(dilated pupil). A teardrop-shaped pupil is suggestive of globe rupture, with the apex of the teardrop pointing to the rupture site. Each pupil should be assessed for direct and consensual response to light stimulation (pupillary light reflex). Patients should be screened for an afferent pupillary defect (APD) utilizing the swinging light test. (See Figure 2.) In the setting of trauma, an APD is likely the result of an optic nerve injury, retinal injury, or extensive vitreal hemorrhage.

**Visual Field Testing.** Visual field testing will detect disorders affecting the retina, optic nerve, optic chiasm, and visual cortex. Regardless of visual acuity, patients with visual complaints always should be screened for visual field defects. Confrontational visual fields are measured one eye at a time, and can detect segmental retinal detachments (often a horizontal defect) or even intracranial pathology (usually a vertical defect). Care must be taken to ensure that the non-examined eye of the patient is covered completely.

**Anterior Segment Examination.** General inspection and slit lamp examination will detect injuries to the conjunctiva, sclera, cornea, iris, lens, and anterior chamber. The conjunctivae and the sclera should be examined for injection, bleeding, lacerations, chemosis (swelling), exposed tissues (darksly pigmented uveal tissues), and foreign bodies. The presence of bloody chemosis or circumferential subconjunctival hemorrhage suggests open-globe injury. The cornea should be examined for lack of clarity, surface irregularities, and foreign bodies. Fluorescein staining of the cornea is helpful in diagnosing corneal epithelial defects. Removal of contact lenses prior to the application of fluorescein will prevent permanent staining of the contact lenses. In cases of possible globe penetration, a Seidel test should be performed. The iris is inspected for color, irregularities, tears, and evidence of prior surgical procedures. Inspection of the lens should reveal it to be clear and centered immediately behind the pupil. Traumatic subluxation of the lens often manifests as a dark crescent moon in the center of the pupil. The depth and contents of the anterior chamber require evaluation. Excessively shallow or deep anterior chambers (when compared with the opposite eye) suggest the possibility of globe rupture. The anterior chamber may reveal proteinaceous debris (flare), red blood cells (hyphema), or purulent exudate (hypopyon). Flare resembles dust specks floating in a bright, sunlit room, whereas the red blood cells that form a microscopic hyphema will look like brown dust.

**Posterior Segment Examination.** Direct ophthalmoscopy will allow visualization of the anterior and posterior chambers, the retina, and the optic nerve. A fundoscopic exam should begin by documenting the status of the red reflex. A diminished red reflex suggests corneal edema, a cataract, vitreous hemorrhage, or a large retinal detachment. Dilation of the pupils with a topical mydriatic (e.g., 2 drops of 1% tropicamide) or cycloplegic (2 drops of 1% cyclopentolate) may facilitate the fundoscopic examination. Patients should be screened for contraindications to pupillary dilation; contraindications may include patients with significant head trauma, suspicion of globe rupture, or history of angle-closure glaucoma. A complete pupillary exam should be performed prior to initiating pupillary dilation. All patients with possible posterior segment injuries should be referred to an ophthalmologist for a complete posterior segment evaluation. Few emergency physicians possess the skills and tools (such as an indirect ophthalmoscope) to perform a complete, 360-degree retinal examination.

**Intraocular Pressure Measurement.** The IOP may be measured using a Schiotz tonometer or tonopen, or by applanation tonometry. Normal IOP ranges from 10 mmHg to 20 mmHg. It is important to exclude elevated IOP in the presence of hyphema or retrobulbar hemorrhage. IOP measurements should be deferred in cases of suspected open-globe injury. If a low IOP (< 5 mmHg) is documented in a patient with ocular trauma, an open-globe injury should be suspected.

**Ocular Trauma Imaging Techniques.** Plain radiography, computed tomography (CT), ultrasound (US), and magnetic resonance imaging (MRI) have been used in the evaluation of orbital trauma and the search for foreign bodies. CT scanning is the study of choice in the evaluation of orbital and ocular trauma, and is more sensitive than plain films in the detection of foreign bodies. In settings where CT is unavailable, conventional plain films may be used to screen for metallic foreign bodies, fractures, and sinus injury.