Dear friends,

We have just started receiving donations from our readers / members for Tsunami Victims. I am still hopeful that we will be able to collect a significant amount to Prime Minister's Relief Fund from DOS. More than two months have passed, but it is difficult to rebuilt the damage caused by devastating Tsunami waves there is lot more to do. It is never late to help our own Tsunami victims who have lost home and relatives. I understand many of our members may have donated by other means like myself and many other in Government jobs have already donated one day salary to Prime Minister's relief fund but I still request all of you to come forward and help the needy people of our country.

In this issue of DOS Times we have covered a wide range of common topics, which are of practical importance to all practioners and residents, most readers should benefit reading these articles.

Annual conference of DOS is coming and all of you may have noticed the registration & free paper abstract submission details in the previous DOS Times. This year too we are going to cover all the speciality areas of ophthalmology and the major emphasis is on recent advances in the field of diagnostics, therapeutics & surgical techniques.

It is my suggestion to all members they should register on time & submit more abstracts, papers, posters & video for presentations.

Dr. Jeewan S. Titiyal

DOS MONTHLY CLINICAL MEETING FOR FEBRUARY, 2005

Venue : Lecture Theatre, Maulana Azad Medical College, New Delhi - 110002

Date & Time : *26-02-2005* ***(Saturday)*** *at 2:30 P.M.*

Case Presentation :

1. Unusual case of Exudative R.D. ---------- : Dr. Deepender Chauhan (10 Min)
2. Unusual case of Strabismus ---------- : Dr. Deepali (10 Min)

Clinical Talk :

- Recent Advances in Keratoplasty ---------- : Dr. Ritu Arora (20 Min)

Mini Symposium : Alternative Management Techniques in Cataract Surgery

Chairman : Dr. D.K. Mehta
Convenor : Dr. B. Ghosh
Moderator : Dr. Usha Yadav

- **Management of Subluxated lens** - Current Trends ----- : Dr. Abhay S. Vasavada
- **Senile Cataract :**
  (a) Non phaco small incision cataract surgery ---------- : Dr. Kamlesh
  (b) Blumenthal Technique ---------- : Dr. B. Ghosh
- **Congenital Cataract Management :**
  (a) Extra Capsular with CCC ---------- : Dr. Anju Rastogi
  (b) Epilenticular with Parsplana Vitrectomy ---------- : Dr. Priyanka Jain
- **Co-Existing Glaucoma with Cataract :**
  ((a) One step surgery ---------- : Dr. Kirti Singh
  (b) Two Step Surgery ---------- : Dr. Usha Yadav

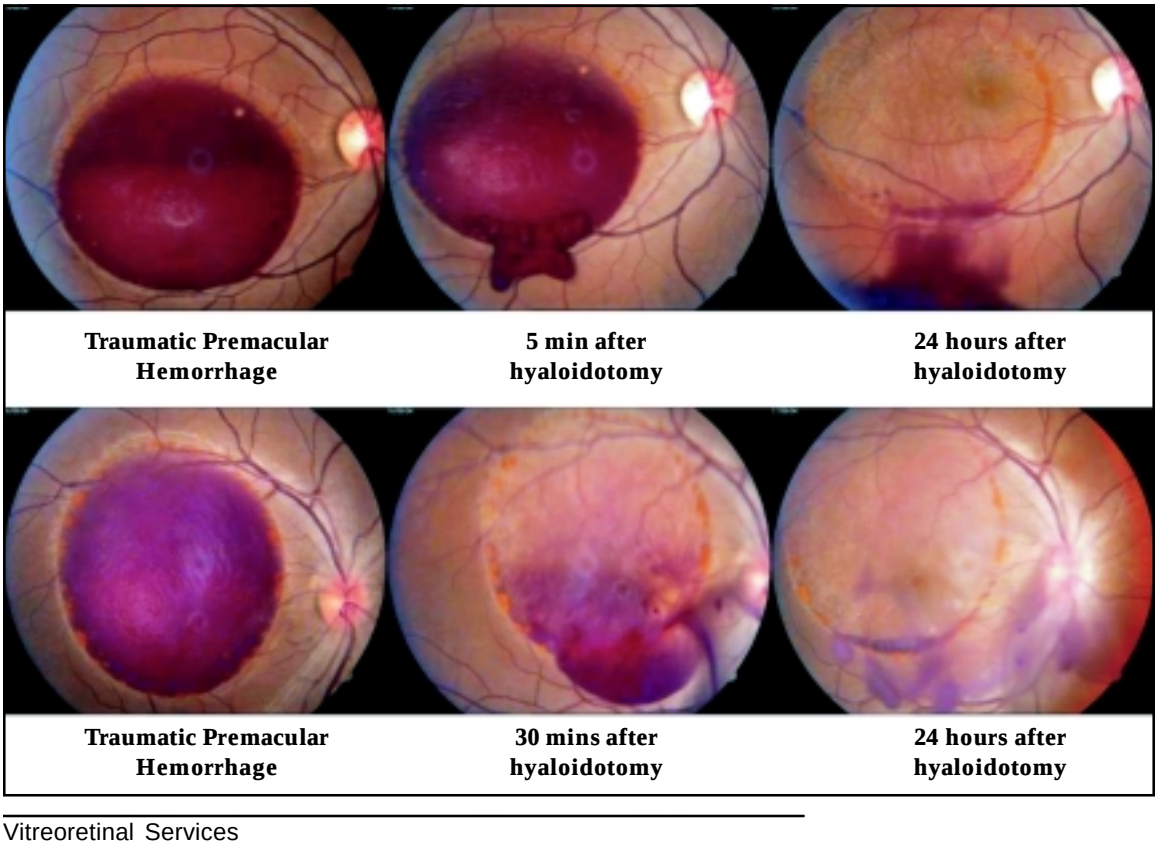
Premacular Subhyaloid Hemorrhage

Deependra Vikram Singh, MD, **Yog Raj Sharma,** MD, **Rajvardhan Azad,** MD

Besides ocular trauma various vascular or hematologic disorders can cause circumscribed premacular hemorrhage at the vitreoretinal interface, leading to a sudden loss of vision. Spontaneous resorption of the blood entrapped in the subhyaloid space tends to be slow and may result in long-standing visual impairment. Table 1 shows common etiologies of subhyaloid hemorrhage. A small premacular hemorrhage of 1 disc diameter caused by Valsalva retinopathy can resolve within several months, whereas a dense preretinal hemorrhage resulting from diabetic retinopathy persisted for more than 1 year. In long-standing cases, the formation of an epiretinal membrane and macular traction has been observed, and early pars plana vitrectomy has been recommended.

Puncturing the posterior hyaloid face or internal limiting membrane by means of a pulsed Nd:YAG laser hyaloidotomy has been described as a viable alternative to vitrectomy as management for extensive premacular subhyaloid hemorrhage. This method enables drainage of entrapped premacular subhyaloid blood into the vitreous. Hence, the obstructed macular area is cleared and absorption of blood cells may be facilitated. Central vision is restored as early as 24 hours especially in traumatic cases. Complications related to the Nd:YAG laser hyaloidotomy are very few. Although Argon and frequency-doubled YAG laser can also be used for the procedure we prefer Nd: YAG for its better ability to disrupt tissues.

Procedure: The posterior segment contact lenses either volk transequator or quadrispheric can be used with topical anaesthesia. The patient should be explained the procedure in detail including not moving during laser hyaloidotomy and the possibility of a vitreous surgery required later on. The macular area is focused and the proposed site for puncture selected in the dependent portion of the hemorrhage, away from underlying fovea. The inverted view provided by these posterior segment contact lenses is to be noted. Laser settings required are; single pulse, power ranging from 2.0 mW to 5.0 mW and the posterior offset kept to minimum. The laser pulse is applied to the dependent site slightly inside the periphery of the circular mound so that sufficient blood lies between posterior hyaloid and retina and accidental retinal burns are avoided. A bead of blood appears at the site as the hyaloid is ruptured. A minute later one can observe the streak of blood dripping down slowly from the site. After a period of 30 to 60 minutes the whole macular area gets cleared off and visual acuity improves (non traumatic cases take longer time). The patient is advised propped up position and reexamined after a day or two. The importance of examining retinal periphery of any patient who has suffered from trauma cannot be overemphasized.



Traumatic Premacular Hemorrhage | **5 min after hyaloidotomy** | **24 hours after hyaloidotomy**

Traumatic Premacular Hemorrhage | **30 mins after hyaloidotomy** | **24 hours after hyaloidotomy**

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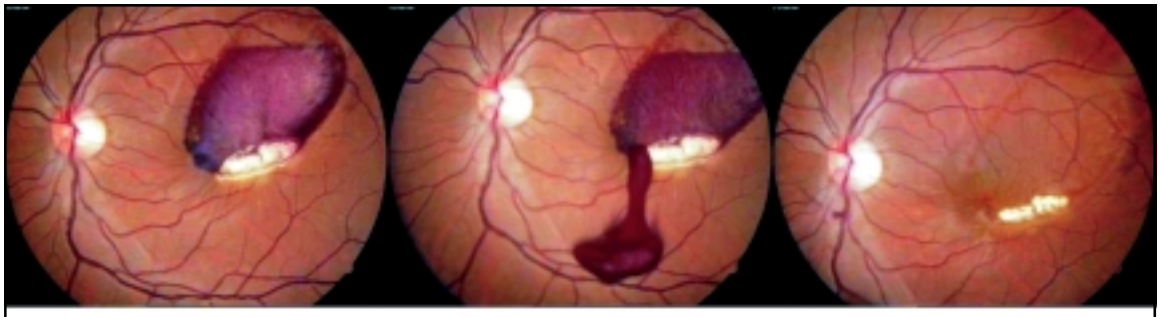
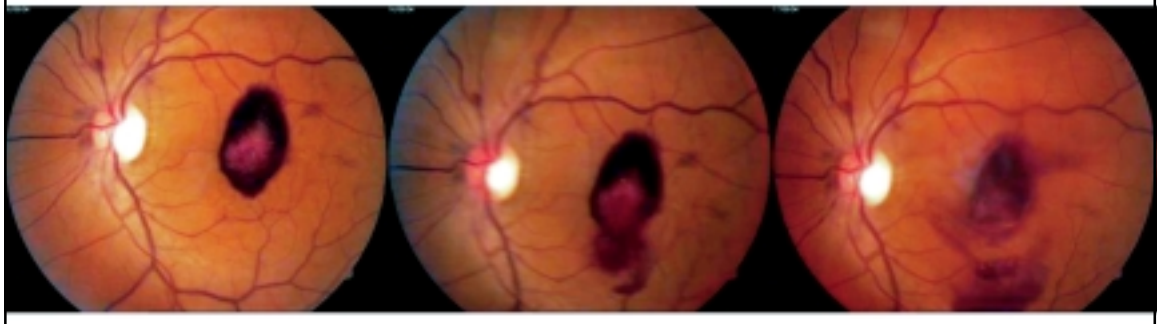


Traumatic case referred after failure with hyaloidotomy with green laser

Successful Nd: YAG hyaloidotomy, pictures after 15 min and 24 hours



Non Traumatic case of subhyaloid hemorrhage

Nd: YAG hyaloidotomy, pictures after 15 min and 24 hours: Blood persisting

Table 1

Common etiologies of Premacular subhyaloid hemorrhage		
Traumatic	Uniocular	Closed globe injuries
	Head injury	Terson Syndrome (associated sub ILM hemorrhage)
Non Traumatic		Proliferative Diabetic Retinopathy
		Choroidal Neovascular membrane
		Valsalva Retinopathy
		Retinal Artery macro aneurysm
		Retinal vein occlusion
		Blood dyscrasias
		Idiopathic

Reported complications include retinal/choroidal tears and or choroidal hemorrhage. The procedure is highly rewarding for traumatic subhyalod premacular hemorrhages of less than 1 week duration (figure1). The hemorrhages secondary to diabetic retinopathy or choroidal neovascular membranes usually don't get drained by Nd: YAG laser and it may be advisable to resort to pars plana vitrectomy for such cases (figure2b).

Nd:YAG laser hyaloidotomy is a safe and effective procedure. It achieves rapid resolution of premacular subhyaloid haemorrhage with restoration of visual function, preventing the need for vitreoretinal surgery.

Suggested Reading:

- Ulbig MW, Mangouritsas G, Rothbacher HH, Hamilton AM, McHugh JD. Long-term results after drainage of premacular subhyaloid hemorrhage into the vitreous with a pulsed Nd:YAG laser. *Arch Ophthalmol. 1998 Nov;116(11):1465-9.*
- Dori D, Gelfand Y, Erlik N, Miller B. Nd:YAG laser treatment for premacular hemorrhage. *Ophthalmic Surg Lasers. 1998 Dec;29(12):998-1000.*
- Celebi S, Kukner AS. Photodisruptive Nd:YAG laser in the management of premacular subhyaloid hemorrhage. *Eur J Ophthalmol. 2001 Jul-Sep;11(3):281-6.*
- Rennie CA, Newman DK, Snead MP, Flanagan DW. Nd:YAG laser treatment for premacular subhyaloid haemorrhage. *Eye. 2001 Aug;15(Pt 4):519-24.*
- Krohn J, Bjune C. Nd:YAG laser membranotomy for premacular haemorrhage. *Acta Ophthalmol Scand. 2004 Jun;82(3 Pt 1):316-9.*

Efficacy of Monocular Drug Treatment in Glaucoma

Shalini Mohan, MS, **Viney Gupta,** MD,
Ramanjit Sihota, MD, FRCS, FRCOphth (EDIN)

Intraocular pressure (IOP) is a dynamic measurement, which shows diurnal variation over time in both normal & glaucomatous eyes, influenced by aqueous humor dynamics. Glaucomatous eyes with reduced out flow facility experience large diurnal fluctuation that can vary from day to day & possibly seasonally. Here lies the challenge of ascertaining the effectiveness of IOP lowering treatment. How do we know whether treatment is successful in a glaucomatous eye, and the observed drop in IOP is therapeutic or spontaneous?

A Uniocular or Monocular drug trial addresses this clinical dilemma. The intent of the "One Eye Trial" is to assess the benefit of the medication in a given person while taking into account both spontaneous IOP variation & the wide response to IOP lowering medication among patients. (The fact is that some drugs are ineffective in an individual).

This procedure identifies agent effectiveness for an individual patient, identifies & prevents exposure to potential side effects. In a "One Eye Therapeutic Trial" a single agent is administered or discontinued, in one eye while the fellow eye remains on its previous regimen to act as a control [5]. An alternative drug is evaluated if the agent is ineffective or not tolerated; a trial period of 2-6 weeks is generally adequate. Such Monocular trials are employed specially in Ocular Hypertensives and Glaucoma Suspects.

This strategy is also used when a patient has used an eye drop for a long period of time & concern arises as to its continued efficacy. A "Reverse One Eye Therapeutic Trial" ([5] is performed in which the drug is discontinued in one eye & results are compared with those for the eye in which treatment is continued.

After administering an appropriate course of uniocular therapy, the difference of IOP from baseline, for the treated and untreated fellow eye, are calculated. The change in the untreated eye represents a spontaneous and therapeutic component. The inter–eye difference is assumed to represent the therapeutic change.

Points against the monocular drug trial are that this strategy is based upon several assumptions [3] -

1. Spontaneous IOP fluctuation between fellow eye pairs is symmetric over time.
2. An IOP lowering intervention in one eye does not alter the IOP of the fellow eye.
3. Fellow eye pairs respond similarly to the same IOP lowering therapy.

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1. **Spontaneous IOP fluctuation between fellow eye pairs is symmetric over time -**

For the uniocular trial to be effective, the spontaneous fluctuation in the fellow eye pairs must be equal, or the physician cannot infer (and correct for) the spontaneous component, and the observed change in IOP in the treated eye. An example is, a patient with an IOP of 21 mm Hg in both eyes. After 6 weeks of treatment with a topical drug in the right eye, the IOP is 15 mmHg in OD & 18 mmHg in OS. It is assumed that the spontaneous 3 mmHg decrease in the left eye also occurred in the right eye, thus leaving a 3 mmHg of therapeutic change in the right eye that is attributable to drug[3]. However clinical data suggest that IOP variation in fellow eye pairs is not as symmetrical and so the therapeutic effect of the drug cannot be mathematically evaluated.

Krupin et al[1] proposed that like all measurements, IOP demonstrates a regression towards the mean[6]. Hence obtaining several IOP measurements after initiating treatment is useful in determining spontaneous IOP fluctuation & subsequent efficacy of medical treatment.

2. **An IOP lowering intervention in one eye does not alter the IOP of the fellow eye -**

It is assumed that the drug applied to one eye does not change the IOP of its fellow. But the contralateral or crossover effect of various IOP lowering medication has been well established [3]. Analysis of data from the Ocular Hypertension Treatment Study showed that beta-blocker crossover effect in the fellow eye was of the order of 1.5 mmHg [2]. Realini et al [3] concluded that uniocular trial would underestimate the agents' true efficacy. Krupin et al[1] emphasized that crossover effect needs to be factored into the overall decision-making process & then the agent's therapeutic effect can be calculated.

3. **Fellow eye pairs respond similarly to the same IOP lowering therapy –**

A difference in aqueous dynamics between a patients eye can produce different responses to medication, even if the eyes have symmetric IOPs. Also asymmetry of pretreatment IOPs requires an adjustment for a greater magnitude of medication induced IOP reduction in the high

pressure eye[1]. Therefore it cannot be assumed that if a medication lowers IOP by a certain amount in one eye, the fellow eye will necessarily respond the same. Additionally, despite the suggestion that the fellow eye will respond similarly, Krupin & Yang [1] reported that the trial real value lies in its ability to determine medication efficacy in the treated eye.

Advantages – The one eye trial is beneficial when the ophthalmologists is adding medication as it is difficult to determine the aqueous humor dynamics and IOP response to multiple drugs and similarly when considering elimination of a therapy.

Conclusion

The uniocular trial is an efficient and effective way to determine the IOP lowering efficacy of glaucoma medication in clinical settings. Though there are limitations of One - Eye trials, there is no proof that they are useless. It is better to lower the patients IOP range to a target.

References :

1. Krupin T, Yang JW. The Uniocular Trial Myth; Discussion: Glaucoma Today: Sep –Oct 04; 20.
2. Piltz J, Gross R, Shin DH, et al. Contralateral Effect Of Topical Beta Adrenergic Antagonists In Initial One Eyed Trials In The Ocular Hypertension Treatment Study. Am J Ophthalmol. 2000;130;441-453.
3. Realini T, Fechner RD, Atreides SP, Gollance S. The Uniocular Drug Trial & Second – Eye Response To Glaucoma Medication .Ophthalmology. 2004; 111; 421-426.
4. Vicker WR, Realini T. Symmetry Of Fellow Eye Intraocular Pressure Responses To Topical Glaucoma Therapy. Poster presented at: the ARVO annual Meeting; April,29,2004; Fort Lauderdale, FL.
5. Gross RL. Therapy : Current Medical Management of Glaucoma; Ophthalmology by Yanoff M & Duker JS; - 2004(2) 1543.
6. Blend JM, Aetman DG. Regression towards the mean. BMJ 1994;308;1493.

Attention DOS Members

If you want to VOTE in the forthcoming DOS Election, Please ensure that your correct address (office and residential) is available in the DOS secretariat by February 15, 2005. Outstation members are not permited to vote in DOS Elections.

- Secretary, DOS

!!! Attention DOS Members !!!

DOS Executive nominated honorable ***Dr. Satish Sabharwal*** *as Chairman of the Election Commission for the next DOS election for the various posts to be held on 3rd April, 2005.*

The members of the Commission are
Dr. B.N. Khanna *and* ***Dr. (Air Marshal) M.S. Boparai***

Clinical Utility of OCT In Glaucoma

Tanuj Dada MD, **Parul Sony** MD

Although visual field assessment has been the gold standard for glaucoma diagnosis, it has been documented that upto 40% of the retinal nerve fiber layer may be lost before a defect is apparent on the visual field. The Ocular Hypertension Study (OHTS) showed that 55% of eyes that converted to glaucoma did not have a field defect but only structural changes in the optic nerve head. Identification of structural optic nerve damage is thus very important in the early diagnosis of glaucoma and in monitoring its clinical course. Until recently, assessment of the optic nerve and retinal nerve fiber layer (RNFL) has been largely subjective. Variability in the size and appear-ance of the optic disk of normal eyes complicates the detection of early glaucomatous optic nerve damage. Stan-dard techniques to diagnose and monitor structural change in glaucoma, have included serial stereoscopic photographs of the optic disk and monochromatic photographs of the RNFL. While these methods provide objective informa-tion for comparisons, the interpretation of photographs remains subjective, and variation in photographic assess-ment among even experienced observers is well documented.[1] Furthermore, qualitative assessment of photographs may not be sensitive to small changes over time, and it is difficult to pick up diffuse damage on these photographs. New technologies such as confocal scanning laser ophthalmoscopy (HRT), scanning laser polarime-try (GDxVCC), and Optical Coherence Tomography (OCT)[2] have become available that provide quanti-tative, reproducible, and objective measurements of optic nerve head and RNFL thickness.[3] The present article will focus on the principles of OCT and its role to diagnose and manage glaucoma patients.

Basic Principles of OCT

Optical coherence tomography is based on the principle of Michelson interferometry.[3] Low-coherence infrared (830nm) light coupled to a fiberoptic travels to a beam-splitter and is directed through the ocular media to the retina and to a reference mirror, respectively. Light passing through the eye is reflected by structures in different retinal tissue layers. The distance between the beam-splitter and reference mirror is continuously varied. When the distance between the light source and retinal tissue is equal to the distance between the light source and reference mirror, the reflected light from the retinal tissue and reference mirror interacts to produce an interference pattern. The interfer-ence pattern is detected and then processed into a signal. The signal is analogous to that obtained by A-scan ultrasonography using light as a source rather than sound. A two-dimensional image is built as the light source is moved across the retina. One can think of the image as a series of stacked and aligned A-scans to produce a two-dimensional cross-sectional retinal image that resem-bles that of a histologic section. This imaging method thus can be considered a form of in vivo histology. The newer Stratus OCT which we have at RP Centre (OCT 3; Carl Zeiss Inc, Dublin, California, USA) can be used in the absence of dilation in many individuals, and usually requires a 3-mm pupil for adequate visualization. An infrared-sensitive charge-coupled device video camera documents the position of the scanning beam on the retina.

The OCT image can be displayed on a gray scale where more highly reflected light is brighter than less highly reflected light. Alternatively, it can be displayed in color whereby different colors correspond to different degrees of reflectivity. On the OCT scanners currently commercially available, highly reflective structures are shown with bright colors (red and yellow), while those with low reflectivity are represented by darker colors (black and blue). Those with intermediate reflectivity appear green.

Current com-mercial scanners employ a low coherence super luminescent diode source (820 nm). The presently available model Stratus OCT (OCT 3) has a theoretical axial resolution <10 mm. Ultra-high resolution research OCT scanners use a titanium sapphire laser that has an ultrabroad spectral bandwidth centered at approximately 800 nm. With these light sources, axial resolution can be increased to 2 mm to 3 mm but these light sources are expensive and have a limited role in routine clinical applications.

OCT in Glaucoma

Optical coherence tomography provides high-resolution measurements and cross-sectional imaging of the retina, optic disc and the RNFL. For glaucoma applications, an operator-determined circular or linear path is scanned: around the optic disk to generate a series of 100 axial reflectance profiles. From these, a real-time two-dimen-sional tomographic image is constructed. The first reflection measurement is the vitreous-internal limit-ing membrane interface. The highly reflective interface posterior to this is the retinal pigment epithelium-photo-receptor interface. A threshold of reflectivity between the two is set as the posterior boundary of the

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RNFL. Retinal nerve fiber layer and retinal thickness are calculated from these landmarks. Average measurements are given for 12, 30-degree sectors. The depth values of the scans are independent of the optical dimensions of the eye, and no reference plane is required. Useful measurements in glaucoma patients are normally made along a circle concentric with the optic disk.

Clinical Uses

- To evaluate the RNFL for early (pre-perimetric)glaucoma detection
- To detect, study and follow the macular changes in hypotony induced maculopathy after glaucoma surgery.
- To evaluate cystoid macular oedema after combined cataract and glaucoma surgery and use of anti-glaucoma medications.
- To evaluate optic nerve head tomography in glaucoma patients.

Interpretation of RNFL Thickness Average analysis

OCT 3 offers a variety of RNFL thickness measurement and analysis protocols.

- **RNFL thickness protocol** (3.4mm): Acquires a scan with radius 1.73mm, centered on the optic disc.
- **Fast RNFL thickness protocol** (3.4mm): Acquires three fast circular scans. This is a time efficient scan alignment and placement is required only once.
- **Proportional circle**: This protocol allows measurement of RNFLT around the optic disc along a circular scan, the size of which can be tailored as per individual's need taking into account the size of optic nerve head.
- **Concentric 3 rings**: This protocol enables us to measure RNFLT along three equally placed default circular scans of 0.9mm, 1.81mm and 2.71mm radii. However the scan radius can be altered according to the need.
- **RNFL thickness** (2.27Xdisc): This circular RNFLT scan size is 2.27times the radius of the optic nerve head. This may help us to measure RNFLT with **accuracy is various disc sizes.**
- **RNFL** map: This protocol comprises of six circular scans of 1.44mm, 1.69mm, 1.90mm, 2.25mm, 2.73mm, and 3.40mm radii. This gives an overlay view of the RNFLT, around the peripapillary area.

Retinal nerve fibre layer measurement with a circular scan of 1.34 mm radius, centered on the optic nerve head has been shown to have a maximum reproducibility.

Mean RNFL thickness is calculated using the inbuilt RNFL thickness average analysis protocol **(Figure 1)**. For understanding purpose the RNFL thickness average analysis printout can be divided into various zones that include

1. Zone 1: Patient ID data.
2. Zone 2: Individual TSNIT curves for each eye presented in comparison with the age matched normative database.
3. Zone 3: Overlap of TSNIT curve showing a comparison of two eyes.
4. Zone 4: Circular diagram showing quadrant wise and clock hour wise distribution of average RNFL thickness in both eyes.
5. Zone 5: Data table; This table shows various ratios, quadrant averages, and difference among the quadrants and between the two eyes. Each value is marked in color to show its level of deviation from the normal values.
6. Zone 6: Red free photograph; B&W photographs of two eyes taken with the infrared camera are available on the printout. These denote the position of scan circle on the fundus.
7. Zone 7: Precentile distribution color coding; A small box denoting the color coding of percentile distribution of normative database is provided. White and green color representing the distribution within 95%, yellow color representing the areas of RNFL thickness below 5th percentile, and red color representing the areas of RFNFL thickness below 1 percentile. Similar color coding is applicable for the individual TSNIT curves also.

Average thickness: The average RNFL thickness along the entire circular scan.

Savg &Iavg (Superior average and inferior average): The Average RNFL thickness in the respective 90^0 of the circular scan

Smax & Imax(Superior maximum and inferior maximum): Maximum RNFL thickness recorded in the respective 90^0 quadrant of the scan

Max-Min: Difference between the maximum and minimum RNFL value along the circular scan.

The four ratios provided in the data table are self explanatory.

OCT3 also enables us to perform a RNFL thickness serial analysis can serially compare up to 4 scan groups and provide an overview of RNFL thickness change overtime.

Interpretation of Optic disc scan and optic nerve head analysis

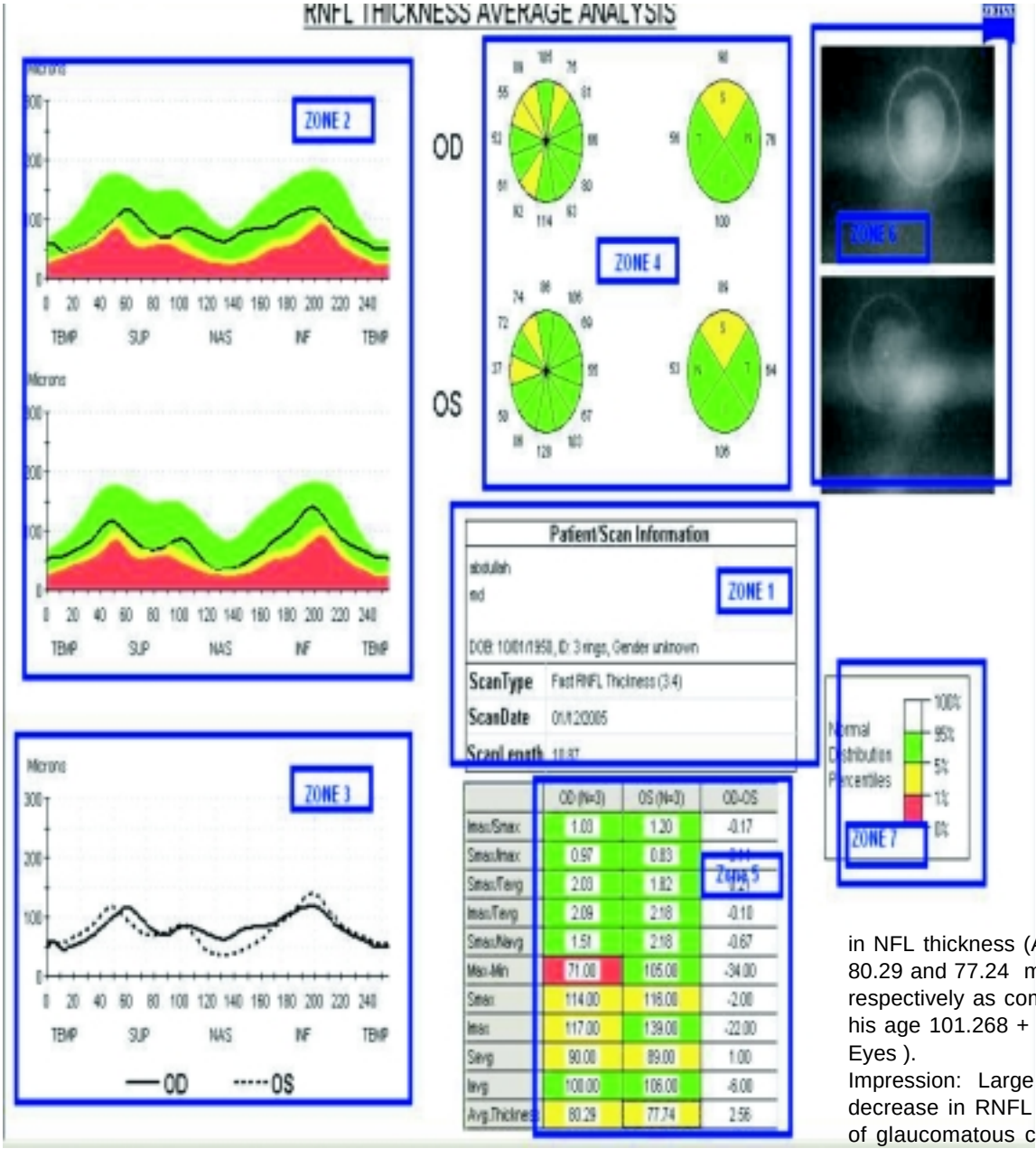

Figure 1
Cross-sectional imaging is vital in the analysis of RNFL thickness in vivo, particularly in differentiating healthy RNFL from glaucomatous RNFL.
This 54-year-old Indian male presents with enlarged optic disc cup OD with CD ratio of 0.7 :1 vertical and 0.8: 1horizontal.RNFL Thickness Average Analysis demonstrates typical triple-hump pattern and almost symmetrical loss in NFL thickness (Average thickness 80.29 and 77.24 microns OD and OS respectively as compared to normal for his age 101.268 + 8.84 microns (Indian Eyes).
Impression: Large optic nerve head with decrease in RNFL thickness suggestive of glaucomatous changes.

The newer version of the OCT, OCT 3 allows a detailed quantitative evaluation of the optic nerve head. It is provided with two scan protocols

- ***Optical disc scan*** consists of equally placed line scans 4 mm in length, at 30^0 intervals, centered on the optic disc. The number of lines can be adjusted between 6-24 lines.
- **Fast Optical disc scan** compresses six optical disc scan into one scan and acquire scan in short time of 1.92 seconds.

The optic nerve head (ONH) analysis and various ONH parameters are calculated using the inbuilt ONH analysis protocol. This analysis detects the anterior surface of the retinal nerve fibre layer (RNFL) and the retinal pigment epithelium (RPE). The cup perimeter is determined by automatic detection of the reference points. The inbuilt algorithm detects and measures all the features of disc anatomy based on anatomical landmarks, (disc reference points), on each side of the disc where the RPE ends. It locates and measures the disc diameter by tracing a straight line between the disc reference points. The cup diameter is measured on a line parallel to the disc line and offset anteriorly by 150 microns and various optic nerve head parameters are automatically calculated. These parameters include optic disc tomography included average disc area, cup area, rim area (disc area minus the cup area), vertical integrated rim area (VIRA), horizontal integrated rim width (HIRD), cup volume, average cup-disc ratio and horizontal and vertical cup-disc ratios.

Vertical integrated rim area (Volume): This estimates the total volume of RFNL tissue in the rim.

Horizontal integrated rim width (Area): This estimates the total rim area.

Rest of the measurements are self explanatory.

The ONH analysis print out can be divided into various zones that include

Zone 1: Patient ID data.

Zone 2: Gives the overview of ONH head analysis along with the composite image figure, contructed from all scans and all the important ONH parameters.

Zone 3: Individual radial scan analysis, along with scan image it gives the disc diameter, cup diameter, rim area, and rim length in that particular meridian.Overlap of TSNIT curve showing a comparison of two eyes.

Zone 4: Red free photograph; B&W photograph of the optic disc taken with the infrared camera is also available on the printout.

Advantages

- Optical coherence tomography provides objective, quantitative, reproducible measurements of the retina and RNFL thickness.
- In contrast with other imaging techniques, direct measurements of the RNFL are calculated from cross-sectional retinal images.
- Measure-ments are not affected by refractive status, axial length of the eye, or the presence of early-to-moderate nuclear sclerotic cataracts.
- Structural information is independent of any arbitrarily defined reference plane.
- A single device gives information about the macula, optic disc and retinal nerve fiber layer.

While OCT provides an objective measurement of nerve fiber layer structure, its clinical use in the early detection and follow-up of glaucoma patients is still under evaluation.

Disadvantages

- As with other ocular imaging tech-nology, high cost currently precludes generalized use of the OCT.
- The presence, of posterior subcapsular and cortical cataracts impairs performance, and pupillary dilation is required to obtain acceptable peripapillary measurements.
- Optical coherence tomogra-phy images contain significantly fewer pixels than both SLP and CSLO. Recent evidence suggests that increasing sampling density of OCT scans from ’25 points/quadrant to 100 points or more/quadrant provides a less variable representation of RNFL thickness.[15]
- The fol-low-up for glaucoma requires change analysis techniques that require further development and testing.

Normative Indian Data

Tewari et al[4] determined the normative values for macular thickness and volume by Optical Coherence Tomography (OCT 3) in healthy Indian subjects. They evaluated the macula of 170 consecutive, randomly selected normal subjects who was imaged on OCT 3 in this cross-sectional study. OCT parameters of macular thickness were analysed with baseline variables including age, gender, axial length and refractive error. The average foveal thickness in the population under study was 149.16 +/- 21.15 micro. Macular thickness and volume parameters of OCT correlated significantly (Pearson’s Correlation coefficient) with age ($r=0.23$, $P<0.01$), but not with gender, axial length and refraction.

Sony et al[5] quantified the retinal nerve fibre thickness in normal eyes with OCT. They studied 146 eyes of 146 patients. The average RNFL thickness in this sample population was 104 + 8.51 microns (95 % CI 87.25 – 121). The RNFL was thickest in inferior quadrant, followed by the superior quadrant, and progressively less in nasal and temporal quadrant. The RNFL was significantly correlated with age but not with gender.

Anterior Segment Optical Coherence Tomography

ASOCT is a new imaging technique for imaging the anterior segment of the eye. It uses a superluminescence diode with an infrared wavelength of 1310 nm. It provides in vivo and high-resolution, cross-sectional imaging of the anterior chamber angle and the ciliary body. OCT being noninvasive can be used in postoperative eyes for assessment of the trabeculectomy site, anterior chamber angle and ciliary body, in addition to evaluation of primary angle closure glaucoma and various other secondary glaucomas. This facility is not available with the conventional OCT machine that is available with us.

References :

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3. Bowd C. Zangwill LM, Berry CC, et al. Detecting early glaucoma by assessment of retinal nerve fiber layer thickness and visual. function. Invest Ophthalmol Vis Sci 2001;42: 1993-2003.
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Floaters and Flashes

Jaswant Arneja, MS (Ophth.)

Presentation of patients with complains of floaters & flashes is a common feature in eye OPD. Patient may complain of "spots", "flies", flashes or a "cobweb" in front of eye. Present article is an attempt to review the possible causes of floaters. Accurate diagnosis can help to select a suitable line of intervention and management.

Causes of Floaters:

Mechanical: Posterior vitreous detachment (PVD) & Retinal tear.

Vascular: Vitreous haemorrhage.

Inflammatory: Intermediate & posterior uveitis.(Pars Planitis, Sarcoidosis,Toxoplasmosis)

Neoplastic: Infiltrates, leukemia

Idiopathic: Muscae volitantes.

Both Retinal Tear and PVD are common and both may present in the same way. In the absence of obvious alternatives, it is important to exclude a retinal tear.

History

The following are important points in evaluating the history.

Establish that **spots are floaters** by asking if spots have a motion independent of eye Movements. Vitreous opacities will move with the eye but will continue to move from inertia when the eye stops. Ascertain the **shape and size** of the spots. Large spots are usually clots. Small spots are cells, which may be white blood cells (WBC), red blood cells (WBC), or pigment cells. Filaments, "cobwebs", or ill defined shapes are usually elements on posterior vitreous face or in the gel. **Onset**: sudden onset in a matter of minutes or seconds usually means a PVD, retinal tear, or a haemorrhage. If floaters appear after flashing lights, a retinal tear must be excluded. Inflamatory cells are built slowly.

Duration: myopic patients will have had similar floaters for a long time. Ask about current **systemic disease**, for example, **diabetes** and systemic **hypertension** are strongly associated with vitreous haemorrhage and sarcoid with ocular inflammation.

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Delhi.

Other known ocular conditions may explain the symptoms, for example, myopia for Muscae volitantes, vein occlusion for neo vascularisation, and toxoplasmosis for choroiditis.

Examination: Key manouvres in examination are:

Check **visual function** (which should have been done in the beginning) and cross check by doing relative afferent pupil response, especially if media are little cloudy and vision is reduced.

Look at the **red reflex** with a direct ophthalmoscope-opacities stand out in silhoutte.

Slit lamp biomicroscopy: Look at the anterior vitreous for cells- RBC and pigment cells are often difficult to differentiate although pigment cells tend to be bigger & look like "tobacco dust." RBCs seldom occur without a trace of frank blood in the retina or vitreous especially inferiorly. Look for the presence of a PVD. Look at the posterior vitreous face with a + 90D (or 78D) lens & look for a Weiss ring, which confirms a PVD.

Examine the **peripheral fundus** with a binocular indirect ophthalmoscope for complete inspection of the periphery for any retinal tear-with indentation, if necessary.

Inspect any suspicious areas with the three mirror lens, which gives better magnification, but does not go as far to the periphery. Look at the fellow eye for bilateral disease.

Perform **ultra sonography,** if visualisation is poor.

Posterior Vitreous Detachment

Patient is usually in age 50 years and over, although could be younger if myopic.

Symptoms: **Flashing lights** on rising or in the dark. Usually unilateral or may be bilateral. Seen as "arcs" or crescents and could be in any field; the position of flashing has no localizing value. Patient may find these spots often difficult to describe but dramatic and alarming to him. Less dramatic forms tend to be recurrent (if vitreous detachment was incomplete). Floaters are described as spots or a spider.

Slit lamp biomicroscopy with a + 78/90 D lens reveals a **Weiss ring** on the posterior vitreous face; which confirms PVD.

Associations: Myopia, or Blunt trauma.

Differential diagnosis:

Retinal tear with or without detachment, Retinal degeneration (ARMD), Migraine with typical history and negative on examination, Retinal neovascularisation with small haemorrhages, Vitritis with history of uveitis and non pigmented cells.

Retinal Tear

Symptoms: May be indistinguishable from PVD. Floaters are more often pronounced, if there is lot of blood. Often, flashes cease when floaters appear.

Signs: Pigment sells in vitreous. Blood in inferior vitreous or inferior part of vitreous. Haemorrhage at the edge of tear. Visible tear often "U" or tongue shaped; are examined with an indirect ophthalmoscope.

Associated features include Myopia, previous tear or detachment in the fellow eye.

Muscae Volitantes: Vitreous Opacities

This is a common complaint in patients with moderate to high myopia. Symptoms usually start at an early age and may worsen with time. This is due to fluid vitreous or syneresis, which is liquification of vitreous followed by cavitation & the ability of myopic individuals to form images of small opacities within the eye.

Inflammatory Cells

Causes: Intermediate uveitis **(Pars planitis)** & Posterior uveitis or choroiditis.- Syptoms & signs(common to both) are-Non specific reduction of vision by varying amounts, Floaters of insidious onset, Occasional discomfort, May have associated anterior uveitis

Inermediate uveitis (s/s): Lumps of fluffy material or **"snow ball"** deposits on inferior retina or pars plana; or "snow bankink". Peripheral vascular sheathing or periphlebitis,

Cystoid macular edema. **Posterior uveitis** (s/s): Focal scars may be visible in localized choroiditis, away from macula. Inflammation may be dense and recurrent but vision may not be greatly reduced. Diffuse inflammation may leave no scars, Disc edema in long standing cases.

Anterior uveitis may not present with floaters as the predominant symptom. An intermediate uveitis or panuveitis may have anterior chamber signs.

Investigations for intermediate and posterior uveitis:

First line tests should include: Full blood counts, ESR, Serum calcium,

Angiotensin converting enzyme, Toxoplasmosis titre, Antinuclear factor (ANF),

RPR+ fluorescence treponema antibody absorption (FTA-Abs), X-Ray chest

Other tests should then be used to identify the common causes of intermediate or posterior uveitis-sarcoidosis.toxoplasmosis,TB,syphilis,SLE

More esoteric tests can be used later to identify less common causes which include-

Bachet's disease, multifocal choroiditis, toxocariasis, fungal infections, Whipple's disease & VKH syndrome.

Sarcoidosis

In sarcoidosis, vision is decreased by varying amounts & floaters cause discomfort.

Symptoms of anterior uveitis: pain, photophobia, redness; & signs of granulomatous uveitis: mutton fat keratic precipitates, vitritis, yellow deposits("candle wax drippings"), and retinal vasculitis may appear.

Less specific features include granuloma of conjunctiva, iris, and optic disc; retinal neovascularisation, disc edema, retinal hemorrhage, and cystoid macular edema.

Extra ocular involvement affects cause hilar lymphadenopathy. It may effect salivary glands, facial nerve or CNS. There may be erythema nodosa, hepato spleenomegaly or bone marrow cysts.

Investigations needed are: Chest radiograph for hilar lymphadenopathy, Angitotensin converting factor in serum, Calcium levels in serum (raised in bone involvement), Purified protein derivative for anergy (in 50% cases of sarcoid), Conjunctival or lymph node biopsy.

Management:

Treat anterior uveitis with topical steroids, mydriatics & cycloplegics.

Posterior uveitis is treated according to level of vision and progression of disease.

Treatment is by systemic steroids or by orbital floor injection (short term).

Side effects of steroids should be explained to patient.

Toxoplasmosis

This is primarily a retinitis but the choroid is invariably involved. The age group is chiefly young adults.

Symptoms and signs: Floaters and varying degrees of diminished vision. If macula is involved, the vision may be profoundly effected. Active lesions look yellow-white and have a fluffy edge They look like a "scooter Head Light in a fogged atmosphere". They may be adjascent to an old scar or arise de novo. Inlammatory cells in the vitreous, anterior chamber cells and flare are occasional.

Investigations:

Differentiate from other forms of posterior uveitis, for example, TB, sarcoidosis

Serum anti toxoplasma antibody titres,

Serum IgM antibody levels- positive in current infections,

Dye test, if confirmation needed.

Treatment: Topical steroids and cycloplegiscs, Cotrimoxazole 960 mg twice daily is an alternative substitute for sulphadiazine (Tab Septran 2 BD and folic acids), Prednisolone by mouth may added after starting antibiotic treatment.

Vitreous Haemorrhage:

Symptoms and sign include Black worm like floaters or spots. It may be preceeded by flashing light. There may be varying degrees of reduced vision depending on the density of haemorrhage. Blood in the vitreous varies according to the severity, ranging from a few cells in the anterior vitreous to a blood filled cavity with no fundus view. In general, Mild cases give a hazy view, Moderate amounts produce clumps seen as black silhouettes on retro illumination or as sheets lying inferiorly, Severe cases will loose the red reflex & RBCs may be seen in the slit lamp.

Causes can be:

Retinl tear (rarely PVD without tear),

Retinal new vessels, for example, proliferative diabetic retinopathy, old branch retinalvein occlusion(BRVO), sickle cell disease, and Eale's disease.

Sub retinal neovascular membrane in age related macular degeneration (ARMD), where blood has broken through the retina, Intra ocular tumours, Systemic hypertension,

Bleeding disesases, Sub arachnoid haemorrhages (Terson's syndrome)

Management: This depends on the cause:

Slit lamp examination for rubeosis,

Look for the clues from the other eye (dilate both pupils for funduscopy)

Simple base line investigations include BP, BM stix in urine, full blood count.

Stop aspirin ingestion and do international normalized ration if on warfarin

B-sacan if no fundus view isvisible.

Bed rest with slit spectacles for 4-48 hours if laser may be possible in vasoproliferative cases.

Treatment:

Retinal break- laser coagulation or cryo therapy. For Retinal detachment- surgical repair

Proliferative retinopathy- laser when view permits.

Tumour- enucleation, radiation or cryotherapy.

ARMD- PDT or TTT.

No view of fundus- follow with B-scan.

Vitrectomy is indicated in–

Persistant haemorrhage of more than 6 months, Haemorrhage with tear or detachment, haemorrhage with rubeosis, haemorrhage with known proliferative retinopathy where haemorrhage is not clearing after 3-4 weeks.

Monthly Meetings Calendar For The Year 2004-2005

1st August, 2004 (Sunday) Army Hospital (R&R)
29th Auguest, 2004 (Sunday) Sir Ganga Ram Hospital
6th November, 2004 (Saturday) *Rescheduled :* Hindu Rao Hospital
30th October, 2004 (Saturday) R.P. Centre for Ophthalmic Sciences
21st November, 2004 (Sunday) DOS Midterm Conference
27th November, 2004 (Sunday) Dr. Shroff's Charity Eye Hospital
18th December, 2004 (Saturday) Venu Eye Hospital & Research Centre
29th January, 2005 (Saturday) Safdarjung Hospital
26th February, 2005 (Saturday) M.A.M.C. (GNEC)
27th March, 2005 (Sunday) Mohan Eye Institute
2nd & 3rd April, 2005 (Saturday & Sunday) Annual DOS Conference

Goldmann Visual Fields - Part I (Basics)

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Introduction

Visual field is a three dimensional area that can be seen around an object of fixation. The extent of normal visual field is with a 5mm white color object is 60° superiorly, 70°-75° inferiorly, 60° nasaly and 100°-110°˜ temporally. The field for blue and yellow color is 10° less and for red and green color is 20° less than that for white color.

Perimetry

It is the procedure for estimating the extent of visual fields. It is of 2 types:

(a) Kinetic perimetry.

(b) Static perimetry.

Kinetic Perimetry

In this technique stimulus of known luminance is moved from periphery towards the center to establish isopters. It can be done by

1. Confrontation method.
2. Lister's perimetry.
3. Tangent screen scotometry.
4. Goldmann's perimetry.

Static Perimetry

This method involves presenting a stimulus at predetermined position for a preset duration with varying luminance. It includes

1. Goldmann's perimetry.
2. Friedmann's perimetry.
3. Automated perimetry.

Methods for Estimation of Visual Fields

A. Peripheral Field Charting

It is done by - Confrontation method.

-Perimetry: Lister's, Goldmann's, Automated.

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B. Central Field Charting

It is done by - Campimetry/ Scotometry.

- Goldmann's
- Automated field analysis.

Goldmann's Perimetry

Goldmann's perimeter is one of the common devices providing standard and reproducible patterns of peripheral visual fields.

Preperation for Goldmann's Perimetry

A . CALIBRATION OF THE PERIMETER

Calibration of perimeter should be a routine morning task and is done as outlined in the manual provided with the perimeter. The target and the background luminance are calibrated primarily.

B. CALIBRATION OF THE SUBJECT

This aims at providing proper refractive correction to the subjects before the actual test is performed. The correction is mainly given for near and is most important when central fields are charted.

Refractive correction can be given in the form of:

(a) Spectacles: It is usually not the preferred modality, because variability in the shapes of the frames makes it difficult to know where different frames obscure field of vision.

(b) Contact lenses.

(c) Lens holder of the perimeter with proper refractive correction.

Table 1: Presbyopic correction

Age (in yrs)	Near correction (Diopters)
30-39	+1.00
40-44	+1.50
45-49	+2.00
50-54	+2.50
55-59	+3.00
>59, aphakics	+3.25

However, correction is usually not required for large targets detected outside central 20°, but poorly focused small targets have diffuse fainter images which create an artificial shrinkage and alteration in shape of the central isopter charted require correction.

Thus, when following a patient of field defect over time, a refractive change may bring about qualitative change in the appearance of field in form of generalized constriction and shape alteration.

C. Placement of the Subject

The purpose and procedure of the test is explained to the patient. The patient is then positioned on the machine such that the chin is placed on the chin rest and forehead is apposed to the forehead bar. The occluded is then used to occlude one of the eye of the patient and the chin rest is adjusted vertically and horizontally, until the patient's viewing eye is centered in the crosshairs of the telescope, so that the fixation is easily monitored while the test is being performed.

The perimetry is of the normal eye is followed by the diseased eye as the usual protocol. The patient is constantly advised to fixate on small white spot in the center of the telescopic screen. It is also stressed to the patient that they should press the button as soon as they have a faint glimmer of light and not wait for a sharp crisp view of the target. The test is routinely done at a back ground illumination of 31.5 asb (apostilbs) and the distance between white bowl from the center of cornea is 33 cms.

Strategy for Goldmann Perimetry

A. Targets

The Goldmann perimeter has manual controls that can change the size and brightness of the targets. The diameter (in mm) and area (in mm^2) of each target size is depicted by Roman numerals . There is doubling of the diameter of the targets from one size to the immediate next higher size. The brightness is controlled by levers marked by letters and Arabic numerals. The lever with Arabic numerals changes brightness by 5 db for each shift, and the letter lever changes it by 1 db.

Table 2 : Goldmann Target sizes

Name	Diameter (mm)	Area (mm^2)
0	0.28	0.0625
I	0.56	0.25
II	1.13	1
III	2.26	4
IV	4.51	16
V	9.03	64

Various combinations of target size and brightness provides the user with a wide range of targets that can be used. The increase in size of a target is equivalent to effect to increase in the brightness. Thus II4e is equivalent to III3e or IV2e. However, this principle does'nt work out in practical exactly.

Relationship of intensity (I) and Goldmann target brightness is shown in Table 3.

Table 3

I (in asb)	Brightness	I (in asb)	Brightness
13	1a	126	3a
16	1b	158	3b
20	1c	200	3c
25	1d	251	3d
32	1e	316	3e
40	2a	398	4a
50	2b	501	4b
63	2c	631	4c
79	2d	794	4d
100	2e	1000	4e

B. Choice of Targets

The Goldmann strategy usually invoves charting three isopters in the visual field. The aim is to map farthest extent of the field of vision with the largest brightest target (V4e) and use a faint target which is perceived at or just within central 30° field (I2e) and another that produces an isopter lying in between the above two isopters (I4e). The choice of targets also varies according to the situation for example if a defect involves central or paracentral area 03e target can be added.

C. Target Presentations

It can be done by two methods:

(a) Kinetic (moving) method.

(b) Static (stationary) method.

As the name implies, with the *kinetic* targets the procedure is to move targets from an invisible area to a location where the patient reports seeing the target for the first time. The speed of movement is 2°-3°/sec. The procedure is repeated at spaced intervals 360° around the eye and at the end isopter is formed by connecting all the points charted at regular spaced intervals. These points are considered to represent common kinetic threshold (*KINETIC ISOPTER*)

Static presentations can be performed by manual

perimetry. The targets are presented in this method by two different principles:

(a) *Static threshold principle*: This principle involves gradual increase in the illumination of a preset target at a point in the visual field, until it is perceived. However, this method is too cumbersome and time consuming.

(b) *Static suprathreshold principle*: This principle is employed after mapping kinetic isopter. It assumes that the target should be visible anywhere with in the kinetic isopter charted except at the physiological blind spot (physiological scotoma). If the patient is unable to see the target presented anywhere within the kinetic isopter, there is a scotoma that needs further exploration. The kinetic strategy is used to define boundaries of the scotoma.

For central fields central static threshold is identified, following which the brightness of the targets is increased by 2db and points of equal eccentricity are tested.

In nutshell, kinetic isopter charting is the hallmark of manual perimetry. Static principle, however aid in detection of scotoma with the kinetic isopter defined and also reveals distortions within the isopter.

D. Mapping of an Isopter:Armaly Drance Technique

For each eye, three targets are chosen, and for each target kinetic strategy is used with a similar number of locations in each quadrant. Following the mapping of kinetic isopters , the smallest kinetic target(suprathreshold for 25°) is flashed within the central 10°, once in each of the quadrants, as a static suprathreshold strategy to exclude central defect. In the region between isopters, the target used to map peripheral and larger isopters can be flashed as a similar suprathreshold strategy to exclude peripheral scotomas. Thus to conclude Goldmann strategy uses kinetic strategy for peripheral fields and static targets for central field mapping.

Blind spot is plotted using I-target size usually I4e or I2e target. It is done by turning off the target and placing it 15° temporal to the horizontal meridian and then turning it on ,while monitoring fixation of the patient. If the patient reports seeing it. The target is turned off and is moved laterally or vertically a few degrees, and presented again, checking to make sure that fixation is true. Once the patient fails to see the target, it is the blind spot. The target is moved until the patient sees it, then it is placed back in the blind spot and moved again in another direction until the patient sees it there too, and so on, until the horizontal and vertical extent of the spot has been determined. Inability to plot the blind spot is a sign of poor fixation.

Advantages

- Tests full extent of patient's field.
- Better for mapping shape of defects.
- Can be carefully tailored to pathology.
- Can be used in patients with poor vision.
- Has a human interface, thus easier for the patients.
- Fixation of the patient is always under check, the test is stopped if the patient fails to concentrate.

Disadvantages

- Cumbersome and time consuming.
- Requires highly trained personnel.
- Doesn't provide with numeric data for comparing the patient with normative data base.
- Less sensitive for subtle visual field defects.
- Inter observer variation.
- Central field charting is not fully reliable.
- Doesn't permit comparison of numeric data from one examination to the other.
- Inbuilt data record/ saving system not available

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Newer Glaucoma Surgery :

Non Penetrating Deep Sclerectomy

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Trabeculectomy as described by CAIRNS remains the gold standard surgical procedure for advanced glaucoma, when medical and laser treatment fails to control IOP. However this fistulising procedure may have several potentially severe complications like intra operative or post operative bleeding, flat anterior chamber caused by excessive filtration, choroidal detachment and long term complications such as cataract formation & late bleb related endopthalmitis. Several non penetrating surgical techniques have been devised. Koslov, Demailly, and Mermoud performed " deep sclerectomy" a non perforating filtering procedure with implantation of porcine collagen. Zimmerman and Arenas described an "ab externo" trabeculectomy with aspiration of the floor of the schlemm's canal and the juxtacanalicular tissue. Viscocanalostomy (VCS), described by Stegmann, consist in deroofing the Schlemm canal and after preparation of a thin corneal "window" formed by the Descemet membrane, injecting Healon GV in to the ostia. The common denominator of all these surgical procedures is the creation of new facilitated outflow pathways without penetration in to the anterior chamber.

Various non perforating surgical techniques are:—

1. Abexterno trabeculectomy
2. Deep sclerectomy
3. Viscocanalostomy

It is commonly indicated in chronic primary open angle glaucoma while it should be avoided in Angle closure glaucoma, post traumatic, uveitic, Neovascular glaucoma, dysgenetic glaucoma, & patient who needed combined procedure.

1. **Ab externo trabeculectomy -** Zimmerman & Arenas described an Ab externo trabeculectomy with aspiration of the floor of the schelmms canal & juxtacanalicular tissues. They attempted to create an artificial aqueous drainage without entering the anterior chamber of the eye. He employed a microdiamond drill in order to unroof schelmm's canal & avoid the risk of accidental perforation of the anterior chamber which is one of the most frequent complication of non-penetrating filtering operations.The anterior chamber is first unroofed by dissection of a deep scleral flap, with the drill the surgeon achieves a micro communication of the floor (inner wall) of schelmm's canal to the anterior chamber . The aqueous humour in schelmm canal begins to pour out. Then the surgeon drills out the microscopic layer of diseased endothelium that makes up the floor of schlemms canal which constitute the site of greatest resistance to out flow. The presence of several layer of very thin trabecular fibres between the opened schlemms canal and the anterior chamber protects the integerity of anterior chamber & prevent herniation of the iris. The aqueous filter through the remaining trabecular meshwork toward a sub conjunctival bleb.

2. **Deep Sclerectomy** - Kaslov, Demailly & Mermoud performed deep sclerectomy with implantation of porcine collagen.

Procedure

Limbus based conjuctival flap & the dissection of a superficial scleral flap reaching 1mm in to the clear cornea is made. A triangle or rectangle of deep sclera is then resected (4x4mm) leaving only a thin layer of sclera over the ciliary body posteriorly & opening the external wall of schlems canal anteriorly. The corneal stroma is also excised leaving the Descemet's membrane intact. The main outflow occur at the level of the anterior trabeculum & descemets membrane. The mechanism of aqueous outflow bipasses the juxtacanalicular meshwork (inner wall of schlems canal) which is the site of maximum resistance to aqueous out flow.To maintain the patency of the created intrascleral space, an implant may be used. Collagen implant which is dissolved within 6-9 months is sutured radially over the remaining trabecular mesh work & Descemet's membrane.

Other implants used are

- Reticulated hyaluronic acid implant (absorb in 3 months)
- T-shaped hydrophilic acrylic implant (non absorbable)

Deep sclerectomy is an operation that has a slow & difficult learning curve. During the learning period, perforation of the AC is the main complication.

The main advantage of the procedure is obtaining a filtering procedure without entering the anterior chamber. This is to reduce the occurrence of complications such as hypotony, anterior chamber inflammation .

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Success rate is lower than conventional trabeculectomy in term of IOP Control. Some patients required post operative goniopuncture with Nd-YAG laser at the surgical site. If the IOP is greater than 20mm Hg-Goniopuncture was performed only once in these eyes by a Nd- YAG laser. Three to six spots with an intensity of 5-8 mj were placed at the site of the Descemet's window through a goniolens permitting to perforate that membrane. If the IOP is not lowered below 20mm Hg then hypotensive drugs may be added to lower IOP.

3. **Viscocanalostom**y - Viscocanalostomy (CVS) is carried out by performing a deep sclerokeratectomy allowing us to create at the level of the peripheral Descemet's membrane a thin corneal "window" aqueous humor may percolate through this corneal window and reach the unroofed schlemm's canal, thus shortcutting the trabeculum and the juxtacanalicular tissue. High-viscosity sodium hyaluronate is injected into the ostia of the schlemm's canal to enlarge the later locally. A second site of injection of sodium hyaluronate lies between the superficial scleral flap and the deep scleral bed to display potent anti-inflammatory properties. An intrascleral "cavum: is formed in between these two layers. The aqueous humor accumulates there before reaching the schlemm's canal and the collecting channel, or diffusing through an uveoscleral outflow pathway.

The Fornix based conjuctival flap is made & diathermocautery for hemostasis of the episclera is avoided and a site with at least one apparent collecting channel is chosen 5x5mm limbal based triangular or parabolic half thickness scleral flap was dissected deeply in to clear cornea; 1.5mm from the limbus. By using a specially designed scleral knife a second, deep scleral flap is dissected close to the ciliary body ; when reaching the schlemm's canal it is unroofed by gently pulling on the scleral flap & concomitantly peeling the fibrotic lining from the bottom of the canal by means of a triangular cellulose sponge, avoiding microperforation. This same procedure is continued in to a cleavage plane between the corneal stroma & the Descemet's membrane, creating a corneal "window". As soon as the "window" is created seeping of the aqeous humour through the remaining peripheral Descemet's membrane, is usually observed.

A 150 micron canula or viscocanalostomy canula is then inserted in to the ostia of the schlemm's canal & Healon GV is gently injected inside . The deep flap is excised with micro scissors & the superficial flap surtured with 4-5 separate 10-0 nylon sutures. Healon GV is injected under the flap, the conjunctival layer is sutured using 2 separate 10-0 Nylon suture. Subconjunctival injection of Vancomycin 25 mg or Gentamycin 0.5cc is administered in the inferior fornix.

By avoiding perforation into the anterior chamber, no secondary aqueous humor is drawn and no postoperative inflammation is initiated. Therefore, no pupillary dilatation is needed, allowing for a rapid recovery of central vision. NO bleb related problems have been recorded following VCS. The Superficial scleral flap is closed tightly with 4-5 separate nylon sutures, and no antimetabolites are used to enhance bleb formation, no endophthalmitis has been reported after VCS. This may suggest that the presence of a filtering bleb after VCS represents a risk for potential failure.

Viscocanalostomy provide an overall success rate of 88% & a complete success of 59% at 3 yr after surgery. By adding one topical hypotensive agent the overall success rate increases to 94% at 6 month. Nevertheless, considering the minimal rate of immediate or longer term post operative complication & the preservation of visual function. The best indication for VCS appears to be a previously unoperated eye because the major risk factors for failure are many previous surgical procedures. Eyes needing very low pressures (<12mm Hg) would probably need additional hypotensive therapy.

Minitrabeculectomy (Modification of Cairns Trabeculectomy)

Several postoperative complications are not infrequently associated with the Cairns trabeculectomy. Therefore several modifications of this procedure have been proposed, recent among them is the nonpenetrating approach of either the deep sclerectomy or the viscocanalostomy. Reduced rate of the aforementioned complications have been reported following the modified procedure. Nonpenetrating approach is not more successful but rather safer than the classic trabeculectomy. Other limitations of the nonpentrating approach include its contraindications in various glaucoma conditions, including eyes with narrow chamber angle, as well as the relatively wide dissection of the conjunctiva. A modification of Cairns trabeculectomy, the minitrabeculectomy, a procedure that is applicable to practically all glaucomatous eyes requiring surgery. It offer clinical & technical advantages over the standard trabeculectomy, was generally efficacious and relatively safe. The patient with neovascular glaucoma, high risk of filtering bleb scarring or broad conjuctival scar should be avoided.

Procedure - The surgical procedure consists of a small 3mm fornix based conjuctival flap. The deep subtenons inj. of 0.5-1ml of bupivacaine 0.5% through this opening is also directed to inflate the adjacent subconjuctival space to reduce post operative resistance to outflow. There after light diathermy is applied to bleeding vessels & to the scleral area to be dissected. A Scleral incision 1/3-1/2 of its depth, 1mm from the limbus is created involving the 3mm

of the exposed sclera. A crescent shaped diamond knife is then introduced through the scleral incision & advanced in to the corneal lamellar for approximately 1mm. The corneoscleral tunnel made with sclerocorneal pocket of 3mm in length and 2mm in width (from scleral incision to cornea) . The AC entered centrally & complete the 3mm corneal incision by moving the Knife parallel to the iris surface nasally & temporally. A viscoelastic substance is then injected intracamerally adjacent to the surgical wound, a 1mm punch is introduced in to the AC & Corneotrabeculectomy is carried out. A Spontaneous aqueous outflow through the scleral incision is detected ; otherwise the punch is reused, posterior to its first dissection. After peripheral iridectomy one or two 10-0 nylon sutures is applied at the scleral incision. The tightness of the sutures is directed to reach the point where no further aqueous flow is detected but just beyond the point where flow could be detected. (No paracentesis is carried out and the viscoelastic substance is not washed out of the AC). The Conjuctival flap margin should be tight enough by suturing with 10-0 nylon suture to avoid post slippage. At the conclusion of the operation, a mixture of antibiotics & corticosteriods is injected subconjuctivally at the inferior fornix. The patients are followed up daily during 3 to 4 hospitalization days after surgery and at one week & frequently during the first postoperative month until target IOP is achieved, the filtering bleb site is not hyperaemic, & signs of inflammation in the anterior chamber are not detected. Subcunjuctival injection of 5mg 5 FU were injected 180^0 away from the surgical site, if increased vascularity at the bleb site, marked reaction in the chamber & signs of imminent bleb scarring are detected . Needling of the filtering bleb is carried out when signs of imminent bleb failure are evident despite argon laser suture lysis & 5 FU injection If these interventions fail to achieve the planned target IOP then hypotensive medications are indicated.

A small area of scleral dissection 3x1mm with diminished conjunctival dissection and the avoidance of radial incision may decrease bleeding, post operative inflammation and thus the risk of filtering bleb scaring. Another advantage of the current procedure relates to the small peritomy of approximately 1 hour of limbal arc. This usually makes possible the performance of subsequent filtering surgery through the same quadrant & leave enough room at the superior limbus for additional surgical procedure.

Regarding postoperative complications, mild early aqueous leak, hyphaema are well noted just similar to non-penetrating deep sclerectomy.

The overall complete success is 77.8% after 6 month & 69.4% after 1 year with out hypotensive medications. In contrast minitrabeculectomy is applicable to practically all eyes requiring filtering operation, is associated with a relatively small peritomy, and is much easier to learn.

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Night Vision and Investigative Approach to Night Blindness

Vandana Kori, BSc, **Parul Sony,** MD, **Pradeep Venkatesh,** MD

Night Vision has various characteristic features that make it different from photopic vision. Three essential factors that are required for understanding of night vision include

1. There are two kinds of sensitive elements (Rods and cones) in the retina, which have specific function.
2. The various adaptation curves depend on the state of retinal adaptation
3. The distribution of photoreceptors varies in different part of retina thus having an important role in determining the particular features of the field of both photopic and scotopic vision.

Features of night vision

Night vision is characterized by great reduction in visual acuity. Night vision testing usually employs use of the Landolt ring test. Other devices are based on **optotypes** used for the day vision that are especially adapted for night vision. These includes Camberg, Jaeger, Maggioure, Wilson charts. Night visual acuity is influenced by background luminance of the chart, intensity of illumination of the surrounding field, contrast between background and test object. Night and day visual acuity does not have a direct correlation and the influence of the wavelength of light on visual acuity is also different in scotopic and photopic vision.

To determine visual aptitude of a person at night the best is to test him under actual conditions in which he works.

Depth perception (Stereoscopic acuity) is diminished in the scotopic vision. The stereoscopic visual acuity is approx. 4 times greater in photopic vision in scotopic vision.

Color perception: **Night Vision is colorless vision with perception of different shades of gray only, which grow more or less luminous according the intensity of light.**

Scotopic visual field : The dark-adapted visual field varies in several aspects from that of day light illumination under normal conditions. The night seeing eye does not see straight ahead since there is no rods in fovea. It is characterized by a central scotoma that exhibits an interindividual variation, usually it is oval in shape and extends vertically. With decreasing illumination central scotoma appeared larger. The night visual field shows a relative constriction of peiphreal field down to 60 degrees for a larger range of scotopic luminance, with a maximum visual acuity in the paracentral field. Physiological blind spot is also slightly larger under scotopic than under photopic conditions. In the center of the fovea, however beyond five degrees the density of cones becomes less, rapidly giving way to an increase proportion of the rods, which reach maximum density at about 10-20 degree.

Various senses, which contribute to the night vision, include

- Light Sense
- Differential Light sense The differential sense is the ability of the eye to distinguish changes in illumination of two neighbouring surfaces. It is an elementary form of vision from which the more complex kind of spatial discrimination such as the form sense, the motion sense and the visual acuity arise.
- Morphoscopic/form sense: All night vision testing apparatus are designed for the investigation of form sense.
- Sense of the depth and sense of moments

Factors affecting the night vision

Effect of age on night vision: Light sense is at its best between the age of 14 and 20 years, then shows at steady decline and reaches zero at hypothetical age of 170. this decline may be due to decrease in the papillary area from 50.2 mm^2 to 8.05 mm^2 from 20 to 70 years.

The pupillary size influences the night vision by controlling the quantity of light which penetrates the eye.

Hypoxia or anoxemia deteriorates of all phases of night vision due to interference with the oxygen supply of the blood. This may be underlying casuse of night vision problems in tabacco users (altered dark adaptation) and

Drugs E.g. Adrenaline, Ephedrine, Pilocarpine and Eserine, Melaophore Harmone, Vitamin –C, Strychnine, Sulfonamides (Qunine, Tridione), Pencillin.

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Pathological conditions affecting night vision

Dietary deficiencies Principle causes of night blindness by aviatminosis is the actual lack of Vitamin –A (Xerophthalmia and Keratomalacia), Vitamin –B2, Vitamin –E.

Various eye disease Glaucoma, Error of Refraction (Uncorrected myopia, myopic astigmatism)

Psychological causes: phychoses, hysteria.

Physiological causes : malingering

Night blindness

Night blindness is the inability to see in the darkness or in dim light. It is also known as Nyctanopia, Nyctalopia(True night blindness) It is characterized by poor and blurred vision, poor form perception in dim light(people can see clearly in day light but blurred vision in night) along with glare/halos around light. The symptom of nyctalopia should not be confused with the symptom of blurred vision with night myopia or uncorrected refractive error.

Types of night blindness:-

1. **Hereditary**
   - Oguchi disease
   - Fundus albipunctatus
   - Retinitis pigmentosa (Inherited and progressive deterioration of the photoreceptors)
   - Congenital night blindness
2. **Acquired**
   - Vitamin A deficiency
   - Glaucoma
   - Choroiditis
   - Macular degenration (degenration of macula)
   - Cataract
   - Uncorrected Myopia (very common)
   - Post –operated Lasik
   - Certain drugs can cause night blindness

Pattern of inheritance:-

- Dominantly
- Recessively
- Recessive or x-linked

Lab Investigation for night-blindness

- Best corrected visual acuity
- Electroretinogram(ERG).
- Electro-oculogram (EOG**)**
- Visual field.
- Dark adaptometry.
- Psychophysical flicker test
- Fluorescein angiography
- Fundus photography.

Electroretinogram (ERG)

It helps to distinguish abnormalities in the pigment epithilium, outer and inner nuclear layers from abnormalities in the ganglion cell layer or the optic nerve. The ERG measures mass response of the retina and separate functional assessment of the photopic and scotopic conditions.So a- wave(scotopic) arises from hyperpolarisation of the rod, and b- wave arises from Muller cells.

- **Retinitis pigmentosa:** These cases show normal or reduced amplitude time on both cone and rod ERG (b wave), and delayed rod and cones implicit time on ERG. ERG response to flashes of light is very small or nondetectable in advance RP patients.
- **Stationary night blindness:** Helps to distinguish dominant and recessive type of stationary night blindness**.** Dominant CSNB has normal cone ERG but rod ERG is not detectable. Recessive CSNB amplitude of both rod and cone ERG is reduced however the implicit time is normal.
- **Vitamin-A deficiency** ERG findings shows reduced rod and cone responses with normal implicit times, but rod ERG effected before cone ERG.

Electro- Oculogram (EOG)

It measures potential between the electrically positive cornea and electrically negative cornea. In EOG light to dark adaptation ratio, also known as Arden ratio, is determinend by dividing the largest EOG amplitude during light adaptation (light peak0 by the the least value (dark trough) found during the period of dark adaptation.

- **Retinitis pigmentosa:** In early stages light rise of EOG is reduced but standing potential is normal even in presence of a nondetectable or markedly abnormal ERG. In advanced stages the standing potential is reduced.
- **Stationary night blindness:** Helps to distinguish dominant and recessive type of stationary night blindness**.** Dominant CSNB has normal cone function, no detecable rod function and markedly decreased light rise. Recessive CSNB has normal EOG.

Suggested Readings

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The Tsunami - An Appeal for Help

Dear friends,

We are all aware of the natural disaster, probably one of the worst that has ever struck the Indian subcontinent.

The day after the Christmas, when the whole of the world was working swiftly, the giant waves tsunami? hit South east Asia. The impact of the waves was so great that it altered the geographic map of South east Asia. Most of the coastal areas and the beautiful islands were submerged under the water.

Thousands of people have died and even more injured in the coastal India and the islands of Andaman and Nicobar. The damage caused is being gradually revealed as the rescue operations are on their way in the villages devastated by the unforgiving waves, which arose as a result of turmoil under the waters. Many people have lost lives, relatives and the loss of property is far from being estimated. The death toll has already crossed over 80,000 in the world and over 10,000 in the country.

In the midst of warnings for the fresh Tsunami waves, there lies a massive task of relief and rehabilitation. The losses, the people who have survived have incurred cannot be estimated and loss of lives of their relatives cannot be compensated by whatever we do. It would take months and a huge amount of money and a collective effort of the whole of the nation in order to provide relief to the survivors and to rebuild their lives, such massive relief operations need a huge amount.

We the as the members of DOS should help the nation fight the disaster which our beloved country and the countrymen are facing. As a huge country the help provided by our own people would be large enough to make an amount which could help the grief stricken people to rebuild their lives. Imagine, the greatness of the help which could provide shelter to the children whose parents have been swallowed by the giant waves, or a person who has lost all his family and belongings can start his life again.

The Dos has started a ***"DOS Tsunami relief fund"*** for sending its contributions in a unified manner. Please contribute something for the welfare of the survivors of Tsunami.

Please send your cheques in the name of ***"DOS Tsunami relief fund"*** to the secretary, DOS. All the contributions will be acknowledged in the DOS times. Please donate liberally to this fund. We would like to ask all the DOS members to contribute at least one days income to the fund for a good cause. And let us show our countrymen that we can help them whenever the need arises.

Dr. Gurbax Singh
President DOS

Dr. Jeewan S. Titiyal
Secretary DOS

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Management of Keratoconus

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The treatment approach to keratoconus follows an orderly progression from glasses to contact lenses to corneal transplantation. Keratoconus is initially managed conservatively with spectacles and contact lens. During the early stages of this disease, vision may still be correctable to 6/6 with glasses or contact lenses. However, as this disease progresses, there are situations when the patient cannot achieve optimum visual acuity with glasses or contact lens. Surgical management in the form of lamellar and penetrating keratoplasty are valid options in such situations. Over 90% of corneal transplants are successful with the majority of patients obtaining vision of 6/12 or better afterwards with either glasses or contact lenses.

Conservative management of keratoconus includes improvement by providing good optical aids. The mainstay of management remains use of rigid gas permeable contact lens. A gas permeable lens covers the irregular protrusion on the cornea and makes a new smooth surface for the light to bend through. Apart from these, management of other associated ocular and systemic problems should also be taken care off.

Over the years there have been many different techniques advocated to fit contact lenses on patients of keratoconus. The goal of any contact lens is to provide adequate vision with maximum comfort over a prolonged period of time.

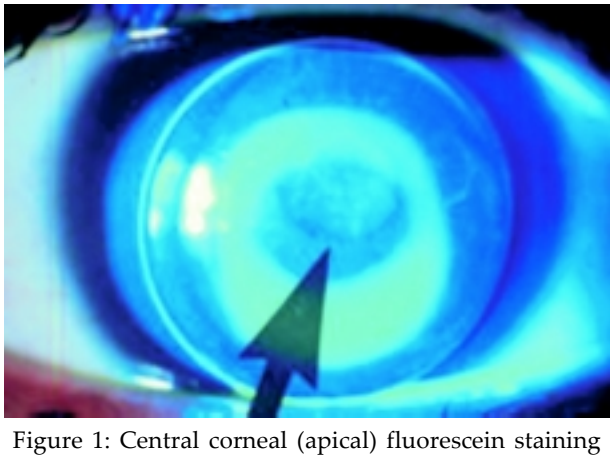

Figure 1: Central corneal (apical) fluorescein staining in a flat lens

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History of Fitting Contact Lenses in Keratoconus

Flat fitting lenses with harsh central bearing areas used to be the mainstay of keratoconic fits. This means that the lens was much flatter than the cone, and therefore pressed down on the center of it. Such a lens, with a large diameter, was often comfortable for the patient. The disadvantages of such fits are corneal edema, fluorescein staining on the apex of the cone, and central scratching of the cornea (Figure 1). To counteract this theory, a corneal clearance lens was fit. This lens was made very steep so that it vaulted over the cone to keep from pressing down on it. One problem with this idea is that the lens had to be made so steep to fit over the cone that air bubbles form between the lens and the cornea. These steep lenses can lead to corneal swelling and lens intolerance.

A Compromise Fit

Often the compromise fit for a keratoconic is what is called a "three-point touch" fit (Figure 2). This means that the lens lightly touches the peak of the cone (not the harsh bearing-down of the old style), then a very low vault over the edges of the cone, and lastly a thin band of touching near the edge of the lens. The name "three-point touch" refers to the edge-peak-edge pattern of the lens touching the cornea. The lens is kept as small as is optically possible. Since the lens will center itself over the peak of the cone, an off-center cone needs a bigger lens than a centered cone. Due to the unusual design of the keratoconic lens, a very high minus-powered lens is usually required, as for a person who is very near-sighted. The most accurate way to fit keratoconic patients is to put a diagnostic lens on the eye, check the fit, and modify the fit from there. Since each individual cone is so different, it is a trial and error process, and may require trying on several different lenses.

Keratoconus lens systems

3-point touch design

The 3-point touch design is the most popular and most frequently advocated design used to fit contact lenses for keratoconus[1,2]. The diameter of the 3- point touch lens is generally 7.8 to 8.5 mm. An optic zone size is usually at least 1.5-2.0 mm. smaller than the overall lens diameter. Multiple peripheral curves are needed and ultimately determined by fluorescein evaluation. The 3-point touch refers to the support provided for the lens by an area of central bearing and 2 other areas of bearing at the corneal midperiphery, usually in the horizontal meridian[3]. The area

of central bearing is about 2 to 3 mm in diameter[1,2,4]. Generally, this design provides a reasonably balance between comfort and vision.

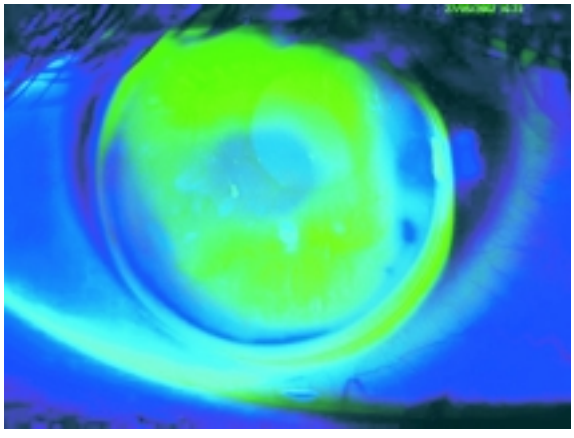

Figure 2: Three-point touch fit

These three areas of bearing distribute the weight of the lens across the cornea and prevent lens rocking because of an excessively flat fit. This type of lens works well for a cornea with a centrally located cone. Fluorescein must break midperipherally with each blink. Otherwise, a smaller optic zone should be chosen. In addition, apical bearing should not exceed 2 to 3 mm because increased bearing may cause punctate staining, corneal erosion and maybe apical scarring[6]. In fitting cones of large diameter or cones which are greatly displaced inferiorly, the 3-point touch design using small lenses cannot be used because poor lens centration usually occurs.

Large, flat lens

This apical bearing fitting philosophy is useful for displaced apexes. As keratoconus develops, the apex of the cornea is generally displaced inferiorly. If a small lens is placed on an inferiorly displaced apex, the lens is generally positioned low, and the lid often dislocates the lens with each blink. In such cases, a lens of larger diameter (9.0 to 9.8 mm) is preferable (Figure 3). The fitting method positions the upper edge of the lens under the upper lid to prevent lens dislocation. The peripheral system must be flat enough—typically 1 to 2 mm flatter than standard lens designs—to permit lens movement. Often, a large lens is too steep peripherally and binds the peripheral cornea. In contrast, a very flat lens without secondary bearing often rocks and is uncomfortable. Several lens designs employing large diameter lenses have been described in the literature of which the Bronstein philosophy uses an alignment approach to the superior cornea.

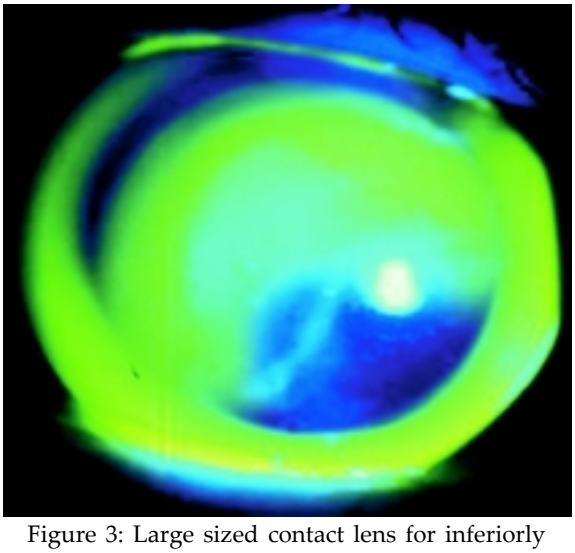

Figure 3: Large sized contact lens for inferiorly displaced cone.

Aspheric

Aspheric lenses have been recommended for fitting keratoconus patients. Spherical lenses have a constant radius of curvature in the optic zone and different curvatures cut into the lens in the peripheral areas. However, aspheric lenses gradually flatten in curvature from the center to the periphery. The eccentricity, or "e value," determines the rate of flattening and is independent of the base curve. The "e value" of an average cornea is about .65. Decreasing the lens "e value" decreases the rate of flattening, and increasing the "e value" increases the rate of flattening. When fitting an aspheric lens, good centration is desirable because poorly centered lenses may induce astigmatism and reduce visual acuity. The fluorescein pattern should show central alignment or slight central bearing. The peripheral system should show clearance, and lens movement should be apparent. In theory, this approach is ideal; in practice, it may be less attractive. Problems occur in finding the correct "e value" for the cornea as well as in reproducing the lens.

Soper lens system

The objective of the Soper lens system, popularized by Soper and Jarrett[7], is based on sagittal depth. The principle is that a constant base curve with an increased diameter results in increased sagittal depth and a steeper lens. The lenses included in the fitting set are categorized as mild (7.5-mm diameter, 6.0-mm optic zone diameter), moderate (8.5-mm diameter, 7.0-mm optic zone diameter), and advanced (9.5-mm diameter, 8.0-mm optic zone diameter). The initial trial lens is selected on the basis of degree of advancement of the cone. The more advanced the cone, the larger the diameter of the recommended lens; the smaller and more centrally located the apex, the smaller the diameter of the lens.

McGuire lens system

The McGuire keratoconic system is a modification of the Soper lens design. This is an aspheric lens design specifically set up to put minimal pressure on the central cone by vaulting it and distributing the bearing pressure to the more healthy peripheral cornea.

In the McGuire system, fitting sets are categorized as nipple (8.1 mm diameter, 5.5 mm optic zone), oval (8.6 mm diameter, 6 mm optic zone), or globus (9.1 mm diameter, 6.5 mm optic zone).

NiCone lens

The NiCone lens system (available from Lancaster Contact Lens Co, Lancaster, PA) is promoted as having three base curves and one constant peripheral curve of 12.25 mm. NiCone fitting sets are designated by the numbers 1 to 3. The Number 1 cone set is for patients with keratometry readings between 40 and 52 D, the Number 2 set covers from 53 to 65 D, and the Number 3 set is for readings >65 D. The preferred lens alignment is feather touch. The second base curve is a .3-mm "transition zone" between the central base curve and the "third base curve," which rests on the normal peripheral cornea.

Rose K design

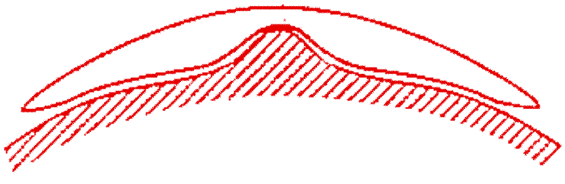

Figure 4: Rose- K lens

The Rose K design is a unique keratoconus lens design (Figure 4). The Rose K lens is probably the most widely fitted keratoconus lens worldwide. The Rose K lens design is a fully flexible lens that works well on early to advanced keratoconus patients. Complex lens geometry, combined with the enhanced material benefits of Boston ES™, makes the Rose K lens the good fit enhancing patient comfort and visual acuity. Multiple parameters make fitting the Rose K lens possible for most keratoconic eyes.

The system (26-lens set) allows the practitioner to choose lens options based on a systematic fitting approach. The design starts with a standard 8.7 mm. diameter that incorporates a decreasing optic zone as the base curve steepens coupled with an intrinsic, computer designed peripheral curve system. The lens is provided through Paragon Optics and is manufactured on a DAC lathe. The standard lift lenses should work approximately 70% of the time. Additional lens diameters are available when needed (8.3, 9.0). Peripheral curves and even base curves can be configured in a toric design. Front surface cylinder using truncation for stability is an additional option.

Soft lens and hybrid combination lens alternatives

Soft lenses as well as combination lens alternatives have been advocated in fitting keratoconus patients.

Piggyback lens designs

A piggyback lens system consists of a rigid lens fitted on top of a soft lens (Figure 5). Piggyback systems are usually used in difficult cases but are not the preferred lens system for keratoconus.

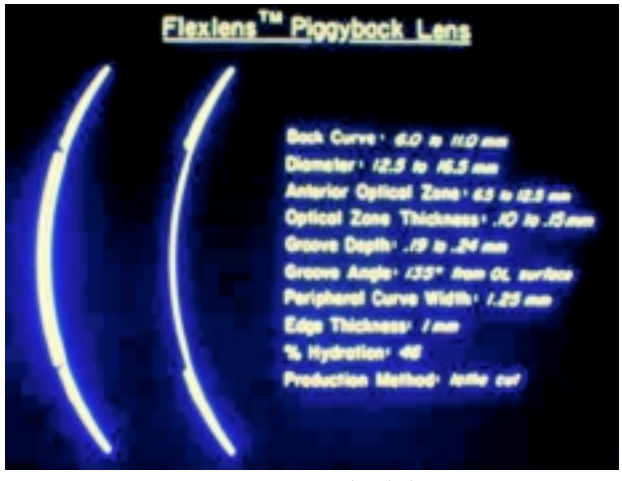

Figure 5: Piggy back lens

SoftPerm lens

The SoftPerm lens (from WJ/PBH, San Diego, CA) is a hybrid lens with a rigid, gas-permeable center surrounded by a soft, hydrophilic skirt. This lens may be indicated for patients with displaced corneal apexes or for patients who cannot tolerate rigid lenses. However, in advanced keratoconus, in which a lens of larger diameter is useful, the lack of steep base curves in the SoftPerm lens (its steepest base curve is 6.5 mm) limits performance. In addition, the lens material has a low DK value (rigid lens, 14 DK; soft portion, 5.5 DK).

Fitting procedure

Keratometry and videokeratography

Refraction

Trial lens fitting: Initial base curve: slightly flatter than K

Fluorescein pattern analysis: Three-point touch (Figure 6)

Corneal apex position relative to the trial lens should be determined. In general, the lower the apex, the larger the lens diameter required for centration. A low-riding lens may be too flat or too small, requiring a larger lens. In attempting to fit a larger lens, a lid attachment fit is desirable.

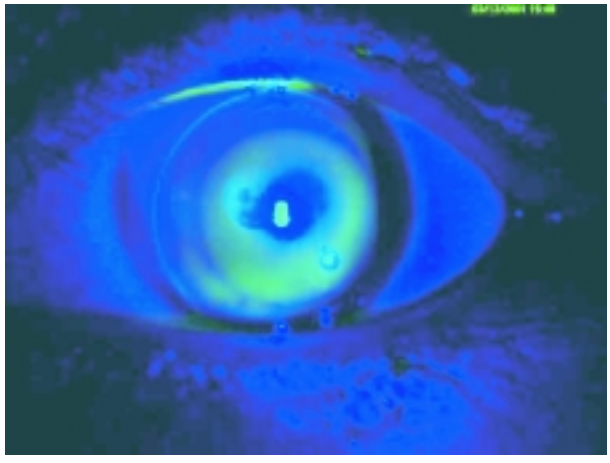

Figure 6: Fluorescein pattern of contact lens fit in keratoconus

Each trial lens should be allowed to settle on the eye for about 10-20 minutes before evaluation.

Over-refraction

Surgical Alternatives

In 15% to 20% of the keratoconic population, a corneal transplant is eventually required[8-9]. The patient should be referred for transplant if any of the following generally accepted referral criteria are met:

1) Contact lens intolerance especially with recurrent abrasions;
2) Inability to fit the patient with a contact lens (including frequent lens loss);
3) Decreased vision (generally from scarring) which prevents the patient from doing necessary visual tasks - for some patients, this may occur at an acuity level of 6/18; for others, it may occur at 6/60;
4) A large cone with progressive thinning in the periphery (the larger the cone, the more difficult the surgery since because the donor button is sutured to the peripheral cornea);

All patients should be informed that after a corneal transplant, the normal healing time required for visual rehabilitation is about 9 to 10 months, although visual correction can be prescribed as early as 3 months postoperatively in some cases when there is a running suture with buried knots.

Various types of surgery are available for the patient with keratoconus.

Penetrating keratoplasty

Penetrating keratoplasty is the most commonly performed surgery in keratoconus. In this procedure, the keratoconic cornea is prepared by removing the central area of the cornea, and a full-thickness corneal button is sutured in its place (Figure 7).

Generally, the second eye is not grafted until the first eye is successfully rehabilitated. Depending on the criteria used to assess the success rate, this surgery is 90% to 95% successful[9].

Contact lenses are often required after this procedure for best visual correction.

Lamellar keratoplasty

The cornea is removed to the depth of posterior stroma, and the donor button is sutured in place. This technique is technically difficult, and visual acuity is inferior to that obtained after penetrating keratoplasty. As a result, use of lamellar keratoplasty is largely confined to the treatment of large cones or keratoglobus when tectonic support is needed[10]. This technique requires less recovery time, and poses less chance for corneal graft rejection or failure[11]. Its disadvantages include vascularization and haziness of the graft.

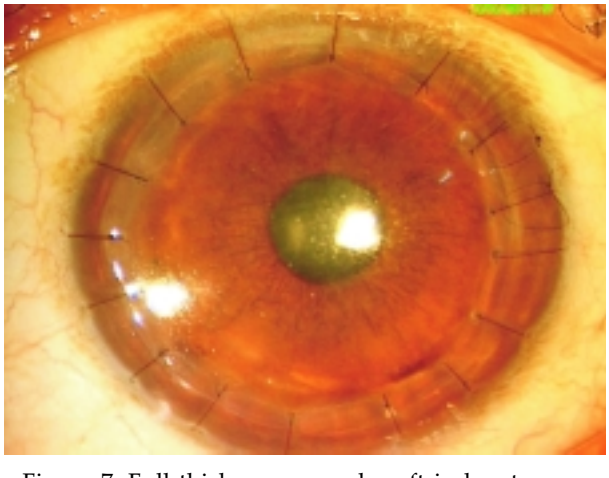

Figure 7: Full thickness corneal graft in keratoconus

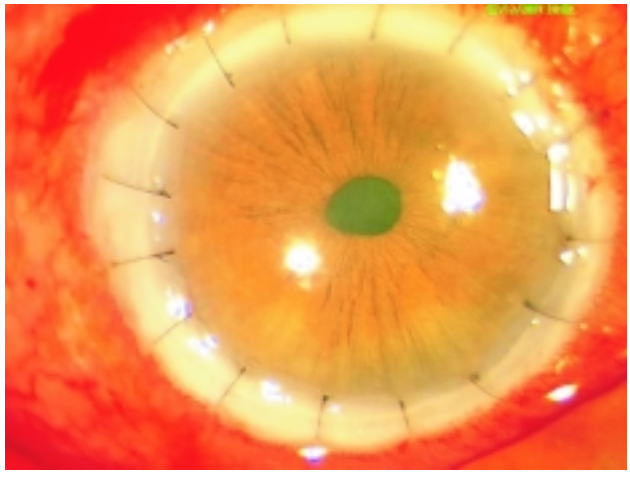

Figure 8: Lamellar keratoplasty with peripheral intrastromal tuck.

Lamellar keratoplasty with peripheral intrastromal tuck

This technique is especially useful in cases of keratoglobus[12] in order to provide tectonic support to the peripheral part of the cornea (Figure 8) as the periphery is thin in these cases.

Deep Anterior Lamellar Keratoplasty

This is a technique in which cornea is dissected up to the descemet's membrane using big bubble technique[13] and a donor tissue is sutured in place.

Keratoconus Contact Lenses

1. **Maguire Lens:** In three fitting formats i.e. **Globus, Nipple & Oval.**

2. **Tricurve Keratoconus Fitting Set (Woodward):** Both the original spherical and aspheric design. These are tricurve lenses**.**

Radius	:	5.50mm (61.14D) to 8.00mm (42.19D)
Powers	:	-3.00Ds to –11.00Ds
Total no. of trial lens	:	26

3. **Menicon Soft Keratoconus Fitting Set (Woodward):**

Radius	:	6.80mm (49.63D) to 7.70mm (43.83D)
Diameter	:	12.50mm
Power	:	-5.00Ds to –10.00Ds
Total no. of trial lens	:	10

4. **Soper Lens:** Based on sagital depth system.

Radius	:	7.03mm (48.01D) to 5.58mm (60.48D)
Diameter	:	8.60mm to 9.20mm
Power	:	-10.00Ds to –20.00Ds
Total no. of trial lens	:	26

5. **Elliptical K Lens:**

Diameter	:	9.30mm to 9.80mm

6. **Korb Lens :** The American lens designed to fit the tip of the cone.

7. **Custom K Lens :** Made to your own specifications

8. **Rose K Lens:** The Rose-K Keratoconus Lens design is the most successful lens design for Keratoconus. It offers ease of fitting excellent visual acuity & better patient comfort.

Radius: 4.75mm (71.00D) to 8.60mm (39.24D). The reverse geometry is used in some of the base-curve range to help align the lens more accurately with the cornea providing superior stability and vision.

Diameter: 4.90mm to 10.20mm. The lens has a standard diameter of 10.40mm but diameters anywhere from 9.50mm to 12.oomm can be ordered with a combination of 4-lifts being available to control the peripheral fit.

Power	:	-30.00Ds to +30.00Ds
Standard Set	:	5.10mm (66.00D) to 7.60mm (44.41D) & Diameter (8.70mm)
Total no. of trial lens	:	26

Epikeratoplasty

Epikeratoplasty is primarily suited for contact-lens-intolerant patients in whom scarring has not yet occurred. This is a rarely performed procedure today. In this procedure, the central host epithelium is debrided, and the donor cornea is sutured over the keratoconic cornea.

Lenses following penetrating keratoplasty

A lens can be prescribed following restorative surgery like full-thickness grafting after adequate healing (generally at least six months)[14]. Even rigid lenses can be placed on the eye for considerable wearing periods with running sutures in place. Remember to monitor closely for graft rejection or failure.

Intraocular pressures are to be monitored since many of these patients will be on topical steroids for some time and an increased intraocular pressure can be a sign of early inflammation suggestive of graft rejection. Grafts typically heal from the center outward and tend to be flatter in the central than the mid-periphery, not unlike some refractive surgery corneas. Usually high oxygen flux rigid lenses predominate since they often provide stable acuity and an excellent physiologic response to wear.

Surgical reduction of astigmatism rather than fitting back surface/ bitoric lenses is preferred since rarely is the astigmatism anything other than irregular and non-orthogonal.

Lack of lens movement and bubbles around the graft margins are two problems that can be encountered during contact lens fitting following keratoplasty in such cases. Smaller diameter lenses with flatter peripheral curves may aid in movement of the lens. Frequent lubrication is recommended.

Complications in fitting contact lenses following penetrating keratoplasty include: graft rejection, inadequate vision, corneal edema and scarring, lens intolerance and infection.

Keratoconus presents a great challenge to the ophthalmologists. The treatment of this disorder ranges from spectacle correction to full-thickness grafting. This disease is generally best managed by appropriately fitted contact lenses. Contact lens management is often a compromise between the quest for an ideal fit and the patient's requirements for comfort and best vision. Information has been provided to allow the practitioner to diagnose keratoconus, to counsel the patient about this condition, to choose the right fitting philosophy, and to decide when surgical consultation is necessary.

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GLAUCOMA IMAGING CENTRE

Announces its programme on glaucoma management

"Decision making in glaucoma .... a practitioners perspective"

Sunday, June 12, 2005 • 9.00 a.m. to 6.00 p.m.

This course will discuss current definitions, relevance of intraocular pressure and concept of target pressure, changes in the optic nerve head and visual fields, interpretation of gonioscopic findings and their relevance, seek to explain the concept of pre perimetric glaucoma, look into the relevance of newer diagnostic modalities and provide a step by step approach to open angle and angle closure glaucomas, ocular hypertension and normal tension glaucoma, introduction to the concept of risk, rational of treatment – to treat or not to treat, guidelines for medical treatment, choosing the right medication, drug and preservative toxicity, compliance – its importance and how we can be sure, role of lasers in glaucoma and glaucoma surgery – indications, techniques , intraoperative complications and their prevention, postoperative complications and their management.

This course will also discuss the findings from major clinical trails – Ocular Hypertension Treatment Study (OHTS), collaborative Initial Glaucoma Treatment Study (CIGTS), Collaborative Normal Tension Glaucoma Study (CNTG Study) Advanced Glaucoma Intervention Study (AGIS) Early Manifest Glaucoma Treatment Study (EMGT Study) and their implications viz a viz our patients.

Programme Chairman : ***Prof. (Dr.) N.N. Sood***

Programme Moderator ***: Dr. Devindra Sood***

Registration Fee	Upto April 12, 2005	**April 13, 2005 onwards**	Spot Registration
Delegate	Rs. 1000/-	Rs. 1500/-	Rs. 2000/-
Residents in Training*	Rs. 750/-	Rs. 1000/-	Rs. 1500/-

***** Required: Proof of residency to be signed by Consultant / Head of Department on letterhead.

- Please make cheques / demand draft payable at New Delhi to : ***Glaucoma Imaging Centre***
- For all outstation cheques please add Rs. 50/-

REGISTRATION FORM

Please complete and return to : CME Co-ordinator, **Glaucoma Imaging Centre**
P-13 GF, South Extension Part – II, New Delhi – 110049 INDIA, Email : glaucomacentre@yahoo.com

Surname : _____ Title (Dr.) Mr. / Miss./Mrs._____

First Name: _____ Middle:_____

Cheque / DD No._____ Drawn on _____ for Rs._____

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Email : _____

Telephone Number : (Std:_____)_____ Mobile : _____

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!! Attention DOS Members !!

Dr. Michael Trese from Royal Oak, Michigan, U.S.A., a renowed Paediatric Retinal Surgeon is coming to India on **22nd February, 2005.** He will be delivering a lecture on **"Enzymes in Vitreoretinal Surgery and Vitreoriental Diseases" on 23rd February, 2005** from 12:00 noon to 1:00 p.m. at Lecture Theatre 6th Floor, Dr. R.P. Centre, AIIMS, New Delhi. All DOS Members are invited.

!! Congratulations !!

Dr. Anita Panda, Professor, Cornea, Refractive and OSD services, Dr. Rajendra Prasad Centre for Ophthalmic Science, AIIMS, New Delhi for being elected International Member American Academy Ophthalmology.

Dr. Tushar Agarwal, Senior Resident Cornea & Refractive Surgery Services, Dr. R.P. Centre for Ophthalmic Sciences, AIIMS, New Delhi for receiving INSA Medal for Young Scientists, 2004.

DOS QUIZ NO. 18

1. Whitnals tubercle is on _____ bone.
2. Orbit is connected to middle cranial fossa through _____ and superior orbital fissure.
3. Duane's syndrome does not obey the _____ law.
4. Maximum limit of recession in adults are _____ for medial rectus and _____ for lateral rectus.
5. 40% loss of ganglion cells result in _____ db visual field defect.
6. Glasses used for computer vision syndrome should have _____ lens with _____ coating.
7. Most common cause of 3rd nerve palsy in the pediatric population is _____ .
8. When fitting RGP lens a 0.05 mm steeper curve produces a _____ + ve lens.
9. Pegaptanib sodium (Macugen) is a _____ inhibitor.
10. Muscle with the shortest tendon is _____.

- Please send your entries to the DOS office latest by 10th March, 2005.
- Prize Rs. 500/- *Courtesy:* ***Syntho Pharmaceuticals***

ANSWERS OF DOS QUIZ NO. 16

1. *Preferred type of foldable lens to be used in eyes with zonular dialysis*
2. *Chromatic interval between blue and red light is_____diopters*
3. *Ideal Illumination for snellen chart is _____ lumens / square foot*
4. *Normal rate of loss of retinal ganglion cells_____ axons annually*
5. *Letter box visual field is seen in patients of _____ with patent_____artery.*
6. *The effective power of a cyclinder of power x - 30^{O} away from its axis is _____.*
7. *Antimetropia means_____.*
8. *Maximum acurracy of Schiotz tonometer is when its scale reading is between_____to_____.*
9. *Material used in vicryl suture is _____*
10. *Two most common ophthlamic manifestations of congenital rubella are _____ and _____.*

Answers :

***1.* 3 piece rigid hapitic IOL** ***2.* 1.25 Dioptres** ***3.* 50** ***4.* 5,000**
***5.* CRAO, Patent artioretinal artery** ***6.* x /4 at 30^{O} from axis, x/2 at 45^{O}; 3x/4 at 60^{O}**
***7.* One eye is myopic other eye is hypermetropic** ***8.* 5 to 15** ***9.* Polyglactin**
***10.* Cataract, retinopathy.**

FORTHCOMING EVENTS

NATIONAL

Annual DOS Conference
2nd & 3rd April, 2005
Contact : Dr. Jeewan S. Titiyal, Secretary DOS
R.No. 476, 4th Floor,
Dr. R.P. Centre for Ophthalmic Sciences
AIIMS, Ansari Nagar, New Delhi – 110029
Ph : 91-011-26589549, 265888852-65 Ext. 3146
Fax : 91-011-26588919
Email : dosonlin@vsnl.net
Website : www.dosonline.org

40th Annual Conference of
UP State Ophthamological Society
12th & 13th November, 2005
Contact : Dr. Harish Gupta, Organizing Secretary
Manav Hospital & Laser Eye Centre
B-Block Market, Kavinagar,
Ghaziabad-201002
Tel. : 0120-2752659, 3943310
Emal : ghaziabadopthalmicsociety@yahoo.co.in

INTERNATIONAL

ESCRS 9th Winter Refractive Surgery Meeting
4th - 6th Feb.2005 ROME, ITALY
Temple House,Temple Road
Blackrock, Co Dublin, Ireland
Tel: +353 1 209 1100
Fax: +353 1 209 1112
Email: escrs@agenda-comm.ie
Web: www.escrs.org

20th Asia Pacific Academy of Ophthalmology Congress
27-31st March, 2005
Kuala Lumpur, Malaysia
The 20th Asia Pacific Academy of Ophth. Congress
Tel : +603-7956-3113 Fax : +603-7960-8297
Email : scretariat@apao2005.com.my
Web : www.apao2005.com.my

5th International Glaucoma Symposium
20th March, 2005 – 2nd April, 2005
Cape Town, South Africa
Contact : Kenes International
Tel : +41-22-908-04-88 Fax : +41-22-7322850
Email : glaucoma@kenes.com
Website : www.kenes.com/glaucoma

World Cornea Congress
13th - 14th April, 2005
WASHINGTON, DC
Contact: ASCRS
Tel: +1 703 591 2220 Fax: +1 703 591 0614
Email: ascrs@ascrs.org Web: www.ascrs.org

ASCRS/ASOA Meeting Congress
16-20th April, 2005
Washington, DC
Contact : ASCRS
Tel : +1-703-591-2220 Fax : +1-703-591-0614
Web : www.ascrs.org

XXIII Congress of the ESCRS
10th - 14th Sept.2005 LISBON, PORTUGAL
Contact: ESCRS
Temple House,Temple Road,
Blackrock, Co Dublin, Ireland
Tel: +353 1 209 1100 Fax: +353 1 209 1112
Email:escrs@agenda-comm.ie
Web: www.escrs.orgSESept.2005PTEMBER

!! Attention DOS Members - Last Reminder !!

All DOS Members are requested to inform DOS Secretariat for their respective change in address, telephone nos., email address etc. by email or fax latest by 4th March, 2005. DOS is finalising the printing of Members' Directory.
DOS email : dosonline@vsnl.net fax : 011-26588919

- Secretary DOS

Extraocular Muscles

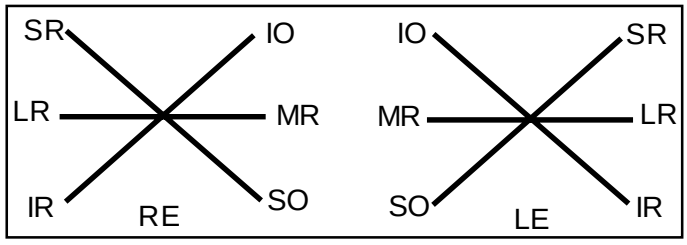

Figure 1 shows the direction of eye movement in which specific eye muscles are most active. If any one muscle was paralysed, the direction indicated would be that of the greatest under-action. In reality, muscles supplied by the IIIrd cranial nerve are rarely affected in isolation. The SO and IO act as an antagonistic pair, elevating and depressing the eye when it is in adduction. The IR and SR work as an antagonistic pair when the eye is in abduction..

Defective muscle	Affecting Right Eye			Affecting Left Eye		
	Chin	Turn	Tilt	Chin	Turn	Tilt
Lateral Rectus	X	Right	X	X	Left	X
Medial rectus	X	Left	X	X	Right	X
Superior rectus	Up	Right	Right	Up	Left	Left
Inferior rectus	Down	Right	Left	Down	Left	Right
Superior oblique	Down	Left	Left	Down	Right	Right
Inferior oblique	Up	Left	Right	Up	Right	Left

Table 1:The abnormal head posture for underaction (paresis) of each individual extra-ocular muscle

Right Eye	Greatest Under-action Defective muscle	Greatest over-action Contralateral synergist	Secondary over-action Direct antagonist	Secondary under-action Contralateral antagonist (Inhibitional palsy)
Lateral Rectus	RE in Dextro-version (RLR)	LE in Dextro-version (LMR)	RE in Laevo-version (RMR)	LE in Laevo-version (LLR)
Medial rectus	RE in Laevo-version (RMR)	LE in Laevo-version (LLR)	RE in Dextro-version (RLR)	LE in Dextro-version (LMR)
Superior rectus	RE in Dextro-elevation (RSR)	LE in Dextro-elevation (LIO)	RE in Dextro-depression (RIR)	LE in Dextro-depression (LSO)
Inferior rectus	RE in Dextro-depression(RIR)	LE in Dextro-depression(RSO)	RE in Dextro-elevation (RSR)	LE in Dextro-elevation (LIO)
Superior oblique	RE in Laevo-depression (RSO)	LE in Laevo-depression (RIR)	RE in Laevo-elevation (RIO)	LE in Laevo-elevation (LSR)
Inferior oblique	RE in Laevo-elevation (RIO)	LE in Laevo-elevation (LSR)	RE in Laevo-depression (RSO)	LE in Laevo-depression (RIR)

Table 2. The spread of comitance (sequelae) for paralysis of each muscle of Right eye.

Harinder Singh Sethi,MD, **Rohit Saxena,**MD, **Vimla Menon,** MS
Dr. R. P. Centre for Ophthalmic Sciences
AIIMS, New Delhi - 110 029

Annual Conference of
DELHI OPHTHALMOLOGICAL SOCIETY

April 2nd & 3rd, 2005, New Delhi

A Preview of
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• Plenary Sessions • Spot Light
• Question Time • Recent Advances & Innovations
• Symposia • Video Assisted Skill Transfer Courses
• Instruction Courses • Wet Labs
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REGISTRATION FORM FOR DOS ANNUAL CONFERENCE (2005)

Name _____ Spouse Name _____

Status: Delegate / Spouse / Resident _____ Member/Non Member Membership No. _____

Address for _____ Registration fee enclosed Rs. _____

Correspondence _____ (in words) _____

by Cash/Draft/Cheque No. _____ dated_____drawn on _____

_____ (Name of bank) in favour of Delhi Ophthalmological Society **(Outstation delegates to pay by DD only)**

REGISTRATION FEES

	Till 10.3.2005	From 11.3.2005 to 24.3.2005	Spot
DOS Member	Rs. 700.00	Rs. 1,000.00	Rs. 1,200.00
DOS Member Spouse	Rs. 600.00	Rs. 800.00	Rs. 1,000.00
DOS Non-member	Rs. 1,200.00	Rs. 1,700.00	Rs. 2,500.00
DOS Non-member Spouse	Rs. 900.00	Rs. 1,100.00	Rs. 1,500.00
Resident* - Member	Rs. 400.00	Rs. 550.00	Rs. 700.00
- Non-Member	Rs. 500.00	Rs. 650.00	Rs. 850.00

*** Proof of Residency Required**

Mail Registration form with Demand Draft/Cheque to: **Dr. Jeewan S. Titiyal**, Organizing Secretary, Room No.476, Dr. R.P. Centre for Ophthalmic Sciences, A.I.I.M.S., New Delhi-110029.
Ph.: 91-011-26589549 **Fax.:** 91-011-26588919 **Web.:** www.dosonline.org **Email.:** dosonlin@vsnl.net

Annual Conference of
DELHI OPHTHALMOLOGICAL SOCIETY

FRONTIERS IN OPHTHALMOLOGY 2005

2nd & 3rd APRIL, 2005

* ABSTRACT SUBMISSION FORM

To be sent to: **Dr. Jeewan S. Titiyal**, Organizing Secretary, # 476, 4th floor,
Dr. R. P. Centre for Ophthalmic Sciences, AIIMS, Ansari Nagar, New Delhi 110 029 (INDIA)
Deadline for submission of abstracts: 28th February, 2005
Deadline for submission of complete text: 15th March, 2005

TITLE	
AUTHORS	
INSTITUTION	
TYPE OF PRESENTATION	FP ☐ Poster ☐ Video ☐
Please Indicate:	FP **Session - I** ☐ FP **Session - II** ☐

INSTRUCTIONS TO AUTHORS: Abstracts should be submitted in English for publication in the Abstract Book. They should be typed in single spacing to fit the frame for camera ready copy. Each abstract should be completed in only one frame. Place unusual abbreviations in parentheses after the full word, the first time it appears. The text should not contain erasures or visible marks. Write the title in Capitals, the name of the Authors and the Institution in small letters.
Format of Abstracts must be structured under following headings – Objective, Materials & Methods, Results and Conclusion. Abstract not to exceed 250 words. (Fax must be followed by submission of hard copy of abstract by post).

Presenters Surname:_____ Name_____

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Please Note:

- *All Abstracts should compulsarily be accompanied by full text along with the illustrations and photographs. An MS Word file of the same is also required on a 31/2 floppy disk.*
- *Session - I: Dr. A.C. Agarwal Trophy Session (only for Delhi Members).*
- *Session - II: Winner of Best Paper in this session will be awarded "**Certificate of Merit**".*
- ***ONLINE SUBMISSION:** (Submission can also be made online through the DOS website: www.dosonline.org*
- *Video in (CD, VHS) should be submitted along with abstracts.*
- *Best Poster and Best Video presentation will be awarded trophy and **"Certificate of Merit"***

DOS Credit Rating System Report Card

DCRS July 2004 – Army Hospital (R&R)

Total No. of Delegates	83
Delegates from Out side (N)	75
Delegates from Army Hospital (n)	8
Overall assessment by outside delegates (M)	610.5
Assessment of case presentation-I (Dr. Lt. Col. R. Maggon) by outside delegates	549
Assessment of case presentation-II (Dr. Lt. Col. (Mrs.) Madhu Bhaduria) by outside delegates	541.5
Assessment of clinical talk (Dr. Col. Ajay Banajee) by outside delegates	572.5
Rejected Form Army Hospital (n)	2
Rejected Form Out side (N)	2

DCRS August, 2004 – Sir Ganga Ram Hospital

Total no. of Delegates (Valid DCRS forms)	86
Delegates from Out side (N)	76
Delegates from Sir Ganga Ram Hospital (n)	10
Overall assessment by outside delegates (M)	552
Assessment of case presentation-I (Deepti Manocha) by outside delegates	475
Assessment of case presentation-II (Dr. Piyush Kapoor) by outside delegates	498
Assessment of clinical talk (Prof. H.K. Tewari) by outside delegates	571
Total no. of invalid DCRS forms	NIL

DCRS September, 2004 – Hindu Rao Hospital

Total No. of Delegates	45
Delegates from Out side (N)	32
Delegates from Hindu Rao Hospital (n)	13
Overall assessment by outside delegates (M)	225.5
Assessment of case presentation-I (Dr. Vikas Anand / Dr. Ruchi Goel) by outside delegates	214.5
Assessment of case presentation-II (Dr. Bithi Chowdhury) by outside delegates	216
Assessment of clinical talk (Dr. Ruchi Goel) by outside delegates	229
Rejected Form Hindu Rao Hospital (n)	NIL
Rejected Form Out side (N)	1

DCRS October, 2004 – Dr. R.P. Centre for Ophthalmic Sciences

Total No. of Delegates	57
Delegates from Out side (N)	38
Delegates from Dr. R.P. Centre (n)	19
Overall assessment by outside delegates (M)	272.5
Assessment of case presentation-I (Dr. Balasubramanya R.) by outside delegates	261
Assessment of case presentation-II (Dr. Arun Singhvi) by outside delegates	264
Assessment of clinical talk (Dr. Rajesh Sinha) by outside delegates	300
Rejected Form Dr. R.P. Centre (n)	2
Rejected Form Out side (N)	NIL

DCRS November, 2004 – Shroff's Charity Eye Hospital

Total No. of Delegates	34
Delegates from Out side (N)	28
Delegates from Shroff's Charity Eye Hospital (n)	6
Overall assessment by outside delegates (M)	196.5
Assessment of case presentation-I (Dr. Umang Mathur) by outside delegates	180.5
Assessment of case presentation-II (Dr. Suneeta Dubey) by outside delegates	191.5
Assessment of clinical talk (Dr. Manisha Aggarwal) by outside delegates	207
Rejected Form Shroff's Charity Eye Hospital (n)	1
Rejected Form Out side (N)	1

DCRS December, 2004 – Venu Eye Institute & Research Centre

Total No. of Delegates	43
Delegates from Out side (N)	29
Delegates from Venu Eye Institute & Research Centre (n)	14
Overall assessment by outside delegates (M)	189
Assessment of case presentation-I (Dr. Amit Wasil) by outside delegates	133.5
Assessment of case presentation-II (Dr. Ashish Ahuja) by outside delegates	152.5
Assessment of clinical talk (Dr. Jeena Mascarenhas) by outside delegates	167
Rejected Form Venu Eye Institute & Research Centre (n)	NIL
Rejected Form Out side (N)	NIL

DCRS January, 2005 – Vardhman Mahavir Medical College & Safdarjung Hospital

Total No. of Delegates	54
Delegates from Out side (N)	46
Delegates from Vardhman Mahavir Medical College & Safdarjung Hospital (n)	8
Overall assessment by outside delegates (M)	312
Assessment of case presentation-I (Dr. Virender Sachdev) by outside delegates	305
Assessment of case presentation-II (Dr. Sulab) by outside delegates	322
Assessment of clinical talk (Dr. V.S. Gupta) by outside delegates	332
Rejected Form Vardhman Mahavir Medical College & Safdarjung Hospital (n)	NIL
Rejected Form Out side (N)	NIL

Attention DOS Members

The Hi-tech DOS Library is functioning on Ground Floor, Dr. R.P. Centre, Delhi Ophthalmic Sciences, AIIMS, New Delhi-110029 from 12.00 Noon to 9.00 P.M. on week days and 10.00 A.M. - 1.00 P.M. on Saturday, Sunday. The Library will remain closed on Gazetted Holidays. Members are Requested to utilise the Facilities Available i.e. Computer, Video Journals Viewing, Latest Books and Journals. We are planning to subscribe two journals member can give suggestion in this regard.

Dr. Lalit Verma, Library Officer, D.O.S.

Nominations for
DR. P.K. JAIN ORATION & DR. S.N. MITTER ORATION

Nominations are invited for a distinguished Ophthalmologist of long standing and who is a voting member of the Delhi Ophthalmological Society, for the above mentioned Orations of DOS.

Selection Procedure

Nomination can be sent by:

1. Any of the Past Awardees
2. Any of the Past Presidents
3. At least 5 Members of the Executive Committee
4. At least 15 Members of the Delhi Members of DOS.

The nomination must include an introductory paragraph justifying the Nomination, a Biodata of the Nominee, a statement to the effect that the Nominee would accept the Award if awarded and would deliver an Oration of his choice at the Annual Conference of the DOS and would intimate the Society the Topic at least 4 weeks before the Conference and a type script 15 days before. The Awardee would need to give the copyright of the text of his talk to the Society.

Selection Process

The selection will be made by a Selection Committee consisting of the President, Secretary and 3 Senior, distinguished members from 3 different sub specialties of Ophthalmology. The Executive Committee would take the final decision on the basis of the recommendations of the Selection Committee. The nominations must be received in DOS Secretariat not later than 5.00 p.m. on ***February 24th, 2005.***

Advance copy of the nominations may be sent by fax/email. The hard copy must be however be received in the DOS Secretariat by the last date for receiving the nominations.

!! DOS Election !!

Last date of withdrawal for all nominations is 1st March, 2005 (5 p.m.)

Last Date of withdrawal for various posts : Vice President (1 Post), Secretary (1 Post), Joint Secretary (1 Post), Treasurer (1 Post), Editor (1 Post), Library Officer (1 Post), & Executive Member (8 Posts) and DOS Representative to AIOS (2 posts) is 1st March, 2005 (5 p.m.)

Election will be held during the Annual DOS Conference on 3rd April, 2005.

Secretary, DOS

DOS Credit Rating System (DCRS)

DOS has always been in the forefront of efforts to ensure that its members remain abreast with the latest developments in Ophthalmology. Among the important objectives formulated by the founders of our constitution was the cultivation and promotion of the Science of Ophthalmology in Delhi.

The rapid strides in skills and knowledge have created a need for an extremely intensive Continuing Medical Education programme.

In a bid to strengthen our efforts in this direction DOS had DOS Credit Rating System (DCRS), the details of which are given below. Our Primary objective is to promote value-based knowledge and skills in Ophthalmology for our members and give recognition and credit for efforts made by individual members to achieve standards of academic excellence in Ophthalmic Practice.

DOS CREDIT RATING SYSTEM (DCRS)

		DCRS	*Max.*
1)	Attending Monthly Clinical Meeting* † (For full attendence)	10	90
2)	Making Case Presentation at Monthly Meeting**	15	—
3)	Delivering a Clinical Talk at Monthly Meeting**	15	—
4)	Free Paper Presentation at Annual Conference (To Presenter)**	15	30
5)	Speaker / Instructor** in : Monthly Symposium	15	30
	: Mid Term Symposium	15	30
	: Annual Conference	15	30
6)	Registered Delegate at Mid Term DOS Conference	20	—
7)	Registered Delegate at Annual DOS Conference	30	—
8)	Full Article publication in Delhi Journal of Ophthalmology / DOS Times	30	60
9)	Letter to editor in DOS Times	10	20
10)	Letter to editor in DJO	15	30

If any of the presentations is given an Award – Additional 20 bonus Credits.

Member who have earned 100 Credits, are entitled to:

a) Certificate of Academic Excellence in Ophthalmic Practice.

b) Eligible for DOS Travel fellowship for attending conference.

If any member earns 200 Credits, he / she shall, in addition to above, be awarded Certificate of Distinguished Resource-Teacher of the Society.

Institutional assessment for best performance will be based on the total score of members who attend divided by number of members who attended. Institutional assessment regarding decision to retain the institute for the next year will be based on total score by all delegates who attend the meeting divided by average attendence of all 8 meetings.

Please note that the Institutions' grading increases if the attendance at its meeting is higher (i.e. more than the average attendence of the eight monthly meetings).

* Based on Signature in DCAC
** Subject to Submission of Full Text to Secretary, DOS
† Credits will be reduced in case attendence is only for part of the meeting.

DCRS !! Attention !!

* Members are requted to sign on monthly meeting attendance register and put their membership number.

* The DCRS paper will be issued only after the valid signature of the member in the attendance register.

* Please submit your DCRS papers to the designated DOS Staff only.

* The collected DCRS papers will be countersigned by President and Secretary and sealed immediately ofter the meeting is over.

DELHI OPHTHALMOLOGICAL SOCIETY

(LIFE MEMBERSHIP FORM)

Name (In Block Letters) _____

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

Qualifications* _____ Registration No.* _____

Sub Speciality (if any) _____

ADDRESS

Clinic/Hospital/Practice _____

_____ Phone _____

Residence _____

_____ Phone _____

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.]

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. Jeewan S. Titiyal, Secretary, Delhi Ophthalmological Society, R.No. 476, 4th Floor, Dr. R.P. Centre for Ophthalmic Sciences, AIIMS, Ansari Nagar, New Delhi – 110029.
7. Licence Size Coloured Photograph is to be pasted on the form in the space provided and two Stamp/ Licences 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).

!! Attention !!

Case Presentation in the Monthly Meetings by Non Institutional Members

There will be one non Institutional case presentation / Clinical talk by one of the DOS member during the monthly meeting. The presentation will be done by a non Institutional member where monthly meetings are not being held. The presenter will be allowed to present a case or a clinical talk for same amount of time as it is given for other presentations in the monthly meeting. Interested members should contact secretary DOS at least two weeks before the monthly meeting with details of their presentation. If there are more than one request then they will be given opportunity in the next monthly meeting. The President and Secretary will review the presentation for its clinical and scientific contents. These non Institutional presentation will be graded for the best case presentation / Clincal talk as it is done for Institutional presentations and they will be eligible for best presentation award.