

**ORIGINAL ARTICLE****Minimonoka Stent for Canalicular Reconstruction***Sunil G Biradar<sup>1</sup>, Darshanakumar U Kansara<sup>1\*</sup>**<sup>1</sup>Department of Ophthalmology, Shri B.M.Patil Medical College and Research Centre, Vijayapura-586101 (Karnataka) India***Abstract:**

*Objective:* Canalicular injuries are relatively common and accounts for 16-26% of all lid tears. There are different techniques for reconstructing traumatic canalicular lacerations. The most favorable intervention would be one that is simple, less invasive with reduced postoperative complications/recovery time. The aim of this study is to report the surgical outcome with the Mini-Monoka monocanalicular stent. *Material and Methods:* Patients with traumatic canalicular lacerations who underwent surgical reconstruction using the Mini-Monoka monocanalicular stent were included. The surgical outcome was based on subjective (epiphora) and objective (tear meniscus level, and lacrimal irrigation) findings after stent removal. *Result:* Ten patients (mean age: 9.7 years) of lower canaliculus injury were included. Successful stenting was accomplished in all cases. Postoperative eyelid position was satisfactory in most patients. The mean postoperative follow-up period was 6 months. There were no cases of premature stent extrusion. Functional drainage after stent removal was normal in all of patients. Syringing showed full patency. *Conclusion:* The Mini-Monoka monocanalicular stent is an effective tool in reconstructing traumatic canalicular lacerations. Easy to use, carries a minimal risk of infection and injury to the non-lacerated canaliculus, and results in high anatomical and functional success rates.

**Key words:** lid trauma, canalicular lacerations, epiphora, Mini-Monoka monocanalicular stent.

**Introduction:**

Canalicular lacerations are not an uncommon entity for ophthalmic surgeons which are encountered in about 16-26% of all lid tears [1]. They can result from direct or indirect injury to the canalicular system. Traumatic canalicular lacerations require stenting of the injured canaliculus to prevent canalicular obstruction. If surgical repair of the lacerated canaliculus is not appropriate, the patient will develop symptomatic epiphora. Silicone tube is the most widely used tube material because of its ease of insertion and the low degree of reactivity to surrounding tissues. Numerous surgical techniques have been described for the repair of canalicular lacerations; these can be divided into monocanalicular intubation and bicanalicular intubation techniques.

A single-lacerated canaliculus has been traditionally managed with either an annular stent using the pigtail probe, or with a bicanalicular nasal intubation [2]. Reconstruction of the canaliculus with a bicanalicular stent has some disadvantages, including cosmetic problems and the potential to cause injury to the normal canaliculus during intubation, punctal or canalicular slitting, granuloma formation, superior loop dislocation, and chronic nasal irritation [3-5].

The monocanalicular intubation is a less invasive alternative to bicanalicular intubation, and can avoid injury to the uninvolved canaliculus [6-8]. The Mini-Monoka (FCI, Cedex, France) monocanalicular stent was first developed and described by Dr Fayet from France [9,10]. It has been successfully used in the management of acquired external punctal stenosis and congenital nasolacrimal duct obstruction [11]. Aim of the study is to report the surgical outcome with the Mini-Monoka monocanalicular stent.

### **Material and Methods:**

#### **Inclusion criteria:**

All patients with unicanalicular tear.

#### **Exclusion criteria:**

Patients who could not be identified medial end during surgery, bicanalicular injury or profound tissue loss.

It was an interventional study of 10 patients presented to the tertiary eye care centre during the period of April 2013 to July 2014 presenting with unicanalicular laceration. In all patients commercial Mini-Monoka stent was placed. Pediatrics patients were operated under general anaesthesia and adults were operated under local anaesthesia in the standard manner. Once the medial edge of the canaliculus had been identified using an operating microscope with high magnification, a probe was inserted through the punctum into the wound and through the medial end of the cut canaliculus. A Mini-Monoka stent was then inserted through the medial section of the lacerated canaliculus and the

punctal anchor at the proximal end of the tubing was placed securely in the punctum by exerting gentle traction on the distal end of the tubing. Re-approximation of overlying orbicularis oculi muscle and tissue (medial canthal tendon, lid margin and skin) was performed layer by layer using a single 8-0 vicryl horizontal suture with mucosal anastomosis of the canaliculus. Patients were instructed to use topical antibiotics (0.3% ofloxacin) and steroids (0.1% fluorometholone) four times per day to prevent infection and canalicular adhesion formation, and were told not to rub their eyes in order to prevent early tube protrusion. Patients were advised to discontinue 0.1% fluorometholone eye drop after one week. Each patient was followed up immediately, at 1<sup>st</sup> week, 1, 3 and 6 months respectively.

6 months later stents were removed, sac syringing was done from the respective punctum and patency confirmed. Subjective improvement in tearing was assessed. Complete success was defined by much improvement in symptoms, and passage patency under irrigation. Partial successes were defined by the presence of some symptomatic epiphora and the partial or complete passage of irrigation through the track. Failure was defined by a blockage and the presence of persistent tearing.

#### **Results:**

All the patients who demonstrated involvement of monocanalicular lacerations, underwent canalicular laceration repair with the Mini-Monoka monocanalicular stent in Fig. 1-7.

The mean age at presentation was 9.7 years (range, 11 months to 32 years); 8 (80%) were males. Most commonly the lower canaliculus was involved in all the patients. Right eye was involved in 6 (60%) patients and left eye was involved in remaining 4 (40%) patients. The cause of canalicular injury included “blousehook fastener” in three (30%) patients, metal rod injury, sharp object injury, chain pendent injury in two (20%) patients each, and remaining one (10%) was road traffic accident. All the patients had more than three months follow-up. Stent was removed after 6 months of post-operative follow up. None of the cases had shown any premature stent extrusion, eyeball irritation, inflammation, or granuloma formation. Only one case had shown secondary inflammation at the site of stent insertion and subsequently blockage after stent removal. 9 patients (90%) achieved anatomical and physiological patency. Syringing showed full patency with no narrowing or reflux at last follow-up. Thus complete success was observed in 9 out of 10 patients while the repair with Mini-Monoka stent failed in one patient.

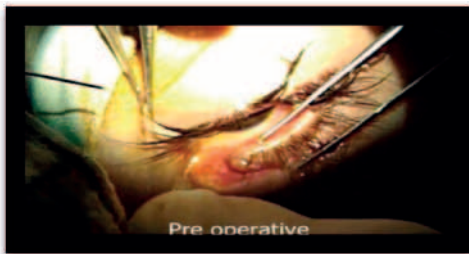


Fig 1: Pre-operative

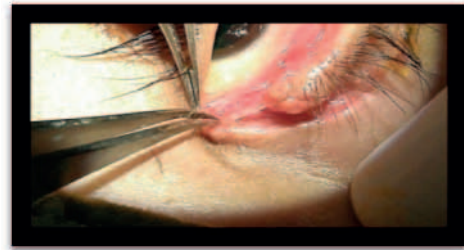


Fig 2 : Identification and stent introduction engaging puncta

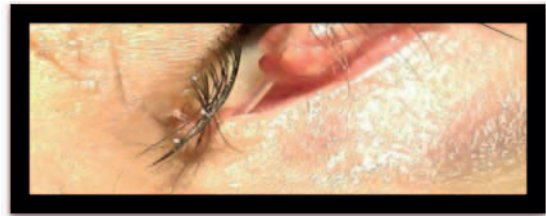


Fig 3 : Stent engaging the proximal end

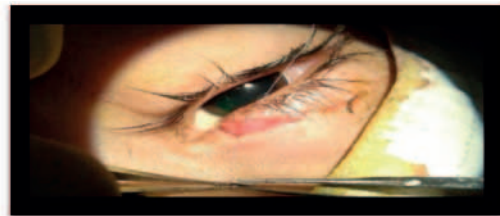


Fig 4 : Suturing of the lid margins



Fig 5 : Post-operative 1 week follow up



Fig 6 : Removal of stent at 6th month

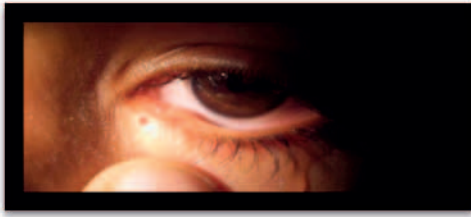


Fig 7 : L.E Follow up after 3 months

### Discussion

Lid trauma is a common entity faced by the ophthalmic surgeon and canalicular laceration is reported in about 16-26% of the patients [1]. Several reports described the management of canalicular lacerations with different procedures, but there is limited literature available on the epidemiological aspects of canalicular involvement in eyelid trauma [12].

Kennedy and associates, in an 11-year epidemiologic and clinical study, have noted that two-thirds of canalicular injuries have occurred in children or young adults below 30 years of age, with a median age of 20 years at the time of injury. In their series of 222 patients of canalicular lacerations managed over a 10-year period, 68% of patients have been below 30 years of age [13]. In our series, the mean age at the time of injury has been 9.7 years (median, 5.5 years), with 70% of patients below 12 years of age. This highlights the fact that canalicular injuries are more common in children and young adults in India. A male predominance (80%) was also noted in our series, as has been reported earlier.

Kennedy and associates have reported lower eyelid involvement in 66.2% of cases. Our study has shown also a similar trend with the lower

canaliculus being most commonly involved [13]. Kennedy and associates reported dog bites and scratches as the most common cause of injury in children [13]. In our series, three (30%) patients, all breast-feeding infants, had a unique pattern of injury caused by the mother's "blousehook fastener," a metal fastener used to secure the saree blouse, a traditional Indian dress. In two (20%) patients each, the causes of laceration have been injury by iron rod and sharp object. This suggests that the cause of injury can vary considerably between various ethnic groups and regions.

Immediate repair of laceration with stenting of the canaliculus is currently the most preferred treatment approach for canalicular injuries and it also guards against a future laceration of the uninvolved canaliculus.

Anatomical success has been obtained in 9 (90%) out of 10 patients. One patient had infection at the site of stent flange so premature removal of stent had to be performed.

Mini Monoka's tube is commercially available silicon stent and is safe and effective option than bicanalicular stenting as it helps to achieve a good functional success without risk of damage to uninvolved canaliculus. It also avoids injury to nasal mucosa and thereby nasal bleeding as compared to bicanalicular stent.

### Conclusion:

In conclusion, Mini monoka stent is an effective, easy to use tool in reconstructing traumatic canalicular laceration. There is a low risk of infection and trauma to the canaliculus. A good

anatomical and functional success was achieved in our case series, similar to previous studies.

Hence, immediate repair of laceration with

stenting of the involved canaliculus is a preferred procedure with a better outcome compared to earlier techniques.

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