Surgical Ophthalmologic Examination

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KEYWORDS

• Eye • Ocular • Ophthalmology • Trauma • Exam • Fundoscopy • Vision • Pupils

KEY POINTS

- Vital signs of the eye are vision, pupils, and intraocular pressure. They need to be monitored perioperatively.
- The finding of a pointed pupil in the setting of trauma raises a high suspicion for an open globe injury and precludes further manipulation of the globe.
- Traumatic hyphemas need to be followed closely for rebleeding, and orbital reconstruction should be delayed until they are stabilized or resolved.
- The absence of a red reflex and identification of posterior segment blood on fundoscopic examination raise a high suspicion for a posterior segment injury and require immediate ophthalmologic evaluation.
- A relative afferent pupillary defect, detected by the swinging flashlight test, is indicative of a blind or partially blind eye and requires identification of its cause.

INTRODUCTION

Oral and maxillofacial surgeons are frequently called to assess and treat facial injuries, including those of the orbit and nearby structures. Ocular trauma constitutes approximately 3% of all emergency department visits in the United States.[1] Most encounters for eye and adnexal tissue complaints are related to trauma, followed by ocular complaints related to workplace injury.[1–3] From 2 to 2.5 million ocular injuries occur annually in the United States,[4,5] with the incidence of ocular injury in major trauma ranging from 2% to 16%.[4,6–8] More than 90% of midfacial fractures are associated with injury to the eye and/or adnexa, of which nearly one-third are moderate to severe injuries.[8] More than one-half of ocular injuries are treated in the emergency department, but nearly 40% are treated in private physician offices, followed by other outpatient and inpatient facilities.[6]

Although the eyes make up a small proportion of total body surface area, visual impairment carries a disproportionately high level of disability. The maxillofacial surgeon should be able to conduct a thorough and expedient assessment of the eye after blunt or sharp midfacial trauma and perioperatively for the many surgical procedures that involve the orbit and surrounding soft tissues. Recognition of potentially sight-threatening disorders is of the highest priority, and prevention of secondary injury is equally important.[5] Proficiency with the relevant anatomy and ophthalmologic examination is paramount for the oral and maxillofacial surgeon to perform a rapid, appropriate triage and to arrive at potentially critical diagnoses. Failure to recognize an ocular injury before or after

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surgical intervention could lead to permanently reduced vision or even complete blindness.

OPHTHALMOLOGIC HISTORY AND EXAMINATION

Once the orbital and ocular examination can be obtained, modeling the examination after an ophthalmology note is useful. A sample ophthalmologic or oculoplastic note is represented in **Fig. 1**.[9] Familiarity with the nomenclature, Abbreviations, and examinations of an ophthalmology consult is useful and aids in communication between specialists, including such terms as the Birmingham Eye Trauma Terminology System (**Fig. 2**).[10] Ophthalmologists often refer to and differentiate between anterior segment injuries (cornea, iris, anterior chamber, ciliary body, and lens) and posterior segment injuries (vitreous, choroid, and retina).

The organized history can be accomplished in a few minutes and includes a detailed history of present illness (indicated on trauma note as HPI, past medical history (indicated as PMH), past ocular history (indicated as POH), allergies (indicated as ALL), family history (indicated as FH), and medications (indicated as Meds). Once these are obtained, the physical examination will focus on obtaining measurements of the patient's vision (indicated on trauma note as V), pupils (indicated as P), ocular pressure (indicated as Tap), confrontational fields (indicated as CF), and extraocular muscle (EOM) movements. The examination can then be completed with a slit lamp examination (SLE) and the dilated fundus examination (DFE).[9]

History of Present Illness

Once appropriate, the ocular history needs to assess the nature of the injury/injuries (What happened?) including the mechanism (How did it happen?) and timing (When did it happen?). Any visual symptoms should be elicited, including reduced or altered vision, diplopia (double vision), floaters, pain, discharge, dyschromatopsia (altered color vision), and flashing lights.[11,12] These symptoms should be characterized in terms of location (focal or diffuse, unilateral or bilateral?), degree (mild, moderate, or severe?), duration (brief, intermittent, or persistent?), frequency, and rate of onset (rapid, gradual, or asymptomatic—perhaps only noted when the opposite eye was covered?).[11,12] These findings give clues that will guide the physical examination (**Table 1**).

Birmingham Eye Trauma Terminology System (BETTS) Glossary of Terms

Term	Definition and Explanation
Eyewall	Sclera and Cornea
Closed globe injury	No full thickness wound of the eyewall
Open globe injury	Full thickness wound of the eyewall
Contusion	There is no full thickness wound. *The injury is etither due to direct energy delivery by the object (ex: choroidal rupture) or to the changes in the shape of the globe.*
Lamellar laceration	Partial thickness wound of the eyewall
Rupture	Full thickness wound of the eyewall, caused by a blunt object. *Since the eye is filled with incompressible liquid, the impact results in momentary increase of the IOP. The eyewall yields at its weakest point. The actual wound is produced by an inside out mechanism.*
Laceration	Full thickness wound of the eyewall, caused by a sharp object *The wound occurs at the impact site by an outside-in mechanism.*
Penetrating Injury	Entrance wound *If more than one wound is present, each must have been caused by a different agent.*
Perforating injury	Entrance and exit wounds *Both wounds caused by the same agent.*

Fig. 1. Birmingham Eye Trauma Terminology System (BETTS).[10]