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## Surgical management of traumatic proptosis by enucleation in an indie dog: A case report

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### Abstract

A 3-month-old male indie puppy weighing 2.1 kg was presented with history of a prolapsed, left eyeball resulting from trauma during a dog fight. Upon physical examination it was revealed all the physiological parameters were within normal limits. Ophthalmic examination showed absence of pupillary light reflexes and marked extraocular muscle injury, indicating a poor prognosis for globe salvage. The dog was premedicated with xylazine and butorphanol combination and induction done with propofol and diazepam whereas maintenance with 2 percent isoflurane gaseous anesthesia. Enucleation was performed followed by closure of conjunctiva and subcutaneous tissues with absorbable suture. Postoperative care included seven days of antibiotics and analgesics, along with Elizabethan collar placement. Complete wound healing was observed by 14 days post operatively, with no complications. This case report demonstrates that enucleation is an effective surgical method for non-viable globes in case of traumatic proptosis, improving quality of life by alleviating pain and preventing chronic complications.

**Keywords:** Ophthalmology, proptosis, indie dog, enucleation

### Introduction

Traumatic proptosis, defined by the anterior displacement of the globe beyond the orbital rim, is a critical ophthalmic emergency in animals, often resulting from blunt force trauma to the head or periorbital region (Mandell and Holt, 2005) <sup>[1]</sup>. This condition is commonly seen in brachycephalic breeds such as Lhasa Apso, Shih-Tzus, Pug and Pekingese due to their anatomical predispositions including shallow orbits, prominent globes and wide palpebral fissures, which offer limited protection against even minor insults like vehicular accidents, dog fights or excessive restraint (Ali and Mostafa, 2019; Gelatt, 2021) <sup>[2, 3]</sup>. In dolichocephalic breeds and cats, more severe trauma is typically required to induce proptosis (Vijay *et al.*, 2023) <sup>[4]</sup>. When displaced, the eyelids can become entrapped behind the globe equator, leading to complications such as corneal desiccation, extraocular muscle avulsion, optic nerve stretching, vascular compromise and potential retinal detachment any of which can result in irreversible vision loss or globe rupture if not addressed promptly (Pe'er *et al.*, 2020) <sup>[5]</sup>. Diagnosis relies on clinical assessment, including signs such as exophthalmos, periorbital swelling and evaluation of prognostic indicators like pupillary light reflexes (PLRs), while treatment focuses on globe preservation repositioning with temporary tarsorrhaphy for salvageable eyes or enucleation for severely damaged ones to alleviate pain and prevent infection (Kalaka, 2023) <sup>[6]</sup>. This case report aims to describe the clinical evaluation, surgical enucleation and outcomes in a three-month-old indie puppy with traumatic proptosis, emphasising the role of enucleation in non-viable globes.

**Case history and clinical findings:** A 3-month-old male indie weighing 2.1 kg was presented with a prolapsed left eyeball resulting from trauma during a dog fight (Fig.1). Upon physical examination revealed all the physiological parameters such as rectal temperature, heart rate and respiratory rate were within limits. Upon ophthalmic examination it was showed absence of meace response, pupillary light reflexes, palpebral reflex and marked extraocular muscle injury in the affected eye. Severe pain upon palpation of the affected eye ball was noticed.



**Fig 1:** Photograph showing a three-month-old indie dog with left eye traumatic proptosis

### Surgical management

The puppy was aseptically prepared for surgery and placed on lateral recumbency with the affected eyeball towards the surgeon. The periorbital skin and eyelids of the affected eye were aseptically prepared for the procedure by clipping the periorbital area and irrigating the periorbital tissues with 5% povidone-iodine solution (Fig. 2). The patient was then sedated with xylazine and butorphanol combination at the rate of 1 mg/kg and 0.2 mg/kg respectively intramuscularly and anaesthetized with propofol at the rate of 2 mg/kg intravenously. Surgical drape was placed over affected eye and cross action towel clamps were applied (Fig.3). The bulbar conjunctiva was excised about 3 mm posterior to the limbus and the extraocular muscles were transected near their scleral attachments. The retractor bulbi muscle and optic nerve were then severed with curved scissors after application of hemostat and also the remaining conjunctiva was excised (Fig.4). Once the globe was removed (Fig.5), the orbit was packed with gauze and pressure was applied for about five minutes to achieve haemostasis of the minor capillary bleeding. The eyelid margins were excised 5 mm posterior to the mucocutaneous junction with mayo scissors. The conjunctiva and subcutaneous tissues were closed with 5/0 absorbable polyglactin-910 in a simple continuous pattern. The skin of the orbit was then apposed with a 4/0 non-absorbable monofilament nylon in a simple interrupted pattern (Fig 6). Post operatively dog was administered with Cefpodoxime and Melonex at 5 mg/kg and 0.1 mg/kg per orally respectively for 5 days. An Elizabethan collar was also placed on the patient to eliminate the risk of rubbing the eye. Dog showed an uneventful recovery and sutures were removed on 14 th postoperative day.



**Fig 2:** Photograph showing aseptically prepared surgical site



**Fig 3:** Photograph showing placing of surgical drape over affected eye



**Fig 4:** Photograph showing application of hemostat behind the globe



**Fig 5:** Photograph showing traumatized globe removed from the orbit



**Fig 6:** Photograph showing simple interrupted sutures were placed to oppose the eyelids

### Discussion

The enucleation performed in this 3-month-old indie puppy exemplifies a definitive approach to managing a non-viable globe following traumatic proptosis, resulting in an uneventful recovery with complete wound healing by 12 days post-surgery and no reported long-term complications such as infection or orbital fistula during the follow-up period. Similarly, Ali and Mostafa, 2019<sup>[2]</sup>; Pe'er *et al.*, 2020<sup>[5]</sup> mentioned that enucleation plays role in alleviating chronic pain and preventing secondary complications in cases with poor visual prognosis, as evidenced by absent pupillary light reflexes and avulsion of at least three extraocular muscles, which are strong indicators of optic nerve compromise and irreversible vision loss. Key factors to take decision for enucleation included were absence of direct and consensual PLRs, signifying optic nerve avulsion or severe stretching, which correlates with vision retention rates as low as 0% in feline cases and only 28% in canines post-repositioning (Pe'er *et al.*, 2020)<sup>[5]</sup>. Additionally, extensive extraocular muscle damage further tilted the balance toward enucleation, as studies indicate that such injuries lead to persistent strabismus, exposure keratitis from lagophthalmos and phthisis bulbi in salvaged globes, often necessitating delayed enucleation (Ali and Mostafa, 2019; Yaygingul *et al.*, 2020)<sup>[2, 7]</sup>. Ali and Mostafa 2019<sup>[2]</sup> reported that  $\leq 2$  muscle avulsions allowed for successful repositioning with temporary tarsorrhaphy, preserving vision in cases with intact PLRs, whereas  $>2$  avulsions, as seen in this case report were associated with lateral exotropia and glaucoma. Concurrent findings like hyphema and corneal dessication in this case reinforced the poor prognosis, as hyphema often signals intraocular haemorrhage and retinal detachment, reducing salvageability as reported by Wheler *et al.*, 2001<sup>[8]</sup>; Mandell and Holt, 2005<sup>[1]</sup>.

### Conclusion

The enucleation performed in this 3-month-old indie puppy showed a definitive and humane approach to managing a non-viable globe following traumatic proptosis, resulting in an uneventful recovery with complete wound healing by 12 days post-surgery. Also, this case report emphasizing enucleation role in alleviating chronic pain and preventing secondary complications in cases with poor visual prognosis.

### Conflict of Interest

Not available.

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