

# Use of Lacrimal Symptoms Questionnaire After Punctoplasty Surgery: Retrospective Data of Technical Strategy

Alessandro Meduri, MD, PhD,\* Giuseppe Tumminello, MD,\* Giovanni William Oliverio, MD,\*  
Leandro Inferrera, MD,\* Gabriele Delia, MD, PhD,†  
Pasquale Aragona, MD, PhD,\* and Marco Cicciù, DDSm, PhD‡

**Abstract:** The goal of this study is to evaluate postpunctoplasty symptoms with lacrimal symptoms questionnaire (Lac-Q). A retrospective study was conducted on 31 patients (14 men and 17 woman) with a diagnosis of canalicular stenosis: 26 patients with unilateral occlusion and 5 patients with bilateral occlusion. The Lac-Q was administered preoperative and at 1, at 3, and at 6 months following the surgery. Moreover, the Lac-Q questionnaire was administered by an independent observer (SI). The mono-lateral and bilateral postoperative Lac-Q score showed a significant improvement of symptoms at 1, 3, and 6 months than the preoperative results. The Lac-Q questionnaire is a way to evaluate the quality of outcomes after punctoplasty surgery. In this study, all patients showed a significant improvement of symptoms after surgery.

**Key Words:** Lac-Q, punctal occlusion, punctoplasty, venous catheter

(*J Craniofac Surg* 2021;32: 2848–2850)

Punctal stenosis is a disorder of lacrimal drainage system, commonly involved the lower lacrimal punctum, the patients generally complain epiphora and wet eye. Malposition of the eyelids like ectropion, chronic blepharitis, and infections represents the most frequent etiologies of punctal stenosis.<sup>1,2</sup> Different surgical procedure have been proposed to solve this problem and punctoplasty represent one of the most used in the world.<sup>3–14</sup> In a study published by Meduri et al in 2020 it was proposed a use of venous catheter to reconstruct the lower punctal duct<sup>12</sup> and the results demonstrated that this technique supports the recanalization of the lacrimal drainage system 15 days after surgery. To evaluate how

this technique impact on symptoms, in this study we propose the results of the lacrimal symptom questionnaire (Lac-Q) on these patients. We used the Lac-Q because is a simple questionnaire to assessing the quality of outcomes following lacrimal drainage surgery.<sup>15–17</sup>

## MATERIALS AND METHODS

A retrospective study was conducted on 31 patients diagnosed with canalicular stenosis. All patients underwent dacryocystography to exclude lower obstruction. All patients reported epiphora. No one presented episodes of acute dacryocystitis. 26 patients had unilateral occlusion; 5 patients had bilateral occlusion. Fourteen were men and 17 women. Surgery was performed on all patients with a technique proposed by AM. The technique consists of the application of venous catheter as a stent for treatment of acquired canalicular stenosis (Fig. 1). All the stents were removed at 2 weeks. The Lac-Q questionnaire was administered preoperatively by an independent observer (SI) at preoperative and at 1, 3, and 6 months following the surgery. The Lac-Q questionnaire has 2 sections; the first composed of 5 questions to evaluate the social impact of the disease and the second, the lacrimal symptoms scores. The lacrimal score section is further subdivided into 4 categories: watery eye, pain, sticky eye, and swelling (Fig. 2). The statistical analysis was executed with Microsoft Excel software (Microsoft 365 (R) USA). Mean and standard deviation was used. The parametric tests used to compare quantitative variables was Student *t* test. The differences were considered significant with a probability higher than 95% (confidence interval,  $P < 0.05$ ). Pearson coefficient was used to verify the relationship between symptom and social impact score.

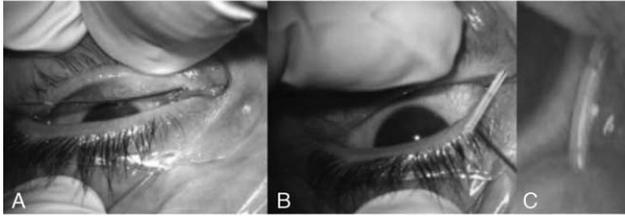
## RESULTS

The application of venous catheter as a stent for treatment of acquired punctal and canalicular stenosis was performed on 31 patients. The median age of subjects with unilateral involvement was 70.5 years (range 60–76). The median age of subjects with bilateral involvement was 69.5 years (range 65–77). The mono-lateral preoperative Lac-Q score mean was  $11.2 \pm 1.7$  and this showed a significant postoperative improvement of symptoms at 1, 3, and 6 months ( $P < 0.05$ ). The bilateral preoperative Lac-Q score mean was  $22.20 \pm 4.6$  and this showed significant postoperative improvement at 1, 3, and 6 months ( $P < 0.05$ ) (Supplementary Digital Content, Table 1, <http://links.lww.com/SCS/C785>, Fig. 3). None patients had anatomical and functional failure.

## DISCUSSION

Punctal stenosis is a common disorder of the proximal drainage lacrimal system, and one of the main frequent causes of epiphora. The structure of the proximal lacrimal system, composed by

From the \*Department of Biomedical Sciences, Eye Clinic; †Department of Human Pathology, Plastic Surgery Unit; and ‡Department of Biomedical  
Accepted for publication April 16, 2021.



**FIGURE 1.** (A) The punctum is dilated with a punctum dilator. (B) One ends of the venous catheter is placed inside inferior punctum. (C) The venous catheter placed into the lacrimal system, a circular ring has been realized.

ampulla, punctum, and canaliculus, is essential for the function of the tear drainage.<sup>18</sup> The epiphora denotes a direct consequence of the outflow obstruction mechanism, observed in stenosis of the lacrimal drainage system. The anatomical alterations of the proximal lacrimal system recurrently involved punctum and proximal canaliculus and could be primary or acquired. Several causes for secondary punctal stenosis were described, which can be generally classified under inflammatory, infective, traumatic, and resultant of drug toxicity.<sup>19</sup> Blepharitis, chronic conjunctivitis, Meibomian gland dysfunction, and eyelid malposition represent the main eye conditions associated with punctal stenosis. Moreover, a higher prevalence in the female is demonstrated, as well as an increased risk of punctal stenosis in patients using antiglaucomatous eye-drops.<sup>1,20</sup> In the present study, 70% of patients were female, and meibomian gland dysfunction was associated with punctal stenosis in 70% of cases. Histopathological studies evidenced the prevalence of inflammatory etiologies. In particular, chronic inflammation leads to a mechanism of fibrosis, that progressively causes the narrowing of the punctum.<sup>1</sup> The punctum represents the entry point for tears, and an outflow obstruction causes a significant reduction of the physiological clearing of the ocular surface, so it exposes to all the possible soluble irritants that an ocular surface encounters. Several surgical approaches were proposed to correct the punctal and canalicular stenosis. The basic principles in the treatment of punctal stenosis include creating a sufficient opening, enhancing tear access from lacrimal lake to punctal opening, and preserving the function of the lacrimal pump.<sup>21</sup> Punctoplasty (1, 2, or 3 snips), which involves the destruction of the normal ampulla and punctal

**Lac-Q - The Lacrimal Symptom Questionnaire** Name: \_\_\_\_\_ Number: \_\_\_\_\_ Date: \_\_\_\_\_

**Social and lifestyle impact of tear duct problems**

Which of these five statements is true about the tear duct problem overall in the last eight weeks?  
Please tick the box next to any true statement.

- Friends or family have commented about the watery eye problem.
- The watery eye problem has caused embarrassment in company.
- The watery/sticky eye problem has interfered with everyday activity, for example (underline such that applies):  
Reading, Driving, Wearing make-up, Wearing glasses, Eating, Other activity (specify):
- The vision is sometimes blurred because of the watery/sticky eye problem.
- Medical attention: visit to the family doctor's surgery, or the hospital eye clinic, because of tear duct problem.

(Scoring: score one point for each box ticked, maximum score =5)

Total score for social impact:

**Problems with each eye separately**

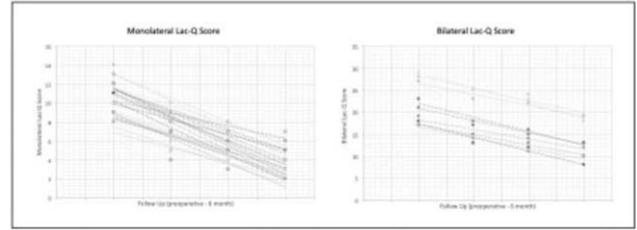
For each of the four problems (watery eye, pain, sticky eye or swelling), put a tick in the box next to the statement which best describes the situation over the last eight weeks.  
Use the left hand column for the left eye, and the right hand column for the right eye.

Problem	Left	Right
<b>• Watery eye</b>		
No watery eye problem	0	0
The eye waters occasionally, mainly outdoors	1	1
Troublesome watering of the eye, indoors and outdoors, some days	2	2
Troublesome watering of the eye most days	3	3
Troublesome watering of the eye every day	4	4
<b>• Pain in or around the eye, soreness of eyelids</b>		
No pain	0	0
Some pain or soreness, but has not sought medical advice or treatment	1	1
Pain or soreness, has used prescription eye-drops	2	2
Painful and swollen (diagonal absent), requiring antibiotics or surgical drainage	3	3
<b>• Sticky eye</b>		
No problem with sticky eye	0	0
The eye is sometimes sticky in the mornings	1	1
The eye is sticky every day in the mornings	2	2
The eye has sticky or mucous discharge throughout the day	3	3
There is infected discharge leaking through the skin of the lower eyelid (blepharitis)	4	4
<b>• Swelling or lump at the medial canthus (inner corner)</b>		
No swelling or lump	0	0
Swelling present, but only occasionally	1	1
Swelling present all the time	2	2

(Scoring: one number in central column) Total scores for each eye:

Lac-Q score (sum of three total scores):

**FIGURE 2.** At each visit, the patient had to count the social impact of lacrimal symptoms for each eye. Total score is the sum of social (max score = 5) and lacrimal symptoms (max score = 14 for each eye). Outcomes assessed were anatomical success, functional success, and changes in the social impact and lacrimal symptoms scores. Anatomical success was defined as subjective resolution of epiphora.



**FIGURE 3.** Pearson correlation between social impact and symptom score was not statistically significant. An opposite trend was observed in the 2 groups of patients with unilateral and bilateral involvement. In the first (unilateral) R was negative and in the second (bilateral) was positive (Supplementary Digital Content, Table 2, <http://links.lww.com/SCS/C786>).

and canalicular anatomy; this is thought to disrupt the normal pump function of the proximal lacrimal system, an essential mechanism of a normal tear drainage system.<sup>22</sup> The main disadvantage of this surgery is the occurrence of restenosis, related to healing of apposed cuts, as well as the disruption of canaliculus anatomy, leading to variable success rates.<sup>23</sup> An alternative procedure used for acquired punctal and canalicular stenosis is the insertion of silicone stent in the lacrimal duct. Some authors propose adding stents, such as mini-monoka tube on top of snip punctoplasty procedures, to treat the associated canalicular stenosis. The mini-monoka is a silicone mono-canalicular stent designed to repair canalicular lacerations, and it was considered for treat acquired punctoplasty.<sup>24</sup> Although probing and silicone intubation are effective methods to treat such stenosis, they are associated with high recurrence and complication rates. The use of balloon catheter dilatation has begun to be used for canalicular and naso lacrimal duct stenosis. We proposed a surgical technique to treat acquired punctal and canalicular stenosis, using 24 G BD Vialon cannula (Insyte-W, Becton Dickinson Infusion Therapy Systems Inc., Sandy, UT) as stent a for canalicular stenosis. It consists of a hollow cylindrical silicone tube of 1.1 × 30.0 mm dimensions. The Vialon cannula is composed of polyurethane hybrid co-polymer, projected for vascular access. The greater integrity of the tip, the extremely smooth surface, and the exclusive lubrication process offered the easiest insertion possible. BD Vialon has the ability to soften more than 70% inside the vein, as well as conforming to the canalicular anatomy and reduce the causes of irritation and consequent mechanical lacerations. After the insertion, this cannula is sutured to the skin using 5-0 prolene (Ethicon Inc., Somerville, MA) to avoid the movement. The principal advantage of this surgical technique is the easy availability and the huge diffusion of 24 G BD Vialon cannula. However, several factors may influence the patient satisfaction of surgical outcome. There is no consensus or a universally accepted method to evaluate quality of lacrimal outcomes; however, symptom-based scores are gaining more grounds in this regard. The chronic overflow of tears from the eye experienced by the patients, might affect significantly the quality of life, causing discomfort, social embarrassment, and blurring of vision. Several studies have assessed patient benefit following dacryocystorhinostomy surgery, using questionnaires such as Glasgow Benefit Inventory. Mistry et al<sup>15</sup> developed a symptom score (Lac-Q) based on social impact and lacrimal symptoms and demonstrated its validity, reliability, stability, and simplicity in assessing patient-reported outcomes following a dacryocystorhinostomy surgery. They reported a significant reduction in the Lac-Q after surgery, and it was well correlated with fluorescein endoscopic dye test. Moreover, Sipkova et al<sup>25</sup> investigated the effect on QoL in patients treated with common interventions for epiphora, including lid-tightening procedures and punctoplasty. In the current study, we documented a statistically

significant reduction in the mean Lac-Q score at 1, 3, and 6 months after surgery.

## CONCLUSIONS

Lacrimal symptoms questionnaire is a specific lacrimal symptom-based questionnaire and is a useful quality tool in assessing the outcomes of punctoplasty. The questionnaire confirmed the subjective improvement in symptoms and quality of life at 6 months in patient treated with 24 G BD Vialon cannula, for punctal and canalicular stenosis. Further studies with an even larger sample size are required for specifically corroborating clinical symptoms and social impact scores with surgical success.

## REFERENCES

1. Ali MJ, Mishra DK, Baig F, et al. Punctal stenosis: histopathology, immunology, and electron microscopic features—a step toward unraveling the mysterious etiopathogenesis. *Ophthalmic Plast Reconstr Surg* 2015;31:98–102
2. Gazia F, Abita P, Alberti G, et al. NICU infants & SNHL: experience of a western Sicily tertiary care centre. *Acta Medica Mediterranea* 2019;35:1001–1007
3. Andaliib D, Nabie R, Abbasi L, et al. Silicone intubation for nasolacrimal duct stenosis in adults: monocanalicular or bicanalicular intubation. *J Craniofac Surg* 2014;25:1009–1011
4. Galletti B, Gazia F, Freni F, et al. Endoscopic sinus surgery with and without computer assisted navigation: a retrospective study. *Auris Nasus Larynx* 2019;46:520–525
5. Lee H, Ahn J, Lee JM, et al. Clinical effectiveness of monocanalicular and bicanalicular silicone intubation for congenital nasolacrimal duct obstruction. *J Craniofac Surg* 2012;23:1010–1014
6. Soner D, Seyhan D, Gül FP, et al. Apart from surgical procedures, another important point to note in lacrimal canalicular lacerations traumatic retinal tears. *J Craniofac Surg* 2019;30:2115–2118
7. Freni F, Galletti B, Bruno R, et al. Multidisciplinary approach in the removal of post-trauma foreign bodies in the head and neck district: cases report and review of literature. *Acta Medica Mediterranea* 2019;35:405–410
8. Kim SH, Park CY, Hwang SW, et al. Clinical significance of biofilm on silicone tubes removed from patients with nasolacrimal duct stenosis. *J Craniofac Surg* 2018;29:462–465
9. van Burink MV, Rakhorst HA, van Couwelaar GM, et al. Postoncological lacrimal duct reconstruction: a practical classification system for reconstructive planning and short-term results of a case series. *J Plast Reconstr Aesthet Surg* 2018;71:1796–1803
10. Meduri A, Inferrera L, Tumminello G, et al. Surgical treatment of dacryocystitis by using a venous catheter. *J Craniofac Surg* 2020;31:1120–1121
11. Galletti B, Gazia F, Galletti C, et al. Endoscopic treatment of a periorbital fat herniation caused by spontaneous solution of continuity of the papyracea lamina. *BMJ Case Rep* 2019;12:e229376
12. Meduri A, Inferrera L, Tumminello G, et al. The use of a venous catheter as a stent for treatment of acquired punctal and canalicular stenosis. *J Craniofac Surg* 2019;30:2544–2545
13. Meduri A, Inferrera L, Tumminello G, et al. The application of a venous catheter for the surgical treatment of punctal occlusion. *J Craniofac Surg* 2020;31:1829–1830
14. Ali MJ. Quality of life in lacrimal disorders, patient satisfaction following management. In: Ali MJ, ed. *Principles, Practice of Lacrimal Surgery*. New Delhi, India: Springer; 2015:359–362
15. Mistry N, Rockley TJ, Reynolds T, et al. Development and validation of a symptom questionnaire for recording outcomes in adult lacrimal surgery. *Rhinol* 2011;49:538–545
16. Ali MJ, Iram S, Ali MH, et al. Assessing the outcomes of powered endoscopic dacryocystorhinostomy in adults using the lacrimal symptom (Lac-Q) questionnaire. *Ophthalm Plast Reconstr Surg* 2017;33:65–68
17. Ali MJ, Paulsen F. Ultrastructure of the lacrimal drainage system in health and disease: a major review. *Ann Anat* 2019;224:1–7
18. Hur MC, Jin SW, Roh MS, et al. Classification of lacrimal punctal stenosis and its related histopathological feature in patients with epiphora. *Korean J Ophthalmol* 2017;31:375–382
19. Hurwitz JJ. Disease of the punctum. In: Hurwitz JJ, ed. *The Lacrimal System*. Philadelphia, PA: Lippincott-Raven; 1996:149–153
20. McNab AA. Lacrimal canalicular obstruction associated with topical ocular medication. *Aust N Z J Ophthalmol* 1998;26:219–223
21. Kashkouli MB, Beigi B, Nick A. Acquired external punctal stenosis: surgical management and long-term follow-up. *Orbit* 2005;24:73–78
22. Sachdev A, Sagili SR. Suture-assisted punctoplasty. *Digit J Ophthalmol* 2017;23:60–62
23. Wong ES, Li EY, Yuen HK. Long-term outcomes of punch punctoplasty with Kelly punch and review of literature. *Eye (Lond)* 2017;31:560–565
24. Hussain RN, Kanani H, McMullan T. Use of mini-monoka stents for punctal/canalicular stenosis. *Br J Ophthalmol* 2012;96:671–673
25. Sipkova Z, Vonica O, Olurin O, et al. Assessment of patient-reported outcome and quality of life improvement following surgery for epiphora. *Eye (Lond)* 2017;31:1664–1671