

External Dacryocystorhinostomy Using Buccal Mucous Membrane Graft Following Resection of Lacrimal Sac: A Case Report



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ABSTRACT

We report a case of a 10-year-old patient presented with recurring nasolacrimal duct obstruction post-lacrimal sac cyst extirpation in which CT scan revealed a solid lesion that was more depicted by contrast-enhanced image. The initial surgery and flap creation had inadvertently led to a mucosal shortage, posing a challenge for the subsequent procedure, which aimed to create a Dacryocystorhinostomy (DCR). In a challenging approach, a buccal mucous membrane graft was employed to address the lack of mucous membrane required for the DCR. Over the course of five years, there was no recurrence of the cyst, signifying the success of this innovative treatment method of using buccal mucous membrane graft for external DCR.

Key words: External Dacryocystorhinostomy, Buccal Mucous Membrane Graft, Lacrimal Sac Granuloma.

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INTRODUCTION

Nasolacrimal duct obstruction (NLDO) is the blockage of the lacrimal drainage system, it can be congenital, with the most common site of blockage being at the valve of Hasner, or acquired, which can be caused by various factors such as involutinal stenosis, dacryolith, sinus disease, granulomatous disease, neoplasms, and more.^{1,2} NLDO can also be categorized into two main types: primary acquired nasolacrimal duct obstruction (PANDO), and secondary acquired lacrimal duct obstructions (SALDO), a concept introduced by Bartley in 1992, which are classified into five categories: infections, inflammations, injuries, mechanical issues, and neoplasms, each having several underlying causes.¹

Management involves the creation of a passage between the lacrimal sac and nasal cavity to bypass the duct obstruction. Complications, reoccurrence, and challenges may arise due to adhesions, scar tissue, or inadequate flaps, especially in cases of previous failed surgery or atrophic rhinitis.¹

This case report presents a challenging situation of recurrent nasolacrimal duct obstruction (NLDO) in a patient with a prior surgical history. The management plan involved performing an external Dacryocystorhinostomy (DCR), but a significant difficulty arose due to the lack of lacrimal sac mucous and nasal mucous membrane required to complete the procedure. To address this issue, the case explored the use of oral mucosal grafts, which previous studies, such as the one by Mal C in 2013,² suggested as a viable option with benefits like sufficient size for repeated procedures and high graft stability.

This case report emphasizes that all relevant photos and data presented have been obtained with patient consent, ensuring ethical considerations and patient privacy. This study also included human subject with ethical principles taken into account, as

stated in WMA Declaration of Helsinki in 2013.

Case Presentation

A 10-year-old boy presented with a lump at the right eye's inner corner near the base of the nose. He has a history of a similar lump which was later diagnosed as a lacrimal sac cyst with dacryocystitis 8 months ago. Extirpation of the lacrimal sac cyst was performed 6 months ago. However, a few weeks later, the current lump reappeared. During the examination, a lump was identified at the right eye's inner corner near the base of the nose, measuring 15x6 mm, accompanied by a fistula (Figure 1A). Additionally, there was a sinus regurgitation in the lacrimal sac area. CT scan revealed a solid lesion that was more depicted by contrast-enhanced image (Figure 2). Patient was then diagnosed with cystic mass on right lacrimal sac region and chronic dacryocystitis sign with cutaneous fistula. The mass in lacrimal sac was surgically excised and a sample was sent to be analysed. Histopathological examination showed a granulation tissue. The patient was planned to undergo a DCR procedure to address the tear duct blockage. However, the lacrimal sac appeared to be no longer intact, thus a buccal mucosa grafted from lower lip was used to re-establish the site of lacrimal sac defect to form anterior flap of new pathway into the nasal cavity after inserting a silicone tube.

The patient was positioned supine on the operating table, followed by asepsis and antisepsis of the

surgical area, and the placement of an eye drape. A skin incision was made at the base of the nose approximately 1 cm from the medial canthus, and the periosteum was undermined until the lacrimal sac and fossa were visible. Tenting was performed with a probe to the punctum, canaliculus, and lacrimal sac. In this case, the lacrimal sac was partially unidentified. An osteotomy of the lacrimal fossa was performed according to the tenting, with a diameter of 2 cm. The remaining wall of the lacrimal sac was incised into an I shape to form anterior and posterior flaps. The nasal mucosa was incised into an I shape to create anterior and posterior flaps, and a 3x1 cm graft of lip mucosa was taken and sutured with vicryl. The posterior flap of the sac wall and nasal mucosa was excised. The anterior flap was sutured to the graft, and the graft was sutured to the common canaliculus. Silicone intubation was performed from the superior and inferior lacrimal puncta to the nasal cavity, followed by suturing of the anterior flap of the sac wall and nasal mucosa with vicryl 6-0. The surgical incision was closed layer by layer with vicryl 6-0, and the skin was sutured with prolene 6-0. Finally, silicone tube fixation was done within the nasal cavity (The step-by-step procedure is depicted in the original illustration available in Figure 3. Postoperatively, the skin fistula closed completely and the dacryocystitis resolved without symptomatic epiphora (Figure 2B). Irrigation testing was positive. There were no signs of recurrence during 20 months follow-up.

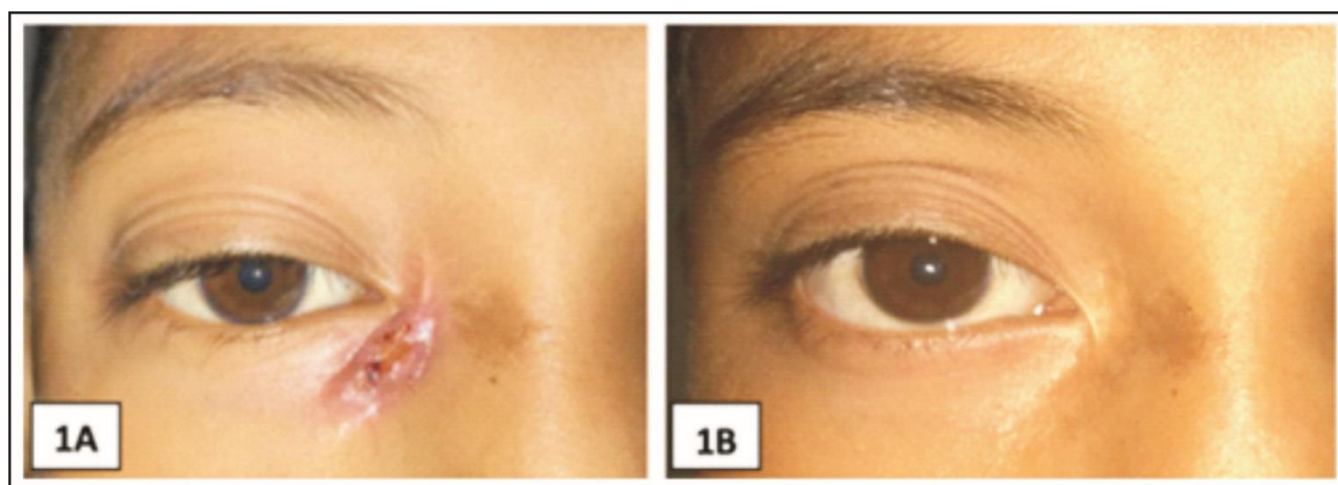


Figure 1. (1A): Clinical appearance of right lower medial canthus mass with skin fistula, six weeks after excision of the lacrimal sac cyst; **(1B)** Minimal scar with patent lacrimal system 20 months post mass excision and DCR with buccal mucous membrane graft.

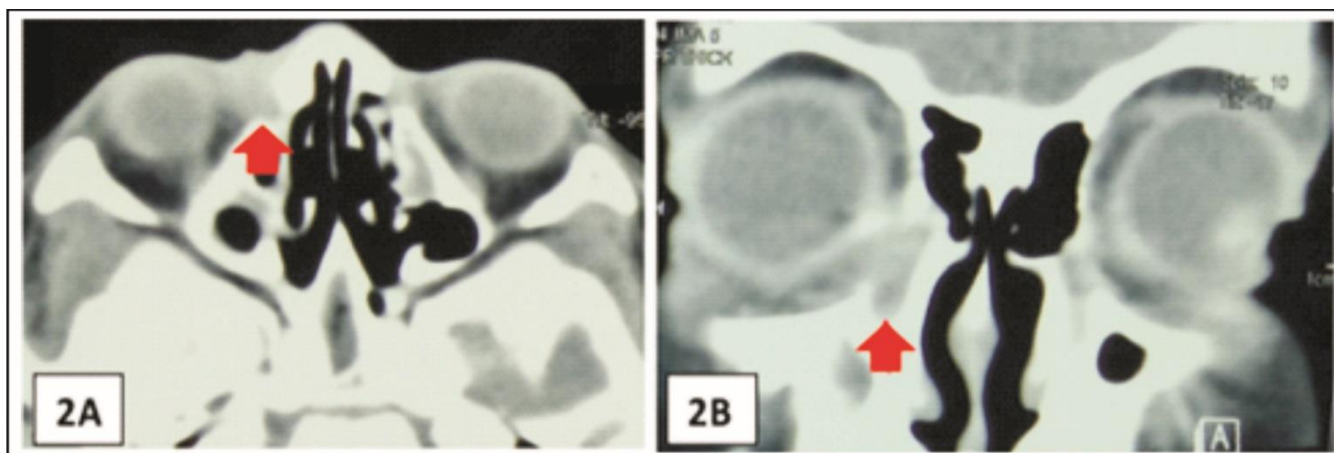


Figure 2. (2A): Preoperative computed tomography scan axial section showed right isodense mass on lacrimal sac area (red arrow); **(2B)** coronal section.

DISCUSSION

Patent alignment of entire lacrimal drainage channel is important for the success of DCR procedure. In complex cases such as lacrimal sac defect following mass resection, the remaining normal sac mucosa may not supply intact flap anastomosis, thus simple DCR alone may fail and require revision procedure. In such case, full-thickness mucosal grafting is advantageous for the unification of lacrimal sac with nasal mucous membrane, while replacing the sac wall deficiency.

In a prior study conducted by Tharwat, a group of 12 patients suffering from refractory nasolacrimal duct obstruction (NLDO) associated with expected poor mucosal flaps, due to factors such as previous failed Dacryocystorhinostomy (DCR) or atrophic rhinitis, underwent treatment using a modified DCR technique incorporating a buccal mucous membrane graft.³ The results of this intervention demonstrated a 91.7% success rate in achieving complete relief from watering. This outcome underscores the potential effectiveness of buccal mucous membrane grafts in addressing challenging NLDO cases. Similarly, another study by Tao, involving 11 patients with obstructions

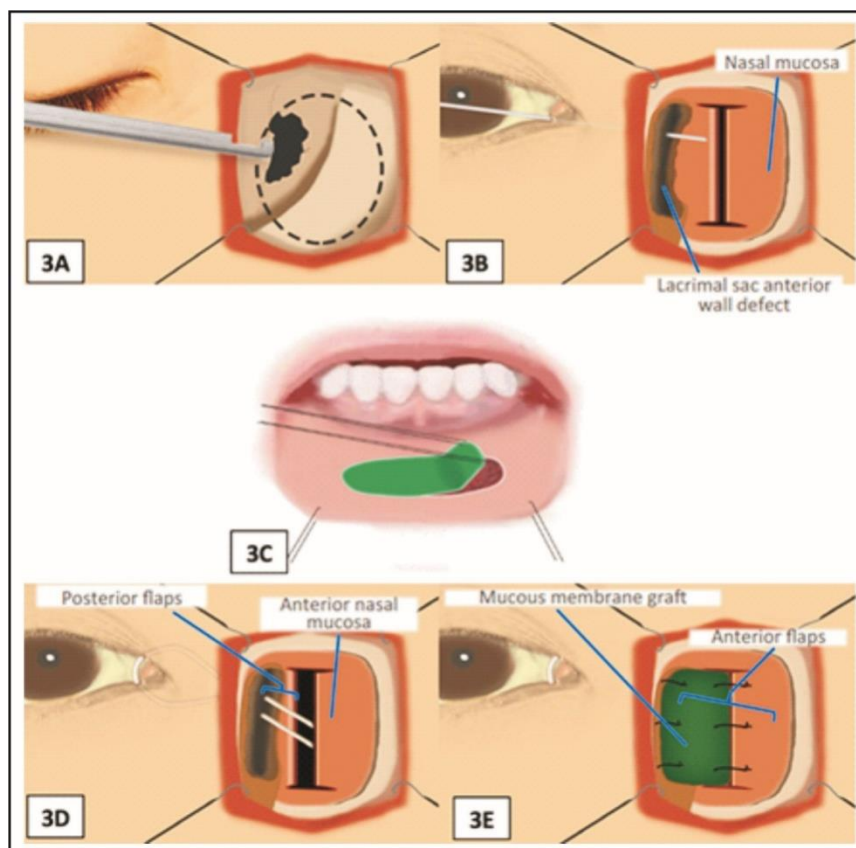


Figure 3 (3A): Osteotomy of lacrimal & nasal bone, **(3B)** Identification of common canaliculus and remaining lacrimal sac mucosa with probing. "H" shaped nasal mucosal flaps incision was made, **(3C)** Buccal mucous membrane graft harvested from lower lip, **(3D)** Silicone tubes were inserted. Posterior nasal mucosal flaps were left un-sutured, **(3E)** The buccal mucous membrane graft was sutured to line the anterior flaps of the anastomosis.

of the nasolacrimal outflow system, employed a buccal mucous membrane graft-assisted DCR approach.⁴ The findings from Tao's research revealed that all individuals experiencing preoperative epiphora

achieved complete relief from tearing after the procedure. Furthermore, all cases of dacryocystitis resolved, with no instances of recurrence observed. Additionally, nine out of eleven tear ducts were found to be patent during postoperative irrigation testing, further attesting to the efficacy of this innovative surgical approach in treating NLDO.

In our study, we encountered a patient who had undergone a prior lacrimal sac resection six months ago, resulting in a compromised lacrimal system structure. This pre-existing condition posed a significant challenge for the conventional external DCR procedure, which typically relies on obtaining flaps from the nasal mucosa. To address this unique case, we opted to incorporate a buccal mucous membrane graft to facilitate the DCR procedure. Following the surgery, we observed complete closure of the skin fistula and resolution of dacryocystitis, with the absence of symptomatic epiphora, and irrigation testing was positive. Furthermore, during the 20-month follow-up period, no signs of recurrence were documented.

CONCLUSION

Application of a buccal mucous membrane graft can significantly enhance the success rate of the DCR procedure, particularly in cases where nasolacrimal outflow obstruction is complicated by mucosal insufficiency, as was the scenario in our patient who had previously undergone lacrimal sac resection. This approach offers a valuable alternative for addressing challenging cases of lacrimal system dysfunction.

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Patient's Consent: Researchers followed the guidelines set forth in the Declaration of Helsinki.

Conflict of Interest: Authors declared no conflict of interest.

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Authors Designation and Contribution

Yunia Irawati; Consultant Ophthalmologist: *Concepts, Design, Literature search, Data acquisition, Manuscript preparation, Manuscript editing, Manuscript review.*

Vega Casalita; General Practician: *Design, Literature search.*

Nadia Kartika Dewi; General Practician: *Literature search.*

