular obstruction demonstrated by lacrimal sac irrigation,
  - b. who had previously undergone lacrimal surgery,
  - c. whose etiology involved trauma (due to post-traumatic bony deformity) and
  - d. who were diagnosed atrophic-scarred lacrimal sac in computed tomographic dacryocystography were excluded.

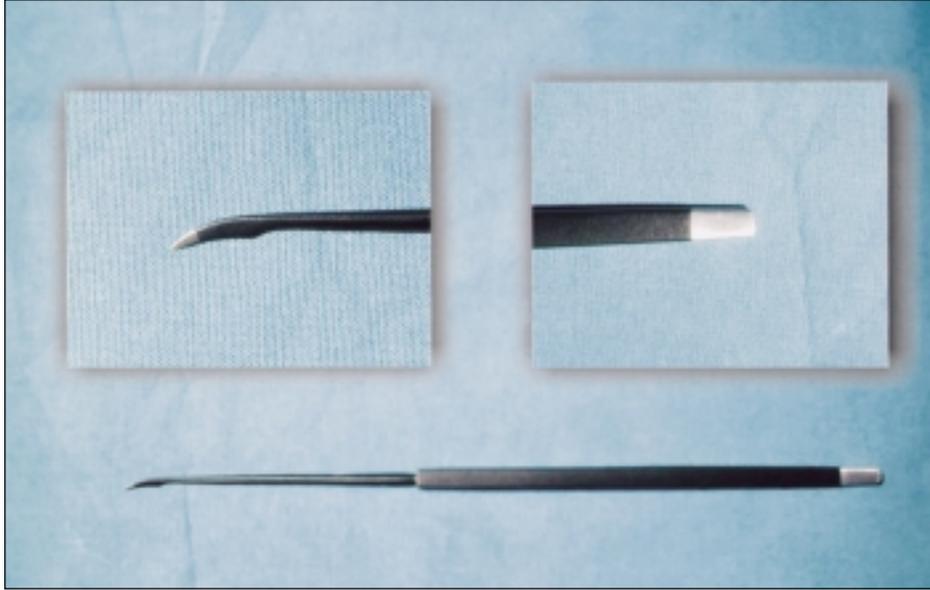
All of the cases were operated by the same ophthalmologist and otorhinolaryngologists. The image of nasal endoscope 4 mm in diameter and 0 degree (Karl Storz 7200A) was projected onto the monitor via a video-camera to enable both surgeons to follow the operation at the same time. Fifty milligrams meperidin was administered intramuscularly as premedication in 2 cases, operated under local anesthesia. Lidocaine (10%) absorbed cotton tamponade was inserted intranasally and 2% lidocaine with 1/100000 adrenaline was injected into the middle nasal turbinate and lateral nasal wall in concordance with lacrimal sac localization. In 32 cases operated under general anesthesia, on the other hand, 2% lidocaine with 1/100000 adrenaline was injected prior to the mucosal incision to decrease

hemorrhage and facilitate the elevation of mucosa. Having dilated the punctum with a lacrimal dilator, 20 gauge fiberoptic light probe (Endo-illuminator, Karl Storz Instruments, 495 NL) lubricated with antibiotic ointment was used for transillumination in all of the cases, except 4 (Figure 1). The light intensity of nasal endoscope was reduced in some cases to follow the reflection of transillumination on the monitor. However, in cases where the reflection could not be observed, anterior rhinoscopy was applied using the head lamp with reduced light intensity. Following the determination of sac localization, a rectangular incision in concordance with the localization of the sac was made with a sickle blade on the nasal mucosa of the first 12 cases. Mucosa was elevated and removed with an ethmoid forceps. In 22 cases operated under general anesthesia, the incision with a sickle blade having a non-isolated end and a tip of 2 mm was performed along with the mucosal incision where 30 watts monopolar cauterization was applied to reduce the bleeding (Figure 2). Osteotomy was performed by drilling in all cases except for one case where a hammer gauge was used. Anterior partial middle turbinectomy and middle turbinate infrac-

ture was performed in seven cases who had the possibility of obstruction in the osteotomy area. Along with IEDRC, septoplasty was performed in 2 patients whose septa were deviated. In case of visual difficulties due to bleeding, intraoperative nasal cotton tamponade with adrenaline was used. Having exposed the medial bony wall of lacrimal sac approximately 10x7 mm and 14x10 mm in dimension, the punctum was dilated with a punctal lacrimal dilator. The sac was elevated with Bowman lacrimal probe, and opened in 7 cases from up to down by a sickle blade. Having performed a similar elevation in 27 cases, the sac was opened as cross-shaped vertically and horizontally by using a Belucci ear micro scissors facing left in the right lacrimal sac and facing right in the left lacrimal sac and by using a straight micro scissors, respectively. Some of the medial sac wall was removed from the edges of the incision by using ear microsurgery instruments. A silicone tube was placed bicanalicularly in all of the cases and tied in the nose, then sutured with 4/0 prolene to the interior surface of ala of the nose. Postoperative nasal tamponade was used due to bleeding in two subjects.



**Figure 1.** The fiber optic light probe used for transillumination.



**Figure 2.** The sickle blade with a non-isolated end and a tip of 2 mm.

## Results

Although IDRCE method was aimed to be performed during the operations, external method had to be used in the 2nd and 4th of the first 4 cases because of extensive bleeding and failure to detect the intranasal projection of the lacrimal sac. A 20 gauge fiberoptic light probe was used in the other cases for intranasal transillumination of the lacrimal sac. Although the intranasal transillumination was successfully performed in 12 cases by endoscopy-video camera and monitored dully in 10 cases, no intranasal reflection could be determined in 12 cases even at a complete turn-off of the cold light. However, the red reflection in comply with the localization of the sac was determined by direct vision in anterior rhinoscopy. In some of the cases, the light intensity of the head mirror was reduced to see the reflection more clearly by direct vision.

While a cotton tamponade with adrenaline was frequently used intraoperatively due to bleeding blocking the vision in most of the cases where mucosal incision was performed without cauterization, the intraoperative bleeding was minimal in 18 of 22 cases where the incision was performed with

cauterization. The bleeding occurred in 4 cases thanks to the contact to the middle turbinate during the drilling of the bony wall.

Although a hammer gauge was tried to elevate the bony wall in the first cases, it turned out to give successful results just in 1 case. Therefore, a tungsten carbide drilling tip with different diameters and dense tooth was used. The bone dusts produced during drilling disturbed the vision by staining the fiberoptic.

It was observed that the incisions performed in thickened and dilated lacrimal sac -especially due to recurrent infections- by sickle blade was not sufficient manipulative. It was found out that Belucci ear micro-scissors used instead of a sickle blade for sac incision could be used successfully even in the cases where elevation couldn't be achieved following the first incision. It was also observed that alligator forceps used in ear micro-surgery was considerably practical for the surgical procedures performed in the medial wall of the sac.

Postoperative periorbital ecchymosis occurred in 1 case in which a large osteotomy was performed.

## Discussion

Conventionally, ophthalmologists are concerned with nasolacrimal surgery in punctal, canalicular and lacrimal sac diseases. However, diseases of nasolacrimal sac and duct may be directly related to a pathological process arising from the nose. Furthermore, among the reasons for failure in the sac surgery are intranasal pathologies such as abnormalities in ethmoid air cells,<sup>15</sup> enlarged middle conch and deviated nasal septum.<sup>16</sup> Therefore, the ophthalmologist should evaluate the patients together with an otorhinolaryngologist in the pre-operative, perioperative and even postoperative period. Rapid developments in endoscopic techniques narrow the scope of open surgery approaches to the nose and paranasal sinuses. Although the external approach in nasolacrimal sac has been relatively more successful than IEDCR, its disadvantages in increasing the incidence of complications such as scar tissue formation, the risk of disorder in pump mechanism, delayed wound healing, and rhinorrhea have made the IEDCR more popular.<sup>17-22</sup>

One of the most important problems at IEDCR operation is the determination of intranasal projection of the nasolacrimal sac and duct.<sup>23</sup> In this study, despite the fiberoptic probe used for the determination of the sac localization, the transillumination could not be projected onto the monitor in some cases, or the projection was very poor in the others. Although the authors employing some different probes reported no failure on the determination of the sac localization,<sup>9,11,12</sup> no reflection could be obtained on the monitor in some of our cases even the intensity of cold light source was completely turned off. However, in all cases the red reflection could be observed in the anterior rhinoscopy performed with forehead light. That the reflection could not be seen may be related to the thickened sac and bony wall. But the main causative factor thought of was that the illuminated tip of the probe which was flexible tended towards punctum without contacting the medial wall vertically. That the vitoretinal probe used by these

authors while performing transillumination in the localization of the sac was rigid and no failure<sup>9,11,12</sup> was reported supports this assumption.

The bleeding induced by vasodilator effects of inhalant anesthetic drugs in general anesthesia may disturb the endoscopic vision and increase the surgical complications.<sup>9</sup> When the laser is not used to decrease the bleeding during the removal of nasal mucosa, local anesthetics' infiltration with adrenaline and preparation of mucosa with cocaine, adrenaline and ephedrine has been recommended, even the operation is performed under general anesthesia. Although no information has been given about the bleeding in IEDCR performed under general anesthesia, the use of nasal tamponade in almost all cases<sup>7</sup> suggests that bleeding causes some problems. It has been reported that bleeding decreases by performing the mucosal evaporation with laser and that even laser is used to reduce only bleeding.<sup>9,11,12,21</sup> The reason for operating nearly all of our cases under general anesthesia were the low socio-cultural level of the patients, communication problems and their own choice. It was determined that bleeding reduced fairly in cases where the incision with an isolated sickle blade was performed at the same time with the mucosal cauterization. With this technique, except for the hemorrhage in 4 cases developed as a result of a contact to the middle turbinate during drilling, the bleeding was minimized in 18 cases and the intraoperative vision was not disturbed. Laser in IEDCR is generally used to reduce bleeding and create a hole in the bony wall. But the laser may be inadequate in the cases with a thick bony wall in opening a window in the bony wall. It is obvious that such a bony window can easily be opened by using a simple drill. Hence, the use of laser only for the evaporation of nasal mucosa in cases with a thick bony wall determined in the preoperative computerized tomography is a costly procedure. We are of the opinion that a monopolar cauterization available in most operation rooms is a useful device to minimize the bleeding during the incision of the nasal mucosa.

Laser, sickle blade, angular biting forceps, Blakesley forceps and radio-surgery may be used to open the medial wall of the lacrimal sac.<sup>7,9,24</sup> Laser and radio-surgery require some equipment. In our cases, the use of sickle blade was insufficient, especially in a dilated and thickened sac after opening a bony window. The sickle blade was observed to cause a mechanical trauma in the sac. Therefore, it was determined that, by using Bellucci ear micro-scissors, the incision could be handled easily without causing a trauma in the sac. The use of scissors functional at different angles provided some additional advantages. Laser has been reported in the literature to be a commonly used instrument to open the medial wall of the lacrimal sac.<sup>9,11,12,24</sup> It is beyond dispute that the use of laser is far more advantageous than the conventional surgical devices. Because of the financial problems in obtaining and using such devices in all operation rooms however, it is obvious that the use of conventional surgical devices is more economical.

It is concluded that endoscopic dacryocystorhinostomy might be performed at an acceptable level of comfort by using standard conventional surgical instruments available in any operating room.

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