



## Paediatric Endoscopic Dacryocystorhinostomy: A Treatment Option for Congenital Dacryocystitis

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### Abstract

*Congenital dacryocystitis is a condition that causes inflammation and infection of the lacrimal sac in newborns due to nasolacrimal duct occlusion. Traditional treatments for congenital dacryocystitis include lacrimal sac massage and topical medicines. If these therapy are proved to be ineffective, surgical options may be explored. Endoscopic dacryocystorhinostomy (DCR) has emerged as a safe and effective surgical method for treating congenital dacryocystitis. We described a case of congenital dacryocystitis in an eight-year-old child who was effectively treated by endoscopic DCR.*

**Keywords:** Congenital Dacryocystitis; Nasolacrimal Duct Obstruction; Conservative Techniques; Surgical Alternatives; Endoscopic Dacryocystorhinostomy.

### INTRODUCTION

About 20% of children are born with congenital nasolacrimal duct obstruction (CNLDO), which frequently manifests as epiphora during the first year of life (1). An imperforate membrane at the Hasner valve is the cause of this condition. On the other hand, about 96% (2) of CNLDO will resolve on its own. Thus, in the paediatric population, CNLDO is the most frequent reason for dacryocystorhinostomy (2); however, acquired reasons such ethmoidal sinusitis or craniofacial trauma may also result in disruptions of the nasolacrimal route and need further examination.

Topical antibiotics, lid hygiene, and compression and massage of the lacrimal sac are examples of conservative treatment (3,4). Probing has been found to be effective in 70% to 97% of children whose obstruction did not resolve spontaneously, according to several studies (5-7). Since its introduction in the late 1960s, nasolacrimal intubation has been widely used to treat persistent naso-lacrimal duct obstruction (NLDO) following unsuccessful probing (8-12). In this operation, a silicon tube stent is inserted into one or both canaliculi after the nasolacrimal duct is probed. When the duct feels tight during probing, intubation has also been used as the primary treatment for NLDO in older children (9,13,14). When NLDO is coupled with a mucocele or recurrent dacryocystitis, or when it is not responding to more conservative treatment options such forced syringing, intubation, or probing, paediatric DCR is recommended (15). Over the past ten years, endonasal dacryocystorhinostomy (DCR), which has an estimated success rate of 88-100%, has grown in popularity [16,17,18]. It is superior than the

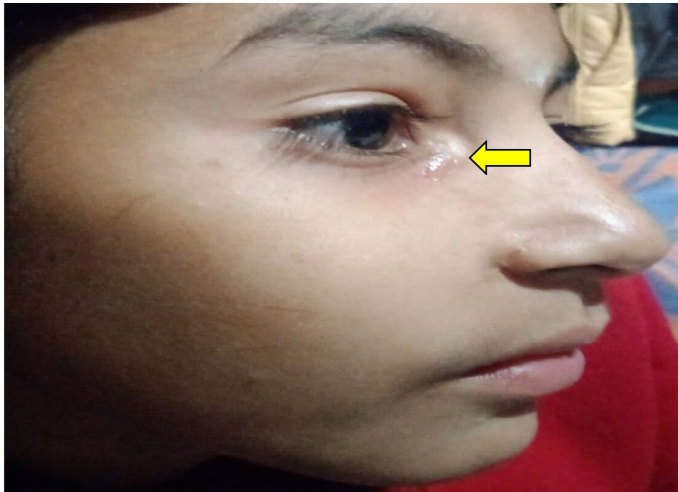
external technique in several ways, including the lack of a face scar, the intact lacrimal pump mechanism, and the capacity to address co-occurring nasal issues at the same time. This instance emphasizes how crucial it is to rule out congenital dacryocystitis in older kids who continue to have symptoms related to the lacrimal system.

### CASE REPORT

An 8-year-old boy complained of continuous tears and drainage from his right eye since he was a newborn, and he was taken to the pediatric ophthalmology clinic. The parents complained of sporadic redness and discharge from their right eye. (figure 1a and 1b) The boy had previously had conservative treatment for a nasal injury sustained at the age of five.



Figure 1a.

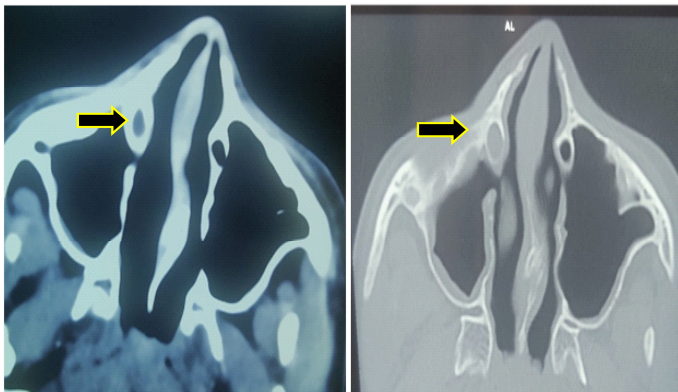


**Figure 1b.** (1a and 1b) Clinical picture showing right eye epiphora.

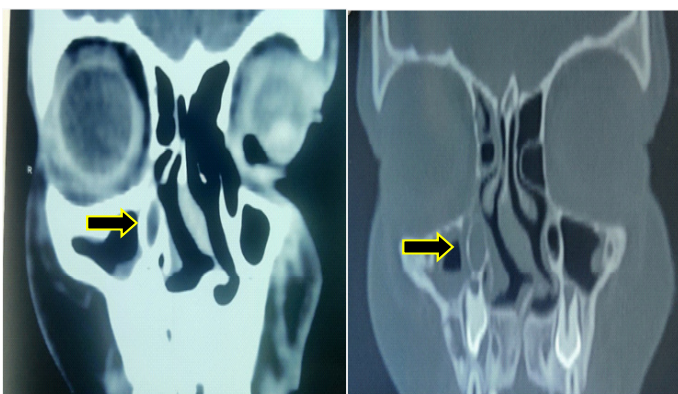
Examination revealed matting of the eyelashes and epiphora in the right eye. No signs of a fever or other systemic symptoms were present. Extraocular motions and visual acuity were both normal. Mucopurulent discharge was seen coming from the right punctum during slit-lamp inspection.

**Diagnostic Evaluation**

Soft tissue was observed at the level of Hasner’s valve on the right side, leading to the conclusion that a computed tomography scan of the paranasal sinus with nasolarimal system (figure 2 and 3) was necessary.



**Figure 2.** CT-PNS- axial view (bony + soft tissue window)



**Figure 3.** CT-PNS coronal view (bony + soft tissue window)

**Figure 2&3.** Soft tissue was observed at the level of Hasner’s valve on the right side

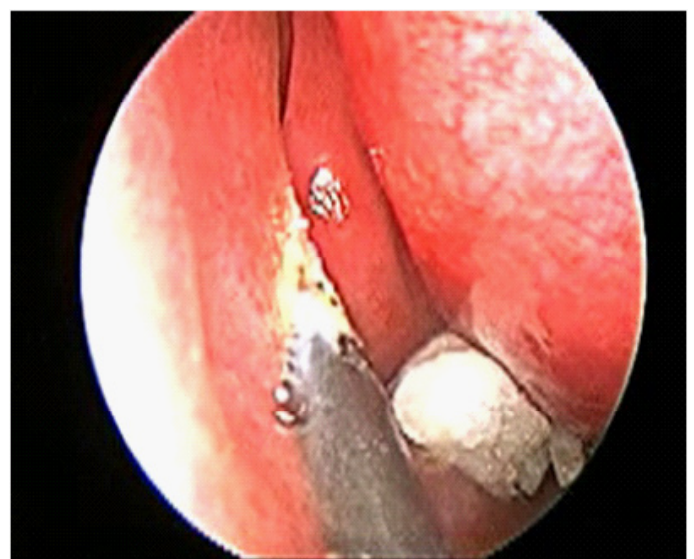
Additional diagnostic procedures, such as sac syringing and nasal endoscopy, were carried out to evaluate the mechanical blockage of the lacrimal drainage system. Regurgitation of water from the opposite punctum was the outcome of sac syringing. The nasolacrimal drainage area’s typical structure was revealed by nasal endoscopy.

The patient was directed to our center and given the go-ahead for an endoscopic DCR surgical procedure.

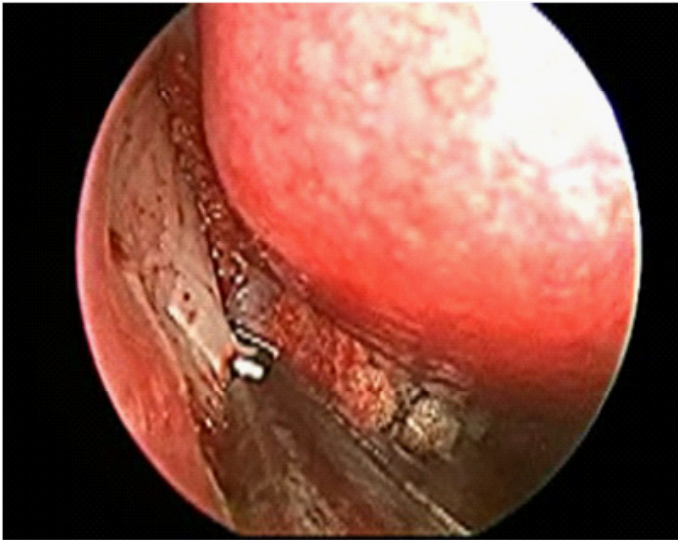
**Management**

It was determined that the patient had congenital dacryocystitis and that surgery was advised. In order to facilitate appropriate drainage, an endoscopic dacryocystorhinostomy (DCR) was conducted to construct a bypass between the lacrimal sac and nasal cavity.

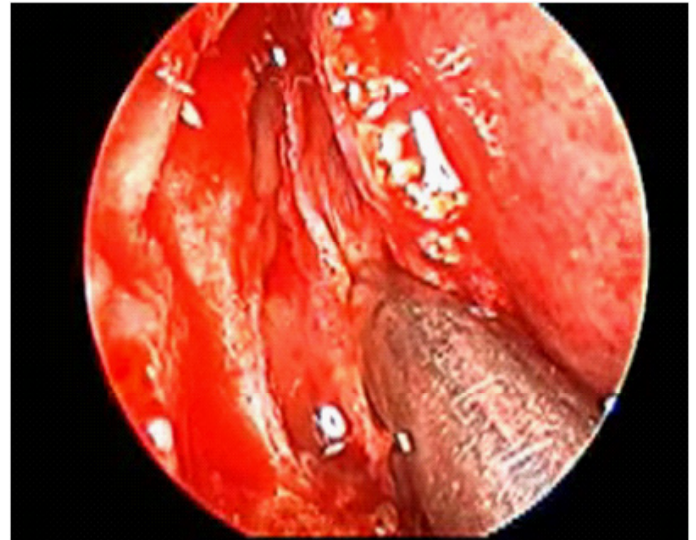
A 3 mm diameter zero-degree nasal endoscope was used to conduct endoscopic DCR. In order to begin the procedure, 2% lidocaine HCl with epinephrine 1:100:000 is injected into the submucosa of the lateral nasal wall just anterior to the attachment of the middle turbinate. Using a small monopolar suction cautery, a mucosal incision was made along the axilla of the middle turbinate, beginning 6 mm anterior to the uncinate process (figure 4). This cut went along the maxillary line antero-inferiorly. The lacrimal bone and a portion of the maxillary frontal process are visible after the mucosal flap is raised using a Freer elevator. Kerrison’s bone punch is used to remove the bone covering the lacrimal sac, revealing the medial wall of the sac (figure 5). Incision was taken at medial wall of lacrimal sac and pus was evacuated (figure 6). Blakesley forceps are used to remove the sac’s medial wall. The opening’s patency is verified by sac syringing and the unimpeded flow of irrigating fluid visible through the endoscope (figure 7 and 8). The blockage was effectively removed during the treatment, and nasal decongestants and antibiotic eye drops were prescribed as part of the aftercare.



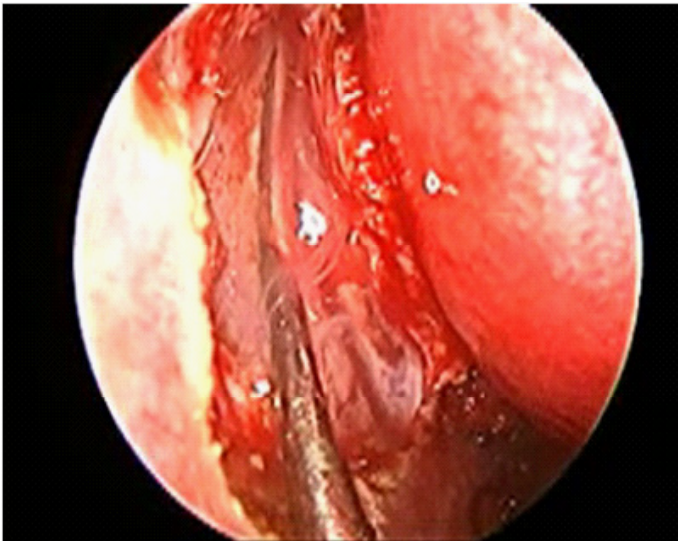
**Figure 4.** Intraoperative endonasal endoscopic view showing mucosal incision.



**Figure 5.** Intraoperative endonasal endoscopic view showing removal of bony edge of frontonasal process of maxilla by using Kerrison's bone punch to expose lacrimal sac.



**Figure 8.** Free flow of saline during lacrimal sac syringing.



**Figure 6.** Intraoperative endonasal endoscopic view showing incision over lacrimal sac.



**Figure 9.** Immediate post-op clinical picture.

Follow-up: After surgery, the child's tears, drainage, and edema resolved, and he shown considerable improvement. In order to ensure long-term success and to monitor the lacrimal drainage system, follow-up meetings were arranged on a regular basis.

### DISCUSSION

By the fifth week of pregnancy, the lacrimal system commences to form. During the tenth week, it causes the inferior meatal lamina to cavitate and develops a lumen in the lacrimal cord. From the sixth month of pregnancy until after term, contact with the inferior meatus is facilitated by the lacrimal cord's canalization. If it does not, a membranous barrier develops at the Hasner's valve; nevertheless, by the time a child is a year old, 85–95% of these instances have resolved spontaneously. [25,26,27].

A lacrimal drainage system that is undeveloped in up to one-third of newborns causes obstruction, which in turn causes epiphora and infection [28]. Using an endoscopic DCR, persistent epiphora caused by blockage above the level of the common canaliculus can be managed [16,29,30].

Clinical manifestations typically take the form of epiphora,



**Figure 7.** Post operative lacrimal sac syringing to see the patency.

such as crusting on the eyelids, recurrent conjunctivitis, wet eyes, and sticky eyes. Lacrimal mucocele, a swampy swelling under the level of the inner canthus, occasionally appears. Erythema covers the swelling when the mucocele becomes infected. A lacrimal fistula results from the rupture of the infected lacrimal sac through the skin in cases of severe dacryocystitis. Mucoid or mucopurulent material from the punctum refluxes when pressure is placed on the lacrimal sac.

Generally, a gentle sac massage facilitates spontaneous resolution. The valve can be opened by applying light pressure with the finger on the common canaliculus and vigorously stroking downward to increase pressure in the lacrimal sac. Two or three times a day, this is done. It is quite helpful to combine heat fomentation with sac massage. Although there is not much research on the effectiveness of lacrimal massage in clearing duct obstructions, in our experience, about 70% of them dissolve on their own. According to Kushner, lacrimal massage that involved closing the common canaliculus and applying strong downward pressure on the lacrimal sac proved to be more beneficial than either no massage at all or very light lacrimal massage [31]. It is advised to use topical antibiotics in conjunction with this. In more than half of instances, non-surgical therapy of babies with nasolacrimal duct blockage will alleviate symptoms within six months. [32]

Even while endonasal DCR is technically challenging in young children, it has some benefits over external DCR. It reduces operational time, prevents a face scar, lessens disturbance of the medial canthal architecture, does not interfere with the lacrimal pump function, and may even lessen discomfort following surgery [33]. It can also be done on both sides simultaneously under general anaesthesia as a day care treatment, and it can cure any related nasal pathology at the same time.

The considerable learning curve associated with practising nasal space management in the paediatric population and the technological challenges arising from anatomical variances are drawbacks. Certain considerations must be made before undergoing paediatric endonasal endoscopic dacryocystorhinostomy. This is a more challenging treatment since children's nasal cavities are tiny and some of them present with septal deviations (21). This patient group is also predicted to experience more bleeding following mucosal incisions (22) and challenging post-operative hygiene (23). A number of eye problems can arise during endoscopic dacryocystorhinostomy, such as excessive bleeding (20), orbital emphysema (5), conjunctival fistula (24), cicatrization complications (granuloma, synechiae) (2,3), and orbital fat herniation (19). There were no significant issues in our case.

In a study of 26 instances, Leibovitch et al. [21] stated that they obtained a clinical success rate of 92.3% in a series including youngsters. In a series of 24 children on 31 sides,

with a mean age of 5.6 years (2–14 years), research by Bernal-Sprekelsen et al. [34] demonstrated positive outcomes following endonasal DCR. The patency rate following an initial endonasal DCR was 90.3%; with a revision, it increased to 100%. In the literature, silicon tubing is a contentious topic. Some wished to use it in every instance, while others only used it in revision cases or when there was a suspicion of canalicular stenosis. [16,18,17,35,36,37].

## CONCLUSION

The use of paediatric endonasal endoscopic DCR appears to be a safe, minimally invasive method for treating mechanical nasolacrimal system blockage. Because it preserves the pump function, does not need skin incisions, and allows for the simultaneous treatment of other nasal diseases, endoscopic DCR is a worthwhile choice and an effective method for managing recurrent childhood epiphora.

## Compliance with Ethical Standards

The procedure performed in this case report was in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards."

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