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A Bulletin of Delhi Ophthalmological Society

Ocular Trauma

Classification

Ocular Trauma in Blast Injuries

Repair of Corneoscleral Perforations

Blow out Fracture

Guided Sling Surgery

Includes DVD of 59th Annual Conference

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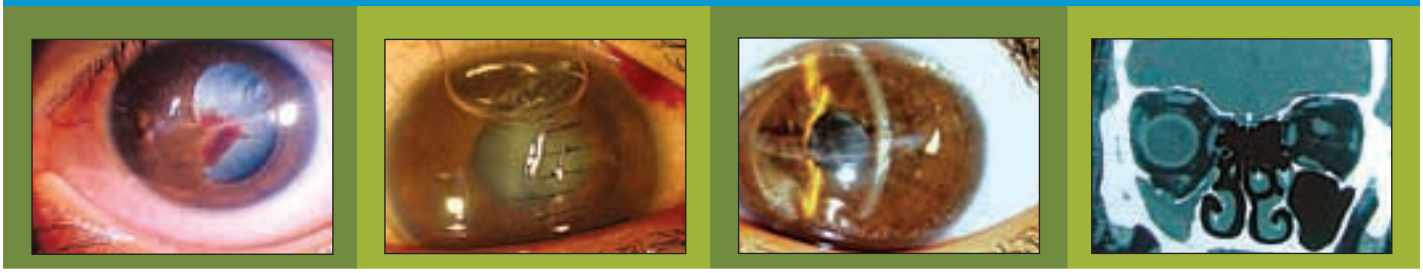


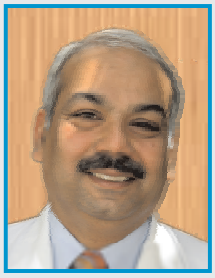
Annual General Body Meeting

The **Annual General Body Meeting** of Delhi Ophthalmological Society which will be held on **Sunday** the **28th September 2008** at **10.00 A.M.** at Ayurvigyan Auditorium, Army Hospital (R&R) Delhi Cantt, Dhaula Kuan, Delhi.

All members are requested to attend.

Namrata Sharma
Secretary, DOS

Executive Members
Delhi Ophthalmological Society



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Editorial

Dear Friends,

It is always a great pleasure to communicate with you. There are two big events coming up in the near future – The World Sight Day and the Mid-Term Conference.

Like last year, this year also we are planning to hold Free Eye Check-up Camps on World Sight Day. All institutions (Governmental and Private) that are willing to participate are welcome. Visits to blind schools are also planned to identify blind children who may be offered services at governmental or generous non-governmental institutions.

It is very rightly said "While one person hesitates because he feels inferior, the other is busy making mistakes and becoming superior" *Henry C. Link.* The theme of this year's Mid-term conference is "Everything was alright till….." Since it is wise to learn from others' mistakes, a conglomeration of cases with intra-operative and post-operative complications will be shown. Experts will share there experience how they managed these tricky situations. This will be useful for both the novice surgeons who are in their learning curve as well as for experts.

Thanking you,

Namrata Sharma

Secretary,

Delhi Ophthalmological Society

World Sight Day

Delhi Ophthalmological Society

Free Eye Screening Camp

On the occasion of "World Sight Day" on 8th October, 2008 Delhi Ophthalmological Society with the cooperation and help of its members is planning to organize "Free Eye Screening Camps".

Interested Institutions/Centres may please apply to the President/Secretary DOS by 4th October, 2008.

The concerned institutions/Centres should be able to screen in minimum of 100 patients and fill up a pre-designed proforma preferably with the help of 2-3 qualified ophthalmologists and 2-3 optometrists.

The screened patients can be suitably advised regarding treatment/procedure/surgery.

The Delhi Ophthalmological Society proposes to give advertisement in leading newspapers of the city regarding this with the names of the participating centres.

The Proforma can be collected from the Office of the Delhi Ophthalmological Society or downloaded from the website: ***http:www.dosonline.org.***

The filled up Proforma has to be submitted to DOS Office for records. The institute with maximum scored patients will be presented with an award at the annual conference of DOS March, 2008.

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Mid Term Conference of

Delhi Ophthalmological Society

22nd & 23rd November, 2008

at Hotel Ashok, Chanakya Puri, New Delhi

Everything was alright till....

Learn from master's

mistakes

Mechanical Ocular Injuries: Terminology and Classification

Arindam Roy MBBS, *Sourabh Dileep Patwardhan* MD, *Namrata Sharma* MD, DNB, MNAMS, *Shubha Bansal* DNB

Ocular trauma has been an unavoidable hazard of industrialization in today's world. It is the leading cause of acquired monocular visual disability and blindness in children.[1,2]

Because of heterogeneous eye injury characteristics and ambiguous trauma literature and terminology, it has been difficult to determine a treatment plan for ocular trauma and inform the patient and family about the status and visual prognosis of the injured eye.

In a review of literature on ocular trauma one finds it impossible to draw unambiguous conclusions on the exact nature of injury treated as the terms used were ill-defined and varied from one investigator to the next.

A standardized terminology is necessary to enable ophthalmologists and ocular trauma experts from all over the globe to communicate amongst themselves regarding better management of various categories of ocular injury.

This lack of a consistent terminology and classification had been a major hurdle before some standardized classification systems of ocular injuries were described by Kuhn et al and Pieramici et al. [3,4]

The Ocular Trauma Classification Group [4] had suggested a grading system. This was straightforward system for classifying eye injuries based on four characteristics:

- Mechanism of injury,
- Initial visual acuity,
- Pupillary involvement and
- Most posterior location of the wound.

This classification could be easily performed at the time of initial evaluation and primary injury repair (Table 1).

An ideal ocular trauma terminology system should have the following desired goals:

- Clarifying the tissue of reference
- Providing a clear definition for each injury type (Table 2)
- Placing each of these injury types within the framework of a comprehensive system (Table 3).

The *Birmingham Eye Trauma Terminology (BETT)* satisfies all these elements; the most important feature is that *all* of its terms relate to the whole eyeball as the tissue of reference. By always using the entire globe as the tissue of reference, classification is unambiguous, consistent, and simple.

Before BETT, a *'penetrating corneal injury'* could imply two vastly different conditions, depending on the tissue of reference:

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All India Institute of Medical Sciences,
Ansari Nagar, New Delhi

Figure 1: *Corneal Penetrating Injury (Laceration): An Open Globe Injury*

- an injury penetrating only into the cornea ie, a partial-thickness corneal wound- a closed globe injury or
- an injury penetrating into the globe through the cornea (ie, a full-thickness corneal wound- an open globe injury).

In BETT, a penetrating injury is unambiguously an open globe injury with a single entrance wound; *corneal* simply refers to the location of the wound (Figure 1).

BETT has been endorsed by several organizations:

- American Academy of Ophthalmology
- International Society of Ocular Trauma
- Retina Society
- United States Eye Injury Registry
- Vitreous Society
- World Eye Injury Registry

It is critically important for patients and ophthalmologists to have, as early as possible, a reliable information regarding the expected outcome of a serious eye injury.

Kuhn et al. designed the *Ocular Trauma Score (OTS)*[5], a simplified categorical system for standardized assessment and visual prognosis in ocular injuries, in a large series of ocular trauma patients, both pediatric and adults. The OTS was designed using the large databases of the United States and the Hungarian Eye Injury registries and with a grant from the National Center for Injury Prevention at the Centers for Disease Control and Prevention (CDC).

Over 2500 injuries were analysed in the study and a certain numerical value (raw number) is rendered to each of the following variables:

Table 1: Classification of mechanical ocular injuries

Open globe injury classification		Closed globe injury classification	
TYPE		***TYPE***	
A	Rupture	A	Contusion
B	Penetrating	B	Lamellar laceration
C	Intraocular foreign body	C	Superficial foreign body
D	Perforating	D	Mixed
E	Mixed		
Grade	Visual Acuity*	Grade	Visual Acuity*
1	≥ 20/40	1	≥ 20/40
2	20/50 to 20/100	2	20/50-20/100
3	19/100 to 5/200	3	19/100-5/200
4	4/200 to light perception	4	4/200 to light perception
5	No light perception"	5	No light perception**
PUPIL (affected eye)		PUPIL (affected eye)	
Positive	RAPD +	Positive	RAPD +
Negative	RAPD -	Negative	RAPD -
ZONE		ZONE***	
I	Isolated to cornea(including corneo-scleral limbus)	I	External (limited to bulbar conjunctiva, sclera, cornea)
II	Limbus to 5mm posterior into the sclera	II	Anterior segment (Involving structures in the anterior segment internal to the cornea and including the posterior lens capsule; includes pars plicata, not pars plana)
III	Posterior to anterior 5mm of sclera	III	Posterior segment (all internal structures posterior to the posterior lens capsule)

**Measured at a distance of 20ft or 6 m using a Snellen chart or a Rosenbaum near card, with correction and pinhole when appropriate.*
***Confirmed with a bright light source and the fellow eye well occluded.*
****Requires B-scan USG when media opacity precludes assessment of more posterior structures.*

- Initial visual acuity
- Globe rupture
- Endophthalmitis
- Perforating injury
- Retinal detachment
- Afferent papillary defect

The United States Eye Injury Registry (USEIR), Birmingham,USA developed the Ocular Trauma Score (OTS) which provides a single probability estimate of an eye trauma patient obtaining a specific visual range by six months after injury.

It takes basic simple mathematics to add up the determined numbers. The sum of the numbers relates to an OTS category, based on which the expected visual acuity, divided into five meaningful categories, can be identified.

The OTS can be used as an aid in the counselling and treatment of eye injury patients, and is intended to direct attention toward resource needs and rehabilitation during the treatment process. The OTS is meant to be a continually evolving scoring system to be put to practical use and thereby refining the computational methods for the same.

How to calculate the Ocular Trauma Score

- First, determine the patient's initial visual acuity after the injury and their tissue diagnoses.
- Second, assign a raw point value for initial visual acuity from row A of Table 4
- Then subtract the appropriate raw points for each diagnosis from rows B-F.

For example, a patient with an initial visual acuity of 1/200, scleral rupture, and retinal detachment would receive a raw OTS score of 80-23-11= 46.

Higher OTS scores tend to indicate a better prognosis

To provide an estimate of the patient's probability of attaining a specific visual acuity range at a six-month follow-up, locate the row in Table 5 corresponding to the patient's OTS. A patient with a raw OTS score of 46 would have an OTS category score of 2.

Table 5 shows the estimated probability of all potential visual outcomes vision after six-months.

Table 2: BETTS Glossary of Terms	
Term	**Definition and *explanation***
Eyewall	**Sclera and cornea.** *Though technically the eyewall has three coats posterior to the limbus, for clinical and practical purposes violation of only the most external structure is taken into consideration*
Closed globe injury	**No full- thickness wound of eyewall.**
Open globe injury	**Full- thickness wound of the eyewall.**
Contusion	**There is no (full- thickness) wound.** *The injury is either due to direct energy delivery by the object (e. g., choroidal rupture) or to the changes in the shape of the globe (e. g., angle recession)*
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 (at the impact site or elsewhere; example: an old cataract wound dehisces even though the impact occurred elsewhere); 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***Retained foreign object/ s.***Technically a penetrating injury, but grouped separately because of different clinical implications*
Perforating injury	**Entrance *and* exit wounds.** *Both wounds caused by the same agent*

Table 3: BETTS: The PINK boxes indicate the diagnoses that are used in clinical practice.

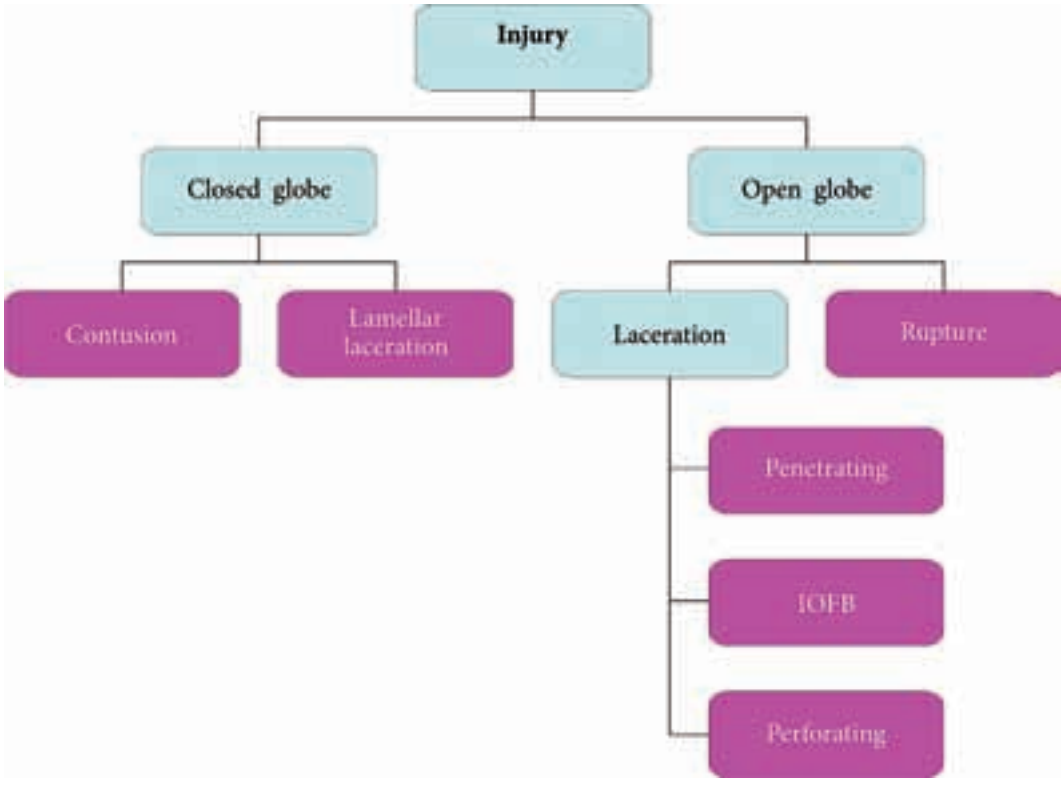

Table 4: Computational method for deriving the OTS score	
Initial Visual Factor	***Raw points***
A. Initial visual acuity category	NLP = 60 LP to HM = 70 1/200 to 19/200 = 80 20/200 to 20/50 = 90 ≥20/40 = 100
B. Globe rupture	-23
C. Endophthal mitis	-17
D. Perforating injury	-14
E. Retinal detachment	-11
F. Afferent papillary defect (Marcus Gunn pupil)	-10
Raw score sum = sum of raw points	

Table 5: Estimated probability of follow-up visual acuity category by the OTS Score

Raw Score Sum	*OTS Score*	*NLP*	*LP/HM*	*1/200-19/200*	*20/200 to 20/50*	*≥ 20/40*
0-44	1	73%	17%	7%	2%	1%
45-65	2	28%	26%	18%	13%	15%
66-80	3	2%	11%	15%	28%	44%
81-91	4	1%	2%	2%	21%	74%
91-100	5	0%	1%	2%	5%	92%

Studies evaluating the Efficacy of the Ocular Trauma Score

- In a recent study by Sobaci et al.[6], the prognostic value of the OTS was assessed in 88 eyes of 80 patients with open-globe injury caused by deadly weapons. They reported that the visual outcomes of their patients were similar to those in the OTS study with the exception of category 2.
- Unal et al.[7] evaluated the prognostic value of the Ocular Trauma Score (OTS) in cases of deadly weapon-related open-globe injuries with intraocular foreign bodies and concluded that the OTS, which is designed to predict visual outcomes of general ocular trauma, may also provide reliable information about the prognosis of deadly weapon-related open-globe injuries with intraocular foreign bodies.
- Unver Y B et al.[8] analysed the predictive value of OTS in open globe injuries in children and concluded that OTS might have limited value as predictors of visual outcome in the pediatric population because of the development of amblyopia in the injured eye in children under the age of 8 years.

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Ocular Trauma in Blast Injuries

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Eyes comprise as little as 0.27% of the total body surface area and only 0.1% of the erect frontal profile. However, injuries to the eye are found in 10–13% of all combat casualties and, more recently, among civilians having unexpected IED injury, which has recently increased dramatically

Explosions have the potential to inflict multi-system life-threatening injuries on many persons simultaneously. The injury patterns following such events are result of the composition and amount of the materials involved, the surrounding environment, delivery method, the distance between the victim and the blast, and any intervening protective barriers or environmental hazards. Blast-related injuries can present unique triage, diagnostic, and management challenges to providers of emergency care

Explosive Devices & Ocular Blast Injury Patterns

Explosions have the potential to cause life-threatening multisystemic injuries and mass casualties, one of these vulnerable systems to blast are the eyes and orbits. These patterns of injuries are a result of the explosive composition and type of explosive and delivery method. Also, the distance between the victim and the blast epicenter and whether the blast occurred in a closed or open space may be contributing factors.

Explosives can be categorized as high-order explosives (HE) or low-order explosives (LE). HE produce a defining supersonic over-pressurization shock wave. Examples of HE include TNT, nitroglycerin, dynamite, and ammonium nitrate fuel oil (ANFO). LE create a subsonic explosion and lack HE's over-pressurization wave. Examples of LE include pipe bombs, gunpowder, and most pure petroleum-based bombs. HE and LE cause different injury patterns.

Explosive are further characterized based on their source into *"Manufactured"* which implies standard military-issued, mass produced, and quality-tested weapons and *"Improvised"* describes weapons produced in small quantities, or use of a device outside its intended purpose. Manufactured explosive weapons are exclusively HE-based. Terrorists will use whatever is available – illegally obtained manufactured weapons or improvised explosive devices (also known as "IEDs") that may be composed of HE, LE, or both. Manufactured and improvised bombs cause markedly different injuries.

Explosion Related Injuries

Auditory-TM rupture, ossicular disruption, cochlear damage, foreign body.

Eye, Orbit, Face-Perforated globe, foreign body, air embolism, fractures.

Respiratory-Blast lung, hemothorax, pneumothorax, pulmonary contusion and hemorrhage, A-V fistulas (source of air embolism), airway epithelial damage, aspiration pneumonitis, sepsis.

Digestive-Bowel perforation, hemorrhage, ruptured liver or spleen, sepsis, mesenteric ischemia from air embolism.

Circulatory-Cardiac contusion, myocardial infraction from air embolism, shock, vasovagal hypotension, peripheral vascular injury, air embolism-induced injury.

CNS Injury-Concussion, closed and open brain injury, stroke, spinal cord injury, air embolism-induced injury .

Renal Injury-Renal contusion, laceration, acute renal failure due to rhabdomyolysis, hypotension, and hypovolemia.

Extremity Injury-Traumatic amputation, fractures, crush injuries, compartment syndrome, burns, cuts, lacerations, acute arterial occlusion, air embolism-induced injury .

Mechanism of Blast Injuries

The four basic mechanisms of blast injury are termed as primary, secondary, tertiary, and quaternary .Blast Wave (primary) refers to the intense over-pressurization impulse created by a detonated HE. Blast injuries are characterized by anatomical and physiological changes from the direct or reflective over-pressurization force impacting the body's surface. The HE "blast wave" (over-pressure component) should be distinguished from "blast wind" (forced super-heated air flow). The latter may be encountered with both HE and LE.

Primary Blast effect

The leading edge of a blast wave, which consists of few millimeters of overpressurized air, is called the blast front and it moves rapidly in all directions from the epicenter of the explosion.

The sudden pressure change caused by the blast wave can damage living tissue through four mechanisms: spalling, implosion, acceleration–deceleration and pressure differentials.

The air-filled organs and air–fluid interfaces are the organs damaged by dynamic pressure changes at tissue density (i.e., air–fluid) borders due to the interaction of a high-frequency stress wave and a lower frequency shear wave. One or the other of these waves predominates, depending on the characteristics and location of the blast. Rupture of the tympanic membranes, pulmonary damage and air immobilization and rupture of hollow viscera are the most important primary forms of blast injury. Ocular/orbital anatomical region containing liquid and other tissue media bounded by thin bone plate walls of air-containing sinuses are also vulnerable.

Secondary Blast Effect

Secondary blast injury is much more common than primary blast injury. Indeed, secondary blast injury is the most common cause of death in blast victims. A large number of blast survivors will have significant eye injuries.

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(R&R) Delhi Cantt, Delhi

Penetrating fragments made of different kinds and shapes of objects ranging from explosive material to car fragments, ground particles, sand and pebbles or other components may cause devastating damage to the eye and body.

In urban explosions, secondary blast causative factors are different inside populated cities. Glass fragments from windows are notorious for causing ocular injuries. They often do not kill, but can cause blindness and ruptured globes. At the speed that explosively propelled fragments of glass travel, there is no time for the blink reflex to operate.

Tertiary Blast Effect

Propelling of the body against walls or objects, or crush injuries and blunt trauma from building collapse resulting in crush injures to any part of the body including the eyes/orbital and facial bone trauma constitutes the tertiary blast effect.

Quaternary Blast Effect

Asphyxia through inhalation of fumes from toxic, burnt materials and burns by high thermal explosive effects on the cornea are the key factors in the quaternary blast effect.

Relevant Anatomical Consideration

The special eye position due to the architecture of the middle part of the facial skeleton extends laterally, exposing the surface of the eye/orbit to the blast injury. Multiple biophysics effects of blast waves demonstrate how blast affects individual tissues as a result of their vibratory energy and why some anatomical tissue are more susceptible to primary blast. The interaction of a high-frequency stress wave and a lower frequency shear wave determines the degree to which organs are damaged by dynamic pressure changes at tissue-density borders.

The ocular/orbital encloses vital anatomical organs (eyeball, muscle, fat, vessels, nerve tissues are enclosed by thin bone plates) containing (air–fluid–soft tissue medium) a unique interface for a shock wave to spread through to the surrounding medium related to the eye globe and orbital anatomical tissues.

The orbital walls consists of thin plates that separate orbital tissue content from the CSF and brain superiorly, the para nasal sinuses medially and inferiorly, and the lateral plates in the temporal region. Only the circumferential orbital rim is a thick resilient bone. The lateral wall has the lowest frequency of injury of all civilian facial fractures. The medial wall is of critical importance during blast implosion of the ethmoidal air cells in the medial wall, as it is composed of thin bones ranging from 0.2 to 0.4 mm in thickness close to the thin cribriform plate that leads to crush injury by blast effect into nasal–orbital–ethmoidal (NOE) comminuted fractures. The superior wall is moderately resistant to fracture; the orbital roof is 3 mm thick in the posterior and is thinnest just behind the superior rim in the anterior. The inferior wall is the most vulnerable to injury.

Orbital volume is approximately 35 cc, of which only 7 cc (20%) is occupied by the eyeball. The remaining 28 cc contains muscles, nerves, fat, glands and blood vessels.The orbit can thus have room for a compressible mechanism and accommodate a relatively large foreign body without showing great disturbance of function.The distance from the eyeball to the medial, orbital wall (6.5 mm) is slightly larger than the distance to the lateral wall (4.5 mm). Medially penetrating objects will injure the eyeball less frequently than an object entering laterally.

Triage

When time is critical due to handling mass casualties and multi-system major injuries in environmental non operational accidents, the primary or secondary eye/orbital injuries are unfortunately likely to remain untreated because of life-saving priorities. In the case of a continuous flow of new casualties in more than one explosion in one city that exhausts medical resources, eye injuries should not be missed

The cases should be examined for evidence of obvious signs and symptoms of serious blast injuries, such as pulmonary, head or extremity amputation. If a hidden injury to another organ is suspected, the victim should be referred to a trauma center for initial triage, before concentrating on the eye. In severe injuries, basic and advanced life support is the primary objective until the patient is stabilized. A consultation for visual system evaluation should be prompt and must be triaged among the multiple consultations and ongoing critical care needs required for the individual patient. If neurosurgical concerns prevent pupillary dilation, a comprehensive evaluation of the posterior sclera, retina, choroids, ciliary body and optic nerve head may be compromised.

The eyes are evaluated and checked for functioning efferent/afferent limbs, extraocular movements, gross deformities, globe perforations, blood, chemosis, dystopia, enophthalmos, exophthalmos and telecanthus. For most, eye injuries should be covered immediately by a simple eye patch for protection. No pressure is to be placed on the open globe. Victims with direct eye injury, not associated with other serious head, facial or general injuries, are evacuated to the ophthalmology department.

A gross assessment of the visual acuity should be obtained with the use of light and counting fingers. 'Near charts' are also helpful for the trauma patient. Therefore, the patient should be examined and primary diagnosis determined. This can only occur and indeed depends on first responders (on all levels) being trained to screen for eye injuries when the mechanism of injuries involves small fast moving objects, such as those that occur in blast or other explosive injuries. However, in certain circumstances emergency room personnel are not properly trained such as when extra hands are needed or when volunteers from other medical units are not familiar with emergency management. This could take place in situations where there is a high influx of severe casualties in a short period of time. The eye should be routinely re-examined when the surgeon screens the blast injury patient from head to toe prior to anesthesia. The vision evaluation compares sight in the injured eye to the uninjured eye. Severe vision loss in the non ruptured eye is a strong indicator of serious injury.

Ocular Injuries

Nasal-orbital-ethmoidal injuries

Blast leads to complicated compressed middle third facial skeleton. These cases are more difficult to treat than in civilian (NOE) fractures, such as those due to direct blow or car accident injuries, which are frequently segmental bone fractures roughly on the bone line of weakness. Reposition by a direct or indirect approach,

simple intraosseous wiring or mini plate fixation are enough for proper fixation.

Hyphaema

The management is dependent on the cause and severity of the hyphema. Frequently, the blood is reabsorbed over a period of days to weeks. During this time, the ophthalmologist carefully monitors the intraocular pressure for signs of the blood preventing normal flow of the aqueous.

Proptosis

Proptosis may indicate a retro-bulbar hemorrhage. Pupillary distortion may be associated with an open globe. Decreased motility on one side may be caused by an open globe. Other causes include muscle injury, orbital fracture and orbital hemorrhage.

Avulsion of the Eye Globe

The eyeball is removed and the shell fragment delivered from the retro-bulbar region via a direct orbital approach. The eye socket should be packed with Vaseline gauze, and the fractured maxilla reduced to its position using direct intra-osseous wiring and upper arch bar for the upper jaw as well as exploration of the neck wound.

Penetrating Eye injury

Although the eye is subject to all the types of injuries described previously, the most common and devastating ocular injuries result from the missiles created by a blast (i.e., secondary blast injuries). Just as with wartime ocular injuries, those associated with terrorist blasts are most commonly due to fragments that damage the eye.

Although the number of ocular penetrating injuries is high due to conventional combat shell fragments, the number of penetrating eye injuries due to IEDs is far higher (and we should expect this to continue to increase) as the rate of attacks rises in high-risk populated areas.

The highly qualified ophthalmology specialist may be surprised as to why these technical specialties and sophisticated instruments are unavailable. The modern vitreoretinal techniques have improved and decreased enucleation rates for severely traumatized eyes due to blast injuries.

Indications for surgical exploration in a case of penetrating injury are:

- Full thickness corneal laceration
- Full thickness corneoscleral laceration
- Iris incarceration
- Suspected IOFB
- Occult / posterior scleral rupture
- Endophthalmitis

Tension Pneumo-orbitus (Orbital Emphysema)

Orbital emphysema due to orbital trauma is a well-known occurrence. Visual loss due to orbital emphysema, however, is an uncommon phenomenon.

An overpressurised blast wave front impact leads to implosion of the paranasal air cells; these can allow the passage of air into the orbit space and orbital soft tissues, particularly of the medial orbital wall. The orbital emphysema does not last as it deflates through the fractured orbital walls.

The compartmentalized orbital space holds the compressed air and occasionally creates a one-way valve effect that entraps this air within, as in civilian conditions, or the pressurized air dissected from oropharynx or upper part of pulmonary system. This situation can precipitate proptosis of the globe, elevation of the intraorbital and intraocular pressure, and vascular insufficiency of the optic nerve and retina. The orbit, therefore, follows pressure–volume dynamics, with a pathophysiology, in which increased tissue pressures in an enclosed space are associated with decreased blood perfusion. When the pressure within the orbit exceeds central retinal artery pressure, ischemia results from insufficient blood supply. It is more serious in retrobulbar hematoma, as the pressure effect of fluid is higher than more diffusible air pressure in tissue anatomical spaces, hematoma can cause a substantial rise in pressure if not treated and may result in blindness if not decompressed by drainage.

Irreversible optic nerve pathology may occur within 90–120 min of ischemia. Front-line surgeons should be familiar with retro-bulbar emergent decompression by lateral canthotomy and inferior cantholysis. Medial and lateral canthal tendons limit the forward movement of the globe. Canthotomy may compensate for small increases in orbital volume by forward movement of the globe.

Suspected globe rupture is a contraindication to lateral orbital canthotomy. Signs of globe rupture include hyphema; a peaked, teardrop-shaped, or otherwise irregularly shaped pupil; exposed uveal tissue, which appears reddish-brown; and extra ocular movement; a restriction that is greatest in the direction of the rupture. Subtle signs of globe rupture include subconjunctival hemorrhage, enophthalmos or a conjunctival laceration.

Lid lacerations and adnexal injuries

Lid lacerations needs to be sutured taking care to maintain tissue plains and anatomical closure. Cleaning the skin and removing dust particles and metallic / non metallic FBs done first. Key to remember is to preserve the skin tissue avoiding excision. Because of excellent blood supply of facial skin repair and vitality is good.

Non penetrating injuries

Blunt trauma to globe can cause damage to anterior and / or posterior segment of eye. Blast injury can present as multiple FBs over conjunctiva and corned which needs to be removed meticulously sometime under general anesthesia in multiple sittings.

Blunt injury can result in subluxation or dislocation crystalline lens. A subluxated lens that becomes cataractous or interferes with patient vision can be removed either using anterior limbal approach, with careful attention to anterior vitreous, or via pars plana. Completely dislocated, non ruptured lenses may be observed in some cases. If removal is necessary, pars plana lensectomy is preferable. Concurrent vitreous hemorrhage can also be removed at the same time.

A variety of retinal injuries may occur with blunt injury to the globe. These include macular hole, peripheral retinal tear, giant retinal tear, retinal dialysis, and avulsion of vitreous base. Management of these injuries depend on nature of retinal injury and / or vitreous hemorrhage. Treatment strategies include laser photo coagulation, cryopexy, scleral buckling and pars plane vitretomy. Use of PFCLs during surgical repair has improved the prognosis for eyes that have a giant retinal tear o detachment.

Intra ocular foreign body (IOFB)

IOFB constitutes an emergency and needs to be operated at the earliest. IOFB should be removed if at all possible at the time of initial clouser. The presense of IOFB increases the risk of endophthalmitis in acute settings and surgical extraction may be associated with decreased risk of clinical infection. In settings of blast injury multiple foreign bodies in both eyes can be encountered and needs meticulous surgical removal.

Irreparable penetrating injury

In a case of extensive blast injury, ophthalmologists can encounter extensively damaged eye in which anatomical restoration will not be possible. In such cases primary enucleation can be considered but should never done without an attempt to repair and reconstruct.

Evaluation

Initial evaluation and documentation is important and essential for prognostic, medico legal and comparative purpose. It is not rare that first detailed examination may have to be performed in OT with patient under anesthesia. For this ophthalmologist should be equipped with portable vision charts, direct and indirect ophthalmoscope, magnifying loop, tonometer, fluorescein, anesthetic drops.

- Visual acuity

Recording of initial visual acuity is of paramount importance. It gives indication for severity of injury and also has medico legal implications. Every effort should be made to record and document vision at the earliest.

- Ocular motility
- Pupils - size, shape, symmetry, RAPD
- Conjunctiva- laceration, Foreign Bodies (FB)
- Cornea - abrasions, lacerations, multiple FBs ,entry wound
- Anterior chamber- depth, hyphaema
- Iris - irregular border, prolase, tear , iridodialysis
- Lens- Position, dislocation / subluxation
- Recording of external injuries-lacerations, fracture and deformities, proptosis, enophthalmos, eyelid position

10. Posterior segment evaluation should be done at the earliest by indirect ophthalmoscopy if possible.

Investigations

Plain X ray-Plain film radiography (PFR) is simplest and most readily available tool.Although PFR of eye and orbit has been largely superseded by CT examination it may be the only imaging tool available at hand in emergency settings.

Computed Tomography (CT scan)-The CT scan is a standard diagnostic test for imaging traumatized eye and orbit.

USG AB scan-It does not require clear media and can be used for detection of suspected foreign bodies when visualization is compromised due to media haze.

Magnetic Resonance Imaging(MRI)-It is strongly contra indicated in all cases of blast injuries where nature of FBs is not known and metallic FB is a rule than exception.

Ultra sound biomicroscopy (UBM)-Small or non metallic IOFBs in the anterior chamber angle or behind root of iris may be difficult to detect and UBM can be useful.

Conclusion

In a setting of blast injury attention should be directed to life threatening injuries. Stabilization of patient and treating critical body and limb injuries always take precedence. Ophthalmologist should use systemic medications to control pain, nausea, coughing, and anxiety. Depending on the nature of injury systemic antibiotics can be started prophylactically. Since the blast injury involves multiple foreign bodies, dust and stone particles broad spectrum antibiotics which cover both gram positive and negative organisms should be started. Tetanus immunization status should be checked and reinforced if required.

The management of such patients is a team effort by critical care specialist and ophthalmologist should be working as part of the team.

Initial resuscitation of the patients remembering ABC (A- airway, B- breathing, C- circulation) of resuscitation is important.

The prognosis for severely injured eyes has improved with the development of advanced microsurgical techniques and better understanding of tissue reaction to trauma from which surgical and medical protocols have been derived. In the immediate period after the injury, the rapidity with which treatment is instituted may have an important effect on the final result. In addition, better methods of visual rehabilitation have improved the final visual function.

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Repair of Corneoscleral Perforations

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Trauma is the second major cause of corneal blindness,[1] and has been reported to be one of the most important causes of unilateral vision loss in developing countries.[2] It represents not only a cause of severe visual loss but also a profound psychological and economic trauma to patients and their families.[3] Males are more than five times likely to be affected than females. These injuries are also more common in the younger age groups—nearly half of patients are under 40 years of age.[3] Treatment is time consuming and expensive but despite this there is often a grave prognosis. [4,5]

The foremost step in any corneoscleral perforation repair is detailed history with regards to mode, duration, time and the object of injury. The medication and intervention done after the injury should be known. Proper evaluation of the injury along with other associated injuries to the surrounding structures should be done. The examiner should be able to identify the possibility of unsuspected or occult globe injury, such as globe perforation, posterior scleral rupture, intraocular foreign bodies, possibility of concomitant microbial contamination etc.

Proper slit lamp examination is essential with recording of visual acuity and to check its further improvement with pin hole. Multiple illumination techniques should be utilized so as to appreciate subtle signs of ocular injury. Most important among these is direct illumination, which will reveal obvious injuries. The illumination can be reduced by using neutral density filter if patient is becoming uncooperative due to photophobia. Other techniques, such as indirect illumination, sclerotic scatter, and retroillumination are also important. Sclerotic scatter can be extremely helpful in locating fine, shelved corneal lacerations that result from penetrating trauma from sharp edged, high-speed foreign bodies. Retroillumination from the fundus light reflex can also be helpful in detecting discontinuities in the lens and cornea specially tears in Descemet's membrane, or in showing the presence of iris transillumination defect. Seidel's test also helps in detecting an occult penetrating corneal injury. The severity of perforation is judged by the extent of damage. Therefore the perforating corneal injuries can be graded according to security as follows[6]:

- Non penetrating injury with intact anterior chamber
- Perforation with anterior chamber partially present and iris adhering to posterior wound edge
- Corneal perforation with iris prolapse and flat anterior chamber
- A lacerated perforation with tissue loss, exposed iris, absent anterior chamber and cataractous lens
- Grossly lacerated wound with extrusion of lens and/ or loss of vitreous.

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After assessment of the anterior segment and extent of the injury several investigation are must in a case of corneal perforation.

- X-ray orbit both AP and lateral view to rule out presence of any foreign body and bony fractures.
- Ultrasonography for assessment of posterior segment and any defect in the posterior layer of sclera. The examination should be done gently to avoid any further damage to the already damaged structures.
- Cultures should be sent, in case the wound is infected, from the[7]
  - margins of the wound
  - devitalized excised tissue
  - intraocular foreign bodies

Preoperative management

Topical concentrated eye drops are to be avoided to prevent intraocular penetration of the drops. In case of small perforation with uveal tissue incarceration a broad spectrum topical antibiotic can be given.

Patient should be started on oral/ intravenous antibiotics having broad spectrum coverage.[7] Although no well controlled randomised trial has been conducted to prove the efficacy of IV or oral antibiotics in prevention of post operative endophthalmitis. But treatment for infected wounds is initiated with intravenous Cefazolin or Vancomycin for gram positive coverage and third generation cephaosporin for gram negative coverage.[8] Clindamycin can be added in presence of foreign body specially of vegetable origin.[7]

Patient should be kept fasting for general anaesthesia.

Principle of wound repair

Primary aim: complete water tight closure of the globe with restoration of structural integrity.

Secondary aim: restoration of normal anatomic relationships, avoidance of uveal tissue & vitreous incarceration in the wound removal necrotic tissue debris, removal of disrupted lens, removal of foreign bodies.

Keratorefractive principles

Micromechanical effect of penetrating injuries and of its repair is crucial for facilitating primary corneal restoration and maximizing ultimate visual outcome.[9]

Effect attributable to laceration

The anatomy of the wound is as important consideration. Corneal incisions produce keratometric flattening due to gaping of the wound. The valve rule of Eisner states[11], "Incisions through the wall of globe produce valves whose margin of water tightness is equal to the projection of surface incision onto the surface of the

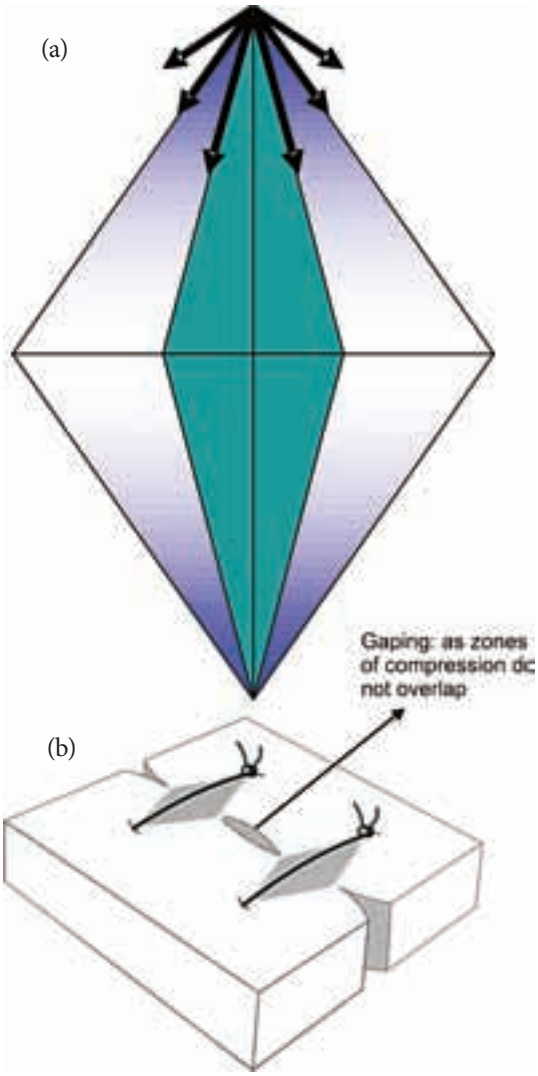

Figure 1: *Zone of compression of a interrupted suture*

globe". Thus the incisions with bevelled edges gape less that those which are vertical incisions. The bevelled incision can close spontaneously whereas perpendicular incisions gape and separate to open up requiring sutures for coaptation.

Effect attributable to sutures

The sutures tend to flatten in the area where ever they are applied and cause the cornea in the centre and nearer to the visual axis to steepen. There are 5 components of tissue effect:[9]

1. Compression factors, 2. Torquing, 3. Splinting, 4. Tissue eversion, 5. Tissue inversion.

Sutures result in wound apposition by compressing the tissues within the loop. The area of compression is equal to the length of the sutures therefore lesser number of longer sutures are used in the repair of the wound. Interrupted sutures generate a plane of compression in the tissue contained within the suture loop (Figure 1a) and a zone of compression extending away from the suture itself (Figure 1). The compression zones have a roughly triangular configuration. Wound closure is achieved when zones of adequate compression abut. Moreover, the longer sutures especially near to the visual axis lead to greater tissue distortion and therefore more of astigmatism. Therefore longer sutures should be put away from the visual axis (Figure 2). So, corneal lacerations should be closed initially with long, tight sutures in the corneal periphery (Figure 2,3). Then corneal center should be closed with shorter, more widely spaced minimally compressive tissue bites, thus conserving the now-steepened central cornea (Rowsey- Hays technique).[10] Maximum benefit of this technique requires two additional elements, the ability to measure and control the corneal curvature during the corneal repair. This is achieved with intraoperative keratometry using the hinge of a safety pin.

Corneal sutures should be placed perpendicular to the lacerations because oblique sutures produce tissue torque and wound slippage, that leads to wound gape and leakage (Figure 2, 4).

Single interrupted sutures produce equal everting and inverting forces and so there is no tendency for tissue elevation and depression. Whereas, a running suture produces a wound eversion

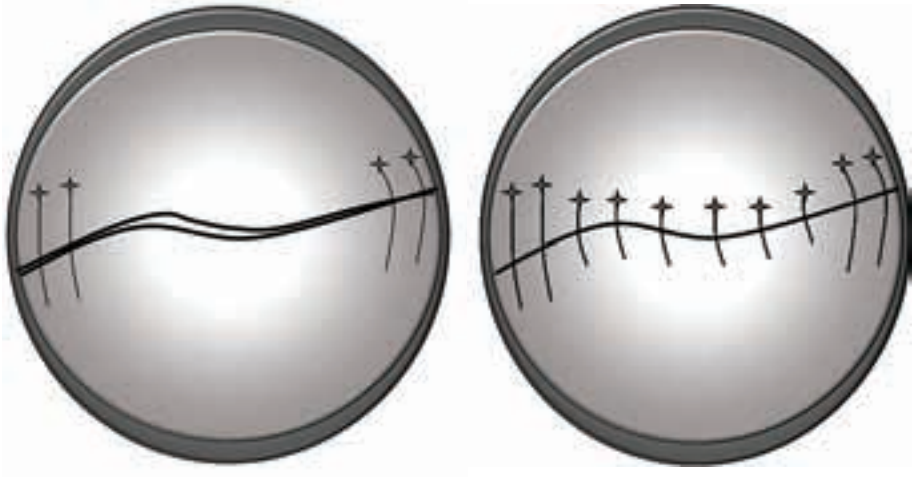

Figure 2: *Principle of wound suturing in cornea*

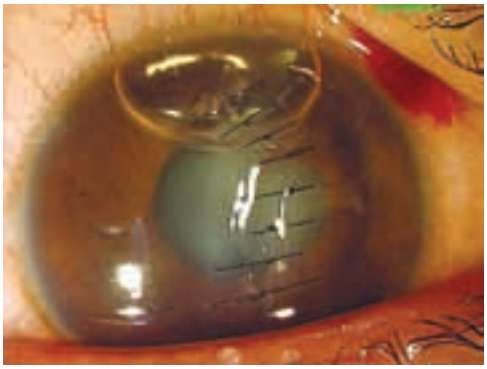

Figure 3: *Repaired corneal perforation (1st postoperative day)*

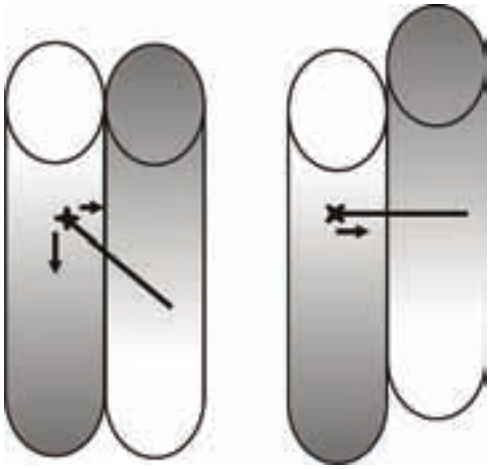

Figure 4: *Slippage of a oblique knot*

tendency over the intrastromal suture bite while creating an inverting force beneath the overlying bite.[9]

Unequal depth of suturing on both the sides of lacerations can lead to wound overriding. It may also result due to unequal entrance and exit suture passage. This results into microwedge resection effect, flattening the surrounding cornea and irregular corneal surface.

Repair of non perforating corneal injuries

These should be thoroughly examined to rule out any occult perforation. Seidel's test with 2% flourescien should be done to see any microperforations. It should be re checked by applying pressure, if found to be negative.

Treatment goal in non perforating corneal lacerations is to promote re-epithelisation, stromal healing and prevention of infection with focus on reducing corneal irregularity and minimizing corneal scarring.

Following measures can be taken:

- In case of non- gaping and wounds that are non – overriding: pressure patching with antibiotic eye ointment is sufficient
- If wound is unstable or is a deeper laceration: A bandage contact

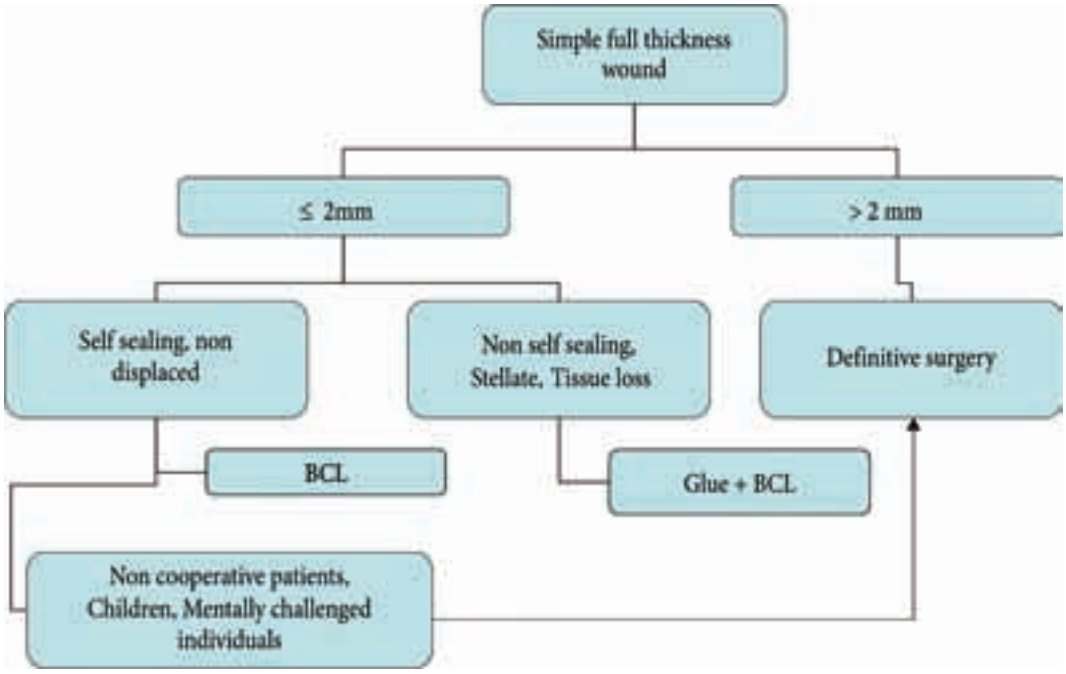

Figure 5: *Management of simple full thickness corneal perforation*

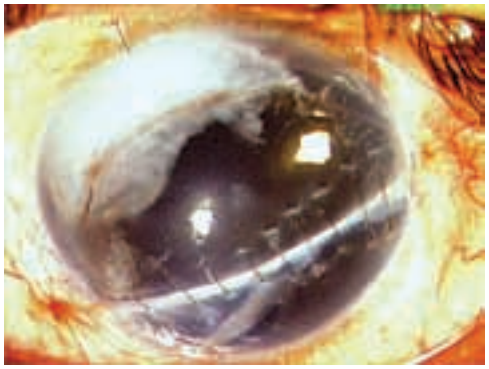

Figure 6: *Repaired limbus to limbus corneal perforation*

lens (BCL) may be used which supports the wound, shield's the cornea from eyelid contact and also enhances epithelization.

- If a flap of wound is avulsed from the cornea remaining attached at its base, if may require few sutures to ensure proper approximation. Similarly wound overriding or gaping may require few sutures.

A broad spectrum topical antibiotic, with topical steroid and cycloplegic is also added on it.

Simple full thickness corneal laceration

It is the wound which does not involve limbus. Additionally there is no iris or vitreous incarceration nor traumatic damage to lens.

The management of full thickness corneal laceration is summarized in the figure 5. Any perforation less than 3 mm can be managed without suturing if they fulfill the following criteria:

- no intraocular tissue to wound
- no other ocular structures involved
- no foreign bodies in the wound
- self sealing, where Seidel's is positive only on pressure
- an adult patient who is mentally sound

The wound in such patients can be treated with the help of BCL, glue or BCL with glue. BCL should be left in place untill the wound stabilizes which can be from 3-6 weeks. However, if anterior chamber persists to leak even after 24 hours or iris or lens incarceration ensues, then further surgical intervention is must.

Small perforation upto 2 mm diameter can be secured with glue[12] which can be natural or synthetic. A study comparing the effect of Fibrin glue with that of cyanoacrylate glue found that both are effective in the closure of corneal perforations up to 3 mm in diameter. Fibrin glue provides faster healing and induces significantly less corneal vascularization, but it requires a significantly longer time for adhesive plug formation. Incidence of papillary conjunctivitis is also more with cyanoacrylate glue.[13]

Cyanoacrylate sets as a result of anionic polymerization, which begins immediately on exposure to air. For this reason it is extremely important to dry the corneal surface prior to the application of the adhesive. Any loose or necrotic tissue must first be debrided. A simple technique we have found successful is the use of an applicator such as the 3-0 or 4-0 Bowman Probe. The applicator is "loaded" with a thin film of adhesive on the tip by an assistant while the surgeon dries the cornea with one hand and immediately applies the glue to the defect with a quick motion (to apply the thinnest possible film of adhesive onto the corneal surface). This film is allowed to dry, and subsequent coats are added as necessary to build a sufficiently thick glue layer. Generous glue application should be avoided because this will result in an elevated glue plaque that will rock with each blink of the lids and thus become loosened. A bandage contact lens should be applied to the cornea immediately after gluing and left in place as necessary. Most glue applications remain stable for several days or weeks, but if applied to a firm bed which has been debrided of necrotic tissue and epithelium, it can remain in place for over a month

Stellate, angular and intersectional lacerations

The key method to close such perforation includes multiple interrupted sutures, bridging sutures, 'X' sutures and purse string sutures. Adjunctive methods like BCL, patch grafts may be required.

Corneoscleral laceration with iris incarceration

A cleanly incised wound where iris is adhering to the posterior margins of the wound and formed anterior chamber can be managed easily by putting sutures and sweeping the iris.

Large wounds with iris prolapse should be managed immediately under general anaesthesia (Figure 6). Corneoscleral wounds should be opened to see the entire extent. The posterior lip of the wound is also examined and any splitting of corneal layers should be noted. Any fluid, blood or clots are thoroughly irrigated with balanced salt solution. Any foreign body is to be checked and removed. The decision to reposit the iris versus excision of the iris should be taken only after meticulous examination of the wound. Iris tissue which is devitalized, macerated, feathery or depigmented should be removed.[9] Any prolapsed tissue for more than 24 hours should be removed to prevent the infection or epithelial in growth. Iris which is healthy can even be reposited even after 24 hours. To reposit the iris a side port entry can be made so as to sweep the iris under the cover of viscoelastic. A fine iris repositor or a Sinsky's hook can be used from the side port entry to clear the iris off the wound. Care should be taken that no corneal endothelial and lens injury takes place during the manuever. The reposition of iris should be done gently so as to prevent iatrogenic iridodialysis. Side port entry is also useful in injection of viscoelastics, balanced salt solution and air.

Monofilament 10-0 nylon thread on a spatula needle is used for suturing of the wounds. An important fact is that 90% of the depth of corneal tissue should be taken during suturing the wound. Any superficial suture can lead to posterior wound gape and therefore iris can adhere to it at any time. Any full thickness wound repair can lead to formation of tract for infection to reach inside the anterior chamber. The sutures put should be on tighter side other

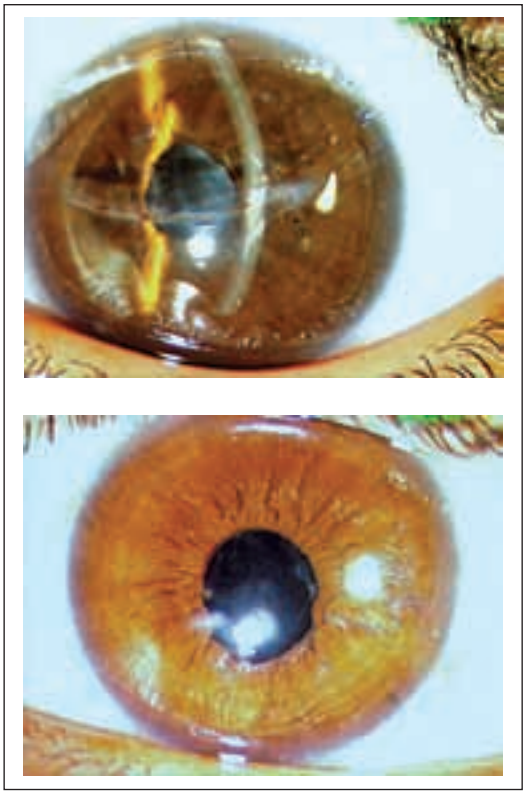

Figure 7: *Repaired corneal perforation with secondary cataract extraction & IOL implantation*

wise they can looser in the post operative period when the edema resolves. Attention is must on the type of incision whether perpendicular or oblique Anterior chamber is kept formed during the suturing with repeated air injection. In case it is difficult to form with air, viscoelastic can be used put one should make sure thorough removal of viscoelastics at the completion of surgery.

Special problems in corneal wound closure

Loose fragments are not uncommon. Most fragments remain attached to the cornea. If a fragment is present, the best anatomical orientation should be determined and the fragment fixated in place either by sutures through the fragment edges or by over sewing the fragment. If multiple small fragments or edges are present, a bandage soft contact lens placed immediately at the end of surgery can be helpful both in keeping the tissue in place, as well as providing substantial postoperative patient comfort.

Tissue loss, while extremely rare, can cause significant reconstructive problems. It can be managed by a freehand patch graft from donor cornea. For larger tissue loss, a primary corneal transplant may be required. If a primary graft is necessary, additional sutures should be placed at the intersection of the graft/host junction and the wound to prevent gaping.

Laceration with incarceration of lens

Lens surgery should be deferred until the eye has recovered from the initial effect of primary surgical repair. Moreover, lens extraction in the presence of anterior chamber reaction, pupillary membrane and edematous cornea is difficult. But in following situation one can consider primary lens removal:

- injured lens capsule with free floating lens matter in anterior chamber
- opaque lens which can hamper the management of posterior segment or foreign bodies.

Extracapsular cataract extraction should be preferred to remove the lens matter. Whereas; a very small entry in anterior capsule of less then 1 mm, generally seals on its own and therefore can be left as such also. Generally an IOL implantation is not possible which can be done as a secondary measure. Cataract formation at a later date can be managed more efficiently after healing of corneal wound (figure7). If there is a total anterior dislocation of crystalline lens then lens should be removed by intracapsular cataract extraction followed by thorough anterior vitrectomy.

Laceration with vitreous loss/ incarceration

Complete vitreous removal from the anterior chamber by bimanual anterior vitrectomy is must. The pupil should be circular, round without peaking. The injury with total lens extrusion and vitreous loss are bad prognosis injuries, especially those in association with intraocular hemorrhage. Such injuries should be assessed regarding the expected post operative visual gain and if the eyes have no visual potential then it is better to enucleate those eyes.

Repair of scleral injury

As in the repair of the corneal injury, the goals of the scleral repair are the same, and the reapproximation of landmarks enables the surgeon to restore the anatomy. Unlike corneal lacerations where the extent of the laceration or injury is clearly visible, it is not uncommon that a scleral laceration begins anteriorly and extends posteriorly to an unknown end point. One should begin the conjunctival peritomy to expose the scleral laceration several clock hours away from the obvious injury so that the scleral surface can be identified. Also, unlike the closure of the corneal laceration, in order to prevent prolapse of intraocular contents, the sclera should be closed in a step-wise fashion the so called "close as you go" technique. This technique involves a limited anterior dissection, exposure of a small portion of the scleral defect, and closure of the visible anterior defect prior to further posterior dissection. Wounds too posterior to close without the threat of intraocular tissue loss should be left to heal on their own with the periorbita repositioned and conjunctiva closed. Because of the slow healing of the sclera and the necessity for structural support, nonabsorbable sutures (8-0 Mersilk) should be used for large defects. For smaller wounds, absorbable sutures (eg, 8-0 Vicryl) are appropriate.[7] If the wound intersects a muscle insertion, careful inspection of the sclera underlying and posterior to the muscle should be undertaken to determine whether the wound extends posteriorly to the muscle. If in doubt, the surgeon should remove the muscle and continue closure of the defect; the muscle is reattached once the wound is closed.

In a case of combined corneo scleral laceration, the first suture should be placed at the limbus, so as to restore the normal anatomic contour of the globe. Then the corneal wound should be repaired as highlighted previously. Lastly the scleral wound

should be approached gradually from the anterior to the posterior aspect as far posterior as possible.

Special problems scleral wound closure

Loss of scleral tissue is extremely rare, occurring most commonly with grazing gunshot wounds and rarely stab injuries of the orbit. If scleral loss is present, the defect can simply be closed with donor sclera in the form of a patch graft.

Frozen sclera can be utilized for up to 3 months following the date of preservation and, once thawed, is good for approximately 24 hours. Glycerin-dehydrated sclera is good for up to 1 year from the date of initial storage but should be rinsed and soaked in balanced salt solution for 30 to 40 minutes, changing to fresh solution two or three times to ensure that no glycerin remains in the tissue.

Prior to use, any residual episcleral and choroidal tissue should be removed from the donor material, and the recipient bed should be cleared of any necrotic or suppurative sclera, with good margins identified, prior to cutting the patch.

Postoperative management

Postoperative care is done as in the case of keratoplasty. Broad spectrum antibiotic eye drops like ofloxacin 0.3% or gatifloxacin 0.3% is given with topical corticosteroid eye drops like prednisolone acetate 1%. A cycloplegic is added along with anti glaucoma medication if IOP is high. In case of infected wounds, fortified eye drops like cephazolin 5% and tobramicin 1.3% are added. Topical corticosteroids are witheld and started after assessing the wound in the post operative period. In such cases, oral corticosteroids can be given. Systemic antibiotics are to be continued as started in the pre operative period. Good apposition of the cut edges with deeply placed corneal sutures leave a fine scar which gradually thins over a period of 6-9 months. Corneal scars in the pupillary axis which are significantly causing deterioration of vision can be treated by optical penetrating keratoplasty after assessing the posterior segment.

Prognostic factors: the main factors indicating good visual prognosis (6/18 or better) are following:[4]

- Presenting acuity after injury of 6/60 or better,
- Wound location anterior to the pars plana,
- Wound length of 10 mm or less
- A sharp mechanism of injury.

It is seen that wounds longer than 20 mm, which extend posterior to the equator, will lead to poor final vision and subsequent enucleation in the overwhelming majority of cases, and that primary enucleation should be considered in eyes with such surgical findings

Summary

Corneoscleral lacerations are an important cause of vision loss and should be dealt diligently on an emergency basis so as to improve both structural and functional outcome. Two types of errors occur in the evaluation of such injuries: errors of commission and errors of omission. Errors of commission (performing surgery or prescribing medication that is contraindicated) are rare. More common are errors of omission, most frequently a failure to appreciate the true extent of the injury at the time of evaluation. The globe must be closed so that it is watertight with the original anatomy restored and the original function can be as closely approximated as possible. Closure of the cornea and sclera is different from the typical skin technique of "halving" the wound. Long corneal wounds are closed utilizing the Rowsey-Hays technique whereas scleral wounds extending posteriorly are closed in a stepwise fashion, proceeding posteriorly only after the anterior portion has been sutured. Timely intervention and meticulous evaluations can solvage vision in these compromised eyes.

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Orbital Blow out Fracture

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The term *pure orbital blowout* fracture is used to describe fracture of the orbital floor, the medial wall or both, with an intact bony margin. The term *impure orbital blowout* fracture is used when such fractures occur in conjunction with a fracture of the orbital rim. The most common site for orbital blowout fracture is the posteromedial aspect of the orbital floor medial to the infraorbital neurovascualr bundle where the maxillary bone is very thin (0.25 – 0.50 mm). As the lamina papyraecea is also very thin, the medial orbital wall is also prone to fracture, either in isolation or in association with a fracture of the orbital floor or other facial bones.

Aetiopathogenesis

Retropulsion Theory/Hydraulic Theory[1] : The backward displacement of the globe caused by a blunt non-penetrating object, which raises the intraorbital pressure sufficiently to fracture the posteromedial orbital floor and/or the lamina papyracea of the ethmoid.

Buckling Theory/Transmission Theory: A transient deformation of the orbital rim transmits the force of injury directly to the orbital wall.

Clinical Picture

Eyelid ecchymosis/ haematoma: Usually present post fracture but signs maybe absent as seen in the 'white eyed blowout fracture'.

Subcutaneous emphysema: When a blowout fracture communicates with an air-filled sinus, particularly medial orbital wall blowout fractures. Subcutaneous emphysema may result in palpable crepitus. Patients should be advised not to blow their nose

Neurosensory Loss*:* This occurs in the area supplied by the infraorbital nerve and is almost pathognomic. The sensory loss occurs in the area of the ipsilateral cheek, upper teeth or tip of the nose. This occurs because the fracture extends along the infraorbital groove or canal injuring the infraorbital nerve. These sensory defects tend to resolve spontaneously with time butt may get aggravated by surgery in the area.

Limitation of ocular motility (Figure 1) : Vertical diplopia may present due to varied mechanisms. Horizontal diplopia may present rarely with medial wall fracture.

Mechanisms

- Entrapment of connective tissue, septa, extraocular muscle (inferior rectus most commonly) within the fracture.
- Haematoma/ edema in the orbital fat adjacent to the fracture.
- Haematoma or contusion of the extraocular muscle itself.
- Palsy of an extraocular muscle due to neuronal damage
- Volkmann,s ischemic contracture of an entrapped extraocular muscle.

Enophthalmos / Proptosis/ Hypoglobus*:* Enophthalmos varies on the degree of bony expansion and is significant with combined (floor plus medial wall) fractures. Proptosis maybe present due to orbital haematoma/ edema/ air or in cases of a blowin fracture where bony fragments protrude upwards within the orbit. Hypoglobus is seen in extensive floor fractures[2].

Upper eyelid sulcus deformity/ pseudoptosis *:* Enophthalmos results in decreased support to the upper eyelid which leads to secondary pseudoptosis and an upper eyelid sulcus deformity.

Examination

Thorough ocular examination is necessary; in particular, special attention is required to check vision and pupillary response for

Figure 1a: *Patient with Right Blowout Fracture with enophthalmos and hypotropia in primary gaze*

Figure 1b: *Patient with Right Blow out Fracture with limitation in elevation.*

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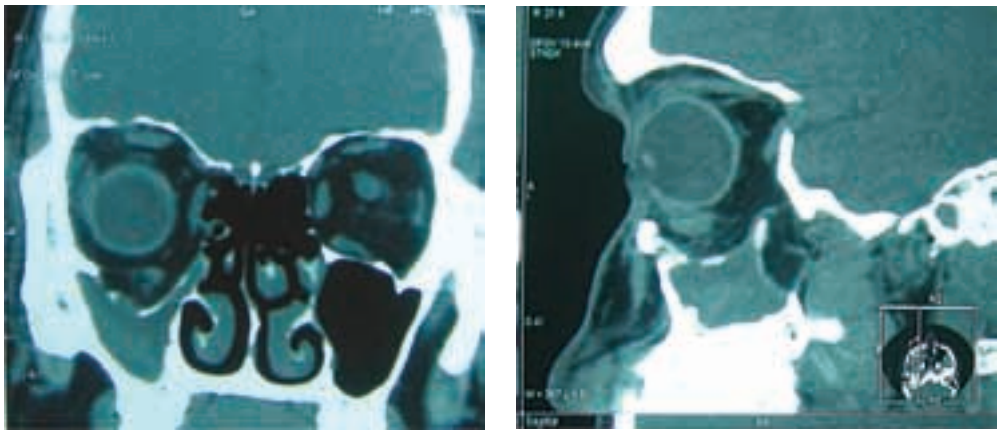


Figure 1c: *CT Scan Of the same patient showing a Right floor fracture.*

Figure 2a: *Medpor (Porous Polyehylene Implant)*

Figure 2b: *Sizing the Medpor Implant*

optic neuropathy and to assess extraocular motility and forced ductions/generations for extraocular muscle entrapment, ischemia, hemorrhage, or orbital compartment syndrome. Exophthalmometry is used to measure globe position; slit-lamp examination is used to diagnose corneal abrasion, hyphema, iritis, lens dislocation, cataract, vitreous hemorrhage, and some ruptured globes; and fundus examination is used to diagnose retinal detachment, commotio retinae, and ruptured globe. Eyelids and periorbital tissues should be palpated for subcutaneous emphysema and for any orbital rim defects. The malar eminences should be palpated and any depression noted. Patient should be asked to open and close his mouth to rule out pain or trismus which maybe associated with a zygomatic complex fracture. Sensory loss should be noted. Full orthoptic assessment should be performed with prism measurements in nine positions of gaze. Hess charting, visual fields, diplopia charting and binocularity assessment should also be performed. Force duction test is useful to diagnose muscle entrapment and active force generation is useful Furthermore, radiographic visualization with coronal CT is necessary to detail soft tissue not visible with conventional plain films; 1.5-mm to 3-mm coronal CTs visualize antral soft tissue densities, such as prolapsed orbital fat, extraocular muscle, hematoma, or an unrelated antral retention cyst[3].

Management

Medical Therapy

Medical treatment is warranted for patients for whom surgery is not indicated. Such patients present without significant enophthalmos (2 mm or more), a lack of marked hypo-ophthalmus, absence of an entrapped muscle or tissue, a fracture less than 50% of the floor, or a lack of diplopia.

The patient can be treated with oral antibiotics on an empiric basis due to the disruption of the integrity of the orbit in communication with the maxillary sinus.

A short course of oral prednisone also may benefit the patient by reducing edema of the orbit and muscle. This also may allow for a

Table 1. Clinical Recommendations for Repair of Isolated Orbital Floor Fractures (These recommendations are taken from a publication which reviewed 31 articles on floor fracture from the period 1983-2000)[3].

Intervention	Scenario	Rating
Immediate	Diplopia present with CT evidence of an entrapped muscle or periorbital tissue associated with a nonresolving oculocardiac reflex: bradycardia, heart block, nausea, vomiting, or syncope	A:I*
	"White-eyed blow-out fracture." Young patients (< 18 yrs), history of periocular trauma, little ecchymosis or edema (white eye), marked extraocular motility vertical restriction, and CT examination revealing an orbital floor fracture with entrapped muscle or perimuscular soft tissue	A:I
	Early enophthalmos/hypoglobus causing facial asymmetry	A:I*
Within 2 wks	Symptomatic diplopia with positive forced ductions, evidence of an entrapped muscle or perimuscular soft tissue on CT examination, and minimal clinical improvement over time	A:II
	Large floor fracture causing latent enophthalmos	B:II
	Significant hypo-ophthalmos	A:II
	Progressive infraorbital hypesthesia	C:III
Observation	Minimal diplopia (not in primary or downgaze), good ocular motility, and no significant enophthalmos or hypo-ophthalmos	B:I

CT = computed tomography.
**Recommendation based on case reports in which there is very compelling evidence that intervention is important to clinical outcome.*

Importance to the care process (three levels)

***Level A**, defined as most important to clinical outcome*

***Level B**, defined as moderately important to clinical outcome*

***Level C**, defined as relevant but not critical to clinical outcome*

Strength of evidence in the available literature that was referenced and used to support each recommendation

***Level I**, defined as data that provided strong supporting evidence of the recommendation. The study design addressed the issue in question. The study was performed in the population of interest, and the study was executed in a manner that ensured production of accurate and reliable data using appropriate statistical methods.*

***Level II**, defined as data that provided substantial evidence in support of the recommendation. These data had selected attributes of level I support but lacked one or more components from level I. Such data might include suboptimal patient follow-up, a population that lacks generalizability to the population of interest, or minimally statistically significant findings.*

***Level III**, defined as the absence of evidence that met levels I and II, such as a weak body of evidence supporting or refuting a recommendation, individual opinions, and panel consensus.*

Ratings of importance to care and strength of evidence were provided after each recommendation. Some guidelines were given an A:I rating based on case reports, because the theses in these reports were compelling and important to clinical outcome in the treatment of isolated orbital floor fractures.

more thorough assessment of the relative contribution to enophthalmos or entrapment from the fracture versus that from edema.

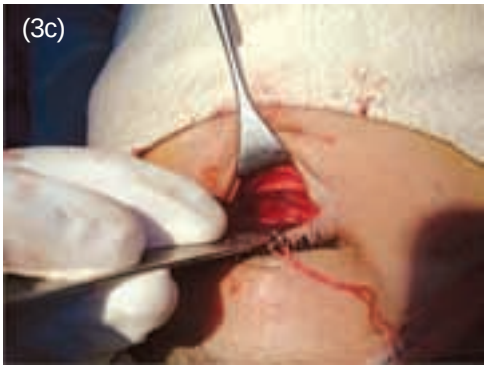
Discourage nose blowing to avoid creating or worsening orbital emphysema. Nasal decongestants can be used if not contraindicated. Ice packs may be applied for 48 hours[4].

Surgical Therapy

Protocols for surgical intervention may vary but the commonly accepted ones are:

- Unresolving soft tissue entrapment with disabling diplopia.
- Enopthalmos greater than 2mm

Surgical Managenent of Blowout Fracture : The transcutaneous approach.



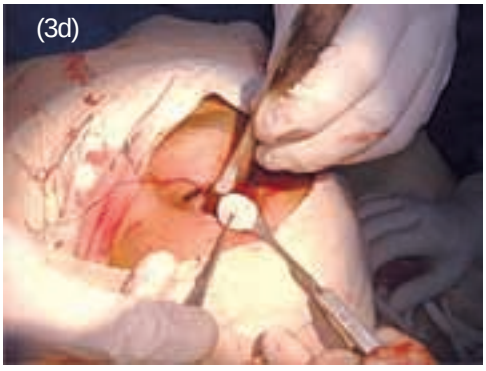


Figure 3a: *Cutaneous incision 2-3mm below the lash line.*
Figure 3b: *Subcutaneous dissection and exposure of inferior orbital rim.*
Figure 3c: *Dissection of the periorbita and exposure of the fracture.*
Figure 3d: *Medpor implant.*
Figure 3e: *Placement of Medpor implant over the orbital floor.*
Figure 3f: *Closure of periosteum.*
Figure 3g: *Final appearance of repaired Blow-Out Fracture.*

- CT scan evidence of a large fracture.

Patients with diplopia are observed for 2 weeks. If the diplopia resolves with a small fracture evident on CT no surgical intervention is required. It is advisable to wait for 2 – 3 weeks for resolution of orbital edema/ haematoma.Extensive defects involving the medial wall and orbital floor warrant urgent surgery. Young patients with marked tissue entrapment and a linear fracture on CT (Trap Door Fracture) are at the risk of ischemic contracture and warrant early surgery.

Surgery

A forced duction test should be performed to assess entrapment preoperative intraoperative and after releasing all entrapment.

The orbital floor can be accessed through a conjunctival approach, through cutaneous exposure, or through a transmaxillary approach. Access to this region allows for exploration and release of displaced or entrapped soft tissue, thereby correcting any extraocular motility disturbances. In addition, repair of the bony defect with removal or repositioning of bony fragments allows for restoration of the partition between the orbit and maxillary antrum, thereby preserving orbital volume and eliminating any impingement on soft tissue structures.

Transconjunctival approach

The transconjunctival approach can be combined with a lateral canthotomy for exposure of the orbital floor

- Initiate this approach with a curvilinear incision approximately 3 mm below the tarsal plate parallel to lower lid punctum.
- Carry this surgical plane forward in a fashion posterior to the orbicularis oculi muscle and anterior to lower lid retractors and orbital septum.
- Placement of this dissection is paramount. If placed too low, orbital fat prolapse likely compromises visibility of the fracture, and if placed too high, postoperative architectural distortion may ensue.
- Moving in a vector anterior to the septum, approach the orbital rim and overshoot it for several millimeters. Incise the periosteum at the medial aspect of the anterior border of the inferior orbital rim and carry it laterally.
- Then elevate the periosteum with a hand-over-hand technique using sharp periosteal elevators, starting nasally and moving temporally until adequate exposure is obtained.
- Preserve an anterior flap to be sutured at the conclusion of the procedure and remain cognizant of the location of the infraorbital groove and foramen that enshroud the infraorbital neurovascular bundle.
- The advantages of this approach include the absence of visible scars and reduced risk of lower eyelid retraction[2].

Cutaneous approach

The cutaneous approach commences with a skin-muscle flap elevation via an incision 2-3 mm below the lower lid margin. Carry this dissection anterior to the orbital septum until the orbital rim is exposed (Figure 3).

Incise the periosteum and liberate it from its bony attachments as described in the transconjunctival approach. Of note is the downward sloping of the floor immediately posterior to the rim, which can result in breech of the septum during periosteal dissection.

Transantral approach

A transantral approach allows access to the orbital floor via the maxillary sinus. This approach may be especially useful when repairing a floor fracture of the trap door variety.

Achieve exposure of the incision site with upper labial retraction exposing the buccal-gingival sulcus.

Create a horizontal incision just inferior to the buccal-gingival sulcus so that a wide mucosal band is present. This wide band allows for imbrication of the wound, avoiding oral-antral fistulization.

Employ a periosteal elevator to strip the anterior maxillary wall of periosteum. The proximity of the infraorbital foramen should be kept in mind to minimize the risk of insult to the neurovascular bundle.

Fashion a Caldwell-Luc antrostomy with an osteotome and mallet, followed by rongeurs to increase the diameter of the antrostomy, providing access to the orbital floor, medial wall, and ethmoid sinus complex.

Strip the mucosa from the maxillary antrum and cauterize the remnants.

Following repair of the fracture, attention to hemostasis is followed by closing the buccal-gingival mucosa with fast-absorbing suture material.

This approach results in inferior orbital floor exposure and is not favored for floor fracture repair.

Other approaches

Recent advances in endoscopic and surgical technique have allowed for repair of orbital floor fractures through minimal cutaneous incisions.

Adequate visualization of the fracture allows for thorough exploration and liberation of entrapped soft tissue from the defect. Once the fracture has been isolated, reconstruction of the orbital floor is paramount to restoring and maintaining orbital geometry and volume. Furthermore, reconstruction provides a partition between the orbit and maxillary antrum and provides support for the globe and intraorbital tissues.

Implants

A myriad of implants is available for reconstructive use. The ideal implant should be easy to insert and manipulate, inert, not prone to infection or extrusion, easily anchored to surrounding structures, and reasonably priced, and it should not rouse fibrous tissue formation. Most orbital floor defects can be repaired with synthetic implants composed of porous polyethylene (Medpor) (Figure 2), silicone, metallic rigid miniplates, Vicryl mesh, teflon, supramid, gelfilm, hydroxyapatite, PMMA, titanium, autogenous cartilage, autogenous bone from iliac crest, outer table of skull, the maxillary wall or the calvarium can be used, as can nasal septum or conchal cartilage. Each material has advantages and disadvantages that are not within the realm of this article. The surgeon should have a certain comfort level and familiarity with his or her choice of material[5].

Complications of Blow Out Fracture

Diplopia: Diplopia may worsen upto few weeks after surgery as edema and surgical trauma will take time to heal. It is important to

perform the forced duction test after placing the orbital implant.Residual diplopia maybe given 4-6 months to resolve or stabilize. Temporary relief maybe given by Fresnel prisms and surgically the inverse knapp procedure (Transposition of the medial and lateral recti towards the inferior rectus to enhance the degree of depression) may be tried.

Lower Lid Retraction

- Due to incorrect closure of the periosteum over the infraorbital margin with inadvertent incorporation of the orbital septum in the sutures.
- Adhesions of the orbital septum to the infraorbital margin.

This is avoided by careful identification and dissection of tissues and prolonged postop eyelid massage.

Lower Lid Entropion : This occurs due to the contraction of the wound after using the transconjunctival route.

Implant Extrusion

- Due to Infection.
- The use of oversized implant.
- Inadequate closure of the periosteum along the inferior orbital margin.

Infection: Late sinusitis may be troublesome.

Infraorbital sensory loss: Residual loss is common maybe prevented by careful dissection and removal of bony fragments.

Undercorrection of enophthalmos : This occurs due to inadequate sized orbital implant and failure to identify medial wall fractures.

Proptosis : This maybe due to oversized orbital implants.

Visual Morbidity

- Due to damage to the globe or optic nerve intraoperatively.
- Postoperative orbital haemorrhage.
- Compression of the optic nerve by misplacement of the orbital implant.

Precautions

- Exclusion of a ruptured globe.
- Meticulous hemostasis to be observed.
- Patients vision to be monitored and documented.
- Correct size of the orbital implant.

Prognosis

- Most cases do well, and most patients obtain resolution of diplopia and correction of enophthalmos.

Patient Education

- Warn patients to avoid strenuous activity.
- Warn patients to avoid nose blowing for several weeks after the injury and repair.
- Educate patients about nerve damage recovery. An injured motor nerve (third nerve branch) or sensory nerve (infraorbital nerve) can take weeks or months to return to normal. In some cases, the damage may be permanent[6].

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Answer Quiz No. 2

1. ROSETTE
2. HYPOTONY
3. FRACTURE
4. SIDEROSIS
5. ECCHYMOSIS
6. IRIDODIALYSIS

Extra Word: INJURY

Traumatic Retinal Detachment

Sourabh Dileep Patwardhan MD, *Jatin Ashar* MBBS, *R.V. Azad* MD, *Y.R. Sharma* MD, *Atul Kumar* MD

Trauma is the most common cause of retinal detachment in children. It accounts for almost 10% cases of rhegmatogenous retinal detachment. Traumatic retinal detachments have a different course when compared to non traumatic retinal detachment.

Causes of traumatic retinal detachment

Table1: Causes of Traumatic retinal detachment

	No	%
Missiles	38	49.4
Sport	23	30.0
Assault	10	13.0
RTA*	2	2.6
Fall	3	4.0
Explosion	1	1.3
Total	77	

*Road traffic accident

Pathophysiology of traumatic retinal detachment

Various theories have been put forth

Theory 1:

External force transmission to the globe

↓

Distortion of the globe

↓

Inelastic sclera and cornea and constant globe volume with change of shape

↓

Vitreous base traction

↓

Traction transmitted to retina

↓

Retinal tears at anterior or posterior edge of vitreous base

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Globe deformation follows the following sequence of events

- Compression of the globe by the projectile with a decrease in the axial length causing an expansion of the equatorial diameter of the globe
- Decompression when projectile recoils from the globe
- Overshooting with a rebound increase in the axial length and decrease in the equatorial diameter below normal
- Oscillation with cyclical small increase and decrease in axial length and equatorial diameter

Theory 2

Retina l fragmentation and necrosis at a site of direct trauma to the retina, usually in temporal retina.

Features of traumatic retinal detachment

- Most detachments follow direct trauma to the globe
- Duration between the detection of the detachment and trauma is with in 24 hrs in 12% to 20% , within 1 month in 30 % to 46%, within 8 months in 50 to 60% and within 2 years in 80 % cases.
- Traumatic detachments are more common in younger patients
- Males are more commonly affected than females
- Myopic eyes are more likely to develop retinal detachment compared to emmetropic eyes.

A number of other ocular structures may also be involved in cases of ocular trauma.

Table 2: Associated ocular injury[1]

	No	%
Vitreous haemorrhage	40	52
Hyphaema	32	42
Lens subluxation	11	14.2
Iridodialysis	4	5.2

Modes of presentation of traumatic detachments

- Dialysis 53%- 84%
- Giant retinal tears 8- 16%
- Tears related to abnormal vitreoretinal adhesions 11%
- Lattice degeneration related tears 8%
- Horse shoe tears 3%
- Round holes 5%

Table 3: Various types of retinal breaks		
Type of break	**Comment**	**Treatment**
Laceration/ impact site	Direct retinal injury caused by an object penetrating the eye wall. The object impacts the retina either directly or secondarily (transvitreally). The lesion develops instantly	It is advisable to surround the lesion with laser, although deep lacerations probably require prophylactic chorioretinectomy
Hole	Caused by slow disintegration of the retina; traction does not play a role in the pathogenesis. The lesion develops months/years after the injury	Treatment is rarely necessary; surrounding the hole with laser is probably more important for the ophthalmologist's peace of mind than for the prevention of retinal detachment
Necrotic hole	The retina is dissolved at the impact site; the choroid may also be involved. The necrosis can be evident immediately or manifest shortly after the contusion	It is advisable to surround the lesion with laser
Macular hole	The pathomechanism of the development of traumatic macular holes is unknown; traction probably contributes. The vast majority of cases are caused by contusion. The lesion develops within hours or up to a few weeks after the injury; its shape is often oval, not round	Traumatic macular holes have a stronger tendency to spontaneously close than do idiopathic holes; conversely, surgery (vitrectomy, ILM peeling, and gas tamponade) is highly successful,even if other macular pathologies are present
Dialysis	The retina is torn at the ora serrata; the condition is most common in the inferotemporal quadrant and pathognomonic of contusion. The vitreous remains attached to the torn retina. The dialysis presents very early but its progression to retinal detachment is slow	It is advisable to wall-off the lesion with laser. A dialysis-related retinal detachment is the one most amenable to be treated with a scleral buckle, rather than with vitrectomy
Tear	The typical horseshoe appearance is a telling sign of strong vitreoretinal traction as the responsible factor. The vitreous is attached to the peripheral lip of the tear in the form of a strand; this is why symptoms are common and the risk of retinal detachment development is high. Vitreous often remains adherent to the retina posterior to the tear	It is advisable to surround the lesion with laser
Giant tear	Tears exceeding 90° are discussed separately because they do not show the characteristic horseshoe shape and, more importantly, because they lead to retinal detachment much faster, with a significantly elevated risk of PVR	It is advisable to surround the lesion with laser; because of the large size and prominent traction, prophylactic scleral buckling should also be considered. Conversely, should a retinal detachment develop, it is best treated with vitrectomy without a scleral buckle to prevent slippage

Retinal dialysis without detachment

Retinal dialysis is the separation of the retina from the border of non pigmented pars plana epithelium at ora serrata. It almost occurs at the time of injury.

Many a times, dialysis are asymptomatic or may just present as mild blurring of vision or flashes or photopsia.

A sclera indentation of the peripheral retina helps in diagnosis of a dialysis. At the site of dialysis, the normal serrations of the ora serrata will be deviated and there may be signs of vitreous base avulsion associated with it.

The inferotemporal quadrant is by far most commonly involved accounting to almost 65% of the cases. This is followed by the superonasal in 15%, superotemporal in 10% and inferonasal in 4% cases.

All these cases must be treated with prophylactic cryotherapy or a laser indirect photocoagulation to prevent any retinal detachment.

A rigorous follow up of these patients is paramount for early detection and management of retinal detachment.

Retinal dialysis with retinal detachment

Rhegmatogenous retinal detachment following dialysis are slowly progressive and may be detected months to years after the trauma.

The symptoms are flashes, floaters and blurring of vision. there may be associated visual field changes.

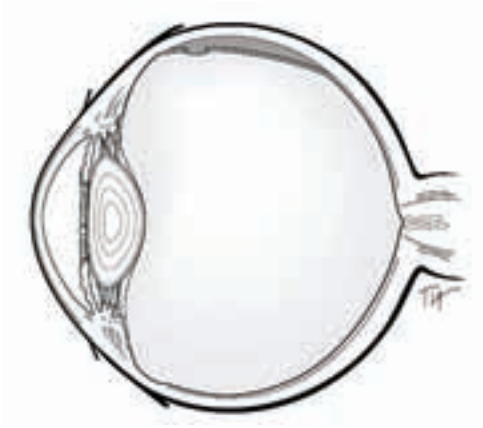

Figure 1: *Retinal dialysis*

The detachment may vary from mild elevation of the retina to a bullous configuration of the detachment.

In old cases of detachment multiple demarcation lines may be seen.

Old detachments may be also characterized by thinned out retina with intra retinal macrocysts.

Retinal detachments associated with dialysis are treated with cryopexy or with sclera buckle.

In cases with extensive proliferative vitreoretinopathy associated with detachment, relieving the traction and complete vitrectomy with internal tamponade with oil or gas must be done.

The surgical results of repair of detachment secondary to dialysis are usually good. The final visual outcome depends on the macular status at the time of surgery.

Traumatic retinal tears without retinal detachment

Retinal tears are less common than retinal dialysis. 3 basic types of tears are found

- Round holes without apparent apparent vitreoretinal traction
- Macular hole
- Tractional retinal tear

In most cases, contusion related retinal tears are located inferotemporally, probably because the bony orbit affords less protection at this location and the eye is rolled upward due to Bell's phenomenon associated with the impending approach of any noxious stimulus.

Prophylactic treatment is needed for most of the tears except macular hole. Traumatic retinal breaks convert to detachment more often than dialysis. Most traumatic tears must be treated with cryopexy or photocoagulation and followed for rhegmatogenous retinal detachment.

Traumatic retinal tears with retinal detachment

Rhegmatogenous retinal detachment develops faster with tears than with dialyses.

Traumatic retinal tears without and with apparent vitreoretinal traction are inferotemporal in 54% vs 8%, superotemporal in 28%vs 20%, superonasal in 10% vs 60%, and inferonasal in 8% vs 13%. These need treatment with sclera buckling or vitrectomy.

Giant retinal tears without retinal detachment

These tears extend more than 90 degrees in circumference. Usually develop circumferentially at the vitreous base but may develop radial extensions.

Giant retinal tears with detachment

The management of GRTs with detachment depends on the degree of tear. In cases with tears from 90 to 120 degrees, a sclera buckle may suffice for management.

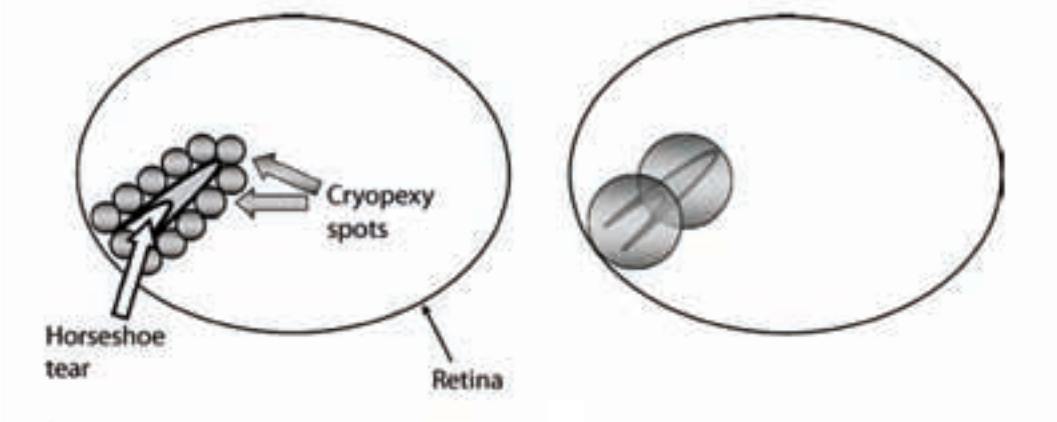

Figure 2: *Cryopexy or laser treatment of a retinal break*

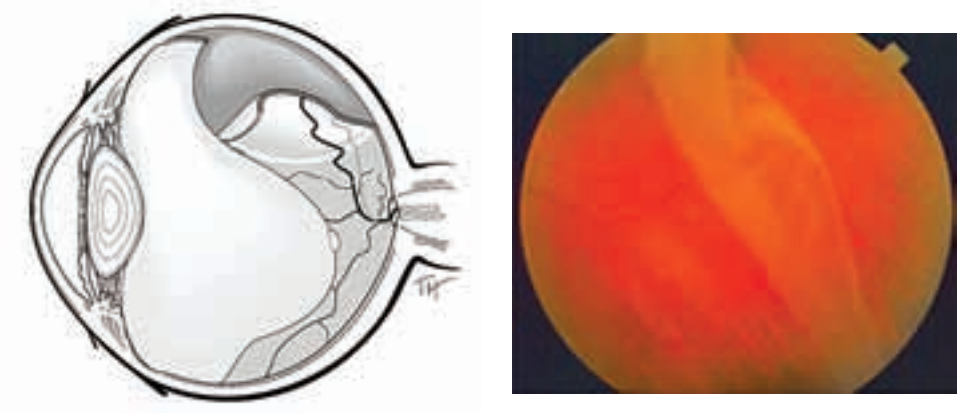

Figure 3: *GRT*

In cases of tears larger than 120 degrees, with inverted flaps and PVR, pars plana vitrectomy is necessary. Use of PFCL is necessary during surgery for GRT to unroll the retina. Long acting gas tamponade or silicone oil is necessary.PPL may be needed during the surgery.

Anatomical success rate vary from 78% to 90% in these patients.

Review of literature

Assi A,et al, suggested that combined vitrectomy, lensectomy and primary intraocular implantation can offer good visual rehabilitation in patients with traumatic cataract and posterior segment injury[3].

Wang NK et al. suggested that retinal detachment caused by open globe injuries in the pediatric population is associated with worse surgical results and unsatisfied visual outcomes. Early vitrectomy, before a diagnosis of retinal detachment is made by serial echographic examinations, may be considered to reduce the incidence of PVR.[4]

Kovaceviæ D et al. suggested that most serious complication of retinal rupture, retinal detachment, can be prevented by early laser photocoagulation. The success rate was 94%. No major complications attributable to laser treatment were noted.[5]

Sheard RM et al, suggested that Vitreoretinal intervention resulted in an improvement in vision in 57.1% children and 19.6% stabilised at their presenting acuity . Two thirds of the children attained a final VA of 6/60 or better. Proliferative vitreoretinopathy was the cause of redetachment in 68.2% of cases and was significantly associated with a poor outcome.[6]

Warrasak S et al, suggested that sharp perforating ocular injuries have the best visual prognosis among all types of injuries. Pars plana vtrectomy and prophylactic broad encircling scleral buckle, can salvage and prevent subsequent retinal detachment in these severely traumatized eyes.[7]

Chen YP et al, studied the surgical management of traumatic macular hole-related retinal detachment. Vitrectomy combined with gas tamponade appears to give an effective anatomic re-attachment rate for traumatic macular hole-related retinal detachment. The presence of peripheral retinal breaks, vitreous hemorrhage, or the extent of retinal detachment has no discernible significant influence on closure rate of macular hole and retinal re-attachment rate.[8]

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Guided Sling Surgery: Jacob- Agarwal Technique of Frontalis Suspension with Single Stab Incision

Amar Agarwal MS, FRCS, FRCOphth, *Soosan Jacob* MS, FRCS, Dip NB, *Dhiya Ashok Kumar* MD

Ptosis management is a real problem. There are various techniques for treating it. A new surgical technique for acquired and congenital ptosis with poor levator function in which Seiff silicone suspension set is used in frontalis sling procedure is described. Here the entire length of the silicone set is guided in the muscle plane through a single stab incision of 2mm. The advantage of the procedure includes less surgical time, no multiple incisions, no postoperative scars or edema and early recovery. Six eyes of 5 patients underwent the technique for congenital ptosis with poor levator function. The postoperative outcome was comparable with conventional frontalis sling surgery. Thus it provides good cosmesis while retaining the usual advantages of standard sling procedures.

Introduction

Frontalis muscle suspension procedure[1,2,3] is the gold standard for the treatment of congenital ptosis with poor levator function. It creates a linkage between the frontalis muscle and the tarsus of the upper eyelid, which allows for a better eyelid position in primary gaze. There have been various modifications[4,5,6] of performing the sling procedures in the recent past. Different sling materials[7,8,9] namely from autologous facia lata to several suture materials have been tried. Our technique differs from the conventional procedures by use of a single stab incision in making the pentagon or triangle and guiding the silicone sling in the muscle plane with one external incision while suspending the frontalis muscle.

Surgical Technique

The upper eyelid is infiltrated with lidocaine 2% with 1:100,000 epinephrine. In children and adolescent patients, surgery is performed with general anesthesia. Under aseptic precaution, the eye is cleaned and draped. The pentagon shape is marked over the skin with a marker (Figure A). Amount of upper lid elevation needed is again decided on table. Single supra eyebrow stab incision of about 2mm is put on the superior mark of the pentagon about 5mm from the eyebrow (Figure B). Sterile Seiff silicone frontalis suspension set dipped in antibiotic solution is then taken. It has a long silicone tube with stainless hollow rods on both ends with moderately sharp ends. The silicone sling of the set measures about 23.5mm on each side and the rod measures about 6.3 cms. The overall diameter of the tube is 0.9mm. One end of the tube is advanced through the stab incision in the muscle plane (Figure C) and guided along the incision sites marked. When the corner of the pentagon is reached, it is then turned downwards along the marks made on the overlying skin. Care is taken so that the surgeon maintains the muscle plane all throughout the procedure. If crumbling of tissue is observed while advancing the rod, it indicates that the plane of the tissue in which the rod is positioned is not uniform. Surgeon's left hand index finger (Figure C,D) can be used to palpate while the rod is advanced underneath. When the lid margin is reached, the needle end is palpated and again turned laterally (Figure E,F) and brought to the other end of the pentagon. Finally it is brought back through the same superior stab incision (Figure G,H) and exteriorized. Lid margin is adjusted according to

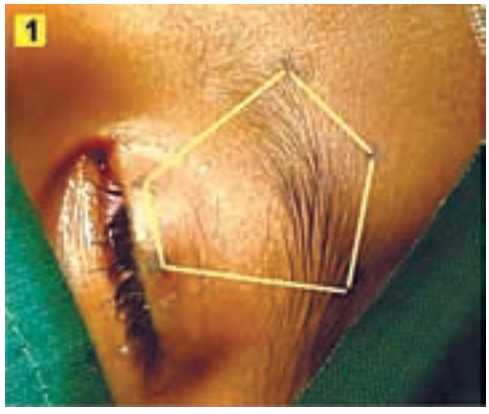

Figure 1: *Single pentagon is marked on the skin. Seiff suspension set is passed through the supra brow incision*

Figure 2: *and advanced through the stab incision in the muscle plane*

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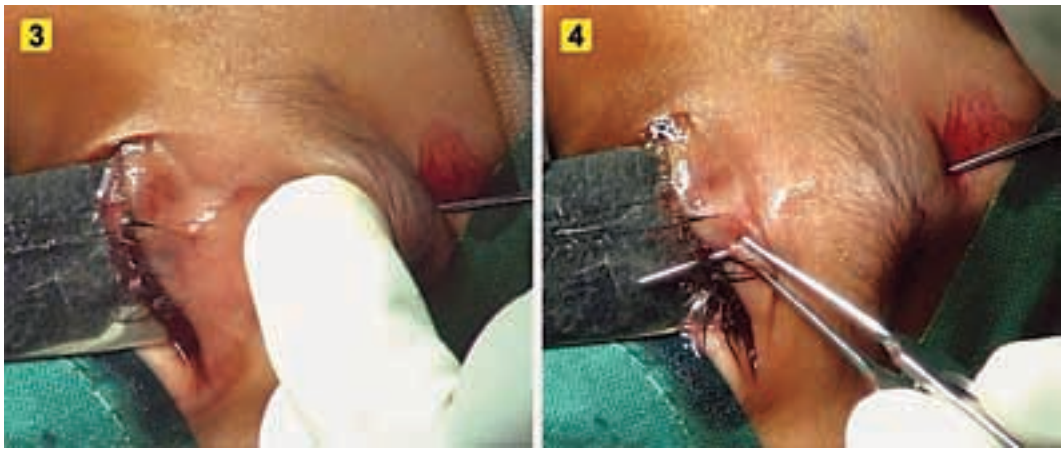

Figure 3&4: *Then turned laterally*

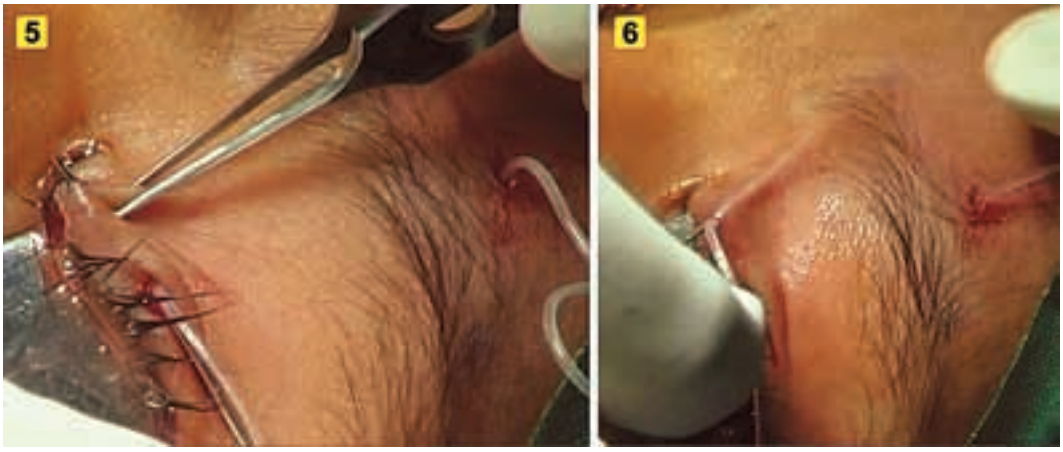

Figure 5-6: *Brought to the other end of the pentagon and finally through the same superior stab incision*

the amount of correction. When the two ends of the silicone rods are tied, automatically the upper lid margin is positioned. Minimum 4 knots are placed and the knots are buried below the subcutaneous layer. A stay suture is placed with 6-0 vicryl or any non absorbable suture to secure the silicone knot in position. If needed, one can also hitch the silicone tube knot to the underlying periosteum. The single supra brow stab incision is closed with silk suture.

Discussion

The advantage of the technique is that with minimal skin incisions and less surgical time, the clinical outcome of conventional frontalis sling procedure is obtained. Postoperative lid edema, pain and suture related complications due to multiple sutures can be avoided. The technique can be performed in all eyes with ptosis and poor levator function which necessitates frontalis sling. The stab incision used is only about a 2mm. The surgeon if faces difficulty while changing the direction of the rod; the rod is curved to pass it smoothly along the lid curvature. It is advantageous over the conventional procedure that involves five stab incisions which creates more bleeding and edema in the postoperative period. Though mild immediate postoperative edema was encountered in our technique, it was observed to resolve spontaneously within 24 hours. There have been reports in the past on minimum incision[10] and incision less sling procedures[11]. Our technique differs from their procedure[10] by being permanent and use of silicone rod instead of non absorbable suture[9]. Though silicone material[12,13,14] for frontalis sling suspension has been tried successfully, our method of guided sling procedure with silicone sling has not been reported. Skin of infant is prone to early scar formation and moreover forehead scars caused by frontalis suspension procedures can be a cosmetic problem in future as the

Figure 7-8: *Skin of the supra brow incision closed with a non absorbable suture*

child grows. We believe our technique will provide better aesthetic and functional results in such patients with poor levator function and requiring better cosmetic results. In our 6months postoperative follow up, the results are comparable with conventional technique. However long duration follow up and comparative study with conventional technique in large study population might be required to evaluate the long term prognosis. Simple learning curve, good cosmesis, less number of sutures with better functional results while retaining the usual advantages of standard sling procedures are the unique features of our technique.

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TOPICS

1)	***Application and relevance of IOP measurements to clinical practice***	*Sunday December 7, 2008*
2)	***Clinical evaluation of the optic disc***	*Sunday January 4, 2008*
3)	***Interpretation and analysis of automated perimetry techniques to glaucoma practice***	*Sunday (to be announced)*
4)	***Clinical gonioscopy:*** *Interpretation and application of findings to one's practice*	*Sunday (to be announced)*
5)	***Managing a patient with glaucoma :*** *What medication to start A step by step approach to medical treatment*	*Sunday (to be announced)*

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Dr. Suneeta Dubey
Dr. Monica Gandhi

Timing :
12.00 pm to 2.00 pm

Venue
Lecture Theatre
Dr. Shroff's Charity Eye Hospital
Daryganj, Delhi

Registration & Organising Secretariat
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Retinopathy of Prematurity: Classification and Screening Criteria

Jagdeep Singh *DNB,* ***Abhishek B. Dagar*** *MS, DNB, FPOS,*

Retinopathy of prematurity (ROP) is a vasoproliferative disorder of the developing retina of low birth weight preterm infants. It can leads to blindness in a small but significant percentage of these infants. Because of modern life-support systems capable of keeping tiny premature infants alive, the incidence of retinopathy of prematurity is increasing. A universal classification to quantify disease and efficient screening protocol is extremely useful.

The International Classification of Retinopathy of Prematurity *(ICROP)* was published in 2 parts, the first in 1984[1] and later expanded in 1987[2]. It was a consensus statement of an international group of retinopathy of prematurity experts (23 ophthalmologists from 11 countries). This classification has facilitated the development of large multicenter clinical treatment trials and furthered our understanding of this potentially blinding disorder. An international group of pediatric ophthalmologists and retinal specialists (a group of 15 ophthalmologists from 6 countries) has developed a consensus document *(ICROP Revisited[3])* in 2005 based on experiences gained on the basis of various multicenter trails that revises original *ICROP.*

The original *ICROP* include (1) the location of retinal involvement by zone, (2) the extent of retinal involvement by clock hour, (3) the stage or severity of retinopathy at the junction of the vascularized and avascular retina, and (4) the presence or absence of dilated and tortuous posterior pole vessels (plus disease).

The aspects that differ in 2005 revision from the original classification include introduction of (1) the concept of a more virulent form of retinopathy observed in the tiniest babies (*aggressive, posterior ROP*), (2) a description of an intermediate level of plus disease (*pre-plus*) between normal posterior pole vessels and frank plus disease, and (3) a practical clinical tool for estimating the extent of zone- I.

ICROP Revisited classifies ROP as:

Location of Disease

The anteroposterior location of the retinopathy has been divided into 3 concentric zones of retinal involvement. Each zone is centered on the optic disc.

Zone I (the innermost zone) consists of a circle, the radius of which extends from the center of the optic disc to twice the distance from the center of the optic disc to the center of the macula. *As a practical approach, the approximate temporal extent of zone I can be determined by using a 25- or 28-diopter (D)–condensing lens. By placing the nasal edge of the optic disc at one edge of the field of view, the limit of zone I is at the temporal field of view.*[4]

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Zone II extends centrifugally from the edge of zone I to the nasal ora serrata (at the 3- O'clock position in the right eye and the 9-O'clock position in the left eye). Any ROP that is continuous and circumferential must by definition fall into 1 of these 2 posterior zones.

Zone III is the residual crescent of retina anterior to zone II. By convention, zones II and III are considered to be mutually exclusive. Retinopathy of prematurity should be considered to be in zone II until it can be determined with confidence that the nasal-most 2 clock hours are vascularized to the ora serrata.[5,6]

Extent of Disease

The extent of disease is recorded as hours of the clock or as 30° sectors.[1] As the observer looks at each eye, the 3-o'clock position is to the right and nasal in the right eye and temporal in the left eye, and the 9-o'clock position is to the left and temporal in the right eye and nasal in the left eye. The boundaries between sectors lie on the clock hour positions; that is, the 12-o'clock sector extends from 12 o'clock to 1 o'clock.

Staging the Disease

Stage 1: Demarcation Line

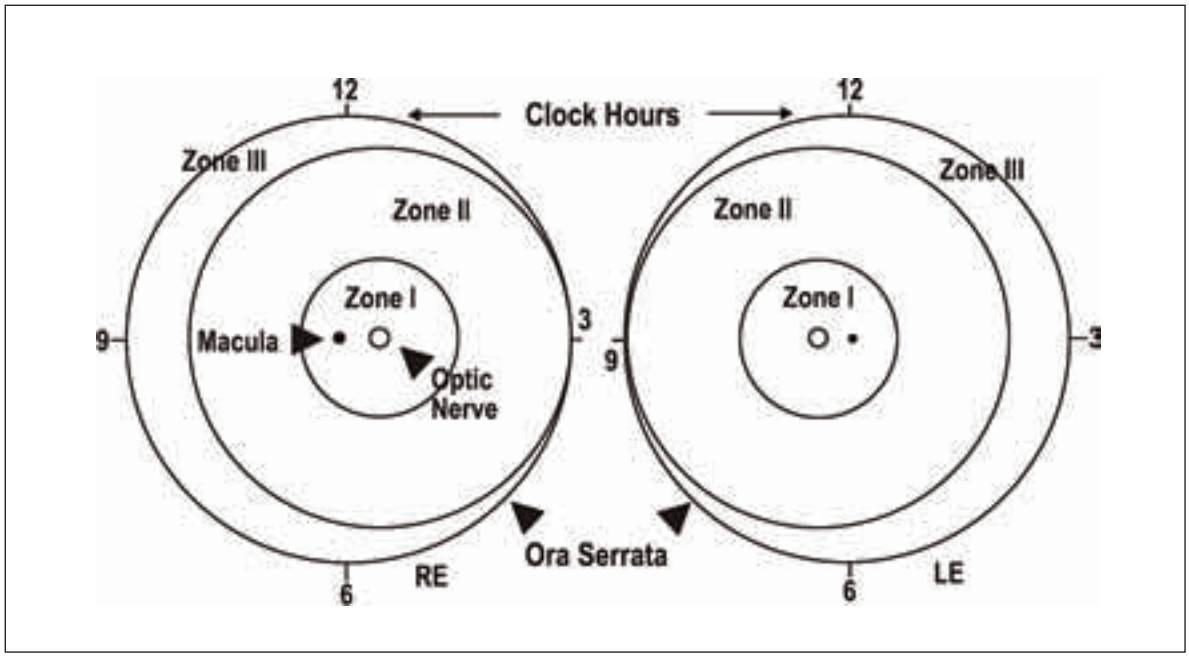
It is a thin but definite structure that separates the avascular retina anteriorly from the vascularized retina posteriorly. There is abnormal branching or arcading of vessels leading up to the demarcation line that is relatively flat, white, and lies within the plane of the retina. Vascular changes can be apparent prior to the development of the demarcation line, such as dilatation rather than tapering of the peripheral retinal vessels, but these changes are insufficient for the diagnosis of ROP.

Stage 2: Ridge

The ridge is the hallmark of stage 2 ROP. It arises in the region of the demarcation line, has height and width, and extends above the plane of the retina. The ridge may change from white to pink and vessels may leave the plane of the retina posterior to the ridge to enter it. Small isolated tufts of neovascular tissue lying on the surface of the retina, commonly called "popcorn" may be seen posterior to this ridge structure.

Stage 3: Extraretinal Fibrovascular Proliferation

In stage 3, extraretinal fibrovascular proliferation or neovascularization extends from the ridge into the vitreous. This extraretinal proliferating tissue is continuous with the posterior aspect of the ridge, causing a ragged appearance as the proliferation becomes more extensive. The severity of a stage 3 lesion can be subdivided into mild, moderate, or severe depending on the extent of extraretinal fibrovascular tissue infiltrating the vitreous.



Stage 4: Partial Retinal Detachment

Stage 4 is divided into extrafoveal (4A) and foveal (4B) partial retinal detachments. Stage 4 retinal detachments are generally concave and most are circumferentially oriented. The extent of retinal detachment depends on the number of clock hours of fibrovascular traction and their degree of contraction. Typically, retinal detachments begin at the point of fibrovascular attachment to the vascularized retina. In progressive cases, the fibrous tissue continues to contract and the tractional retinal detachment increases in height, extending both anteriorly and posteriorly.

Stage 5: Total Retinal Detachment

Retinal detachments are generally tractional and may occasionally be exudative. They are usually *funnel shaped*. The funnel is divided into anterior and posterior parts. Various configurations of funnel in order of frequency are:

Open both anteriorly and posteriorly: The detachment generally has a concave configuration and extends to the optic disc.

Narrow in *both anterior and posterior aspects*: The detached retina is located just behind the lens.

Open anteriorly but narrowed posteriorly.

Narrow anteriorly and open posteriorly: Least common.

Plus Disease

It refers to increased venous dilatation and arteriolar tortuosity of the posterior retinal vessels. It may increase in severity to include iris vascular engorgement, poor pupillary dilatation (rigid pupil), and vitreous haze. All these signs together in the original classification were referred to as plus disease. Subsequent multicentered clinical trials have used a "standard" photograph to define the minimum amount of vascular dilatation and tortuosity required to make the diagnosis of plus disease.[5, 7-9] This definition has been further refined in the later clinical trials in which the *diagnosis of plus disease could be made if sufficient vascular dilatation and tortuosity are present in at least 2 quadrants of the eye.*[7] A + symbol is added to the ROP stage number to designate the presence of plus disease. For example, stage 2 ROP combined with posterior vascular dilatation and tortuosity would be written "stage 2+ ROP."

Pre-Plus Disease

Pre-plus disease is defined as vascular abnormalities of the posterior pole that are insufficient for the diagnosis of plus disease but that demonstrate more arterial tortuosity and more venous dilatation than normal. Over time, the vessel abnormalities of pre-plus may progress to frank plus disease as the vessels dilate and become more tortuous. The presence of pre-plus disease can be noted beside the stage, for example, stage 2 with pre-plus. disease.

Aggressive Posterior ROP (AP-ROP)

An uncommon, rapidly progressing, severe form of ROP is designated AP-ROP (Previously referred as "**Type II ROP" and "Rush disease"**[10-12] but was not included in ICROP[1,2]). If untreated, it rapidly progresses to stage 5 ROP without passing through intermediate stages.[13] The characteristic features are its posterior location (most commonly in zone I), prominence of plus disease (dilatation and tortuosity in all 4 quadrants), and ill-defined nature of retinopathy. Because of shunting of vessels in vascularized retina[14] and resultant tortuosity of vessels, it is difficult to distinguish between arterioles and venules. Hemorrhages at the junction of vascularized and avascular retina may be present. It may appear as a flat network of brush like neovascularization at the deceptively featureless junction between vascular and avascular retina. AP-ROP typically extends circumferentially and is often accompanied by a circumferential vessel.

Regression of ROP

In most of the cases, ROP regresses spontaneously by a process of involution or evolution from a vasoproliferative phase to a fibrotic phase. One of the first signs of stabilization of the acute phase of

ROP is failure of the retinopathy to progress to the next stage.[15] The process of regression occurs largely at the junction of vascular and avascular retina as retinal vascularization advances peripherally. On serial examinations, the anteroposterior location of retinopathy may change from zone I to zone II or from zone II to zone III. The ridge may change in color from salmon pink to white. Involutional sequelae include a broad spectrum of peripheral and posterior retinal and vascular changes that are listed in the Table 1.

The more severe the acute phase of the retinopathy, the more likely involutional changes will be severe as the disease enters the "cicatricial" phase.[16] During the process of involution, conspicuous features are vascular abnormalities such as prominent areas of retinal avascularity, abnormal branching of vessels with formation of arcades, and telangiectatic vessels. Pigmentary changes may be subtle but more often become large areas of decreased or even increased pigmentation located along blood vessels and in underlying retinal pigment epithelium, as seen through an avascular retina. Circumferential retinovitreous interface changes may be seen as delicate lines or more prominent ridges. In general, the more severe the peripheral changes, the more severe the posterior pole changes. These are tractional phenomena that can vary from minor distortions of foveal architecture to severe displacements of major retinal vessels, usually temporally and often accompanied by dragging of the retina over the optic disc (macular heterotopia or ectopia). Finally, traction and rhegmatogenous retinal detachment and, rarely, exudative detachment can develop as late complications of regressed ROP.

A good screening protocol should be carefully tailored to the population at risk and be modified in accordance with new data as it becomes available. On the basis of experience collected by the international retinopathy of Prematurity classification committee 1982-84, recommendation was to examine eyes after one month, followed by weekly or biweekly examination until there was no risk of developing ROP (evident at the chronological age of 10-12 weeks). Obvious ROP changes required follow up examination for a longer period.

As per the latest guidelines given by American Academy of Pediatrics[17] in 2006 following protocol is suggested for screening of infants for ROP:

- The following infants should have retinal screening examinations performed after pupillary dilation using binocular indirect ophthalmoscopy to detect ROP.
    - Infants with a birth weight of less than 1500 g or gestational age of 32 weeks or less.
    - Selected infants with a birth weight between 1500 and 2000 g or gestational age of more than 32 weeks with an unstable clinical course, including those requiring cardiorespiratory support and who are believed by their attending pediatrician or neonatologist to be at high risk.

One examination is sufficient only if it unequivocally shows the retina to be fully vascularized in each eye.

Effort should be made to minimize the discomfort and systemic effect of this examination by pretreatment of the eyes with a topical anesthetic agent such as proparacaine; consideration also may be given to the use of pacifiers, oral sucrose, etc.

Table 1: Involution Sequelae of Retinopathy of Prematurity

Peripheral changes
Vascular
1. Failure of peripheral retinal vascularization
2. Abnormal nondichotomous branching of retinal vessels
3. Vascular arcades with circumferential interconnection
4. Telengiectatic vessels
Retinal
1. Pigmentary changes
2. Vitreoretinal interface changes
3. Thin retina
4. Peripheral folds
5. Vitreous membranes with or without attachment to the retina
6. Lattice like degeneration
7. Retinal breaks
8. Traction-rhegmatogenous retinal detachment
Posterior changes
Vascular
1. Vascular tortuosity
2. Straightening of blood vessels in temporal arcades
3. Decrease in angle of insertion of major temporal arcade
Retinal
1. Pigmentary changes
2. Distortion and ectopia of macula
3. Stretching and folding of retina in macular region leading to periphery
4. Vitreoretinal interface changes
5. Vitreous membrane
6. Dragging of retina over optic disc
7. Traction-rhegmatogenous retinal detachment

- "The International Classification of Retinopathy of Prematurity Revisited"[3] should be used to classify, diagram, and record these retinal findings at the time of examination.
- The onset of serious ROP correlates better with postmenstrual age (gestational age at birth plus chronologic age) than with postnatal age.[6] That is, the youngest infants at birth take the longest time to develop serious ROP. Following table was developed from an evidence-based analysis of the Multicenter Trial of Cryotherapy for Retinopathy of Prematurity[18] natural history data and was confirmed by the Light Reduction in ROP Study[19], conducted a decade later. It provides a schedule

Table 2: Timing of first examination based on gestational age at birth

Gestational age in weeks	Age at initial examination in weeks	
	Postmenstrual age	Chronological age
22*	31*	9*
23*	31*	8*
24	31	7
25	31	6
26	31	5
27	31	4
28	32	4
29	33	4
30	34	4
31	35	4
32	36	4

** This is tentative rather than evidence-based for infants with a gestational age of 22 to 23 weeks because of the small number of survivors in these gestational-age categories.*

for detecting ROP potentially damaging to the retina with 99% confidence (Table 2).

- For follow-up examinations following schedule is suggested

1-week or less follow-up

- stage 1 or 2 ROP: zone I
- stage 3 ROP: zone II

1- to 2-week follow-up

- immature vascularization: zone I—no ROP
- stage 2 ROP: zone II
- regressing ROP: zone I

2-week follow-up

- stage 1 ROP: zone II
- regressing ROP: zone II

2- to 3-week follow-up

- immature vascularization: zone II—no ROP
- stage 1 or 2 ROP: zone III
- regressing ROP: zone III

The presence of plus disease in zones I or II suggests that peripheral ablation, rather than observation, is appropriate.[20]

- Treatment may be initiated for the following retinal findings as per the Early Treatment for Retinopathy of Prematurity Randomized Trial study[21]:
  - zone I ROP: any stage with plus disease
  - zone I ROP: stage 3—no plus disease
  - zone II: stage 2 or 3 with plus disease

The number of clock hours of disease may no longer be the determining factor in recommending ablative treatment. Treatment should generally be accomplished, when possible, within 72 hours of determination of treatable disease to minimize the risk of retinal detachment.

- The conclusion of acute retinal screening examinations should be based on age and retinal ophthalmoscopic findings.[20] The following findings suggest that examinations can be stopped:
  - zone III retinal vascularization attained without previous zone I or II ROP (if there is examiner doubt about the zone or if the postmenstrual age is less than 35 weeks, confirmatory examinations may be warranted);
  - full retinal vascularization;
  - postmenstrual age of 45 weeks and no prethreshold disease (defined as stage 3 ROP in zone II, any ROP in zone I) or worse ROP is present; or
  - Regression of ROP[15] (care must be taken to be sure that there is no abnormal vascular tissue present that is capable of reactivation and progression).
- Parents should be aware of ROP examinations and should be informed if their child has ROP, with subsequent updates on ROP progression. The possible consequences of serious ROP should be discussed when there is a significant risk of poor visual outcome.

- Responsibility for examination and follow-up of infants at risk of ROP must be carefully defined by each NICU. If hospital discharge or transfer to another neonatal unit or hospital is contemplated before retinal maturation into zone III has taken place or if the infant has been treated by ablation for ROP and is not yet fully healed, the availability of appropriate follow-up ophthalmologic examination must be ensured, and specific arrangement for that examination must be made before such discharge or transfer occurs. If responsibility for arranging follow-up ophthalmologic care after discharge is delegated to the parents, they should be made to understand the potential for severe visual loss, including blindness; that there is a critical time window to be met if treatment is to be successful; and that timely follow-up examination is essential to successful treatment.

Pediatricians and other practitioners who care for infants who have had ROP, regardless of whether they require treatment, should be aware that these infants may be at risk of other seemingly unrelated visual disorders such as strabismus, amblyopia, cataract, etc. Ophthalmologic follow-up for these potential problems after discharge from the NICU is necessary.

References

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First Author
Jagdeep Singh DNB

Use of trypan blue dye during conversion of deep anterior lamellar keratoplasty to penetrating keratoplasty

Sharma N, Jhanji V, Titiyal JS, Amiel H, Vajpayee RB.

Rajendra Prasad Centre for Ophthalmic Sciences, All India Institute of Medical Sciences, New Delhi, India.

J Cataract Refract Surg. 2008 Aug;34(8):1242-5.

We describe a technique that uses trypan blue dye to identify residual recipient corneal stroma and Descemet membrane (DM) during conversion of deep anterior lamellar keratoplasty (DALK) to penetrating keratoplasty (PKP). After the host cornea is dissected, trypan blue dye (0.06%) is used to highlight the remaining host corneal stroma and DM, if any. In 8 DALK procedures that had to be converted to PKP because of DM perforation, trypan blue staining identified remnants of DM and parts of the posterior corneal stroma in 7 eyes. Improved visualization of the residual host tissue enabled complete excision and an overall optimal recipient wound profile

Higher-order aberrations in young refractive surgery candidates in India: establishment of normal values and comparison with white and Chinese Asian populations

Prakash G, Sharma N, Choudhary V, Titiyal JS.

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J Cataract Refract Surg. 2008 Aug;34(8):1306-11

PURPOSE

To establish normal values of higher-order aberrations (HOAs) in young candidates in an Indian population and compare them with results in white and Asian (Chinese) populations.

SETTING

Rajendra Prasad Centre for Ophthalmic Sciences, All India Institute of Medical Sciences, New Delhi, India.

METHODS

This prospective trial comprised 206 consecutive candidates (412 eyes) for customized laser in situ keratomileusis. Exclusion criteria were previous ocular surgery, corneal ectasia, rigid gas-permeable contact lens use, corneal scar, or cataract. Higher-order aberrations were analyzed on a Zywave workstation (Bausch & Lomb Surgical).

RESULTS

The mean age was 23.63 years +/- 1.99 (SD); the mean refractive error, -2.97 +/- 4.0 diopters (D) sphere and -1.73 +/- 3.6 D cylinder; and the mean 6.0 mm HOA root mean square (RMS), 0.36 +/- 0.26 microm. The most predominant HOAs were 3rd order (coma, trefoil). The summated RMS of the 3rd order was the most predominant (mean 0.23 +/- 0.15 microm), followed by the 4th and 5th orders (P<.0001). The ratio between summated RMS means was 1:0.7:0.3, similar to that in white populations (1:0.7:0.3) and different than in Asian (Chinese) populations (1: ~ 0.8:0.002). Third- and 4th-order aberrations were between 60% and 70% higher in Asian (Chinese) eyes. The difference between data in this study and those in others was less than 10% in 3rd and 4th order.

CONCLUSION

The normative data for HOA in Indian eyes closely matched that in white populations but was different from that in Asian (Chinese) populations, which may provide help in nomogram modifications.

Modifications in the Surgical Technique of DSAEK

Jhanji V, Greenrod E, Sharma N, Vajpayee RB.

Australia

Br J Ophthalmol. 2008 Feb 21. [Epub ahead of print]

Descemet stripping automated endothelial keratoplasty (DSAEK) has several advantages over penetrating keratoplasty.Surgical outcome, however, depends upon factors like atraumatic graft insertion and reducing dislocations. During our learning curve we tried to overcome certain problems associated with various surgical steps by developing modifications in the standard technique. DSAEK was performed in four eyes of four patients with pseudophakic corneal edema and Fuchs endothelial dystrophy.

Early predictors of traumatic glaucoma after closed globe injury: trabecular pigmentation, widened angle recess, and higher baseline intraocular pressure

Sihota R, Kumar S, Gupta V, Dada T, Kashyap S, Insan R, Srinivasan G.

Glaucoma Research Facility and Clinical Services, Dr Rajendra Prasad Centre for Ophthalmic Sciences, All India Institute of Medical Sciences, Ansari Nagar, New Delhi 110029, India.

Arch Ophthalmol. 2008 Jul;126(7):921-6.

OBJECTIVE

To prospectively analyze the clinical and ultrasonographic biomicroscopy (UBM) features in eyes with closed globe injury, at the initial examination, that would predict the occurrence of chronic traumatic glaucoma during a 6-month follow-up.

METHODS

Forty consecutive eyes with closed globe injury and a chronically elevated intraocular pressure (IOP) of at least 21 mm Hg for a minimum of 3 months were diagnosed as having traumatic glaucoma and compared with 52 eyes with closed globe injury and no evidence of glaucoma.

RESULTS

The median grade of trabecular pigmentation on gonioscopy in eyes with traumatic glaucoma was 3 compared with 2 in eyes without glaucoma (P = .001). On UBM findings, 18 eyes with closed globe injury without glaucoma showed evidence of cyclodialysis, compared with 7 eyes with glaucoma (P = .001). The relative risk of developing traumatic glaucoma was also significantly higher with hyphema, elevated baseline IOP, angle recession of more than 180 degrees, lens displacement, and wider angles on UBM.

CONCLUSIONS

Clinically, the presence of increased pigmentation at the angle, elevated baseline IOP, hyphema, lens displacement, and angle recession of more than 180 degrees were significantly associated with the occurrence of chronic glaucoma after closed globe injury. On UBM findings, a wider angle and the absence of cyclodialysis were significant predictors for the subsequent development of traumatic glaucoma.

DOS Correspondent
Shubha Bansal DNB

Delhi Ophthalmological Society
Monthly Clinical Meeting, September 2008

Venue: Waiting Area Speciality Clinics, Venu Eye Institute & Research Centre, Sheikh Sarai, Institutional Area, Phase-2, New Delhi

Date and Time : *7th September,* 2008 (Sunday) 11:30 a.m. onwards

Clinical Cases:

1.	BOTOX: Initial Experience at Venu	:	Archana Sood	10 Mins
2.	Lamellar PK	:	Aditi Agarwal	10 Mins

Clinical Talk:

OOKP		:	Ramendra Bakshi	15 Mins

Mini Symposium: *LV - Resource Centre*

Chairman: Dr. S.C. Gupta ***Co-Chairman:*** Dr. Anil Tara

1.	Indications of Low Vision Device	:	Sunita Lulla Gur	15 Mins
2.	Paediatric Low Vision	:	Kanak Tyagi	15 Mins

Panel Discussion: 15 min **To be followed by Lunch**

Sponsored by: M/s. NRI Vision Care (MISTY, OLO-1, MO-4)

Delhi Ophthalmological Society
Monthly Clinical Meeting, September 2008

Venue: Ayurvigyan Auditorium, Army Hospital (R&R), Delhi Cantt. New Delhi - 10

Date and Time : *28th September,* 2008 (Sunday) 11:30 a.m. onwards

Clinical Cases:

1.	A case of Traumatic Corneal rupture in a young boy	:	S.K. Dhar	15 Mins
2.	A case of Blow Fracture of orbit	:	Jaya Kaushik	15 Mins

Clinical Talk:

Role of Multifocal & Accommodative intra ocular lenses in visual rehabilitation-do they come upto patients expectations?		:	J.K.S. Parihar	20 Mins

Mini Symposium: *Ocular Trauma*

Chairman: Col. J.K.S. Parihar ***Co-Chairman:*** Col. N. Bhargava

1.	Anterior segment reconstruction - visual rehabilitation following trauma	:	Vijay Mathur	10 Mins
2.	Retained intra ocular foreign body in posterior segment - always a challenge	:	M.A. Khan	10 Mins
3.	Post - traumatic glaucoma - a stealthy and silent killer	:	Tarun Choudhary	10 Mins
4.	Armed Forces experience with Ocular Trauma	:	Nitin Vichare	10 Mins

The academic programme will be followed by lunch in officer's mess

Forthcoming Events : National

August 2008

21-24 MUMBAI

Eye Advance 2008
Contact Person & Address:
Dr. Kaiki R. Mehta
World Trade Centre, Mumbai
The Mehta International Eye Institute
Sea Side, 147, Shahid Bhagat Singh Road, Mumbai - 5
Tel.: 91- 22-22151303, Fax: 91-22-22150433
Email: admin@eyeadvance.com
Website: eyeadvance.com

October 2008

2-5 CHENNAI

A National Board Post Graduate Program
Contact Person & Address
Prof. Amar Agarwal
Dr. Agarwal's Eye Hospital
19, Catheral Road, Chennai-600086
Tel.: 91-44-28112811, Fax: 91-44-28115871
Email: dragarwal@vsnl.com
Website: www.kalpavriksha.dragarwal.com

October 2008

2th NEW DELHI

13th Dr. R.K. Seth Memorial Symposium on Glaucoma
Contact Person & Address
Dr. Abhishek B. Dagar
Venu Eye Institute & Research Centre,
1/31, Sheikh Sarai , Institutional Area,
Phase II, New Delhi-110017
Tel.:- 011-29251155/56, 29250757, Fax - 01129252370
Email : training.venu@spectranet.com
education@venueyeinstitute.org

3-4 NEW DELHI

National Workshop on Strabismus
Contact Person & Address
Prof. Pradeep Sharma
Dr. Rohit Saxena, *Assistant Professor*
Room No. 485, Dr. Rajendra Prasad Centre for Ophthalmic Sciences, All India Institute of Medical Sciences, Ansari Nagar, New Delhi - 110 029
Tel.: 011-26593185, Fax: 011-26588919,
Email: workshoprpc@gmail.com

10-12 DEHRADUN, UTTARAKHAND

Uttara-Eyecon 2008
Contact Person & Address
Dr. S.K. Mittal, *Organizing Secretary (9412909375)*
Dr. Maneesh, *Joint Organizing Secretary (9411712604)*
Sri Guru Ram Rai Institute of Medical & Health Sciences & Sri Mahant Indiresh Hospital, Dehradun, Uttarakhand

17-19 UJJAIN, MADHYA PRADESH

Nayan Kumbh'08
Annual Conference of M.P. State Ophthalmic Society
For details contact :
Dr. Arvind Bhatnagar,
Chairman, Organizing Committee
Celll : 98260 56021

18-20 NEW DELHI

Annual Conference of Strabismological Society of India
Contact Person & Address
Dr. Subash Dadeya
Room No. 205 OPD Block,
Guru Nanak Eye Centre,
Maharaja Ranjit Singh Marg, Delhi-110 002
Tel.: 91-011-23234622 Extn.-292
Mobile: 981057899, 9868245792
E-mail: dadeyassi@gmail.com,
dadeya86@hotmail.com

31st Oct. CHANDIGARH (U.T.)
2nd Nov.

18th Annual Conference of the Glaucoma Society of India
Contact Person & Address
Dr. S.S. Pandav
Advanced Eye Centre,
Postgraduate Institute of Medical Education & Research,
Chandigarh (U.T.)
Telefax: 0172-2747837, Email: sspandav@yahoo.com

November 2008

22-23 NEW DELHI

Mid-term Conference
Delhi Ophthalmological Society
Contact Person & Address
Dr. Namrata Sharma
Room No. 474, 4th Floor,
Dr. Rajendra Prasad Centre for Ophthalmic Sciences,
All India Institute of Medical Sciences,
Ansari Nagar, New Delhi – 110029
Ph.: 011-65705229, ***Fax:*** 26588919,
E-mail: dosonlin@vsnl.net,
Website: www.dosonline.org

23rd GWALIOR, M.P.

Sports Trauma
Contact Person & Address
Dr. Purendra Bhasin, *Organizing Secretary*
C/o. Ratan Jyoti Netralaya
18, Vikas Nagar, Near Sai Baba Mandir,
Gwalior (MP)
Ph.: 0751-2423350/51, Mob. 09826253355
E-mail: rjn_drbhasin@sify.com

December 2008

4-6 WEST BENGAL

XVII Annual Conference of Vitreoretinal Society of India
Fort Radisson, RAICHAK, West Bengal
4th to 6th December, 2008
Contact Person & Address
Secretary, VRSI
Dr Ajit Babu Majji
L V Prasad Eye Institute,, L V Prasad Marg,
Banjara Hills, Hyderabad- 500 034, India
E-mail: ajit@lvpei.org, Website: vrsi.in

5-7 GURGAON, HARYANA

Oculoplasty Panorama 2008
19th Annual Conference of the Oculoplasty Association of India
Contact Person & Address
Dr. Anita Sethi, *Organizing Secretary*
Venue: Artemis Health Institute, Gurgaon, Haryana
Ph.: +91-1246767999 Ext. 1925, 1234, +91-9810199636
E-mail: oculoplastypanorama08@gmail.com

February 2009

5-8 JAIPUR

AIOS Annual Conferences
Contact Person & Address
Prof. (Dr.) P.K. Mathur
C-126, Moti Nagar, Bapunagar, Jaipur-302015
Ph.: 0141-2705972, 0141-2701030, (M) 0-9314614932
Fax: 0141-2705246, Email: pradeepmathur@hotmail.com

March 2009

20-22 NEW DELHI

Annual Conference of Delhi Ophthalmological Society
Contact Person & Address
Dr. Namrata Sharma
Room No. 474, 4th Floor,
Dr. Rajendra Prasad Centre for Ophthalmic Sciences,
All India Institute of Medical Sciences,
Ansari Nagar, New Delhi – 110029
Ph.: 011-65705229, ***Fax:*** 26588919,
E-mail: dosonlin@vsnl.net, ***Website:*** www.dosonline.org

Monthly Clinical Meetings Calendar 2008-2009

Dr. R.P. Centre for Ophthalmic Sciences
3rd August, 2008 (Sunday)

Venu Eye Institute & Research Centre
7th September, 2008 (Sunday)

Army Hospital (R&R)
28th September, 2008 (Sunday)

World Sight Day
October, 2008

Sir Ganga Ram Hospital
26th October, 2008 (Sunday)

Midterm Conference of DOS
22nd & 23rd November, 2008 (Saturday - Sunday)

Centre for Sight
23rd November, 2008 / 30th November (Sunday)

DOS Picnic
December, 2008

Mohan Eye Institute
28th December, 2008 (Sunday)

New Hospital/Institute
25th January, 2009 (Sunday)

Guru Nanak Eye Centre
22nd February, 2009 (Sunday)

New Hospital/Institute
29th March, 2009 (Sunday)

Annual Conference of DOS 20th-22nd March, 2009 (Friday, Saturday & Sunday)

Forthcoming Events : International

August 2008

22-24 NEW DELHI, INDIA

Biennial Meeting SAARC Academy of Ophthalmology
India Habitat Centre, Lodhi Road, New Delhi
Contact: Dr. Namrata Sharma
Room No. 474, 4th Floor, Dr. Rajendra Prasad Centre for Ophthalmic Sciences, All India Institute of Medical Sciences, Ansari Nagar, New Delhi - 110 029
Phone: 91-11-26593144, Fax: 91-11-26588919
E-Mail: sao2008@gmail.com, Website: www.sao2008.org

September 2008

3-6 NEW JERSEY

Clinical Trials Education Series: Principles and Concepts in Clinical Trials for Eye Researchers
Florham Park , New Jersey, United States
Contact Name: Grammer, Jot
Phone: 240.221.2933, Fax: 240.221.0370
Email: jgrammer@arvo.org
Web Site: http://www.arvo.org

5-6 SWITZERLAND

2008 European Professors in Ophthalmology (EUPO) Course on Neuro-Ophthalmology and Strabismus
Contact: EUPO Office
Marlene Verlaeckt, Kapucijnenvoer 33
3000 Leuven, Belgium
Email: office@eupo.eu *Fax:* +32 16 23 40 97
Web Site: http://eupo.eu/

13-17 BERLIN, GERMANY

XXIV Meeting of the European Society of Cataract and Refractive Surgeons
Contact:
M Events Cross Media GmbH
Heimstr. 5 a, 82152 Krailling, Germany
Phone: +49 - (0) 89 - 43 56 96 58
Fax: +49 - (0) 89 - 43 56 96 59
E-mail: info@m-events.eu, Website: www.m-events.eu

October, 2008

18-19 SWITZERLAND

Glaucoma Meeting Basel 2008
Basel, Switzerland
Contact: Haunstein, Daniela
Phone: 41-61-2658718, Fax: 41-61-2658652
E-mail: info@glaucoma-meeting.ch
Website: www.glaucoma-meeting.ch

24-25 GERMANY

From Eye to Mind: International Interdisciplinary Symposium on Neuro-Ophthalmology and Low Vision
Tuebingen, Germany
Contact Name: Susanne, Trauzettel-Klosinski, MD
Phone: +49 7071 2987427 *Fax:* +49 7071 293774
Email: sba@med.uni-tuebingen.de
Web Site: http://www.amd-read.net/from_eye_to_mind.html

November, 2008

8th ATLANTA, GEORGIA

Clinical Trials Education Series: Design, Conduct and Management of Clinical Trials in Eye Research
Atlanta, Georgia, United States
Contact Name: Grammer, Jot
Phone: 240.221.2933 *Fax:* 240.221.0370
Email: jgrammer@arvo.org
Web Site: http://www.arvo.org/eweb startpage.aspx?site=clinictria

8-11 ATLANTA, GEORGIA

American Academy of Ophthalmology Annual Meeting
Atlanta , Georgia , United States
Phone: 415-561-8500 ext. 320
Fax: 415-561-8576
Email: meetings@aao.org
Web Site: http://www.aao.org

16-19 FLORIDA, UNITED STATES

XXX Inter-American Course in Clinical Ophthalmology
Miami, Florida, United States
Contact Name: Department, CME
Phone: 305-326-6110 Fax: 305-326-6518
Email: curso@med.miami.edu
Web Site: http://www.bascompalmer.com/site/info/info_inter.asp

December, 2008

6th PALM BEACH, FLORIDA

Retinal & Glaucoma Imaging 2009
Palm Beach, Florida, United States
Contact Name: Department, CME
Phone: 305-326-6110 Fax: 305-326-6518
Email: bpeicme@med.miami.edu
Web Site: http://www.bascompalmer.org

January, 2009

15-18 HYDERABAD, INDIA

Asia-ARVO
Hyderabad, Andhra Pradesh, India
Contact Name: Honavar, Santosh
Email: asiaarvo@lvpei.org
Web Site: http://www.arvo.org/asiaarvo

March, 2009

17-22 CHICAGO

Illinois Eye Review
Chicago , Illinois , United States
Contact Name: Cindy
Phone: 312.996.6590 Fax: 312.996.7770
Email: IllinoisEyeReview@gmail.com
Web Site: http://www.IllinoisEyeReview.org

Online Journal Available

Many New Journals at DOS Library

Dear DOS Members,

We are pleased to announce that DOS has subscribed to online access of the following 18 journals. We are also in the process of adding a few more journals. These journals can be accessed at the DOS library situated at 4th floor of Dr. R.P. Centre for Ophthalmic Sciences, All India Institute of Medical Sciences, New Delhi-110029. The timings are from 9.30 A.M. to 6.00 P.M. on week days and 9.30 A.M. - 2.00 P.M. on Saturday. The Library will remain closed on Gazetted Holidays. Members are requested to utilise the available facilities i.e. Computer with Video Editing & Conversion facility VHS to VCD, Journals Viewing, Books and Journals etc. The DOS members can get the full text articles of the current issues as well as many back issues of these subscribed journals.

- Archives of Ophthalmology
- British Journal of Ophthalmology
- Contemporary Ophthalmology
- Current Opinion in Ophthalmology
- International Ophthalmology Clinics
- Journal of Neuro-Ophthalmologica
- Journal of Refractive Surgery
- Ophthalmology Management
- RETINAL Cases & Brief Reports
- Acta Ophthalmologic Scandinavica
- Clinical & Experimental Ophthalmology
- Cornea
- Evidence-Based Ophthalmology
- Journal of Glaucoma
- Journal of Pediatric Ophthalmology & Strabismus
- Ophthalmic Surgery, Lasers and Imaging
- Retina
- Techniques in Ophthalmology

You are welcome to give any more suggestions for the improvement of the library facility and making the process simpler for us.

Looking forward to hearing from you and hope this facility would be of benefit to all of us.

Regards.

(Dr. Namrata Sharma)
Secretary, DOS

(Dr. Vinay Garodia)
Library Officer Incharge
Mob: 9811084552
Email: vinay@visitech.org, doslibrary@gmail.com

Delhi Ophthalmological Society

(LIFE MEMBERSHIP FORM)

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S/D/W/o _____ Date of Birth _____

Qualifications _____ Registration No. _____

Sub Speciality (if any) _____

ADDRESS

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Correspondence _____

_____ Phone _____

Email _____ Fax No. _____

Proposed by

Dr. _____ Membership No. _____ Signature _____

Seconded by

Dr. _____ Membership No. _____ Signature _____

[Must submit a photocopy of the MBBS/MD/DO & State Medical Council / MCI Certificate for our records.]

I agree to become a life member of the Delhi Ophthalmological Society and shall abide by the Rules and Regulations of the Society.

(Please Note : Life membership fee Rs. 3100/- payable by DD for outstation members. Local Cheques acceptable, payable to Delhi Ophthalmological Society)

Please find enclosed Rs._____in words _____ by Cash

Cheque/DD No._____ Dated_____ Drawn on_____

Three specimen signatures for I.D. Card.

Signature of Applicant with Date

FOR OFFICIAL USE ONLY

Dr._____has been admitted as Life Member of the Delhi Ophthalmological Society by the General Body in their meeting held on_____

His/her membership No. is _____. Fee received by Cash/Cheque/DD No._____ dated_____ drawn on _____.

(Secretary DOS)

INSTRUCTIONS

1. The Society reserve all rights to accepts or reject the application.
2. No reasons shall be given for any application rejected by the Society.
3. No application for membership will be accepted unless it is complete in all respects and accompanied by a Demand Draft of Rs. 3100/- in favour of **"Delhi Ophthalmological Society"** payable at New Delhi.
4. Every new member is entitled to received Society's Bulletin (DOS Times) and Annual proceedings of the Society free.
5. Every new member will initially be admitted provisionally and shall be deemed to have become a full member only after formal ratification by the General Body and issue of Ratification order by the Society. Only then he or she will be eligible to vote, or apply for any Fellowship/Award, propose or contest for any election of the Society.
6. Application for the membership along with the Bank Draft for the membership fee should be addressed to Dr. Namrata Sharma, Secretary, Delhi Ophthalmological Society, R.No. 474, 4th Floor, Dr. R.P. Centre for Ophthalmic Sciences, AIIMS, Ansari Nagar, New Delhi - 110 029.
7. Licence Size Coloured Photograph is to be pasted on the form in the space provided and two Stamp/ Licence Size Coloured photographs are required to be sent along with this form for issue of Laminated Photo Identity Card (to be issued only after the Membership ratification).
8. Applications for 'Delhi Life Member' should either reside or practice in Delhi. The proof of residence may be in the form Passport/ Licence/Voters Identity Card/Ration Card/Electyricity Bill.

DOS Quiz

Anagram Time

Each of the following words is a jumbled ophthalmic or related term. There is, however, an extra letter in every set of letters. These extra letters will also form a six letter ophthalmic word when unjumbled.

So get cracking.

1. STERNTOE ___ ___ ___ ___ ___ ___ ___ ____
2. NOTROPHYY ___ ___ ___ ___ ___ ___ ___ ___ ____
3. FATCURRIE ___ ___ ___ ___ ___ ___ ___ ___ ____
4. SOSYDISIRE ___ ___ ___ ___ ___ ___ ___ ___ ___ ____
5. SCHEMJOISCY ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ____
6. YOUDARISLIIIDS ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ___ ____

Answers on page number 34

Saurabh Sawhney *DO, DNB* ***Ashima Aggarwal*** *MS, DNB*
Insight Eye Clinic, New Delhi

National Workshop on Strabismus

3rd-4th October, NEW DELHI

Contact Person & Address

Prof. Pradeep Sharma

Dr. Rohit Saxena, *Assistant Professor*

Room No. 485, Dr. Rajendra Prasad Centre for Ophthalmic Sciences,
All India Institute of Medical Sciences,
Ansari Nagar, NEW DELHI - 110 029
Tel.: 011-26593185,
Fax: 011-26588919, 9868350496
Email: workshoprpc@gmail.com

Missed DOS Times Copy

If you have missed your copy of DOS Times.

Please Contact:
Secretary DOS : *Dr. Namrata Sharma*
Room No. 474, 4th Floor,
Dr. Rajendra Prasad Centre for Ophthalmic Sciences
All India Institute of Medical Sciences,
Ansari Nagar, New Delhi – 110029
Ph.: 91-11-65705229, ***Fax:*** 91-11-26588919,
E-mail: dosonlin@vsnl.net,
Website: www.dosonline.org

Congratulations

Congrats to **Dr. Punita Kumari Sodhi**, *Assistant Professor in Ophthalmology, Lady Hardinge Medical College, New Delhi*, for being awarded the "***Rising Personalities of India***" Award and "***Bharat Excellence Award***" by the former Election Commissioner of India — Hon'ble Dr. G.V.G. Krishnamurthy, at a National Level prestigious award ceremony."

Erratum

DOS Credit Rating System Report Card
(July, 2007 - March, 2008)

DCRS July 2007 – Centre for Sight

Total No. of Delegates as per Attendance Register *199*
Total No. of form received from Delegates *182*
Delegates from Out side (N) *173*
Delegates from Centre for Sight (n) *5*
Overall assessment by outside delegates (M) **1381.5**
Assessment of case presentation-I (Dr. Avnindra Gupta) by outside delegates **1019**
Assessment of case presentation-II (Dr. Archana Chafle) by outside delegates **1158.5**
Assessment of clinical talk (Dr. Mahipal S. Sachdev) by outside delegates **1456**
Cancelled Forms *4*

DCRS August 2007 – Dr. R.P. Centre for Ophthalmic Sciences

Total No. of Delegates as per Attendance Register *236*
Total No. of form received from Delegates *155*
Delegates from Out side (N) *99*
Delegates from Dr. R.P. Centre for Ophthalmic Sciences (n) *46*
Overall assessment by outside delegates (M) **782.5**
Assessment of case presentation-I (Dr. Subrata Mandal) by outside delegates **667.5**
Assessment of case presentation-II (Dr. Swati Phuljhele) by outside delegates **637.5**
Assessment of Clinical Talk (Dr. Tanuj Dada) by outside delegates **821**
Cancelled Forms *10*

DCRS September 2007 – Dr. Shroff's Charity Eye Hospital

Total No. of Delegates as per Attendance Register *134*
Total No. of form received from Delegates *117*
Delegates from Out side (N) *97*
Delegates from Dr. Shroff's Charity Eye Hospital (n) *13*
Overall assessment by outside delegates (M) **733**
Assessment of case presentation-I (Dr. Sandeep Buttan) by outside delegates **569.5**
Assessment of case presentation-II (Dr. Suneeta Dubey) by outside delegates **638**
Assessment of Clinical Talk (Dr. Gaurav Sood) by outside delegates **654**
Cancelled Forms *7*

DCRS October 2007 – MAMC

Total No. of Delegates as per Attendance Register *162*
Total No. of form received from Delegates *128*
Delegates from Out side (N) *99*
Delegates from (Maulana Azad Medical College) (n) *27*
Overall assessment by outside delegates (M) **749.6**
Assessment of case presentation-I (Dr. Pankaj Vats) by outside delegates **568.5**
Assessment of case presentation-II (Dr. Pooja Dhama) by outside delegates **692.5**
Assessment of Clinical Talk (Dr. Ritu Arora) by outside delegates **780.1**
Cancelled Forms *2*

DCRS November 2007 – Sir Ganga Ram Hospital

Total No. of Delegates as per Attendance Register *108*
Total No. of form received from Delegates *89*
Delegates from Out side (N) *76*
Delegates from Sir Ganga Ram Hospital (n) *10*
Overall assessment by outside delegates (M) *582*
Assessment of case presentation-I (Dr. Shaloo Bageja) by outside delegates *435.5*
Assessment of case presentation-II (Dr. Tinku Bali) by outside delegates *485*
Assessment of Clinical Talk (Dr. Harbansh Lal) by outside delegates *573.77*
Cancelled Forms *3*

DCRS December, 2007 – Mohan Eye Institute

Total No. of Delegates as per Attendance Register 98
Total No. of form received from Delegates 89
Delegates from Out side (N) 81
Delegates from Mohan Eye Institute (n) 8
Overall assessment by outside delegates (M) 614.5
Assessment of case presentation-I (Dr. Vikas Sinha) by outside delegates 479
Assessment of case presentation-II (Dr. Rachna Agarwal) by outside delegates 581
Assessment of Clinical Talk (Dr. Sanjiv Mohan) by outside delegates 591.5
Cancelled Forms 0

DCRS January 2008 – Venu Eye Institute & Research Centre

Total No. of Delegates as per Attendance Register 73
Total No. of form received from Delegates 65
Delegates from Out side (N) 44
Delegates from Venu Eye Institute & Research Centre (n) 21
Overall assessment by outside delegates (M) 344
Assessment of case presentation-I (Dr. Ankur Agarwal) by outside delegates 281.5
Assessment of case presentation-II (Dr. Kanak Tyagi) by outside delegates 332
Assessment of Clinical Talk (Dr. Archana Sood) by outside delegates 333.5
Cancelled Forms 0

DCRS February 2008 – Army Hospital (R&R)

Total No. of Delegates as per Attendance Register 97
Total No. of form received from Delegates 76
Delegates from Out side (N) 68
Delegates from Army Hospital (R&R) (n) 8
Overall assessment by outside delegates (M) 540.5
Assessment of case presentation-I (Dr. S.K. Mishra) by outside delegates 476
Assessment of case presentation-II (Dr. Lt. Col. Santhosh Kumar) by outside delegates 540.5
Assessment of Clinical Talk (Dr. Col. J.K.S. Parihar) by outside delegates 559.5
Cancelled Forms 1

DCRS March 2008 – Safdarjung Hospital

Total No. of Delegates as per Attendance Register 130
Total No. of form received from Delegates 98
Delegates from Out side (N) 83
Delegates from Safdarjung Hospital (n) 14
Overall assessment by outside delegates (M) 601.9
Assessment of case presentation-I (Dr. Shreekant A. Damgude) by outside delegates 569.8
Assessment of case presentation-II (Dr. Pankaj Yadav) by outside delegates 626.4
Assessment of Clinical Talk (Dr. K.P.S. Malik) by outside delegates 627
Cancelled Forms 1

Delhi Ophthalmological Society Fellowship for Partial Financial Assistance to Attend Conferences

Applications are invited for DOS Fellowship for partial financial assistance to attend conference(s).

Conferences

International: Two fellowships per year (two fellowships can be awarded at a time if committee feels that papers are very good)

- Maximum of Rs. 25,000/- per fellowship will be sanctioned

National: Three fellowships per year (only for AIOS)

- Maximum of Rs. 5,000/- per fellowship will be sanctioned

Eligibility

- DOS Life Members (Delhi Members only)
- 75 or More DCRS Points
- Accepted paper for oral presentation, poster, video or instruction course.

Time since last DOS Fellowship

Preference will be given to member who has not attended conference in last three years. However if no applicant is found suitable the fellowship money will be passed on to next year. Members who has availed DOS fellowship once will not be eligible for next fellowship for a minimum period of three years.

Authorship

The fellowship will be given only to presenting author. Presenting author has to obtain certificate from all other co-authors that they are not attending the said conference or not applying for grant for the same conference. (Preference will be given to author where other authors are not attending the same conference). If there is repeatability of same author group in that case preference will be given to new author or new group of authors. Preference will also be given to presenter who is attending the conference for the first time.

Quality of Paper

The applicant has to submit abstract along with full text to the DOS Fellowship Committee. The committee will review the paper for its scientific and academic standard. The paper should be certified by the head of the department / institution, that the work has been carried out in the institution. In case of individual practitioner he or she should mention the place of study and give undertaking that work is genuine. The fellowship committee while scrutinizing the paper may seek further clarification from the applicant before satisfying itself about the quality and authenticity of the paper. Only Single best paper has to be submitted by the applicant for review (6 copies). Quality of the paper will carry 50% weightage while deciding the final points.

Poster and Video

The applicant will need to submit poster and video for review.

Credit to DOS

The presenter will acknowledge DOS partial financial assistance in the abstract book / proceedings.

The author will present his or her paper in the immediate next DOS conference and it will be published in DJO/DOS Times.

Points Awarded

		Points
1) Age of the Applicant		
a)	< 35 years	10
b)	36 to 45 years	07
c)	45 years plus	05
2) Type of Presentation		
a)	Instructor/ Co-instructor of Course	12
b)	Free Paper (Oral) / Video	07
c)	Poster	05
3) Institutional Affiliation		
a)	Academic Institution	15
b)	Private Practitioner	20
4) DCRS Rating in the immediate previous year		
a)	75-150	05
b)	> 150	08
c)	< 75	not eligible for fellowship

Documents

- Proof for age. Date of Birth Certificate
- Original / attested copy of letter of acceptance of paper for oral presentation / video / poster or instruction course.
- Details of announcement of the conference
- Details of both International & National Conferences attended in previous three years.
- Copy of letter from other national or international agency / agencies committing to bear partial cost of conference if any.
- At least one original document should be provided, that is ticket, boarding pass or registration certificate along with attendance certificate of the conference.
- Fellowship Money will be reimbursed only after submission of all the required documents and verified by the committee.
- Undertaking from the applicant stating that above given information's are true.
- If found guilty the candidate is liable to be barred for future fellowships.

Application should reach **Secretary's office** and should be addressed to President, DOS before **31st July** and **31st January** for International Conference and before **30th September** for National Conference. The committee will meet thrice in a year in the month of August, October and February with in 2 weeks of last date of receipt of applications. The committee will reply within four week of last date of submission in yes/no to the applicant. No fellowship will be given retrospectively, that means prior sanction of executive will be necessary.

Dr. Namrata Sharma
Room No. 474, 4th Floor,
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All India Institute of Medical Sciences,
Ansari Nagar, New Delhi – 110029
Ph.: 91-11-65705229, ***Fax:*** 91-11-26588919
E-mail: dosonlin@vsnl.net, ***Website:*** www.dosonline.org

Attention Please

This e-mail '***alkesh_chaudhary@hotmail.com*** has been hacked. Please use alternative e-mail '**achaudhary18@gmail.com**.

Dr. Alkesh Chaudhary

Tear Substitutes and Preservatives

Component	Properties	Advantages	Disadvantages
Cellulose ethers (e.g., hypromellose, hydroxyethylcellulose, methylcellulose, carboxymethylcellulose [carmellose])	• Viscoelastic polysaccharides • Increase the viscosity of tears • Large increase in viscosity when concentration is moderately increased • Sometimes co-formulated with electrolytes, as hypotonic • Available as sustained-release artificial tear inserts (hydroxypropylcellulose rods)	• Good retention time on ocular surface • Mix well with other ophthalmic products • Viscosity not influenced by blinking	• Only of benefit in aqueous tear deficiency • Hypromellose can cause crusting of eyelids, mimicking blepharitis
Carbomers (polyacrylic acid)	• Synthetic polymers • High viscosity when eye is static, shears thin during blinking or eye movement, maximizing thickness of the tear film while minimizing drag	• Good retention time on ocular surface	• Tend to blur vision • Often uncomfortable to patients
Polyvinyl alcohol	• Synthetic polymer • Low viscosity but optimal wetting characteristics at a concentration of 1.4%	• Beneficial in lipid, aqueous, and mucin layer deficiencies • Water soluble, does not cause blurring of vision	• Short retention time on ocular surface • Does not mix well with other ophthalmic products
Sodium hyaluronate	• Mucopolysaccharides • Viscous formulation	• Good retention time on ocular surface • Beneficial in corneal wound healing	• Little clinical experience
Povidone (polyvinyl pyrrolidone)	• Synthetic polymer • Co-formulated with electrolytes • Superior wetting ability when co-formulated with polyvinyl alcohol	• Beneficial in mucin layer deficiency	• Little clinical experience
Acetylcysteine	• Breaks down mucin molecules • Can be co-formulated with another lubricant such as hypromellose	• Useful for complications resulting from very dense mucus in severe dry eye	• Not commercially available as a topical agent

Component	Properties	Advantages	Disadvantages
Lipids (e.g. petrolatum [paraffin, vaseline, mineral oil] lanolin, lecithin)	• Organic substances • Formulated as drops and ointments	• High viscosity and, therefore, high retention • Contribute to re-build the lipid layer • Useful adjunct to other artificial tears when used at night.	• Cause blurred vision • Little clinical experience with lipid eyedrops

Preservative	Advantages	Disadvantages
Benzalkonium chloride	• Chemically stable • Doesn't easily degrade even at high temperatures • Effective and fast-acting against many micro-organisms Increase corneal penetration of some drugs	• Can accumulate in ocular tissues causing cell death with frequent dosing • Patients at greatest risk are those with dry eye syndrome • Frequency of use must not exceed 4 to 6 times daily • Careful use required for patients using several medications, are overdosing, or have a history of severe corneal damage
Sorbate	• Infrequent adverse reactions • Useful for sensitive eyes and contact lens wearers	• Limited antimicrobial activity • May cause punctate keratitis
Chlorobutanol	• Wide range of antimicrobial action	• Causes irritation in more than 50% of users
Sodium perborate	• Low levels are effective for destroying microbes • Changes to oxygen and water on contact with the tear film/ocular tissue	• Causes cell death within minutes at concentrations as low as 70 to 100 ppm • Even 30 ppm is reported to cause ocular stinging
Polyquatemium-1	• Has a lesser effect on corneal epithelial cells than benzalkonium chloride	• Causes superficial epithelial damage
Stabilised oxychlorocomplex	• Oxidative preservative that is converted into natural tear components in the eye • Wide spectrum of antimicrobial activity, as well as activity against the fungus Aspergillus niger • Safe and well-tolerated when dosed frequently • Useful for multidose drugs or for multiple drug treatments	• Least cytotoxic effects

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