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Case Report

3-Snip Punctoplasty with Silicone Tube Implantation: A Simple Procedure For Punctal Disorders

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ABSTRACT

Introduction: Punctal or canalicular atresia is a rare disorder in which an intact epithelial layer covers the punctum, impairing tear drainage and causing epiphora, especially in lower punctal atresia. Less frequently, canalicular atresia occurs. Standard management involves probing, irrigation, and silicone tube insertion. Case Report: In two cases, an 8-year-old and a 30-year-old female presented with lifelong tearing and discharge from the left eye. Ophthalmic examination revealed imperforate superior and inferior lacrimal puncta, and the Dye Disappearance Test (DDT) confirmed reduced tear drainage, leading to a diagnosis of punctal atresia. In a third case, a 40-year-old female experienced a painful, red lump on the right medial lower eyelid over a three-month period. Palpation produced yellowish discharge, and examination revealed a hyperemic mass with granulomas around the punctum, consistent with chronic canaliculitis. All three patients underwent a 3-snip punctoplasty with silicone tube implantation using a round-tip pigtail probe. Discussion: The 3-snip procedure is a minimally invasive and effective treatment for punctal disorders. It involves one basal cut and two vertical incisions along the canaliculus. Although canaliculotomy with curettage can lead to fistula formation, the use of a silicone tube helps prevent this complication. At the three-month follow-up, all patients demonstrated functional tear drainage and normal DDT results. Conclusion: The 3-snip procedure with silicone tube implantation offers favorable functional and cosmetic outcomes. It is a simple and viable option for ophthalmologists in resource-limited settings, ensuring improvement in tear drainage without symptom recurrence.

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Introduction

Punctal disorders, such as punctal atresia also known as imperforate punctum or membranous punctum are characterized by normal annular tissue in the canalicular papilla or orificium that is covered by an epithelial membrane. The incidence of punctal atresia is rare. The primary clinical symptom resulting from obstructed ocular flow is epiphora. One of the treatments for punctal atresia is perforation and silicone tube insertion.[1]

In 1951, Thomas introduced several procedural techniques for punctoplasty, the most commonly used being the 3-snip procedure, which has two variations: triangular and rectangular. The triangular 3-snip procedure involves one cut on the horizontal canaliculus, one cut on the vertical canaliculus, and one cut at the base, while the rectangular 3-snip procedure features one cut at the base and two vertical cuts on both sides of the vertical canaliculus.[2,3]

A study by Chak et al. found that a simple, fast, and safe punctoplasty procedure is the rectangular 3-snip, which preserves canalicular structure and function. Another study by Ali MJ et al. also found that the rectangular 3-snip procedure showed good resolution in 82% of cases.[3,4]

In this report, we present two cases of punctal disorders that were managed with a 3-snip procedure and silicone tube implantation.

Case Illustration

Case 1. Punctal Atresia

An 8-year-old girl presented at Dr. Wahidin Sudirohusodo Hospital in November 2022 with excessive tearing in her left eye, a condition she had experienced since birth. The symptoms were continuous throughout the day and confined to the left eye. The patient did not report any pain, redness, or discharge. Her birth history was normal, and her mother's pregnancy was uncomplicated. There was no family history of a similar condition.

During the ophthalmic examination, the uncorrected visual acuity was 20/25 in both eyes. Both the superior and inferior puncta were found to be imperforate. The dye disappearance test (DDT) was performed to evaluate the lacrimal outflow function, and the results showed abnormal washout, indicating an obstruction of the flow (Figure 1).

On November 21, 2022, the patient underwent punctoplasty (3-snip procedure) with silicone tube insertion under general anesthesia. The 3-snip procedure was performed by perforating the inferior punctum area with a 26-gauge needle, followed by a canaliculotomy. A silicone tube was inserted through the superior punctum, passed through the inferior punctum using a pigtail probe, and fixed at the medial canthus with a non-absorbable 8-0 suture.

The patient received oral doxycycline and levofloxacin drops postoperatively and was followed up at 2 weeks, 2 months, and 3 months postoperatively (Figure 2). There were no additional complaints during this period.

Figure 1. Ophthalmology examination: (a) Epicanthus, (b) The dye disappearance test (DDT) in the left eye appears to indicate decreased outflow.

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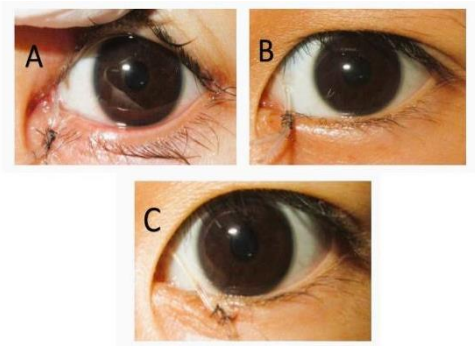

Figure 2. Follow-up after surgery: (a) 2 weeks, (b) 2 months, (c) 3 months.

Case 2. Punctal Granuloma

A 40-year-old female presented at Dr. Wahidin Sudirohusodo Hospital in November 2022 with a chief complaint of a lump on her right medial lower eyelid that had developed over the past three months. Yellowish discharge had been coming out of the lump, accompanied by pain and redness, for the past three weeks.

Ophthalmic examination revealed that the uncorrected visual acuity was 6/9 in both eyes. A granuloma was notable in the nasal right area on the punctal, measuring 8 × 9 × 3 mm, which were hyperemic, had a smooth surface, and had a rubbery consistency (Figure 3). The patient was diagnosed with Punctal granuloma.

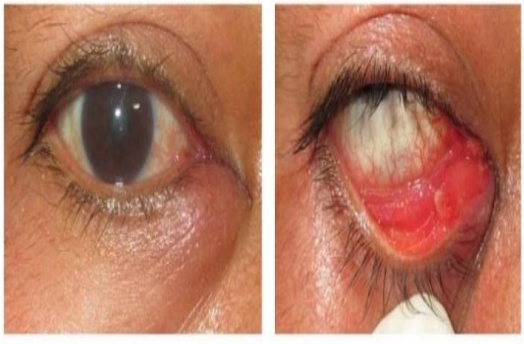

Figure 3. A hyperemic granulomatous tissue covering the punctal .

The snip procedure was performed in the same manner as in Case 1, followed by canaliculotomy (Figures 4 & 5). A "canalicular stone" of varying sizes (Figure 6) was visualized within the canalicular tunnel. Curettage and canalicular repair were performed, followed by silicone tube insertion and eyelid reconstruction.

One week after surgery, a well-formed punctum was observed, and the patient reported minimal pain and edema in the nasal right area. After three months post-surgery, there were no complaints or recurrence (Figure 7).

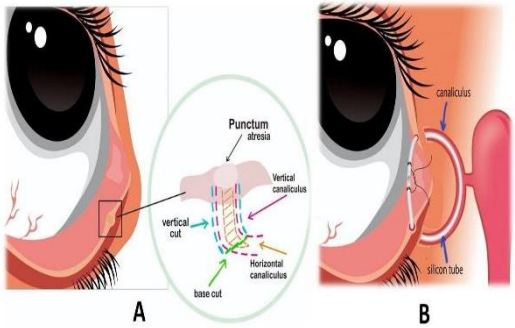

Figure 4. (a) punctum atresia and 3-snip procedure line, (b) silicon tube implantation

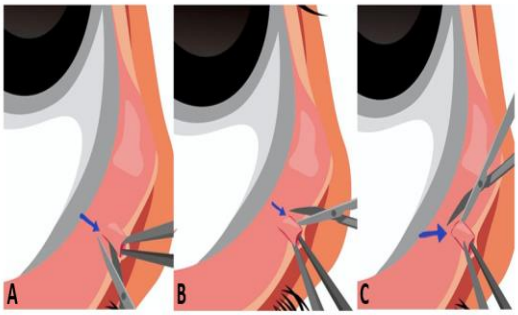

Figure 5. The 3-snip punctoplasty. (a) A vertical cut on the temporal side; (b) a vertical cut on the nasal side; (c) a horizontal cut at the base.

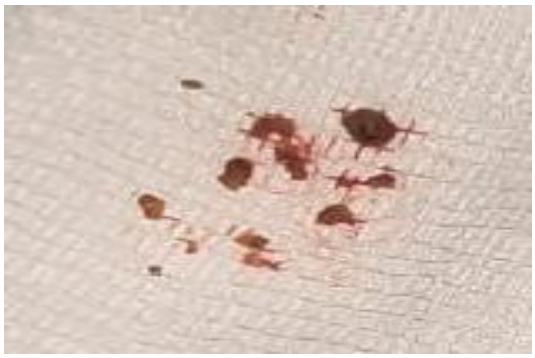

Figure 6. The canalicular stones were removed during surgery, measuring 1 × 1 mm for small stones and 3 × 2 mm for large stones.

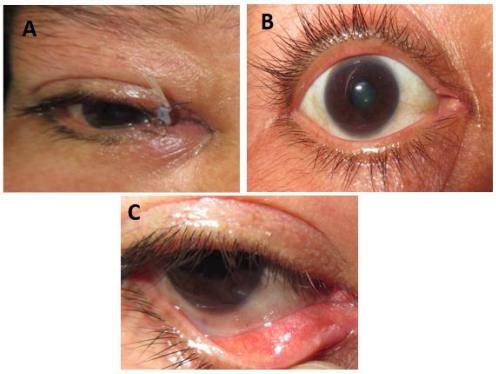

Figure 7. Follow-up after surgery: (a) one week after surgery, (b & c) three months after surgery.

Results and Discussion

This case report describes two patients with punctal atresia and punctal granuloma who underwent a 3-snip procedure with silicone tube implantation to correct the punctal disorder. In the literature, the 3-snip procedure has been widely recognized as one of the current management options for these types of punctal disorders.[1]

A study by Murdock et al. concluded that the 3-snip procedure is a relatively simple and straightforward surgical option with minimal risks and complications. It is also a minimally invasive procedure commonly used to treat symptomatic epiphora caused by punctal stenosis. Another study reported that the 3-snip procedure achieved a 90% success rate in posterior ampullectomy, which was analyzed retrospectively in 53 patients with punctal stenosis.[1,5,6]

Other literature reports various types of punctoplasty procedures, such as the 1-snip procedure, 2-snip procedure, and 4-snip procedure. All modalities used in the treatment of punctal stenosis and various punctoplasty techniques have success rates ranging from 31% to 92%. A study by Molham et al. demonstrated that the 1-snip punctoplasty method combined with three months of silicone intubation is an effective approach for treating bi-punctal stenosis, achieving a high success rate with minimal discrepancy between functional and anatomical outcomes. [3,5,7] This was the consideration for using the 3-snip procedure in this case, as it has a relatively high success rate and is simple to perform.

A study by Choi et al. evaluated the surgical outcomes of punctoplasty and silicone tube intubation in patients with punctal obstruction. The results indicate that silicone tube intubation is more effective than punctoplasty for long-term management. More than a year after surgery, the success rate of punctoplasty declined, with only 4% of patients remaining symptom-free. In contrast, silicone intubation demonstrated better long-term effectiveness, with 71% of patients experiencing no epiphora.[8]

Choi et al. found that silicone tube intubation offers superior long-term success compared to punctoplasty alone, this technique presents a more reliable alternative to conventional punctoplasty, aligning with the long-term benefits observed in silicone intubation. A similar study by Salama et al. concluded that bicanalicular silicone intubation is more

effective than three-snip punctoplasty for the treatment of primary punctal stenosis.[8,9] These findings are consistent with the present case report, in which all cases achieved successful outcomes following punctoplasty combined with silicone tube implantation.

A study by Rashdan et al. confirmed that lacrimal stenting performed using a bicanalicular silicone tube or perforated plug insertion is highly effective for treating punctal stenosis or occlusion. Their findings that this approach yields significantly superior anatomical and functional outcomes, as well as higher patient satisfaction, compared to the three-snip punctoplasty technique in patients with punctal stenosis or occlusion. Rashdan et al. documented that patient satisfaction measured by the absence or occasional occurrence of tearing was relatively low, with rates of 64% at three months and 52% at six months postoperatively. [10] On the other hand, our case report recorded all patient post three-snip punctoplasty with silicon tube with silicon tube in three months with no tearing.

Conclusion

The 3-snip procedure combined with silicone tube implantation is a simple method with a promising success rate. It can serve as a management option for various punctal disorders, especially for general ophthalmologists working in areas with limited facilities. Silicone tube implantation is recommended to prevent postoperative complications following punctoplasty.

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