

Outcomes of rectangular 3-snip punctoplasty in acquired punctal stenosis: is there a need to be minimally invasive?

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Abstract

Aim To report the clinical profiles of acquired punctal stenosis and outcomes with rectangular 3-snip punctoplasty.

Methods Retrospective chart review of all patients who underwent rectangular 3-snip punctoplasty, over a 3-year period from a single surgeon's (MJA) database was performed. Data retrieved include demographics, symptomatology, prior interventions, grades of punctal stenosis, associated ocular findings, and outcomes. A minimum follow-up of 6 months following punctoplasty was considered for analysis. Success was defined as clearance of dye on functional dye disappearance test and resolution of symptoms.

Results One hundred and forty five puncta of 87 eyes of 56 patients were studied. The mean age at presentations was 52 years. Puncta (71.7%; 104/145) were of grade 2 size. Epiphora was the commonest presenting symptom noted in 94.3% (82/87) of the eyes. At a minimum follow-up of 6 months, complete resolution of symptoms was achieved in 74.7% (65/87) of eyes. Eight out of 87 eyes (9.1%) failed to show any improvement secondary to lacrimal obstructions distal to the puncta. Five out of 87 (5.7%) eyes showed punctal restenosis whereas 10.3% (9/87) of the eyes had functional epiphora post punctoplasty.

Conclusion Puncta of grade 2 size were the most common in this series. Although rectangular 3-snip punctoplasty is an effective and safe procedure for majority of grades 1 and 2 of acquired punctal stenosis, a higher percentages of functional epiphora and punctal restenosis in the remaining

patients should propel further investigations into developing nonincisional, minimally invasive alternatives.

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Introduction

Punctal stenosis is a common disorder affecting the punctum and accounted for 8% of all the epiphora in a tertiary care practice.¹ The etiopathogenesis remains elusive but is attributed to a common mechanism of chronic inflammation resulting in fibrosis and subsequent stenosis.^{2–4} In order to facilitate uniform protocols of assessment, Kashkouli *et al*^{4,5} proposed a grading system for the puncta based on its size and shape. However, there are no uniform acceptable guidelines for the management of punctal stenosis. Several modalities described in the literature include punctal dilatation, 1-snip punctoplasty, 2-snip punctoplasty, triangular 3-snip punctoplasty, rectangular 3-snip punctoplasty, 4-snip punctoplasty, punctal punching with Kelly's or Riess punch, punctoplasty with mitomycin-C, and inserting perforated punctal plugs, self-retaining bicanalicular stents, or mini-monoka.^{5–13}

Three-snip procedures in its modern form was described by Thomas in 1951.¹⁴ The triangular 3-snip is a more traditional way with one cut in the vertical canaliculus, one in the horizontal canaliculus and one cut at the base.^{6,10} In contrast, the rectangular 3-snip procedure has two vertical cuts on either side of the vertical canaliculus with one cut at the base and is believed to be better than the triangular

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variant in preventing restenosis and preserving the lacrimal pump mechanisms.^{11,15} The current study examines the role of rectangular 3-snip punctoplasty in achieving successful outcomes in a large cohort of acquired punctal stenosis.

Materials and methods

Retrospective chart review of all patients who underwent a rectangular 3-snip punctoplasty was performed as per the described standard technique.¹¹ The study patients were recruited from a single surgeon's (MJA) tertiary eye care practice over a 3-year period from 2011 to 2013. Institutional review board approval was taken and the study adhered to the principles outlined in the declaration of Helsinki. Data retrieved include demographics, symptomatology, prior interventions, grades of punctal stenosis, associated ocular findings, and outcomes. Punctal grades were defined as described earlier by Kashkoui *et al* where grade 1 is defined as a punctum that is difficult to recognize secondary to a fibrosis or membranous obstruction of the papilla and grade 2 as a punctum, which is less than normal size, but recognizable. The patients were followed up at 6 weeks, 3, 6, and 12 months. At each visit patients symptoms, slit lamp examination of puncta, and a functional dye disappearance test was performed. A minimum follow-up of 6 months following punctoplasty was considered for analysis. Success was defined as clearance of the

dye from conjunctival cul de sac on fluorescein dye disappearance test and resolution of epiphora.

Results

One hundred and forty five puncta of 87 eyes of 56 patients were studied. The mean age at presentations was 52 years (median—54 years). Bilateral presentation was noted in 55.4% (31/56) of the patients. Table 1 presents an overview of demographics, clinical profile, and outcomes. One hundred and four out of 145 (71.7%) puncta were of grade 2 size, followed by grade 1 fibrosed puncta (18.6%, 27/145). Epiphora was the commonest presenting symptom noted in 94.3% (82/87) of the eyes. Chronic use of topical anti-glaucoma drugs was noted in 6.9% (6/87) of the eyes. Following the punctoplasty, associated canalicular obstructions were noted in 6.8% (7/87) and primary acquired nasolacrimal duct obstructions in 2.3% (2/87) eyes. At a minimum follow-up of 6 months, complete resolution of symptoms was achieved in 74.7% (65/87) of eyes. Five out of 87 (5.7%) eyes showed punctal restenosis. Nine out of 87 (10.3%) eyes had functional epiphora despite a patent punctum and lacrimal system. Of the functional epiphora group, four had lid laxity and no cause could be ascertained in the remaining five cases. Nine out of 87 eyes (10.3%) failed to show any improvement secondary to lacrimal obstruction distal to the puncta.

Table 1 Overview of clinical profiles and outcomes of acquired punctal stenosis

S.No	Parameters	Finding (No (%))
1	No of patients/eyes	56/87
2	Male:female (<i>n</i> = 56)	35:21
3	Mean age (median)	52 years (54 years)
3	Laterality (<i>n</i> = 56)	Unilateral—25 Bilateral—31
4	Punctal involvement (<i>n</i> = 87)	Upper—5 (5.8%) Lower—24 (27.5%) Both Upper + Lower—58 (66.7%)
5	Presenting symptoms (<i>n</i> = 87)	Epiphora—82/87 (94.3%) Ocular discomfort—5/7 (5.7%)
6	Mean duration of symptoms	16 months (median—11 months)
7	Prior interventions	Punctal dilatation—8/87 (9.2%) DCR without intubation—2/87 (2/2%)
8	Punctal size grading (<i>n</i> = 145 puncta)	Grade 2—104/145 (71.7%) Grade 1, fibrosed—27/145 (18.6%) Grade 1, membranous—14/145 (9.7%)
9	Minimum/mean follow-up	3 months/4.2 months
10	Outcomes (<i>n</i> = 87)	Complete resolution of symptoms Functional epiphora Restenosis of puncta No improvement (distal to punctum obstructions)
		65/87 (74.7%) 9/87 (10.3%) 5/87 (5.7%) CB—6/87 (6.8%) PANDO—2/87 (2.3%)

Abbreviations: CB, canalicular block; DCR, Dacryocystorhinostomy; PANDO, primary acquired nasolacrimal duct obstruction; S.No, serial number.

Discussion

This large series of 145 rectangular 3-snip procedures showed that the punctal size was grade 2 for majority of the patients at presentation. Male predisposition was noted in this cohort (M:F = 1.65:1). Rectangular 3-snip punctoplasty was helpful in achieving satisfactory outcomes in 74.7% of the cases. Although this technique is considered to preserve the lacrimal pump function, 10.3% of the eyes had functional epiphora and 5.3% had restenosis post punctoplasty. These results taken together emphasizes on the need to develop more minimally invasive techniques in management of punctal stenosis.

Among the various punctoplasty procedures described, 3-snip procedures have been widely popular.^{6,10–12} Caesar and McNab⁶ retrospectively evaluated 53 cases of punctal stenosis and found that posterior ampulectomy with the 3-snip procedure was effective in 92% of their patients. Chalvatzis *et al*¹⁰ prospectively compared 16 eyes of traditional 3-snip punctoplasty with 16 eyes of modified 3-snip punctoplasty and bicanalicular self-retaining stents in upper lacrimal duct stenosis. They found statistically significant and better anatomical and functional scores in the stent group, although reintroduction of silicone tubes were needed in 25% ($n = 4$) of the eyes.

Chak and Irvine¹¹ described a rectangular 3-snip punctoplasty and compared 49 rectangular with 59 triangular procedures. There were more failures in the triangular group and functional epiphora was more common with triangular punctoplasty (16.9%) as compared with rectangular ones (10.2%) although not statistically significant ($P = 0.99$). They proposed rectangular 3-snip punctoplasty as less destructive alternative with a potential to preserve the proximal lacrimal pump mechanisms. The current study had similar results (10.3%) in terms of functional outcomes. As the 3-snips may not be very easy in very severe punctal stenosis, Kim *et al*¹² proposed a rectangular 4-snip punctoplasty, where a rectangular block of puncta involving a part of horizontal canaliculus is fashioned as a flap and excised. They studied 45 eyes and reported higher functional rates (93.3%) than anatomical success (88.9%) in their series and proposed it as an effective procedure in severe stenosis, maintaining large puncta beyond 6 months of follow-up.

The limitations of the present study are its retrospective nature, short follow-up and inclusion of milder degrees of punctal stenosis; however, the strengths include a very large cohort of punctoplasty, uniform surgical technique, single surgeon database, and careful assessment of outcomes.

In conclusion, although rectangular 3-snip punctoplasty is an effective and safe procedure for

majority of acquired punctal stenosis grades 1 and 2, a higher percentages of functional epiphora and punctal restenosis in the remaining patients should propel further investigations into developing nonincisional, minimally invasive alternatives.

Puncta of grade 2 size were the most common in this series. Rectangular 3-snip punctoplasty is a safe and effective procedure for acquired punctal stenosis; however, still has post-surgical issues of restenosis and functional epiphora. This study reiterates the needs for more minimally invasive alternatives for managing punctal stenosis.

What was known before

- Punctoplasty is the standard of managing punctal stenosis.
- Rectangular punctoplasties cause less pump dysfunction.
- 3-snip rectangular punctoplasty has a good success rate.

What this study adds

- Functional epiphora and restenosis rates following 3-snip rectangular punctoplasty are still a matter of concern.
 - The current techniques of punctoplasty needs to be revisited.
 - This study emphasizes on the need to develop non-incisional, minimally invasive alternatives to treat punctal stenosis.
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Conflict of interest

The authors declare no conflict of interest.

Acknowledgements

This study has been reviewed by the ethics committee and has been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki. Informed consent was obtained from the patients.

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