

# Management of nasolacrimal duct injuries in mid-facial advancement

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## ABSTRACT

Nasolacrimal duct (NLD) may be injured following trauma. During certain surgical procedure, inadvertent damage to the nasolacrimal apparatus may occur as well. Such instances should be immediately managed to prevent any subsequent complications. The management of such inadvertent injuries may be accomplished only with a thorough anatomic comprehension and surgical expertise in the field of operation. It also requires the presence of armamentarium required for its management in situations when complications arise. The case report discusses one such rare complication of NLD injury during Le Fort III osteotomy and advancement effectively managed by bicanalicular stenting.

**Keywords:** Epiphora, lacrimal punctum bicanalicular stenting, Le Fort III osteotomy, nasolacrimal duct injury

## INTRODUCTION

Nasolacrimal duct (NLD) injuries may result following eyelid injuries, animal bite injuries, road traffic accidents and physical violence.<sup>[1,2]</sup> It may also be encountered following surgical procedures such as uncinectomy and maxillary antrostomy.<sup>[3]</sup> Surgical procedures which involve reflection of medial wall of the orbit is as in cases of Le Fort III osteotomy possess potential risk for damage to the nasolacrimal apparatus. Though NLD injury following Le Fort III osteotomy has not been reported until, a prompt management of it at the time of its occurrence prevents future complications. The aim of the present manuscript is to present a case of an injury to NLD during a Le Fort III osteotomy and an effective management of it by bicanalicular stenting.

## CASE REPORT

A 14-year-old boy along with his parents reported for correction of his retruded mid-face. The characteristic features of Crouzon syndrome including exophthalmos, proptosis, hypoplasia of malar bones and maxilla were noted. The patient also had an oxycephalic skull. Strabismus was noted, and patient complained of blurring vision. There were no prominent ear abnormalities

or conductive deafness. The maxillary anterior facial height was reduced, and skeletal/dental crossbite was present. Intraorally, the palate was high arched, and maxillary arch was constricted resulting in crowding of teeth. Lateral skull view revealed the classic "metal-beaten appearance" of the skull. An ophthalmologic opinion was obtained, and bilateral optic nerve neuropathy was diagnosed. Endoscopic assisted bilateral optic nerve decompression was accomplished prior to surgery. The treatment protocol was to achieve mid-face advancement (Le Fort III level) using distraction osteogenesis.

### Surgical procedure

Under general anesthesia, standard surgical preparations were carried out. Lignocaine 2% with adrenaline was infiltrated

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as required along the incision for the purpose of hemostasis. A bicoronal incision with preauricular extension until tragus was placed bilaterally. The coronal flap was reflected in the galeal layer until the supraorbital rim anteriorly and superior nuchal line laterally. The supraorbital nerve was identified and carefully handled, and an osteotomy was done around the bony foramen and the nerve reflected along with the flap exposing the frontonasal sutures and the medial orbital walls. Incision over the pericranium was made, and pericranial flap reflected anteriorly. Further dissection proceeded below the pericranium laterally reflecting the temporalis muscle attachments thereby providing access to the zygomatic arch, body of zygoma and lateral orbital walls. The osteotomy “stop” cuts were made 2 mm inferior to the frontonasal junction and extended bilaterally along the medial orbital wall anterior to the NLD. During reflection along the medial orbital wall, due to aberrant position, the NLD was avulsed. The damage of the NLD was repaired using bicanalicular silicone stent intubation as detailed below. The osteotomy cut then proceeded along the floor of the orbit and lateral orbital wall.

A sulcus incision was made in the region of maxillary molar region and flap reflected, pterygoid chisel placed over the plates in anterior, medial and inferior direction and dysjunction performed. Customized, acrylic splint (prefabricated to surgery) was then placed to prevent maxillary fracture during application of maxillary forceps. Then the entire mid-craniofacial unit was mobilized using the Rowe’s disimpaction forceps. The internal distractor was placed over lateral orbital rim anteriorly and over the temporal bone posteriorly along the preplanned vector. A stab incision was made posteriorly for the distractor activation arm. The device was checked by distracting the two segments. After successful check, rhBMP-2 was placed along the osteotomy cuts on the lateral orbital wall. Later layer wise closure was done. Patient was extubated and the recovery from anesthesia was spontaneous and uneventful. Appropriate antibiotics and painkillers (nonsteroidal anti-inflammatory drugs) were provided with as per standard current protocol.

#### Repair of nasolacrimal duct

The upper and the lower punctum of the NLD was identified and physically dilated. The bicanalicular stent that was used was about 40-cm in length, made up of biological grade silicone with stainless steel probes at both the ends [Figure 1]. One end of the bicanalicular silicone stent was passed through the superior punctum under direct vision [Figure 2]. It was then passed through the avulsed end of the NLD and further into the canal [Figure 3]. The emerging end of the stent was pushed through the inferior meatus, then visualized and grasped [Figure 4]. The other end of the stent was similarly passed through the inferior punctum to pass through the nasolacrimal canal to reach the inferior meatus. The length of the bicanalicular stent was adjusted between the superior and inferior punctum to prevent tension before tying the two ends securely [Figure 5]. This bicanalicular silicone stent acts as a temporary surgical stent during the healing process of the damaged NLD [Figure 6]. The patient was managed with corticosteroid and antibiotic eye drops for a week following surgery to prevent ocular infection.

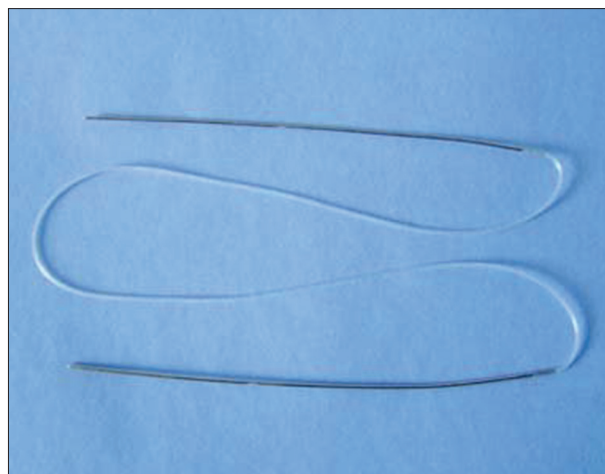


Figure 1: Bicanalicular silicone stent with stainless steel probes



Figure 2: Identification of the superior punctum for insertion of the stainless steel probe of the silicone stent

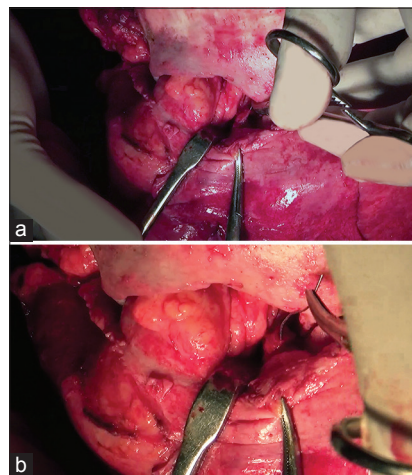


Figure 3: (a) Insertion of the stent through the avulsed end of the nasolacrimal duct. (b) End of the probe emerging through the canaliculi

## DISCUSSION

Le Fort III osteotomy is one of the most challenging mid-facial surgical procedures, often performed as a part of esthetical enhancement by advancing the mid-face as a whole as in cases



**Figure 4:** Retrieval of the two ends of the stent through the inferior meatus



**Figure 5:** Securing the two ends of the stent



**Figure 6:** Slit lamp view demonstrating the bicanalicular stent

of syndromes. In certain cases, it is also performed as a part of access surgery for accessing deep mid-facial structure correction. Technically, it is a craniofacial dysjunction by osteotomy along

the frontonasal junction coursing through the medial orbital wall anterior to the NLD, along the orbital floor through the inferior orbital fissure to frontozygomatic suture and ends with pterygoid dysjunction.

The mid-facial anatomy is very complex, hence Le Fort III osteotomy is a highly technique sensitive procedure that requires precise anatomic knowledge for proper identification of structures, nibble instrument handling and aware of potential complications as well as effective management strategies of the same. Complications following Le Fort III osteotomy include bleeding, inadvertent fractures, failure to mobilize the craniofacial unit as a block and injury to the adjacent structures. In spite of careful manipulation inadvertent damage to vital structure such as the NLD can occur. When left untreated, it may complicate and result in NLD obstruction or infection, dacryocystitis.

Hence, such cases have to be managed promptly to avoid complications in future. Various surgical treatment modalities for its management include dacryocystorhinostomy, mono or bicanalicular intubation. Studies report similar success rate with monocalicular and bicanalicular stenting.<sup>[4]</sup>

Bicanalicular stenting offers better tolerance by patient when compared with monocalicular stenting with no chances of dislodgement. Hence, bicanalicular stent was preferred in this case, and the removal of it was accomplished during the second stage of the surgery after 3 months. In our case, the patient had an uneventful postoperative phase with complete resolution of symptoms following the removal of the surgical stent.

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#### Conflicts of interest

There are no conflict of interest.

## REFERENCES

1. Fayet B, Assouline M, Bernard JA. Monocalicular nasolacrimal duct intubation. *Ophthalmology* 1998;105:1795-6.
2. Herzum H, Holle P, Hintschich C. Eyelid injuries: Epidemiological aspects. *Ophthalmologie* 2001;98:1079-82.
3. Hawes MJ, Segrest DR. Effectiveness of bicanalicular silicone intubation in the repair of canalicular lacerations. *Ophthal Plast Reconstr Surg* 1985;1:185-90.
4. Cohen NA, Antunes MB, Morgenstern KE. Prevention and management of lacrimal duct injury. *Otolaryngol Clin North Am* 2010;43:781-8.