



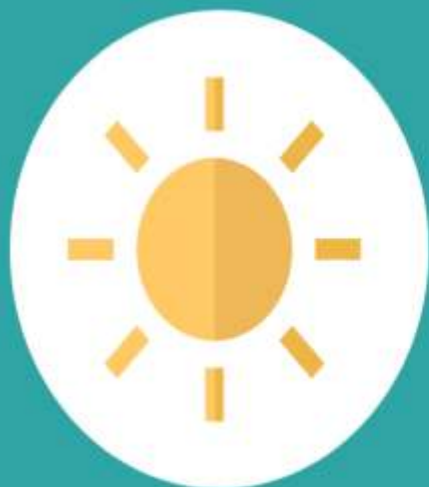
Indian Journal of  
**COMMUNITY OPHTHALMOLOGY**



*Official Journal of*  
Association of Community Ophthalmologists of India (ACOIN)  
Vol. 4, December, 2023



# How can you help a child who has Myopia?



## Get Outdoors

Children need to spend at least 2 hours outdoors. Sunlight has a protective effect (even behind sunglasses). Outdoor time is especially important in children who have other risk factors or have recent onset of myopia

## Adjust Reading Habits

Take regular breaks when reading and don't hold the book too close. Remember the 20/20/20 rule: Look at an object 20 feet away for 20 seconds every 20 minutes



## Get Good Sleep

Children need at least 9 hours of sleep. A lack of sleep has been shown to contribute to higher levels of myopia

## See a Myopia Control Specialist

There is now a wealth of research-based information about how to help your child with myopia. Visit <https://mykidsvision.org/> for independent, evidence based advice from professionals and academics around the world





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## **CHILDHOOD MYOPIA: A COMMUNITY EYE HEALTH CHALLENGE OF TWENTY FIRST CENTURY**

Myopia has become one of the fastest-growing eye health challenges of the twenty-first century, with a disproportionate burden on urban Asia regions.<sup>1</sup> Most school myopia results from an excessive axial length of the eye that develops in childhood. In the past three decades there were significant increases in the prevalence of childhood myopia. By 2050, half of the world population is expected to have myopia, a 2-fold increase compared to year 2000.<sup>2</sup> The pandemic lockdowns established by the authorities for curbing COVID-19 pandemic led to detrimental effects on myopia development due to a significant decrease in outdoor time and increase in near work activities.<sup>3</sup>

Optometrists, public health governmental entities and the World Health Organization have recognized the urgent need to address the global myopia epidemic. Historically, the most common recommendation to address myopia in a child or teenager is to simply correct the refractive error without treating the underlying growth. Scientific evidence is identifying new ways to control myopia progression.<sup>4</sup>

The World Council of Optometry shared at the 74th World Health Assembly (WHA), that the Ministers of Health voted and approved the proposal designed to address the two leading causes of blindness and visual impairment. Specifically, they adopted targets to increase effective coverage of refractive error by 40% and effective coverage for cataract surgery by 30% by the year 2030. The adoption of this proposal addresses the enormous unmet need for eye care outlined in the World Report on Vision which was authored by the World Health Organization (WHO) and adopted by the WHA last year. Accepting these targets is a major step in ensuring that the country members are focusing their attention on the enormous magnitude of preventable vision impairment and blindness. As a member of IAPB, WCO supports Peter Holland's (Chief Executive IAPB) comments that "The targets are ambitious but achievable with national commitment and strong collective action. What is critical now is for countries to implement the World Report on Vision and report their progress to the WHO."<sup>4</sup>

The WCO furthered its commitment by unanimously adopting a resolution advising optometrists to regularly and consistently offer scientifically proven myopia interventions within their practices. While the WCO recognizes that it takes time and resources to achieve the change we are striving for, there are three main components that all optometrists should embrace as first steps toward curbing this public health issue—the three "M's": Mitigation, Measurement and Management.

Mitigation, that is, optometrists educating and counseling parents and children, during early and regular eye exams, on lifestyle and other factors to prevent or delay the onset of myopia.

Measurement, that is, optometrists evaluating the status of a patient during regular comprehensive vision and eye health exams, such as measuring refractive error and axial length whenever possible.

Management, that is, optometrists addressing patients' needs of today by correcting myopia, while also providing evidence-based interventions (e.g., contact lenses, spectacles, pharmaceuticals) that slow the progression of myopia, for improved quality of life and better eye health today and into the future.<sup>4</sup>

To prevent myopia and its complications it is essential to unravel the causes that have produced the myopia epidemic in East and Southeast Asian urban environments. More research is necessary on the lack of outdoor exposure since an early age in childhood, and early high academic load of more than 10 h of schooling a day 6 days a week with short annual vacations, at which Asian children in many urban cities are exposed. Further, the myopia epidemic has occurred along with urbanization and that myopia develops early since kindergarten years, continuing to progress in young adulthood.<sup>5</sup>

Concept of pre-myopia essentially entails a non-myopic refraction that entails high risk of progression to myopia. Studies



**Prof. A.K. Khurana**



like Collaborative longitudinal evaluation of ethnicity and Refractive error (CLEERE) have demonstrated that eyes programmed to turn myopic show an accelerated pattern of axial elongation several years before the onset of myopia'. Additional risk factors that are likely to add to the risk score may include number of myopic parents, parental education, environmental risk factors such as time spent indoors / outdoors, rate of change of axial length, rate of changes of refraction and genomic risk scores.<sup>6,7,8</sup>

Preventive and prophylactic options like increased outdoor activities, less near work and treatment with low concentration of atropine drops 0.01 % are the strategies to be entertained. Treatment can be undertaken from 5 to 12--16 years. Non responders and poor responders who convert to myopia need to be treated appropriately. In a recent study published in 2023, repeated low level red light has been shown to prevent conversion of pre myopes to myopes. RLRL therapy was given twice a day, 5 days a week with each session lasting 3 minutes. The 12-month incidence of myopia was decreased by 33.4%. RLRL intervention requires dedicated devices and investment in time, nevertheless. Mechanism of action is speculated to be that RLRL therapy may increase the blood flow and prevent scleral hypoxia.<sup>9</sup>

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## **DOING A TASK, IS BETTER THAN DOING IT PERFECT**

*A beautiful and appropriate famous quote:*

*If somebody offers you an amazing opportunity but you are not sure you can do it, say YES - then learn how to do it later!*

*- Richard Branson*

And it is even more amazing when this somebody offering you the opportunity happens to be your GURU, your MENTOR, someone you have always looked up to and you feel proud that your teacher has shown faith in you.

I am sure many of you must have guessed that I am talking of none other than the Chief Editor, IJCO respected Dr. A.K. Khurana Sir, who gave me the opportunity to be a team member of Editorial Board as Managing Editor, IJCO, the prestigious journal of ACOIN. Thank you Sir, for having shown faith in me and other team members.



**Prof. Urmil Chawla**

The reason why bringing out this particular journal has been a learning experience and different from being Editor journal of other Society journals is the way we have managed to bring out this particular issue within rigid time constraints. It truly has been a roller coaster ride.

The first flyer for call for articles was floated in the social media on 13<sup>th</sup> December, 2023 keeping the last day of receipt of article as 25<sup>th</sup> December, 2023.

Under the guidance of Khurana Sir, the journey of procuring articles started. The initial few days were spent in deciding the format of the journal, the request sent for Guest editorial, involving a young team of Associate and Assistant Editors in framing the Quiz and the PG corner. Soon the articles started pouring in, few voluntarily and most of them on personal request of Prof. Khurana.

We were very close to New Year 2024, when Prof. Samantha, expressed his desire to Prof. Khurana, to release the Breezer of the journal in upcoming 7th National Assembly of FOTI at RP Centre, AIIMS, Delhi, on 6<sup>th</sup> Jan, 2024.

For a moment it appeared to be an impossible task, but when the coupled positivity of Prof. Samantha and Prof. Khurana, the main driving forces, geared up the editorial team, everything appeared possible.

So, dear friends with two inspirational personalities at the helm of affairs, along with the dedicated editorial team things started falling in place.

Technology no doubt has the most significant role to play in all such ventures and the demand by the readers of an online mode of release than the print version, further adds in making things more simpler. So, 13<sup>th</sup> Dec, 2023 to 6<sup>th</sup> Jan, 2024 makes it 25 days in all. Finally the Breezer of the journal could be released on 6<sup>th</sup> Jan, 2024 during the Inauguration Ceremony of the 7th National Assembly of Forum of Ophthalmic Teachers of India (FOTI) at RP Centre, AIIMS, Delhi.

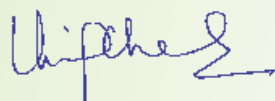
Following the release of the Breezer of journal efforts by the editorial team continued and the journal has been completed in due course of time and ready to be released both in online and offline (Hard copy) format in the month of March.

Lastly, as I have quoted the title of this Editorial as, *Doing a Task is Better than doing it Perfect*, so dear friends our team has tried the best, though might have not reached the level of perfection, yet a deep sense of satisfaction prevails.

Here, while I find myself to be running short of words in thanking Dr. Khurana Sir, and Dr. Samantha Sir for their valuable guidance, I also wish to place on record the blessings received from the Editorial Advisory Board and the support from Editorial Committee members. My Associate Editor, Dr. Bhawna Khurana, and Assistant Editor, Dr. Khushboo Sheoran have no doubt done a wonderful job allowing the Quiz and PG corner be added to IJCO for the first time along with a Current topic on Pneumonia outbreak in China. I would also like to thank all the authors who have contributed their articles in a short time and helped making this journal a reality.

I would end by saying that the fatigue of the hard work put in by the entire Editorial team will disappear once our esteemed readers show not only their love and affection but at the same time give us suggestions after a critical analysis, which would help us to improve further and do a better job next time.

Warm regards



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## **TOWARDS UNIVERSAL EYE CARE: ACHIEVING WHO'S GLOBAL TARGETS FOR VISION HEALTH IN INDIA**

### **INTRODUCTION:**

Vision impairment is a global public health concern that affects the lives of millions of individuals worldwide. According to recent estimates by the World Health Organization (WHO), approximately 2.2 billion people globally suffer from near and distance vision impairment, with more than 90% of cases being avoidable.<sup>1</sup> This represents a significant burden on individuals, communities, and healthcare systems. Fortunately, effective interventions are available to address most vision impairment needs, making vision care one of the most feasible and cost-effective healthcare interventions to implement.<sup>2</sup>

In countries like India, with diverse and heterogeneous populations, having regionally representative, valid, and robust public health data is crucial. Such data enables the planning of appropriate public health strategies at the local level. Rapid assessment surveys have emerged as a valuable tool, offering a less expensive and less time-consuming alternative to detailed and resource-intensive epidemiological studies.<sup>3</sup>

The key interventions in addressing vision impairment is provision of cataract surgery and correction of refractive errors.<sup>4</sup> In fact, complete treatment coverage of refractive error and cataract surgery could eliminate approximately two-thirds of global vision impairment.<sup>5</sup>

### **Global Targets for Vision Health:**

Recognizing the importance of addressing vision impairment, the 73rd World Health Assembly adopted a resolution titled 'Integrated people-centred eye care,' emphasizing preventable vision impairment and blindness. In response to this resolution, the WHO undertook a consultative process with Member States and experts from the field to develop global targets for effective cataract surgery coverage (eCSC) and effective refractive error coverage (eREC).<sup>6</sup>

The endorsed feasible global target for eREC is to achieve a 40% increase in effective coverage of refractive error by 2030.<sup>7</sup> Countries with a baseline eREC of 60% or higher should strive for universal coverage.<sup>7</sup> Moreover, countries should aim to achieve an equal increase in effective coverage of near and distance refractive error in all relevant population subgroups, regardless of baseline estimates.

Similarly, the endorsed feasible global target for eCSC is to attain a 30% increase in eCSC by 2030. Countries with a baseline eCSC of 70% or higher should work towards universal coverage.<sup>8</sup>

### **Community-Based Field Surveys:**

To assess coverage data and ensure the effectiveness of eye health programs, community-based field surveys are invaluable. These surveys provide critical insights into the reach and impact of primary eye care services, helping identify which segments of the population are failing to access these services.<sup>6</sup> Importantly, they do not just measure the extent of coverage but also the effectiveness of coverage, ensuring that individuals receive high-quality eye care that produces the expected health outcomes.

### **Toward Universal Health Coverage and Sustainable Development Goals:**

Achieving these global targets for vision health is not only essential for reducing vision impairment but also contributes to broader healthcare goals. It aligns with the Sustainable Development Goals (SDGs), particularly the target of Universal Health Coverage (UHC).<sup>9</sup> Access to essential eye care services is a fundamental component of UHC, and the data collected from these surveys will help guide governments in making informed decisions to work towards achieving these goals.<sup>10</sup>



**Prof. Praveen Vashist**

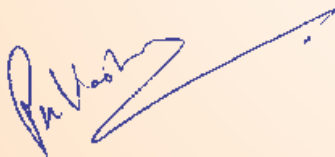
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## CONCLUSION:

Vision impairment affects millions globally, but the majority of cases are avoidable. The adoption of global targets by WHO for effective cataract surgery coverage and refractive error coverage represents a significant step toward addressing this public health challenge. Community-based field surveys play a pivotal role in assessing the effectiveness of eye health programs and ensuring that quality eye care reaches those in need. Achieving these targets not only improves vision health but also contributes to broader healthcare and development objectives, ultimately making a positive impact on the lives of individuals and communities worldwide.

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## President's Message

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Dear ACOIN Members,

It gives me great pleasure and a feeling of pride on the release of Indian Journal of Community Ophthalmology by none other than the renowned academician Dr. A.K. Khurana who is the Chief Editor of IJCO.

I also take this opportunity to share the extensive work done by your goodself.

I express a deep sense of gratitude and extend my best wishes to the entire Editorial Team on the occasion of release of the journal at the 74<sup>th</sup> Annual Conference of Delhi Ophthalmological Society from 29th-31st March, 2024.

With Best Wishes to one and all



Dr. Sharat Ch. Das

**Dr. Sharat Ch. Das**

President

ACOIN

### ECHO FROM ACOIN NATIONAL SECRETARIAT

IJCO ( Indian Journal of Community Ophthalmology ) is 'The Trumpet Blower' of ACOIN ( Association of Community Ophthalmologists of India). ACOIN was established in the year 2009 at the very close of the Indian Alumni Group of ICEH ( International Centre for Eye Health London )- 'IAG ICEH'. The latter Organisation was started in 2000 by the Indian Ex-students of International Centre for Eye Health, London. The goal of both the Organisations were same 'Advocacy in Community Eye Health Services in Indian sub-continent'. Keeping that goal in mind IAG ICEH and ACOIN is working in Indian subcontinent for the last 24 years. In the year 1926 ACOIN is going to celebrate its Silver Jubilee celebration in Kolkata as a mark of fulfillment of its journey for 25 years in Indian subcontinent in CEHS (Community Eye Health Services).



Dr. Swapan Samanta

The latest model of ACOIN towards Public Eye Health Awareness is '**Drishti Ratha Yatra**'. We have the aim to cover all the 1400 districts of Indian subcontinent within coming 5 years. So far we have traveled around 100 districts of India, Bangladesh and Nepal. But many miles to go. In initial years from 2002 we used to publish News Letter. Then We had the proud privilege of publishing the very first issue of this Journal (at that time it was known as '**Vision & Mission**') edited by Professor Ketki Bagchi (an Alumni of ICEH, London) released in 2015, in Kolkata by Prof. Harminder Singh Dua, the Chairman of Department of Ophthalmology, University of Nottinghamshire. Following the three years tenure of Prof Ketaki Bagchi, Dr. Chandana Chakraborty took the baton of editorship and was successful to publish three Annual issues regularly.

#### Golden Hour

Now Professor Ashok Khurana the renowned Academician cum Comprehensive Ophthalmologist as well as an Alumni of ICEH, London is the Editor of this Journal for Three years. This Journal is the unique Ophthalmic Journal in the world which sandwiches both Clinical as well as Public Health Ophthalmology. We are confident that by the kind touch of Prof Khurana this 'Academic Sandwich' will be indexed very soon and will benefit the ophthalmic fraternity of Indian subcontinent at large.

Jai Hind.



**Dr. Swapan Samanta**  
Hony. Gen. Secretary  
ACOIN

## PNEUMONIA OUTBREAK IN CHINA

**Khushboo Sheoran, Urmil Chawla**

RIO, PGIMS, Rohtak

The recent spike in pneumonia cases in China has raised concerns, but it's important to understand the situation before jumping to conclusions. Here's what we know:

### Nature of the outbreak

- Multiple viruses and bacteria: The increase isn't attributed to a single cause but rather a combination of known respiratory pathogens. These include Influenza, Mycoplasma pneumoniae (a bacterial infection), Respiratory syncytial virus (RSV), and even COVID-19.
- Immunity Debt: While affecting all ages, the rise in pneumonia cases seems particularly pronounced among children. This has sparked concerns about "immunity debt," where children missed exposure to common illnesses during lockdowns and now lack immunity.

### Reasons for the surge

- Post-lockdown rebound: As China eased strict zero-COVID policies, a natural surge in respiratory illnesses, including pneumonia, was expected. People who were isolated for long periods are now encountering viruses and bacteria they weren't exposed to before.
- Seasonality: The increase is also consistent with the typical winter peak for respiratory illnesses.
- Limited information: China's official data and media reports haven't provided detailed information about the outbreak, leading to speculation and uncertainty.

### Current situation

- Difficulty in assessing: It's difficult to gauge the severity of the outbreak due to limited data and mixed reports. While some sources paint a concerning picture, others suggest the situation is under control.
- No new unknown pathogen: Authorities haven't identified any new or unknown pathogen, which is reassuring compared to the initial stages of the COVID-19 pandemic.

### Recommendations

- Stay informed: Monitor reliable news sources and official updates for accurate information.
- Practice hygiene: Wash hands frequently, wear masks in crowded spaces, and maintain good personal hygiene to prevent the spread of respiratory illnesses.
- Seek medical attention: If you experience symptoms of pneumonia, consult a doctor promptly for diagnosis and treatment.
- Remember, it's important to avoid unnecessary panic and stay informed through reliable sources. The situation is still unfolding, and we'll need further information to understand its full scope and impact.



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# NATIONAL PROGRAMME FOR CONTROL OF BLINDNESS AND VISUAL IMPAIRMENT : AN UPDATE

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## ABSTRACT

Blindness is a major public health problem in India. One out of every three people in our country is blind and major causes of blindness are Cataract, Refractive Error, Corneal Blindness, Glaucoma etc. The main factors responsible for higher prevalence of blindness in India are less ophthalmic care professional, inequality in availability of services among Rural/urban area and Lack of awareness, knowledge and concern, malnutrition, lack of eye care; superstitions and ignorance. In 1976, to solve this major problem, government of India started the National Program for Control of Blindness. But, in 2017, the programme was strengthened and expanded to cover all kinds of visual impairment. It was renamed from National Programme for Control of Blindness to National Programme for Control of Blindness and Visual Impairment and this programme is implemented all over the India uniformly, with a goal of reducing the prevalence of avoidable blindness to 0.25% by the year 2025. The Government stressed on comprehensive eye care services at grass root level and also committed to provide preventive and curative eye care services through Health & Wellness Centres in the country.

**Keywords:** Blindness, Visual Impairment, Cataract, Treatment, Preventive services

## INTRODUCTION

In India, blindness is a major public health problem with an estimated 15 million blind persons in the country. One out of every three people in India is blind and more than two thirds of blind and visual impairment persons are reported from Andhra Pradesh, Orissa, Madhya Pradesh, Maharashtra, Rajasthan, Tamil Nadu and Uttar Pradesh.<sup>1</sup> Main causes of blindness are cataract (62.6%) refractive error (19.70%) corneal blindness (0.90%), glaucoma (5.80%), surgical complications (1.20%), posterior capsular opacification (0.90%), posterior segment disorder (4.70%), others (4.19%) while the estimated national prevalence of childhood blindness or Low Vision is 0.8/1000. The major factors responsible for higher prevalence of blindness in India are:

1. Less ophthalmic care professional.

2. Under-utilisation of manpower.
3. Inequality in availability of services among Rural/urban areas.
4. Lack of awareness, knowledge and concern, malnutrition, lack of eye care; superstitions and ignorance.
5. Not proper treatment of infections of eyes.
6. Quack practice and home remedies.

A survey was carried out in India in the year 2001-02 which showed the estimated prevalence of blindness was 1.1% and Rapid Survey on Avoidable Blindness conducted during 2006-07 showed reduction in the prevalence of blindness from 1.1% (2001-02) to 1% (2006-07). The National Blindness Survey (2015-19) has shown reduction in the prevalence of blindness from 1% (2007) to 0.36% (2019). Cataract is the dominant cause of blindness as it accounts for nearly two third of blind population. To handle this major problem, Government of India had launched the National Program for Control of Blindness in 1976 with the goal to reduce the prevalence of blindness from 1.4% (1974) to 0.3% by the year 2020 by developing eye care infrastructure human resources, improving accessibility quality of eye care services. The main plan and activities of programme were Basic Programme



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components, Programme organization and Strategic plan for vision 2020: Right to Sight in India.<sup>2</sup>

**The National Program for Control of Blindness** was a 100% centrally sponsored scheme in early years but from 12th Five Year Plan, the contribution between centre and states was set as 60:40 in all States/UTs and 90:10 in hilly states and all North East states. From the year 2017, the programme was strengthened and expanded to cover all kinds of visual impairment. It was renamed from National Programme for Control of Blindness (NPCB) to National Programme for Control of Blindness and Visual Impairment (NPCBVI) and is implemented all over the country uniformly, with a goal of reducing the prevalence of avoidable blindness to 0.25% by the year 2025. Preventive and curative eye care services are also provided through Ayushman Bharat-Health & Wellness Centres in the country.

### **Goals & Objectives of the programme:**

Goal of the programme:

Under the National Health Policy (NHP), the target is to reduce the prevalence of blindness to 0.25% by 2025.

### **Objectives of the programme:**

- To reduce the backlog of blindness through identification and treatment of blind at primary, secondary and tertiary levels based on assessment of the overall burden of visual impairment in the country.
- Develop and strengthen the strategy of NPCBVI for “Eye Health” and prevention of visual impairment; through provision of comprehensive eye care services and quality service delivery
- Strengthening and upgradation of Regional Institute of Ophthalmology (RIOs) to become centre of excellence in various sub-specialities of ophthalmology
- Strengthening the existing and developing additional human resources and infrastructure facilities for providing high quality comprehensive Eye Care in all Districts of the country
- To enhance community awareness on eye care and lay stress on preventive measures
- Increase and expand research for prevention of blindness and visual impairment
- To secure participation of voluntary organizations/private practitioners in eye care

In States where integrated Health and Family Welfare Society has been constituted at State and District levels, functions of District Health Society would be carried out by the integrated society. The primary purpose of the District Health Society is to plan, implement and monitor blindness control activities in the district as per described in NPCB.

### **Important functions of District Health Society<sup>3</sup>:-**

1. To assess the magnitude and spread of blindness in the district by means of active case finding village wise to be recorded and maintained in Blind Registers.
2. To organize screening camps for identifying those requiring cataract surgery and other blinding disorders, organize transportation and conduct of free medical or surgical services including cataract surgery for the poor in Government facilities or NGOs supporting the programme.
3. To plan and organize training of community level workers, teachers and ophthalmic assistants/nurses involved in eye care services.
4. To procure drugs and consumables including micro-surgical instruments required in the Government facilities.
5. To receive and monitor use of funds, equipments and materials from the government and other agencies/donors.
6. To involve voluntary and private hospitals providing free/subsidized eye care services in the District and identify NGO facilities that can be considered for non-recurring grants under the programme.
7. To organize screening of school children for detection of refractive errors and other eye problems and provide free glasses to poor children.
8. To promote eye donation through various media and monitor collection and utilization of eyes collected by eye donation centers and eye banks.
9. The Paramedical Ophthalmic Assistance shall be doing the regular screening for cataract and other diseases in the outreach camps. They shall be under the direct control of the District Ophthalmic Surgeon / DPM.

### **Major activities of NPCBVI<sup>4</sup>:**

1. Primary eye care services:
  - Preventive and promotive eye care services: under comprehensive primary health care

Health and Wellness Centres are providing preventive and promotive eye care services.

- IEC activities for promotion and preventive eye care and eye donation.

## 2. Secondary eye care services

- Cataract surgeries: Reduction in the backlog of cataract by performing cataract surgeries in Governmental, Non-Governmental Eye Hospitals and private practitioners.
- Screening for Refractive errors and Distribution of free Spectacles: Screening of Children for identification and treatment refractive errors and distribution of spectacles to those who are suffering from refractive errors through school eye screening programme.
- Distribution of free spectacles to old persons suffering from presbyopia to enable them for undertaking near work as a new initiative under the programme.
- Management of Visual impairment: The programme is now geared to take care of all categories of visual impairment including low vision cases. Apart from cataract, now the focus of the programme is on treatment and management of other eye diseases like glaucoma, diabetic retinopathy, vitreo retinal diseases, Corneal blindness and childhood blindness.
- Use of Mobile Ophthalmic Units and Tele-ophthalmology network to expand coverage and reach of the programme in disadvantaged and hard to reach areas.
- Eye banking Services: Strengthening of eye banking services and collection of donated eyes.

## 3. Tertiary Eye care Services:

- Grant in Aid for strengthening of RIOs and Medical Colleges to provide super-speciality eye care services
- Hands on Training of Govt. Eye Surgeons for upgradation of their clinical and surgical skills.
- Information Education and Communication campaigns
- Carried out Research and surveys

## 4. Infrastructure Development and Capacity building:

- Grant in Aid for strengthening of eye care units at primary and secondary level.

- Training of Paramedical Ophthalmic Assistant and Eye donation counsellors.

## 5. Newer Initiatives/Focus Areas under the program:

- Revision of NPCBVI guidelines to provide Comprehensive eye health care through AB-Health and Wellness Centers
- "Standards of eye banking in India 2020" have been launched for improvement in eye donation, collection, processing, and maintenance of quality standards, equitable distribution of scarce corneal tissue, strengthening of institutional capacity for corneal transplantation, community awareness and training of health personnel.
- Development of a network of eye banks and eye donation centres and linked with medical colleges and RIOs to promote collection and timely utilization of donated eyes in a transparent manner
- Focus on other causes of Visual impairment, besides Cataract, treatment/management of other eye diseases like diabetic retinopathy, retinopathy of prematurity. Corneal Blindness and glaucoma have been increased. The diabetic retinopathy screening and glaucoma clinics have been made integral part at district and sub-district hospitals.
- In order to achieve elimination of trachoma by the year 2020 as per WHO global action plan, surveillance, case detection and treatment of Trachoma trichiasis is being executed which will be followed by Trachoma trichiasis only survey in all previously trachoma endemic districts.
- Setting up of super-specialty clinics for all major eye diseases including diabetic retinopathy, glaucoma, retinopathy of prematurity etc. in state level hospitals and medical colleges all over the country.
- Linkage of tele-ophthalmology centres at PHC/ Vision centres with super-specialty eye hospitals to ensure delivery of best possible diagnosis and treatment for eye diseases, especially in hilly terrains and difficult areas.

## CONCLUSION

In conclusion, India had revised strategies and plans to reduce the backlog of visual blindness and impairment and results of this will see in coming years and it is evident

from the achievement of programmes i.e NPCBVI. These strategies will focus on universal, easily accessible and early and timely eye care intervention that must be taken forward as a priority. The universal eye care means to ensure the availability, accessibility, and affordability must be implemented at the lowest village level ie at subentres. However, there is a need of hour to strengthen, and expand the infrastructure and ophthalmic equipments under NPCBVI.

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## CHILDHOOD BLINDNESS – AN UNFORTUNATE STORY

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### ABSTRACT

Childhood blindness is a major public health problem across the world. The psychological, mental and emotional impact on a blind child is unimaginable. In addition, the lack of care, frequent hospitalization and death in childhood, are woes which affect the blind child. Even those who survive, educational and vocational opportunities are limited, which affects their quality of life and inability to function normally in society, which leaves a visually handicapped child into isolation, and mentally deranged and discarded by society. The socio-economic burden on the family is devastating, as the number of years or for whole life, a blind child becomes a liability and burden.

**Keywords:** childhood, blindness, poverty, trauma

### INTRODUCTION

#### The chilling facts:

Out of 45 million blind persons in the world, 1.5 million are children. Approximately 5 lakh children become blind every year; almost one in every five minutes, about half of them die within 1-3 years of becoming blind. Another 17.5 million suffer from moderate to severe visual impairment.

Almost 20 babies born each day, will become blind in childhood. And 50% of children who become blind in infancy, die within 1-3 years of life. The reasons are equally disturbing, such as a blind child is often neglected, left to his fate and easily succumbs to trauma, illness and lack of care.

Vast majority of blindness occurs before the age of 5 years, when 75% of learning is through sight. More than 90% of blind children do not go to school.

#### Epidemiology:

More than 75% of blindness occurs in poor and developing countries. Higher incidence of blindness in

low socio-economic regions is mainly due to the following reasons:

1. There are reasons and risk factors which predominate in poverty stricken areas like infections, malnutrition, Vitamin A deficiency, lack of education, etc.
2. Lack of well equipped hospitals and trained medical personal who can manage treatable causes of childhood blindness like congenital cataracts, glaucoma, Retinitis of prematurity, etc.
3. Finally, medical treatment is the last thing on the parents agenda of an impoverished family, priority being their struggle for lively hood.

The prevalence for blindness in children, i.e., the proportion of ' blind child population' is 0.3 / 1000 children in developed countries as compared to 1.5/ 1000 in developing countries.

#### Causes of Blindness:

The following are the main causes of childhood blindness:

1. Vitamin- A deficiency and malnutrition.
2. Corneal scarring due to infections.
3. Ocular trauma.
4. Congenital cataracts.
5. Optic atrophy.
6. Uncorrected refractive errors.
7. Congenital glaucoma.
8. Hereditary retinal diseases.
9. Pre-mature births.
10. Birth defects.



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The above chronology may not be precise in this order as reasons may differ as considerable variations exist in countries and within countries also with regard to magnitude and causes. For example,

Vitamin A deficiency, infections, and trauma are more prevalent in poor and low socio-economic areas; uncorrected refractive errors more prevalent in rural and uneducated regions; while retinal diseases, congenital malformations and prematurity retinal disorders dominate the developed world.

Certain reasons for childhood blindness need special attention, being major causes of avoidable blindness in certain regions.

Severe Vitamin A (Retinol) deficiency disorders (VADD) kills and blinds hundreds of thousands of children needlessly every year in many impoverished and low socio-economic countries of world.

But since the tragedy is preventable, early signs must be looked for and a strong primary level healthcare system should be generated for this reason.

Trauma, is another area prevalent both in developed and underdeveloped world; however the type of injury may vary. India, in particular, has a strong rural and religious background and therefore, injuries during festivals is a concern. Also lack of education and poverty, influences the precautions need to be taken during sport activities.

ROP (retinitis of prematurity) is more common in developed countries where advanced medical care helps survive premature babies.

With all said and done, the bottom line is how to prevent and manage avoidable blindness in children. Taking cognizance of the increasing level of blindness in children, WHO (World Health Organisation) in 1999, launched a global initiative for elimination of avoidable blindness. The program was coined as "Vision 2020- The Right to Sight". There are six major areas which are priority for vision 2020 program :

1. Cataract.
2. Corneal blindness.
3. Childhood blindness.
4. Diabetes (Ocular involvement)
5. Uncorrected refractive errors
6. Onchocerciasis.

Though this was a global initiative which involved general population as a whole, but lot of impetus was given to the prevention of childhood blindness due to

the following reasons:

1. Causes of blindness in children differ from those in adults and require different strategies.
2. Delay or absence in treatment in early stages leads to conditions untreatable later on.
3. Management requires specific training of medical personal, knowledge, skills, and equipment.

Many NGO's have subsequently joined this WHO initiative to help in this program, like International Association for Prevention of Blindness (IAPB) and the Lion's International (Sight first program).

Several countries have added their own programs to strengthen the efforts. India, specifically has added the 'National Program for Prevention of Blindness'. Though it mainly concentrates on elimination of blindness due to cataract, but on the sidelines it also emphasises on childhood blindness in 3 ways :

- a) Primary eye care (through primary health care system).
- b) Referral to pediatric eye care / Tertiary centres.
- c) Rehabilitation of the visually handicapped.

The primary health centres play a major role for pediatric eye care. They are trained and must carry out duty to detect early signs of vitamin A deficiency, see for any defect in eyes specially squint, infections, or white reflex in pupillary area, and urgently refer to the higher centre. They must also hold sessions to educate the masses regarding ocular hygiene, and eye care and most importantly, check vision.

The tertiary eye care centre should be equipped with well trained specialists and infrastructure for pediatric eye care.

What we still lack is proper rehabilitation of the visually impaired. Various vocational centres for training are now available for certain jobs like typing, computers with Braille script, music courses, and similar vocations where a blind person can learn and earn livelihood. But unfortunately, these training centres are too few and not well managed either by government or private.

### CONCLUSION

Pediatric visual impairment or blindness is a major public health problem. A blind child is a liability on the family and the society. And the devastating effect it has on the physical, social and mental development is appalling. It is really sad that we are still lacking much behind in all relevant areas of pediatric eye care.

The Vision 2020 program could bring the child blindness ratio from 1.5 /1000 to 1/1000, but much less as compared to developed countries which have 0.3/1000.

We need to take a pledge and promise by all pediatric medical professional to dedicate some time for management of pediatric eye disorders.

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## PILOT PROJECT

## TRANSFORMING HEALTH CARE IN RURAL INDIA – A PILOT PROJECT

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Globally, Optometry is a primary eye care profession and can contribute immensely in elimination of avoidable blindness. When I was the President of Asia Pacific Optometry Council (APOC) and Board member of World Council of Optometry (WCO) I traveled to different countries in various parts of the world to understand eye care delivery models prevalent across the globe.

After years of observing and learning from such models, I decided to start a small initiative in the village of Patauda, Haryana- where I had my primary and secondary education before joining All India Institute of Medical Science (AIIMS) for Optometry in 1976.

Patauda Village is in the Jhajjar district of Haryana situated about 80 km from New Delhi and had no primary healthcare facility in 2016. Every Sunday, we conducted eye tests and checked refraction and provided free corrective glasses to the community. We set up our eye health camp in the Devi Mandir Temple on the outskirts of the village so that other villages could also avail its services.

As the number of patients grew, the Temple built a few rooms and allotted us a room so that patients would be seen properly. We soon realised that cataract was very prevalent and patients needed the surgical intervention. We tied up with different eye hospitals in Delhi and transported these patients to Delhi and back after cataract surgery. This was usually done in a small bus so that 20 patients could be sent at a time.

There was a challenge that every time we transported 20 patients, 5 to 6 patients were rejected because they had high blood pressure or high sugar or other such complications.

This made us think differently - how could the patients be tested remotely, so they didn't have to travel when they were not fit for surgery? We adopted the latest technologies so that all health vitals and diagnostics could be performed at the village itself, at our eye health camp.

As the eye health camp, which is now a health centre, grew in popularity our patient numbers grew. We increased our reach to tie up with the local district hospital in Rewari and use their operation theatre and brought Ophthalmologists from Delhi to operate there instead of the patients going to Delhi. We used the services of some of the best hospitals - AIIMS New Delhi, Dr. Shroff Charity Eye Hospitals and Lions Eye hospital for cataract surgeries.

Our continued work and reach drew the attention of the Haryana Chief Minister Hooda and he approved a Primary Health Centre in this village in spite of another PHC just 5 Kilometres away. As per guidelines there needs to be a minimum distance of 8 kilometer between two PHC's. However, the volume of patients and trust in services at our centre made this possible.



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Now we had a whole PHC in the Devi Mandir compound, where healthcare services ranged from minor cough and cold to childbirth. Patients who earlier had to travel for all diagnostics were now getting specialist care in their village.

Healthcare delivery came to a standstill during Covid times and everyone turned to the practice of telemedicine. Fortunately, I had been practicing telemedicine for a long time due to my involvement in sports to remain connected with my patients in my clinics when I was away for National and International tournaments.

For safe practice of eye care delivery during Covid times, I also wrote a book " Innovative Approaches in Telehealth for Ophthalmologists, Optometrists & Opticians."

We tied up with CRT Bionics, a AISTA company, for a telehealth examination and diagnostic product "Vision flex" and started the first pilot project in Patauda. Vision flex technology has hardware and software which uses the internet through an optical fibre or 4G or a satellite connectivity. It used various medical devices which turned into sophisticated medical examination and diagnosis tools through Bluetooth connection. All health vitals and parameters are transferred electronically, avoiding medical human errors. All Vision Flex medical devices are approved by FDA, CE, TGA Australia and Indian regulators.

We collaborated with SGT Medical college for the use of all their medical specialists using a computer or tablet, smartphone or smart television. Our Tele medicine portals has cybersecurity protection for all health data which is encrypted from end to end for privacy. Technology also involved HD video and diagnostic quality audio transmission for proper diagnosis.

We plan to provide the training to nurses and medical students in our health hub in Patauda.

All patients are given ABHA ID by our software and all diagnostics tests where a cardiologist could hear the heartbeats of patients in our village hub in SGT medical college or anywhere in the world. Multiple medical specialists and family members could also join the video conference and observe and record the proceeding of every examination so that they're up to speed on the patient care.

Every patient who is transported for cataract surgery or any other surgery has been investigated for height , weight , blood pressure, 3 and 12 lead ECG, eye pressure , HbA1C . Our Fundus Camera could capture retinal image and use AI to diagnose retinal diseases and suggest the need of diabetic retinopathy referrals .

Vision Flex has diagnostic tools like Dental camera which has inbuilt AI and could measure the cavity and size of dental implants . It has an ultrasound probe where fetal detection is masked using Artificial intelligence to be used for other medical specialties.

Multiple probes of endoscopy, laparoscopy, OAE neonatal hearing screener and a portable x ray with inbuilt artificial intelligence diagnosis makes our vision centre unique where patients with different health conditions can be examined and treated in village setting and patients are only transported to hospital for surgeries and all pre and post operative care can be provided by Nurse employee in our hub.

Test trial of a medical drone between our hub and SGT Medical college has now been completed. Medical drones will transport life saving drugs , blood samples for pathology and even cornea for donation after death.

We plan to open more such hubs in nearby villages where drones will also transport expensive instruments like X Ray, Fundus cameras with artificial intelligence and share resources to keep the cost low .Very soon all newborn babies will be screened for hearing loss using AOE screener and ROP as well .

Our vision flex probes fit into a small bag and we can reach and provide healthcare to very old and sick patients or patients with disabilities in their homes too .

For Pathology, we have 30 types of different kits which can diagnose most communicable and non

communicable diseases in 15 minutes using a sample of saliva , blood , urine or stool and can diagnose infections or cancers . We use generic medications through Jan Ashudhi scheme of Government of India to keep the cost affordable for rural public . We are also trying to work out group panchayat insurance where our rural population will be covered for medical and surgical cover of 5 lacs with a very low premium. The goal is to provide and empower the people with access to health care to use it optimally.

We are working closely with ICMR and wish to provide them with all the health data to measure the sustainable development goals of WHO and do research on presence of diseases and also do cost benefits analysis of our model of care. While this may seem like high reaching goals for the future, a small initiative has grown exponentially over the last couple of years and will continue to expand it's reach using technology and with the help of AI. As healthcare providers, and industry frontrunners, its our responsibility to adopt technology to help provide the best level of care at all levels of society in all parts of our vast and varied country.

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# COMPREHENSIVE PRIMARY EYE CARE SERVICES IN URBAN SLUMS OF DELHI-NCR - OUR EXPERIENCE

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## ABSTRACT

Blindness and visual impairment continue to be a major public health problem in India. Availability and easy access to primary eye care services is essential for elimination of avoidable blindness. 'Vision 2020: The Right to Sight - India' envisaged the need for establishing primary eye care units named vision centers for every 50,000 population in the country. The government of India has given priority to develop vision centers at the level of community health centers and primary health centers under the 'National Program for Control of Blindness & visual impairment'. NGOs and the private sector have also initiated some models for primary eye care services. Here we share our experience as an apex center of Ophthalmology implementing gamut of comprehensive primary eye care services in urban slums of Delhi NCR through hub and spoke vision center model.

**Keywords:** Primary eye care, Vision Centers, Health education, Diabetic Retinopathy screening

## Primary Eye Care

Primary eye care (PEC) is defined as "a 'frontline' activity, providing care and identifying disease before it becomes a serious medical issue. It is a combination of activities encompassing promotive, preventive, therapeutic and rehabilitation services delivered at community level. Principally, primary level eye care aims to deliver affordable services to all, irrespective of the socio-economic abilities of individuals.

PEC also includes timely detection of common eye diseases such as cataract and refractive errors, the leading causes of visual impairment. Refractive errors can be addressed effectively by ophthalmic assistants through the primary eye care delivery network by provision of spectacles. Screening targeted to identify diabetic retinopathy and glaucoma can also be initiated at this level with provision of essential equipment and adequate



Fig.-1: Health Promotion activity at vision center

training. The patients identified with diseases should be referred to appropriate secondary and tertiary levels for further management. Rehabilitation of people with blindness and low vision can also be carried out at the primary eye care level itself. It is recognized that a majority of cases with avoidable blindness can either be prevented or treated by efficient utilization of existing resources in the community and through creating eye health promotion programs (Figure 1).

Primary eye care through Vision Centres: Hub and spoke model

As a part of routine outreach eye care services, The Community Ophthalmology Department at the 'Dr.



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Fig.-2- 17 vision centres in urban slums and underprivileged community of Delhi -NCR developed by DR. RP centre in collaboration with Delhi Government and various NGOs.

Rajendra Prasad Center for Ophthalmic Sciences, All India Institute of Medical Sciences, AIIMS New Delhi is providing primary eye care services through 17 vision centers in urban slums and underprivileged community of Delhi and National Capital Region in collaboration with Delhi Government and various NGOs. (Figure 2 & 3) It serves nearly one million populations, with each vision centre catering to around fifty thousand people. More than 70,000 beneficiaries avail the primary eye care services annually through these vision centers. The activities at the vision centre include eye health education events, vision screening, refraction services, free or subsidized spectacles, and distribution of medicines. The PEC centers are situated at fixed locations and are managed either by community-based organizations (CBOs) or the government sector. A one optometrist and two field workers who visit once or twice a week as per the need of the community in the different slum clusters. The optometrist conducts basic eye examinations along with the prescription of spectacles which are subsidized and arranged at the vision center. Patients screened for cataract surgery or other ocular diseases are referred to

List of Vision Centres under Community Ophthalmology, AIIMS					
S.No.	Cluster Name	Partner CBOs	S.No.	Cluster Name	Partner CBOs
1	Nangli Dary	SSMI	12	Taura	Deepulaya
2	Trilokpur	AIIMS	13	Patel garden	Deepulaya
3	Jahid Road	DDFA	14	Jamunpur	Deepulaya
4	Madipur	SSMI	15	Sangy Colony	Deepulaya
5	Nangol Raja	MCD Delhi	16	Sohna	Deepulaya
6	Chang Delhi	Delhi Government	17		
7	Jamunpur	Delhi Government			
8	Fardapur Dori	MCD Delhi			
9	Hassant Green	Delhi Government			
10	Mehrauli	Delhi Government			
11	Sarai Kakhra	Delhi Government			
12	Dhandra	Hess Motors			

Fig.-3- List of Vision Centres under Community Ophthalmology, AIIMS

the base hospital for free investigations and treatment through the community eye care services program.

**Comprehensive services offered through vision centre model**

**I) Health education and training in primary eye care**

As a part of regular outreach eye care services, primary eye care services are provided by Community Ophthalmology section of RP centre for poor and vulnerable communities. Health education talks are organised in vision centres on daily basis by the health worker for awareness in community about prevention of eye diseases, like Cataract, Glaucoma, refractive errors and diabetic retinopathy. The training program of community workers in Primary eye care are also organised to ensure that patients should get Primary eye care services and treatment at their doorstep.

**II) Referral and free treatment facility**

All patients diagnosed with cataract at vision centres are referred to Community Ophthalmology department at Dr. RP Centre, AIIMS. These patients after detailed evaluation by resident Ophthalmologist, are admitted to dedicated beds in community ward with provision of free food, medicines, and quality nursing care. The All such patients are provided cataract surgery using advanced suture less phacoemulsification technique and implantation of acrylic foldable IOL are provided free of cost. These newer techniques and modern lenses have a lesser complication rates and good post operative vision. The focus is on ensuring that all patients, regardless of their financial status, receive the same level of care and access to advanced technologies, promoting equitable opportunity for vision restoration and overall well-being. Nearly 2000 surgeries are performed annually free of cost under community ophthalmology.

**III) Refractive errors and provision of subsidized spectacles**

Refractive error is the major cause of ocular morbidity among school-going children in India and specifically myopia is the most common cause of visual impairment among them. It remains undetected as children usually don't complain of defective vision especially if only one eye is involved. The parents and children are not even aware about these problems. To provide services for refractive errors, community ophthalmology regular organized school vision screening program for timely detection of these

problems and their correction by provision of low-cost spectacles. Under the school vision screening programme, schoolteachers are trained to screen the children for subnormal visions. These children are provided with refraction and free spectacles. Every year, more than 40000 children were screened and nearly 5000 children were identified with sub normal vision and spectacles were dispensed free of cost to them. To Assess the incidence and progression of myopia among school Children of Delhi.

#### IV) Diabetic retinopathy screening programme

Diabetes has emerged as a major public health problem in India. The prevalence of diabetes in urban populations ranges from 10.9% to 14.2%. A large proportion of patients with undiagnosed and poorly controlled diabetes are at great risk of developing diabetic retinopathy (DR) and irreversible blindness. Unfortunately, as per the finding of national Diabetic retinopathy survey, only 10% of the diabetic are going for eye examination for diabetic retinopathy.

Team from Community Ophthalmology provide screening for diabetic retinopathy in the vision centres. A dedicated optometrist, trained in screening of Diabetic retinopathy visits once a month for screening of diabetic patients. The aim of the screening programme is to identify people with sight-threatening DR so that their treatment can be initiated at early stages, and blindness can be prevented.

The optometrist under the project has been trained in using non-mydratic fundus portable camera for taking fundus images. (Figure 4) The fundus pictures

can be taken without dilatation of the pupil. These patients don't have to wait for nearly half an hour for dilating the pupil and can also comfortably do the routine activities after the eye examination. The images are transferred on to a laptop computer. The optometrist is trained to assess these images on a laptop and grade for suspected DR cases who need referral to RP Centre for further management. The diabetic patients without DR advised follow-up for eye fundus examination every year.

#### Data management and monitoring using ODK APP for online Data entry

For data management, our primary eye care teams are using ODK app (Online data entry kit in open-source Android app) which supports a wide range of question-and-answer types of patient record, and work well without network connectivity. It is a replacement of paper forms used before for data recording of the vision centre. By using this app our PEC recorder easily enters the patient data using their mobile phones- and the reports are automatically generated through a STRATA based analysis. number of patients seen, Old/New, age, gender, diagnosis, list of referred patients along with summary statistics on DR, cataract patients reported at RPCentre, admitted for cataract surgery, cataract surgery outcomes and submit to a server. Digital PEC daily report can be retrieved through this app. Reports on WhatsApp group on daily basis. This also help in regular monitoring of the primary eye care activities.

#### CONCLUSION


Primary eye care services using vision centres is a feasible method for eye health care delivery at the doorstep of the community. There is scope of comprehensive eye care services like Diabetic retinopathy screening services using portable fundus camera enabled with tele ophthalmology services. Effective data collection and management using digital technology enables effective data utilization for monitoring for efficient eye care services and future research.

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Fig.-4: Optometrist taking fundus picture using portable fundus camera at vision centre

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## RECENT ADVANCES IN LOW VISION REHABILITATION AIDS

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### ABSTRACT

Functional low vision is defined as an impairment of visual functioning even after treatment and/or standard refractive correction, and a visual acuity of less than 6/18 to light perception, or a visual field of less than 10 degree from the point of fixation, but who uses, or is potentially able to use, vision for planning and/or execution of a task. Low vision rehabilitation services aim to optimise the use of residual vision after severe vision loss and to teach skills to improve visual functioning in daily life and hence improve quality of life of the patients. There have been recent advancements in the field of low vision rehabilitation with introduction of visual based assistive devices including head mounted devices and smart glasses. These technology uses artificial intelligence and virtual reality algorithms to assist patients in performing their daily life activities. The universal uptake of low vision rehabilitation services is still challenging because of barriers like lack of awareness, availability and affordability issues. Research and development focused on creating cost-effective indigenous devices and models of vision rehabilitation appropriate for low-resource settings is imperative.

**Keywords:** Low vision, Blindness, Rehabilitation, Assistive technology, Smart glasses

### INTRODUCTION

The World Health Organization (WHO) classification of low vision defines functional low vision as an impairment of visual functioning even after treatment and/or standard refractive correction, and a visual acuity of less than 6/18 to light perception, or a visual field of less than 10 degree from the point of fixation, but who uses, or is potentially able to use, vision for planning and/or execution of a task blindness is defined as presenting visual acuity <3/60 in better eye with available correction. According to the WHO, functionally, low vision is a level of vision that prevents a person from carrying out their day-to-day activities.<sup>1</sup> Hence, a person may fulfil the cut offs of severe visual impairment or blindness but may still have some residual functional low vision.

According to the WHO-International Agency for the

Prevention of Blindness (IAPB) vision report 2019, 2.2 billion people have a vision impairment or blindness and 1 billion have a vision impairment that could have been prevented or has yet to be addressed.<sup>2</sup> According to the National Blindness and Visual Impairment Survey India 2015-2019<sup>3</sup> the prevalence of blindness in India was found to be 0.36% in all age groups, in which the prevalence among 0-49 years of age was 0.52% and the prevalence among those above 50 years of age was 1.99%. Whereas the prevalence of functional low vision was 0.52% in the age group of 0-49 years and 1.03% in age group above 50 years. Hence, not just blindness, but low vision also poses a grave public health concern.

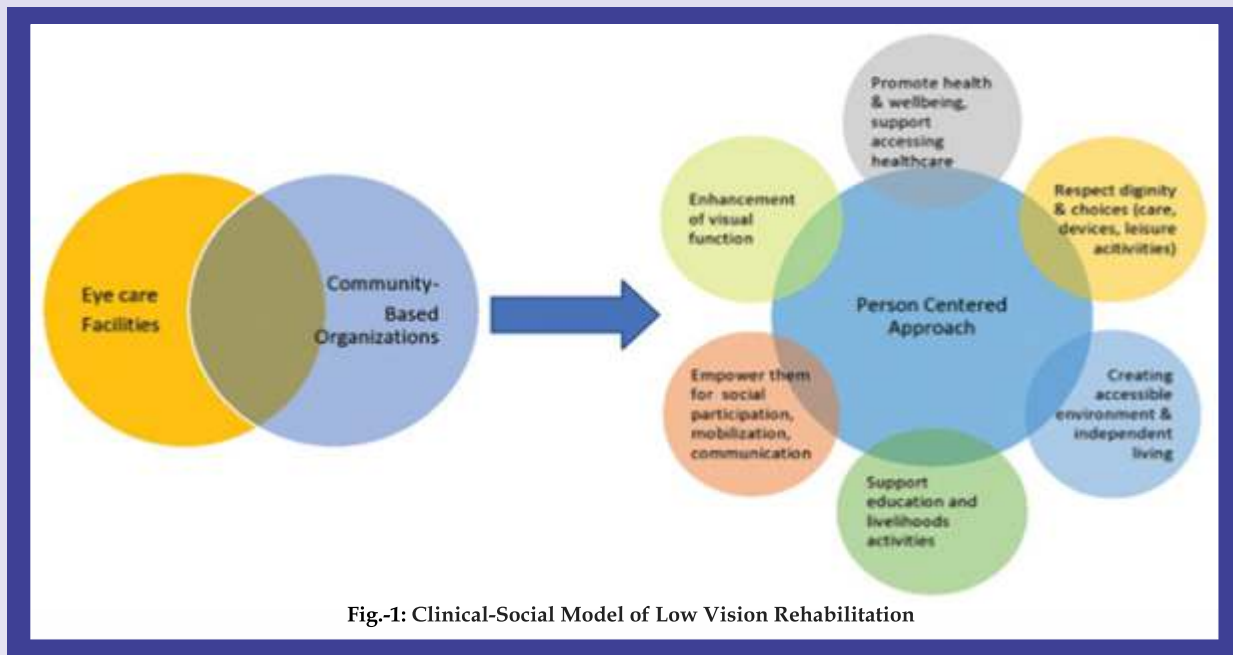
The World Health Organization defines rehabilitation as a set of interventions designed to optimize functioning and reduce disability in individuals with health conditions in interaction with their environment.<sup>5</sup> Low vision rehabilitation thus, not only aims to optimise the use of residual vision after severe vision loss, but also aims to teach skills in order to improve visual functioning in daily life and hence improve quality of life. It includes recommending low vision aids and training for using these devices. Rehabilitation is a collaborative effort of vocational therapists, social workers, and psychologists, led by an ophthalmologist.



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Visual impairment can be further divided into central or peripheral vision loss. The type of rehabilitation varies depending on visual acuity, age, type of visual disability, and individual expectations, but anyone with low vision can benefit from Low Vision Rehabilitation – which needs to shift from a clinical approach to a person-centred approach as envisioned in a clinical-social model of low vision rehabilitation<sup>6</sup>. (Figure 1)

**METHODS OF VISUAL REHABILITATION**

Depending on the visual acuity of the individual, rehabilitation can be done in two broad ways - using visual based assistive technologies or using visual substitution assistive technologies<sup>6</sup>.

• **Rehabilitation Using Visual Based Assistive Technology:**

For individuals with some residual visual acuity (visual acuity less than 6/18 to 1/60 in either eye). These include magnifiers, large print books, typoscopes etc.

• **Rehabilitation Using Visual Substitution Assistive Technology:**

These are assistive technology based on visual substitution skills like tactile or sound. These are for individuals with visual acuity less than 1/60 in both eyes, i.e., near blind or blind. These include Braille reading books, digital audio devices etc.

They can also be classified based on the devices used into<sup>7</sup>:

i. optical devices, incorporating lenses that achieve

optical magnification such as microscopes, telescopes (figure 2), magnifiers, field expansion prisms and telescopic contact lenses

ii. Non-optical devices, or supplementary devices such as illumination, large-print books, increased contrast, typoscope, Braille Alphabets tactile plates (figure 3) reading stands, audio books, voice recording devices, GPS, walking canes etc.



iii. Electronic devices, using electronic/optical techniques such as the standard closed-circuit television (CCTV) system (figure 4) which can control magnification, contrast, and brightness. These also include head mounted devices which are a type of

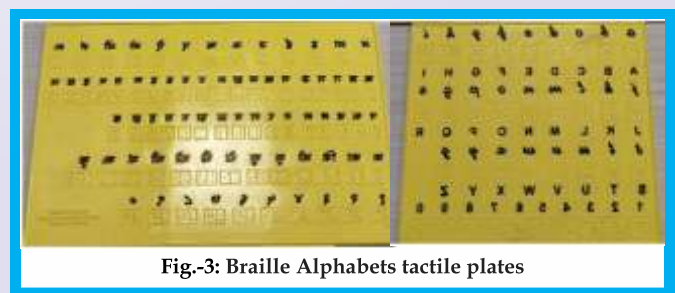






Fig-4: Visual Aid CCTV

electronic visual aid that attach to the user's head and present information directly to the user's eyes. This is in contrast to heads-up displays, which project information onto a stationary surface in the subject's line of sight.



Fig-6: AceSight HMD

**Recent advances in low vision rehabilitation aids**

**I. Visual Based Assistive Technology:**

The recent advances in visual based assistive technology aim to provide the best acuity possible with the ability to move through the day seamlessly to carry out activities of daily living which can be comfortably used for longer times.

*a. Advances in Magnifiers:* Magnifiers are useful tool for near vision, Recent advances in using the lighting source of illuminated magnifiers from halogen to LED has made them more affordable and durable as well as increased contrast

sensitivity. For example, Makrolux Brightfield and Scribolux magnifiers<sup>8</sup>.

*b. Advances in head mounted devices:* They incorporate virtual reality and/or artificial intelligence to serve as a total device set or attachment to the patient's glasses. Enhanced Vision Jordy-Low Vision Glasses<sup>9</sup> (figure 5) which can be used to see both near and far and turns into a HD desktop video magnifier when placed on its docking stand. In India, Acesight<sup>10</sup> (figure 6) and OxSight<sup>11</sup> are also available with focus lock and floating reading mode.

*c. AI/VR integrated glasses:* Devices like eSight (figure



Fig-5: Enhanced Vision Jordy Low Vision Glass



Fig-7: eSight electronic eyewear

7), allow to stream in HD directly from your phone/TV into the device as well as to take and share photos from the device to smartphones. Artificial vision devices can read any printed/digital texts with built-in speakers, recognize faces, products, money notes by just pointing at them and can be clamped magnetically onto any eyeglass frames. The SmartVision glasses<sup>12</sup>, developed in India, has Braille-coded touch keys that can be used for specific functions like walking, identifying objects, reading, and has voice recognition and an SOS emergency button as well.

- d. **CCTVs:** These have improved over the years to become more portable, allowing them to be more suitable now for work environments and classrooms. These days CCTVs can provide better clarity with High Definition (HD) technology in magnification at distance and near as well as OCR (Optical Character Recognition) technology. Examples include Enhanced Vision's Acrobat HD series and DaVinci HD/OCR<sup>13</sup>.

### II. Visual Substitution Based Assistive Technology

- a. **Smart technology:** These devices have seen a massive technological upgrade in the recent years due to varied use in even non-rehabilitative settings. Devices such as Google Home<sup>14</sup> and Amazon Echo (figure 8) allow individuals to link a multitude of their tasks to voice-based input technology.



Fig.-8: Amazon Echo / Google Home (source: Internet)

- b. **Smart Cane device (Assistech, IIT, New Delhi, India):**<sup>15</sup> is an electronic walking aid that fits on the top of the walking cane (figure 9). It can detect knee above and hanging obstacles and the detection distance is increased from 0.5 meters in



Fig.-9: Smart Cane

the traditional cane to 3 meters. It informs about the presence of objects before actually touching the object with the cane and thus helps in preventing unwanted contact.

- c. **Smart tactile gloves:**<sup>16</sup> These can be touch-based, gesture-based or combination smart gloves (figure 10). Not only can these be used for communication by the visually impaired but tactile feedback is integrated to provide tactile sensation and represent some physical parameters such as temperature and proprioception.
- d. **Finger reader:** This device, worn on a finger, uses computer vision algorithm for local-sequential text scanning that enables reading single lines, blocks of text or skimming the text with complementary, multimodal feedback. Since



Fig.-10: Smart Tactile Glove (source: internet)

this system is implemented in a small finger-worn form factor, that enables a more manageable eye-free operation with trivial setup.<sup>17</sup>

- e. *Other advances*<sup>7</sup> that are being researched upo include retinal prostheses, stem cells, Transcorneal Electrical Stimulation (TES), and gene therapies.

### **Telerehabilitation: Making low vision rehabilitation more accessible.**

Like we saw the boom of telemedicine during COVID helped deal with patient burden while maintaining quarantine/isolation guidelines, though not without its own set of challenges, telerehabilitation can potentially make low vision rehabilitation more accessible and in turn affordable to a greater number of individuals. In telerehabilitation<sup>18</sup>, a vision rehabilitation provider uses an internet based approach rather than usual care in an office to train people with low vision to improve their use of remaining visual function. This can allow one service provider to reach more individuals across geographical boundaries.

The way forward: Community based Low Vision Rehabilitation services- Reaching the unreached!

Low vision rehabilitation can create a massive difference in the daily lives of the individuals with visual impairment. Unfortunately, rehabilitation services are not accessible, affordable, and available to a vast majority of individuals who need them, and the uptake of low vision rehabilitation services remains to be low, especially in developing countries like India. This is in part due to lack of awareness among the vision service providers and partly due to the lack of affordability of low vision rehabilitation aids by those who need it the most.

At the end of the day, any scientific innovation is successful only if it can be used for the benefit of people irrespective of their caste, creed, religion and, socioeconomic status. There is a huge lacuna in the utilization of low vision rehabilitation services in spite of technological advances due to their exorbitant prices and non-uniform availability of rehabilitation devices. Hence, future research should also focus on creating cost-effective indigenous devices and models of vision rehabilitation appropriate for low-resource settings like ours.

### **CONCLUSION**

All people should have equitable access to eye health care and opportunities to achieve or recover the highest

attainable standard of health, regardless of age, gender or social position. People who are blind or who have low vision can participate fully in the social, economic, political and cultural aspects of life with the help of comprehensive low vision rehabilitation plan. Rehabilitation is a collaborative effort of vocational therapists, social workers, and psychologists, led by an ophthalmologist. The uptake of low vision rehabilitation services however remains to be low, especially in low- and middle-income countries like India because of lack of awareness and availability of low vision aids. There is an urgent need for creating cost-effective indigenous devices and models of vision rehabilitation appropriate for low-resource settings like ours.

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## STRABISMUS – A COMMUNITY HEALTH PROBLEM

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### ABSTRACT

Strabismus, with a worldwide prevalence of 1.9%, has the potential to cause visual impairment and psychosocial distress impacting the quality of life of patients as well as their family. Owing to multiple misconceptions and misinformation regarding the management of this condition, as well as its potential to cause permanent vision loss if untreated, spreading awareness at the community level is of utmost importance. A multidisciplinary approach with the involvement of doctors from different fields as well as community workers is not just desirable but necessary.

**Keywords:** Strabismus, community health, mental health, social prejudice, health education

### INTRODUCTION

Strabismus, characterized by misalignment of the two eyes, is a common presenting ocular problem in ophthalmology out-patient clinics. With a worldwide prevalence of 1.9%, it is a common public health problem which typically affects children in early years resulting in vision loss and impaired binocular function. Apart from the vision related problems, strabismus has dramatic impact on the patient's learning ability often leading to poor academic performance, decreased workplace achievement, low self-esteem, aesthetic dissatisfaction, poor interpersonal relationships and social stigma, all of which add to the social and economic burden of the society. Hence, to mitigate its effects, creating public awareness to ensure early diagnosis and management is of utmost importance.

### DISEASE BURDEN

Strabismus can develop at any age but usually develops during childhood, before 6 years of age; the peak age of onset is around 3 years. Strabismus in adulthood frequently occurs secondary to either systemic disease or mechanical damage such as trauma or brain tumor. The risk factors of strabismus are uncorrected refractive error,

maternal health, premature birth, low birth weight, developmental delay, congenital syndromes, genetic factors, systemic illnesses, and mechanical agents. Strabismus can be managed with eyeglasses, prisms, surgery, eye exercises, and medicines.

Previous research has reported the prevalence of strabismus to range from 0.12% in Japanese children to as high as 20.1% in low-birth weight English children. Population based surveys in India have observed strabismus in 0.3% to 5% pediatric population. A hospital-based study by Saxena et al<sup>1</sup> reports the magnitude of squint patients as 6% amongst all patients seeking ophthalmology consultation, and that for children as 26.6%. This trend reflects excessive referral of pediatric strabismus to a tertiary care institution due to lack of adequate facilities at primary or secondary level. These numbers further indicate an urgent need to consider strabismus as a community health problem and launch more programs to provide health education and ensure public awareness.

### Health Problems Related to Strabismus

In children who have immature visual systems, strabismus may result in amblyopia and permanent loss of vision. Apart from this, it may also alter an individual's field of vision. Impaired binocular vision, diplopia, abnormal head posture, headache and asthenopia are other common features found in strabismic patients. Impaired binocular vision has been associated with higher odds of sustaining musculoskeletal injuries due to frequent falls. Difficulty in playing sports and judging distances is another limitation that can be seen in these



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patients.

Children with this condition have been found to have longer duration of fixation during reading, hence reading more slowly. Significant improvements in reading accuracy and fluency have been observed in children post squint surgery. Untreated strabismus can, therefore, have a potentially life-long devastating impact on a child's academic success, which has the potential to negatively influence psychosocial health and quality of life.

### **Psychosocial Impact of Strabismus**

Strabismus has been associated with many psychiatric conditions including suicide, suicidal or homicidal ideation, dysthymia, major depression, hyperactivity / inattention disorders, anxiety, adjustment disorder, drug use, learning disorders, social phobia, and schizophrenia.

Strabismus may create significant negative social prejudice, with such negative attitudes emerging as early as six years of age. Disturbed interactions with peer groups lead to psychosocial stress in the form of bullying or undue negative bias. These patients may be perceived as being less intelligent, trustworthy, honest or sincere. Apart from this social stigma, cosmetic stigma maybe the single most important problem for these patients leading to a lower self-esteem and self-confidence. All these factors inadvertently compromise long-term education goals and future job opportunities.

### **Importance of Early Detection and Treatment**

Given its potential to cause permanent vision loss in children, early detection and treatment of strabismus is a public health emergency. In an Indian study conducted by Gupta et al<sup>2</sup>, almost all participants replied that they were unaware that the condition was treatable. The same sentiment was echoed by 32% patients in a study by Sathyan et al<sup>3</sup>. This study also noted that around 4% patients claimed that the primary care doctors did not advice treatment while 12% did not take treatment due to economic reasons. It is therefore imperative to intensify efforts in educating the community that strabismus is treatable.

Poor parental knowledge, misconceptions and misinformation adversely affect the age of presentation. Surgery is one of the treatment options to correct strabismus. However, the very thought of surgery in a child makes parents apprehensive and thus may lead to delayed presentation. In a study by Singh et al<sup>4</sup>, 84% of the parents used to feel that other people notice their child's

strabismus during interaction, 75% parents used to feel uncomfortable if someone asked something about their child's strabismus and 92% parents considered strabismus as a cosmetic stigma. These aspects of strabismus leave a negative impact on the quality of life of parents.

Most of the parents in the lower educated strata are unaware of the possible treatments for the condition hence do not seek proper medical advice and timely treatment. This leads to delayed presentation, resulting in higher susceptibility to strabismic amblyopia. Furthermore, their information is primarily sourced from relatives and friends as opposed to more reliable sources. This further results in a passive approach to identification and treatment of the condition. By contrast, parents with graduate or higher level of education have been found to be more optimistic about their child's condition because of higher levels of awareness. It is therefore extremely important to involve health educators, health extension workers and social coworkers on various platforms including public gatherings to spread awareness regarding strabismus.

### **Strategies for Strabismus Management at Community Level**

Enhancing patient-centered care and improving outcomes for strabismus necessitates a multidisciplinary approach. The interprofessional team includes ophthalmologists, orthoptists and optometrists, community pediatricians, general practitioners, psychologists, pharmacists and nurses. In addition to these varied healthcare professionals, teachers, school nurses and social workers also play an essential role in managing children with strabismus. Involvement of all, together as a team, is therefore necessary to ensure best outcome.

### **CONCLUSION**

Owing to its multiple effects on a patient's life, it can be concluded that treatment of strabismus is not just cosmetic but has the potential to improve psychosocial health, visual function, and overall quality of life. It is therefore imperative to conduct quantitative assessments of the burden of disease at the community level, and commence programs of intervention in the form of health education in antenatal clinics, infant welfare clinics, schools, and use of social media. To ensure early screening and treatment, such programs sensitizing are the need of the hour.

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# SICS UNDER TOPICAL ANAESTHESIA – A SAFE AND VIABLE OPTION FOR HIGH VOLUME COMMUNITY CATARACT SERVICES

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## ABSTRACT

Small Incision Cataract Surgery is the most widely accepted method to address the enormous cataract backlog in most countries. To minimise the requirement of time and skilled manpower and ensure safety of ocular anaesthesia, topical anaesthesia is a promising technique for community cataract services. The purpose of our present study is to evaluate patient's and surgeon's comfort, efficacy and safety of topical Anaesthesia for Manual Small Incision Cataract surgery. The present study is a series of 3912 Small Incision Cataract Surgery performed under Topical Anaesthesia by single surgeon. The patient and surgeon discomfort level, surgical time, complications and outcome were evaluated.

In 81% (80.66%) of cases, patient felt mild or no pain requiring no additional mode of anaesthesia. So, the patients' comfort level was found to be high. Though mild ocular movement was present in most of the eyes, surgeon was comfortable and surgery could be completed without subtenon anaesthesia in more than 99% of cases. Intraoperative complications were Pre-mature entry in 6 cases (0.15%), intra-operative IOP rise in 4 cases (0.10%), Posterior capsular tear in 11 cases (0.28%). Immediate and early post operative complications were Hyphaema in 11 cases (0.28%), Corneal oedema in 42 cases (1.07%), Endophthalmitis in 2 cases (0.05%). Mean Surgical time was 7 minutes 14 seconds. Uncorrected visual acuity on POD 1 was 6/18 or better in 87.99%. Best corrected visual acuity at 1 month was 6/9 or better in 92.13%. Therefore we conclude that Topical Anaesthesia is a safe and viable option for high volume community cataract services.

**Keywords:** Manual Small Incision Cataract Surgery (MSICS), Topical Anaesthesia, Peribulbar anaesthesia, Posterior Capsular Tear, Visual outcome.

## INTRODUCTION

The ever-growing cataract backlog is the largest cause of avoidable blindness worldwide and in our country.<sup>1,2</sup> In



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spite of our best efforts we are always lagging behind in clearing this backlog. Therefore, we need to increase our community cataract service capacity exponentially. For community cataract services, Manual Small Incision Cataract Surgery (MSICS) conventionally done under peribulbar anaesthesia is the most widely accepted and cost effective method of surgery worldwide. Unfortunately all our secondary eye care providers do not have adequate technical staff to support our cataract surgical experts in providing cataract services to large volume of population. In this situation topical anaesthesia<sup>3,4</sup> is a safer, cost effective alternative to peribulbar block in terms of anaesthetic complications, patients' systemic co-morbidities and trained man power requirement.

Our present study aims to evaluate the safety, efficacy and



outcome of a large series of 3912 cases of Manual Small Incision Cataract surgery done under Topical Anaesthesia by a single surgeon.

## MATERIALS AND METHODS

Our present study is a prospective interventional study. In the present study Manual Small Incision Cataract Surgery under Topical Anaesthesia performed in 3912 eyes of 2972 patients operated between 1<sup>st</sup> January 2021 to 16<sup>th</sup> August 2023, by a single surgeon in a single secondary eye care hospital were included. All surgeries were observed for intra-operative patients and surgeons comfort, surgical duration, intraoperative and immediate to early postoperative complications and post operative visual outcome.

All patients including the outreach and walk in, underwent thorough ophthalmic evaluation including history, anterior segment evaluation with special reference to nuclear grading, condition of zonules and other co-morbidities, posterior segment evaluation with special reference to cup:disc ratio, presence or absence of retinal pathologies like diabetic retinopathy, ARMD etc. and routine intra-ocular pressure measurement. Intra ocular pressure was measured by GAT in case of walk in patients on a previous day and with NCT on the day of surgery in case of outreach patients. Every patient underwent systemic evaluation by our physician.

All patients were treated with preoperative topical Moxifloxacin eye drop from 3 days before surgery and continued up to 7 days after surgery. Pre-operatively, every eye was instilled with 0.5% Proparacaine Hydrochloride eye drop topically 1 drop 5 minutes before surgery, 1 drop just before conjunctival incision and additional drops if required during construction of scleral tunnel. Povidone Iodine painting of the eye was done twice, once in the preparation room and once on table.

Electrocautery was avoided in all patients to minimise patients' discomfort. Intracameral 1% Lidocaine injection, Intracameral preparation of Lidocaine 1% + Phenylephrine 0.31% + Tropicamide 0.02% combination and provision for subtenon injection of 2% Lidocaine were kept ready to be used for moderate to severe discomfort during surgery and unsatisfactory pupillary dilatation.

After tunnel construction, side port making and CCC were done; hydro-procedure, nucleus delivery and cortical wash were done with Simcoe canula and Intraocular Lens was implanted. After thorough

irrigation of anterior chamber and wound hydration, 0.5% Moxifloxacin intracameral Injection was injected to all eyes. Post operatively every patient was prescribed 1% Prednisolone acetate in tapering dose. Tablet Paracetamol was given in case of pain.

Patients discomfort and pain grading was customized as per our patient response as no sensation of some procedure being performed inside the eye (Grade 0), no pain but proprioceptive sensation of something happening inside eye (Grade 1), mild pain revealed only on asking patient (Grade 2), spontaneous mention of pain by the patient during surgery (Grade 3), moderate pain controlled with intra-cameral injection of 1% Lidocaine (Grade 4), Severe pain requiring subtenon injection of 2% Lidocaine (Grade 5).

Surgeons discomfort and terms of unwanted ocular movements was graded as no ocular movement (Grade 0), mild ocular movement (Grade 1), moderate ocular movement requiring vocal commands <2 times during surgery (Grade 2), moderate ocular movement requiring vocal commands >2 times during surgery (Grade 3), severe ocular movement requiring subtenon injection (Grade 4).

Surgical time was calculated from initiation of conjunctival incision to concluding step of intracameral injection of Moxifloxacin.

Intra operative and immediate post operative complications were noted.

Follow ups were done on next day, after 1 week and after one month and visual acuity was recorded. Uncorrected visual acuity on POD1 and Best corrected visual acuity at 1 month were recorded. Desirable visual outcome was defined as UCVA 6/18 or better on POD1 and BCVA 6/9 or better at 1 month.

Informed written consent of all patients were taken before the procedure.

## RESULTS

Out of the 2952 patients 1358 (46.003%) were female and 1594 (53.997%) were male. Out of 3912 surgeries, patient discomfort level was Grade 0 in 145 eyes, Grade 1 in 1087 eyes, Grade 2 in 1068 eyes, Grade 3 in 855 eyes and Grade 4 in 753 eyes, Grade 5 in 4 eyes. This means in 81% (80.66%) of cases, patient felt mild or no pain requiring no additional mode of anaesthesia. (Figure 1) There was no significant difference in male

Surgeon discomfort level was Grade 0 in 385 eyes (9.84%), Grade 1 in 1211 eyes (30.96%), Grade 2 in 1292

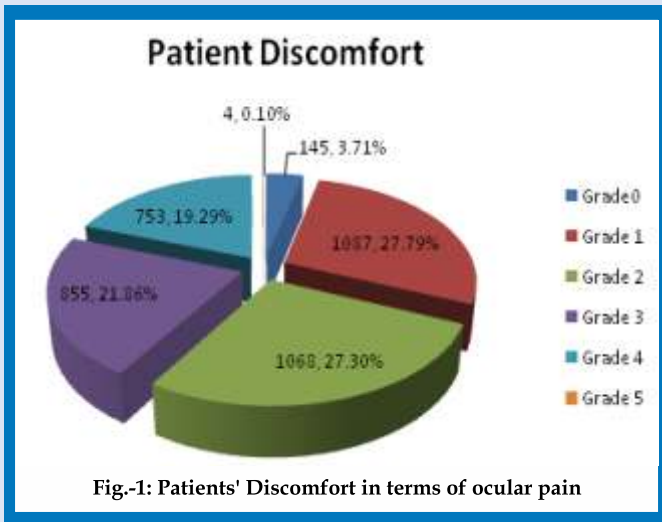


Fig-1: Patients' Discomfort in terms of ocular pain

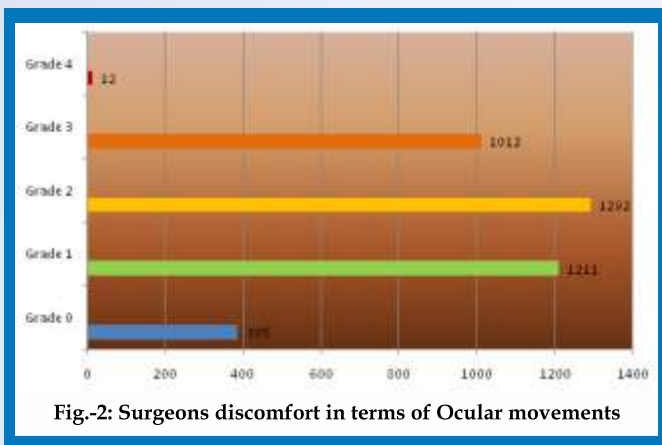


Fig-2: Surgeons discomfort in terms of Ocular movements

eyes (33.03%) Grade 3 in 1012 eyes (25.87%), Grade 4 in 12 eyes (0.31%). (Figure 2). Surgery could be completed without subtenon injection in more than 99% of cases.

Intraoperative complications encountered were Premature entry due to sudden eye movement in 6 cases (0.15%), intra-operative increase of IOP in 4 cases (0.10%), Posterior capsular tear in 11 cases (0.28%). Immediate and early post operative complications were Hyphaema 11 cases (0.28%), Corneal oedema in 42 cases (1.07%), Endophthalmitis in 2 cases (0.05%). Surgical time per case was ranged from 5 to 10 minutes the mean being 7 minutes 14 seconds. Uncorrected visual acuity on POD 1 was 6/18 or better in 3442 eyes (87.99%). Best corrected visual acuity at 1 month was 6/9 or better in 3604 eyes (92.13%). The major causes of unfavourable visual outcome comprised of Diabetic Retinopathy, Age Related Macular Degeneration, Advanced Glaucoma, Optic atrophy, Corneal opacity etc.

**DISCUSSION**

There are many small studies reporting feasibility of

topical anaesthesia in Small Incision Cataract Surgery with respect to patient's comfort and surgical outcome.<sup>3,4,5,6</sup> Our study is probably the largest series of SICS under topical anaesthesia reported till date.

Topical anaesthesia is a very cost effective method of ocular anaesthesia which avoids the sight threatening complications of peribulbar anaesthesia. Topical anaesthesia is also the method of choice in presence of cardio vascular risk factor. Due to the increasing demand of cataract surgery and scarcity of trained man power in many of the secondary eye care centres, peribulbar block may not be practically possible. In this situation, topical anaesthesia saves time, expenditure and man power requirement.

In our series, topical anaesthesia was found to be a very effective mode of anaesthesia in terms of both patients' and surgeon's comfort. It also reduced patients' apprehension towards painful peribulbar anaesthesia. Surgical time was only marginally increased and was acceptable as per requirement for moderate to high volume surgical performance. Complication rates were also at par or rather lower than the standard rates<sup>8,9</sup> and most of them are not attributable to the mode of anaesthesia.

So far as the visual outcome was concerned, a high percentage of cases (92.13%) attained visual acuity of 6/9 or better. Unfavourable outcomes were results of other ocular co-morbidities and not attributable to surgical techniques.

Strength of our study is the large sample size and inclusion of all possible aspects of cataract surgery under Topical anaesthesia.

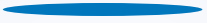
The limitation of our study is difficulty in using standardised pain scale (visual analogue scale) due to the patient response perspectives and we had to formulate our own Grading scale as per our patient profile.<sup>10</sup>

**CONCLUSION**

Topical Anaesthesia for Small Incision Cataract Surgery is a very cost effective, safe and acceptable mode of anaesthesia for Small Incision Cataract Surgery. It is a viable technique for Community Cataract Services.

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## HOSPITAL CORNEA RETRIEVAL PROGRAMME – REVIVING THE HOPE OF GIVING SIGHT

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### ABSTRACT

Corneal blindness in developing countries is a big burden and younger population is mostly affected. About 95% of corneal blindness is avoidable. In comparison to cataracts, the economic burden to society is much higher with corneal blindness. For rehabilitation of patients with corneal blindness, Corneal transplant or Keratoplasty is the primary vision restoring procedure. Procurement of viable corneal tissue is of utmost importance for this procedure. The corneal tissues are procured either by voluntary eye donations or through the Hospital Cornea Retrieval Programme (HCRP). The objective of HCRP is to encourage potential eye donations from hospital deaths by utilising a combined method of motivation and grief counselling.

**Keywords:** Blindness, Hospital Cornea Retrieval Programme, Corneal Transplantation

### INTRODUCTION

Blindness is increasingly been recognized as a global health problem.<sup>1</sup> WHO states that approximately 80% of the blindness is preventable. The most common cause of preventable blindness include diseases affecting cornea.<sup>2</sup> In India, corneal blindness affects approximately 6.8 million people with vision less than 6/60 in at least one eye, however in about 1 million persons, both the eyes are involved.<sup>3,4</sup>

The National Blindness and Visual Impairment Survey 2015-2019 in India showed that corneal opacity stood second place (7.4%) in the age group more than 50 years. In the younger population (0-49) years, most cases of blindness were due to non trachomatous corneal blindness (37.5%), causing a tremendous economic burden.<sup>5</sup>

According to data from National Programme for Control of Blindness (NPCB), about 1,20,000 persons are affected due to corneal blindness and approximately 25,000-30,000 cases of corneal blindness add to this pool every year.<sup>3</sup> Corneal transplantation is the effective treatment with high success rate in restoring sight among patients with corneal blindness. There is still a need of 277,000 donor

corneas every year to do 1 lakh corneal transplants to treat corneal blindness.<sup>6</sup>

**National Programme for control of blindness (NPCB)**, initiated by Government of India through its continuous efforts is trying to reduce the backlog of preventable corneal blindness through comprehensive eye care services, including corneal transplantation.<sup>7</sup> However, even after increasing awareness of corneal donation, the number of donors remains much lower and also waiting period for corneal transplantation remains high at most hospitals across the country.<sup>8</sup> Apart from the efforts of increasing awareness, the Eye Bank Association of India also made efforts to increase the corneal procurement rate over several years.

The current procurement rate of cornea in India is approximately 49,000 per year, this rate is much lower than needed.<sup>6,9</sup> The number of corneal donations still falls short of India's demand even though significant advancements have been made in eye banking and corneal transplant surgery. There is an alarming imbalance between demand and supply of viable corneal tissue. The procurement rate of corneal donation could possibly be enhanced by increasing awareness among population and also by identifying potential barriers and overcoming those barriers to eye donation.

India has an opt-in system where an obligation to obtain next of kin's consent, is mandatory to obtain corneal donation.<sup>10,11</sup>

There are two ways of recovering donor cornea-

- i) Voluntary donation



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## ii) Hospital Cornea Retrieval Programme (HCRP)

Voluntary eye donation is a kind of social responsibility of the citizen towards people with corneal blindness. An eye donation pledge form is to be signed during life by the person to donate the eyes after death. Though the number of pledged eyes are high, the actual number of eyes collected at any given time is very low. It may take several years for a pledged donor to become actual donor.

Prior pledging by donor is not mandatory for eye donation i.e. eye balls or corneas can be collected, if relatives of deceased give consent for eye donation even without prior pledging by deceased. Therefore the living relatives of deceased play an important role in eye donation. Pledging of eyes to donate after death should be encouraged to create awareness and to sensitize people about eye donation and to motivate eye donation in case of any deaths in his/her family or nearby people.

Awareness about eye or organ donation in a community is essential but will not guarantee that the public will do their part and most of the donors are relatively old age.

Unfortunately, despite many efforts by the National Programme of Control of Blindness (NPCB), Eye bank association of India (EBAI) and many Non-Government Organizations, there has not been much improvement in the voluntary donation.<sup>12</sup>

To get more number of corneas, Eye Bank Association of India started Hospital Corneal Retrieval Programme (HCRP), where attempts are being made to motivate & counsel the relatives of a deceased person in Hospital for Eye Donation. HCRP aims at the retrieval of corneal tissues from eligible and willing donors after death in the hospital. It is done by sensitizing the relatives regarding corneal blindness & benefits of corneal transplantation.

A professionally trained grief counselor (eye donation counselor or EDC) motivates the deceased's family in the hospital setting toward the donation of the deceased eyes. Eye donation counsellors are trained personnel who are stationed at multispeciality hospitals round the clock & keep rapport with hospital staff.

Whenever any death occurs in any ward, the concerned staff (Nurse / Doctor / Social worker) inform the counselors so that he or she can counsel, motivate & request family members to donate the eyes of their deceased relatives and contribute to world wide effort to reduce corneal blindness. In absence of Grief counselors, the Hospital personnels can also help in reducing the burden of corneal blindness by involving themselves in these activities. Doctors, Nurses and Hospital social workers especially in wards of Surgery, Medicine, Trauma & ICCU, where chances of death are high, can involve themselves in this noble work.

## Advantages of HCRP

The HCRP focuses on multispecialty hospitals to retrieve eye ball or corneal tissue because of various advantages like:

1. Number of deaths are more in hospitals in comparison to home deaths,so, more number of corneas can be collected if relatives are motivated.
2. Corneal tissue from younger donors can be obtained from hospital deaths because these can occur in younger persons from accidents, diseases etc. compared to home deaths and thus a good quality of viable corneal tissue can be obtained.
3. Quick access to the tissue is there, thereby leading to reduction of time interval between death to enucleation / corneal excision - another factor for getting good quality of tissue.
4. Detailed medical history and investigation reports can be available easily in the hospital setting.
5. Eye donors can become multiple organ donors if the relatives wish to donate.
6. Cost effectiveness

## How to counsel and motivate the relatives of deceased for eye donation ?

It is a very sensitive issue and it is a difficult task to request the relatives of a deceased to donate the eyes of their beloved, who are in grief.

Foremost of all, people coming to hospitals should be sensitized for eye donation by various methods- Installing posters on eye donation, Installing public awareness systems displaying messages regarding eye donation etc. in patient waiting areas.

The Grief counselor or hospital staff or social worker, whoever is going to motivate, should have complete knowledge regarding eye donation. They should be able to answer any queries by relatives, rule out any myths & misconceptions regarding eye donation.

## Steps in counseling

- On the event of death, Grief counselor should reach the ward as soon as possible on getting information from hospital staff /or social worker.
- Approach the decision maker (Spouse / Adult offspring / Parents in case death of young children ) of family & take him/her into a nearby separate pleasant room.
- Introduce him/her self .
- Understanding & sharing the grief
- Convey his/her condolence.

- Discuss briefly regarding corneal blindness & eye donation.
- Ask them if they would like to donate the eyes of their loved one.
- Call the nearest Eye Bank as soon as the family gives consent.
- Help to get death certificate as early as possible.
- Switch off the fan in the room
- Elevate the head end of deceased.
- Keep the eye lids closed.

In India, a significant proportion of the deaths occur in an in-patient setting, which provides the advantage of easy accessibility of potential donors. High to medium mortality hospitals have a high potential for eye donors, and if effectively counseled by the EDCs, can convert into a corneal donation.<sup>12</sup>

Therefore, much emphasis is being given to eye banks to follow this strategy to increase corneal donation. The experience of major eye banks suggests that HCRP accounts for a large proportion of tissue collection. Further, tissue utilization was found to be higher in tissues collected under this scheme.<sup>13,14</sup> However, EDC plays a pivotal role in the HCRP program and studies have demonstrated that EDC's counseling skills are directly linked to the consent rate irrespective of the community awareness of eye donation.<sup>15,16</sup>

### CONCLUSION

Organ/Tissue donation does not happen until we make an effort to happen. Hospital cornea retrieval program is such an effort, focusing on motivation and grief counseling of families in hospital-based deaths. By implementing Hospital Cornea Retrieval Programme, various eye banks have been able to collect more number of good quality corneas.

One of the challenges with HCRP is poor consent rate, especially if the family is not happy with the treatment received by the diseased while being hospitalized. To overcome this periodic reorientation of medical personnel of concerned departments by Meetings and CMEs would be supportive. The challenges in HCRP for an eye bank could be easily overcome by properly implementing strategies, sensitizing the hospital staff, and doctors towards their responsibilities. Proper training of the grief counsellors plays a pivotal role in implementation of HCRP. In today's day and age social media plays a great role and it can be utilised to spread awareness, motivate and promote the noble cause of corneal donation. Proper understanding and

implementation of HCRP is important so that we don't lose these precious opportunities to give the gift of sight to those in need.

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# TOWARDS CLEARER FUTURE: COMBATING GLAUCOMA-DRIVEN BLINDNESS IN INDIA

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## ABSTRACT

This article explores the growing problem of glaucoma-related blindness in India, a country that has a significant 23.5% share of global glaucoma cases. It starts by highlighting the worldwide numbers, pointing out how India faces a larger burden, especially with primary angle-closure glaucoma being prevalent.

The article then discusses the National Program for Control of Blindness and Visual Impairment (NPCB and VI) and how it's adapting to tackle glaucoma, stressing the need for a broader strategy. It also looks at the challenges in diagnosing and managing glaucoma, such as not identifying cases early enough, difficulties in access to care, and a shortage of medical staff.

The proposed solution involves a multi-pronged approach: advocating for awareness, implementing screening programs, and using technology for training. The article introduces a practical model called Glaucoma Screening-Integrated Cataract Camps at Vision Centres, highlighting the importance of clear protocols, trained staff, and telemedicine.

Additionally, it suggests integrating technology, like telemedicine for glaucoma screening by Vision Technicians. The article also stresses the role of technology and training for educating residents, introducing a Digital Training Hub and Blended Fellowship to enhance skills efficiently.

In conclusion, the article calls for cooperation between national and international groups, media involvement, and increased awareness to effectively tackle India's glaucoma crisis, with the ultimate goal of improving eye health and reducing glaucoma-related blindness.

**Keywords:** Blindness, Visual impairment, Screening, Technology, Training, Collaboration, Awareness

## INTRODUCTION

Blindness and visual impairment continue to pose significant challenges to public health globally, with glaucoma emerging as a major contributor to irreversible blindness. This article aims to explore the alarming prevalence of glaucoma-induced blindness, focusing particularly on the situation in India, and proposes a comprehensive approach to address this growing public

health concern.

### Understanding the Global Burden of Glaucoma:

The latest data from the World Health Organization (WHO) paints a distressing picture, revealing that glaucoma ranks as the third leading cause of blindness on a global scale, affecting approximately 8.5% of the population. Shockingly, an estimated 4 million individuals experience visual impairment, while 2.9 million suffer from blindness due to glaucoma, highlighting the substantial and increasing global burden. Notably, the Disability Adjusted Life Year (DALY) rate due to glaucoma has shown a significant upsurge from 1990 to 2017, particularly impacting males.

### India's Glaucoma Predicament:

India bears a staggering 23.5% of the world's glaucoma burden, with an estimated 12 million cases, making it a



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critical public health concern in the nation. While primary open-angle glaucoma (POAG) holds a higher prevalence in India, primary angle-closure glaucoma (PACG) contributes to a greater rate of blindness. The intricate urban-rural disparities in prevalence further compound this complex issue. In light of these concerning statistics, it becomes imperative to delve deeper into the factors contributing to the high prevalence of glaucoma in India and to devise a comprehensive strategy that addresses not only the clinical aspects but also the socioeconomic and geographical disparities associated with this sight-threatening condition.

#### **National Program for Control of Blindness:**

The National Program for Control of Blindness and Visual Impairment (NPCB and VI) in India has played a crucial role in addressing eye health issues since its inception in 1976. Initially focused on cataract and refractive errors, the program has evolved over the years to include a broader range of eye diseases. This expansion has been facilitated by advocacy efforts from international agencies and non-governmental organizations (NGOs). Under the 12th five-year national action plan, the Indian government has extended its priorities to encompass other eye diseases such as glaucoma, diabetic retinopathy, corneal opacities, and more. This reflects a recognition of the need to address a wider spectrum of eye health issues beyond cataract and refractive errors. The overarching goal of the NPCB and VI is to reduce the prevalence of avoidable blindness from 1% to 0.3% by the year 2020. Achieving this goal requires a strategic plan for the development and improvement of glaucoma care services across the country. The program aims to provide comprehensive eye care services that encompass screening and treatment for various ocular problems, including glaucoma.

The World Health Organization (WHO) advocates for universal eye health coverage, emphasizing the importance of screening for potential blinding ocular problems as a clear mandate under comprehensive eye care programs. This aligns with the broader global efforts to ensure that eye health services are accessible to all. However, despite these efforts and goals, there is a significant gap between the burden of glaucoma and the services currently being delivered. Addressing this gap requires ongoing collaboration between government agencies, international organizations, NGOs, and other stakeholders to strengthen the infrastructure, increase awareness, and enhance the delivery of glaucoma care

services throughout the country. By addressing these challenges, the NPCB and VI can contribute to achieving its vision of reducing avoidable blindness and visual impairment in India.

#### **Diagnostic and Management Challenges:**

The challenges highlighted in the context of glaucoma diagnosis and management in India underscore the complex nature of healthcare delivery in the country. Addressing these challenges requires a multifaceted approach that involves not only the healthcare system but also various stakeholders, including policymakers, healthcare professionals, and the community.

#### **Underdiagnosis of Glaucoma:**

The Chennai Glaucoma Study revealing that more than 90% of glaucoma cases go undiagnosed points to a critical need for improved screening and diagnostic strategies. Relying solely on visual acuity for assessing blindness may lead to an underestimation of the prevalence and impact of glaucoma-induced blindness. Additional diagnostic measures, such as regular eye pressure checks and optic nerve assessments, may be crucial.

#### **Barriers to Access:**

- Limited counseling opportunities during busy outpatient department (OPD) visits may result in inadequate patient education about the disease and its management.
- Limited access to professional eye care, lack of transportation, and insufficient financial resources contribute to delayed or inadequate treatment for those in need.
- Human Resource Challenges: Insufficient manpower, including a shortage of trained ophthalmologists, optometrists, nurses, and counselors, poses a significant challenge.
- Lack of resources and a growing patient load make it difficult for institutions to invest in long-term fellowships or training programs for healthcare professionals.
- Training Programs and Skill Enhancement: The absence of training programs for customized, hands-on training on recent advancements in glaucoma is a notable gap. To address this, there is an urgent need to improve ophthalmology residency training in India, ensuring that healthcare professionals are equipped with the skills needed to manage complex eye conditions like glaucoma.
- Community Support: Lack of supporting help from



the community may exacerbate the challenges faced by individuals with glaucoma. Community engagement and awareness programs can play a crucial role in addressing this aspect.

Addressing the service delivery gaps in glaucoma control requires a comprehensive and targeted approach, encompassing advocacy, screening initiatives, and the effective use of technology and training.

### 1. Advocacy for Glaucoma Control includes:

- Define the Situation:
  - ✓ Assess current resources for glaucoma case detection.
  - ✓ Identify gaps in demand and services related to glaucoma.
- Establish Goals and Objectives:
  - ✓ Set SMART objectives to guide advocacy efforts, ensuring they are Specific, Measurable, Achievable, Realistic, and Time-bound.
- Identify Target Audiences:
  - ✓ Recognize primary and secondary audiences who can influence policy and decision-making in glaucoma control.
- Develop Key Messages:
  - ✓ Craft clear, concise, consistent, compelling, and convincing messages that resonate with target audiences.
- Engage Media:
  - ✓ Leverage various communication channels, including editorial coverage, health news, and public-interest case stories to disseminate information and build awareness.
- Implement Advocacy Plan:
  - ✓ Execute the plan through multiple communication strategies, such as personal meetings, official letters, and events.
- Monitor and Evaluate Advocacy Work:
  - ✓ Continuously assess the impact of advocacy efforts and make adjustments as needed for continuous improvement.

### 2. Enabling Screening Initiatives:

- Bridging Demand and Services Gap:
  - ✓ Implement targeted opportunistic screening programs at primary & secondary levels.

- ✓ Engage stakeholders, including ministries, bureaucrats, and the media, to enhance awareness and promote screening efforts

### 3. Glaucoma Screening-Integrated Cataract Camps at Vision Centres:

In an effort to enhance early detection and management of glaucoma, a strategic approach has been implemented through Glaucoma Screening-Integrated Cataract Camps at Vision Centers. The key components of this initiative include:

- Protocol Development: A specific protocol has been developed by our institute to detect glaucoma in cataract camps.
- Trained Vision Technicians: Trained vision technicians play a crucial role in conducting glaucoma screening during cataract camps.
- Glaucoma Screening Algorithm: Patients undergo glaucoma screening using a predetermined algorithm designed for efficient and systematic evaluation. (Table 1)
- Diagnostic Cut-Off Points: Specific diagnostic cut-off points are employed to identify individuals suspected of having glaucoma based on screening results.
- Referral to Secondary/Tertiary Care: Suspected patients identified during screening are referred to secondary or tertiary care centers for confirmatory diagnosis and further treatment.
- Use of Technology - Teleophthalmology: Technology, particularly teleophthalmology, is leveraged to enhance the efficiency and reach of the glaucoma screening initiative.
- Teleophthalmology facilitates remote communication, allowing experts to review screening results and provide guidance or confirmatory diagnosis. (Table-1)

This integrated approach brings together trained personnel, systematic screening protocols, and technology to streamline the process of identifying glaucoma cases during cataract camps. Early detection is crucial for timely intervention and management, and the referral system ensures that individuals requiring further evaluation receive appropriate care at higher-level healthcare facilities. The incorporation of teleophthalmology adds a technological dimension, enabling connectivity and expert guidance in areas where on-site specialists may not be readily available.

**Table 1. Parameters for diagnostic tests for identifying glaucoma suspects.**

Investigation	Record	Suspect
ACD	As VH 1-4	VH grade 2 or less
C/D ratio	As 0.3 to total cupping	Ratio of 0.6 or more or asymmetry of more than 0.2
IOP	As mmHg	Recording of more than 22mmHG
FDT	Printout	<ul style="list-style-type: none"> <li>• More than one spot in central field</li> <li>• One central spot or more than one peripheral spot in disc suspects</li> </ul>

This initiative not only addresses the specific challenge of glaucoma but also maximizes the impact of existing healthcare platforms, such as cataract camps, to comprehensively address eye health and reduce the burden of preventable blindness

**4. Leveraging Technology and Training:**

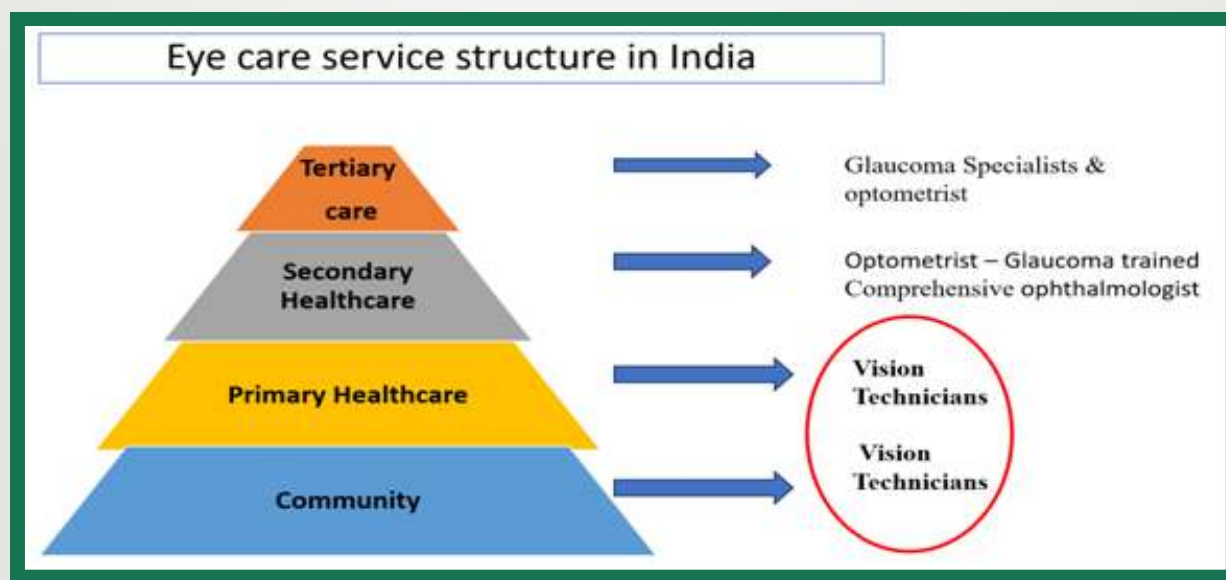
The role of Vision Technicians (VT) as the first point of contact in community settings is crucial for creating awareness and facilitating early screening. VTs capture fundus images using a smart device and send them to a consultant ophthalmologist for teleconsultation, aligns with the concept of Tele Glaucoma. This approach can have several benefits:

- **Improved Accessibility:** By using portable devices, VTs can reach remote or underserved areas where access to specialized eye care may be limited. This helps in bringing glaucoma screening services to a wider population.
- **Early Detection and Intervention:** Tele Glaucoma allows for early detection of glaucoma and timely intervention, which is critical for managing the

condition effectively and preventing further vision loss.

- **Cost-Effective:** This approach can be more cost-effective compared to traditional in-person consultations, making eye care services more accessible to a broader segment of the population.
- **Reduced Burden on Healthcare Facilities:** By decentralizing glaucoma screening to community settings, it can reduce the burden on centralized healthcare facilities, allowing them to focus on more complex cases.
- **Patient Education and Awareness:** VTs, being the first point of contact, can also play a role in educating patients about the importance of eye health, the risks of glaucoma, and the benefits of early detection.
- **Continuity of Care:** Tele Glaucoma facilitates follow-up consultations and monitoring, ensuring continuity of care for individuals diagnosed with glaucoma.

It's essential to ensure proper training for VTs to use the



technology effectively and to interpret the captured images accurately. Additionally, addressing issues related to data security and privacy is crucial when implementing telemedicine solutions. As technology continues to advance, the integration of telemedicine in eye care can significantly contribute to the early detection and management of glaucoma, ultimately improving the overall quality of eye health in communities.

### 5. Integration of technology and training:

- Digital Training Hub (DTH):
  - ✓ Utilizes simulation, digitization, tele-mentorship, telemedicine, and tele-education.
  - ✓ Integrates traditional in-person hands-on training with modern technologies.
- Standardized Approach to Digital Glaucoma Training:
  - ✓ Includes wet lab training.
  - ✓ Integrated into residency curricula.
  - ✓ Utilizes international standards and tools for knowledge and competency assessment.
- Blended Fellowship:
  - ✓ Incorporates innovative training techniques such as distance learning and remote surgical mentorship.
  - ✓ Enhances the skills of healthcare professionals even in short period of time.
- Creating a Pool of In-House Trainers:
  - ✓ Aimed at making ongoing education sustainable.
  - ✓ Focuses on developing in-house resources and trainers in tertiary care centers.

### CONCLUSION

#### A Comprehensive Resolution:

To confront India's glaucoma crisis, a multifaceted approach is indispensable. It necessitates the harmonization of national and international efforts, emphasizing opportunistic screening, comprehensive personnel training across all tiers, exploiting tele-glaucoma in remote areas, and enlisting media collaboration for heightened awareness. Implementing these strategies will mark a pivotal stride in mitigating the burden of glaucoma-induced blindness, ensuring improved eye health for all. This structure dives deeper into each aspect while maintaining a concise and

comprehensive overview of the glaucoma crisis in India and proposed solutions.

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## PERIOCCULAR DOG BITE INJURIES: A COMMUNITY HEALTH MENACE

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### ABSTRACT

Dog bite injuries are fairly common ophthalmic emergency. They tend to occur more commonly in young children predominantly affecting the face and periocular region, causing a diverse set of injuries including eyelid lacerations, canalicular trauma, and rarely open globe injuries and orbital fractures. Infection is rare but potentially devastating complication. Management varies as per the extent of injury and mainly focuses on infection prevention and cosmetic reconstruction.

**Keywords:** Dog bite, Adnexa, laceration, injury.

### INTRODUCTION

Dog bite injuries to the face are seen in emergency across the world resulting in significant morbidity. Dog bites constitute 60–80 % of all animal bite injuries. Children are often the target of animal attacks due to their behavior, which may be provocative to animals and also their small stature, which makes them more vulnerable. Periocular injuries constitute nearly 10–15 % of all animal bite trauma. Dog bite injuries can present as abrasion, puncture, laceration, avulsion and crush injury and result in a diverse set of periocular complications including damage to the canaliculi, facial nerve, levator muscle, lacrimal gland, rectus muscles, bony orbit and globe. Most dog bites are combination of multiple injuries, with crush and laceration being the most common features. Management of dog bites in the periocular location has some distinct considerations which will be discussed below.<sup>1</sup>

**Risk factors:** Risk factors for dog bites include-

- Young age (nearly ¾ of victims are younger than 9 years old)- Younger children are at increased risk for facial involvement due to small stature and

underdeveloped motor skills.

- Male sex
- Attention deficit hyperactivity disorder
- Injured/ill dog or a dog which feels threatened

**Risk of infection:** Overall rates of soft tissue infection after dog bites to the head and neck are less than 5%. The relatively low risk of infection in this area is attributable to rich vascular supply to the area which increases the rate of healing but can also predispose to catastrophic blood borne infection in cases in which infection occurs. Infections can be attributed to the valveless venous supply to the face which communicates with the skull base, allowing potential pathogens direct access to the intracranial space. Soft tissue infections are classically polymicrobial in nature with a high preponderance of anaerobic organisms. Common organisms include Pasteurella, Streptococi, Staphylococci, Moraxella, Corynebacterium and Neisseria. Two especially concerning species, due to potential antibiotic resistance and aggressive nature include Pasteurella multocida, which causes intense pain and abscess formation, and Capnocytophaga canimorsus which can result in a necrotizing infection and fulminant sepsis.<sup>2</sup>

### Classification:

The Lackmann classification has been utilized to grade the level of damage from dog bites. (Table-1)

### Physical examination:

Evaluation of any patient with a dog bite injury begins with complete physical examination to rule out not only



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Stage I	Superficial
Stage II	Skin and Underlying Muscle
Stage III	Traumatic Defects in the Deeper Tissues
Stage IV-A	Stage III + vascular and/or nerve damage
Stage IV-B	Stage III + bone and/or organ damage

periocular involvement but any life-threatening injuries. As dogs preferentially attack the central face, this often results in trauma to the nose and eyelids. In addition to trauma to the globe, dog bites can present with a spectrum of periocular injuries such as lid abrasions, canthal avulsions, eyelid lacerations, canalicular tears, and trauma to extraocular muscles (Fig. 1a,1b,1c). Fractures are relatively uncommon.<sup>3</sup>

**Diagnostic procedure:** Given the high risk for canalicular involvement in eyelid lacerations caused by dog bites, medial eyelid lacerations should be appropriately explored for canalicular involvement. In addition, a high suspicion for orbital fractures should be kept in mind in the case of extensive wounds and/or puncture wounds in the maxillary/ malar area, and these patients should undergo diagnostic maxillofacial CT scan.

**MANAGEMENT**

**General management:**

It is important to obtain all relevant history to ascertain if the dog responsible for the bite was rabid or not, to check if the bite was provoked or unprovoked, to check if there

were similar dog bites in the neighborhood on the same day or recent times involving the same dog.

The aims of treatment of such injuries can be broadly enlisted as:

- Adequate wound toilet to prevent wound infection
- Rabies prophylaxis
- Exploration and surgical reconstruction of normal anatomy with maximum restoration of function

**Infection prevention:**

Infection is a serious concern after dog bite injuries. Facial bites are classified as category III dog bites which indicate single or multiple transdermal bites or scratches. This warrants both local treatment of the wound and complete post-exposure prophylaxis measures including immunoglobulin and vaccination.

The initial management of any periocular animal bite-related trauma is thorough cleaning and debridement. The wound can be washed with soap and water, although ideally, a virucidal agent like povidone-iodine, if available, should be used. If required, this may be done under general anesthesia especially in smaller children. Thorough irrigation can decrease the risk of infection by up to 90%. The suggested technique is using a 30 mL syringe with an 18G catheter or needle to create a forceful stream. A total volume of at least 150 mL is recommended.<sup>4</sup>

It is extremely important to debride the wound site of all devitalized tissue, remove all foreign bodies, and expose the surrounding healthy tissue.

The Center for Disease Control (CDC) guidelines recommend that 20 IU/kg of human rabies immunoglobulin (RIG) should be injected around the



Fig.-1a, 1b, 1c: Spectrum of dog bite injuries

wound site after cleaning. Furthermore, any remaining RIG can be administered intramuscularly at an anatomical site distant from vaccine administration. Of particular importance is to ensure that while injecting RIG, it should not be administered in the same syringe as the vaccine. This is because there is a possibility that RIG might partially suppress the active production of antibody. Following this, human diploid cell rabies vaccine (HDCV) or purified chick embryo cell vaccine (PCECV) 1.0 mL intramuscularly, one each on days 0, 3, 7, and 14 should be administered. Tetanus vaccine may also be given simultaneously after checking the patient's vaccination status. Tetanus spores are relatively common in dog feces and can lie dormant for months. Tetanus vaccination with immunoglobulin is recommended in all patients with an unknown vaccination history, immunocompromised or those who have not received the initial three doses primarily.<sup>5</sup>

#### **Prophylactic systemic antibiotic:**

Use of prophylactic antibiotics is recommended in high risk situations such as deep tissue involvement, bone involvement (including orbital fractures), crush injuries or in patients with immunocompromised status. However its role is minimal in the case of minor injuries. Amoxicillin/ Clavulanate for 3-5 days is first line. Options for patients with penicillin allergy include trimethoprim/ sulfamethoxazole, clindamycin, ciprofloxacin or azithromycin. Longer antibiotic treatment is indicated in the setting of active infection.

#### **Wound closure:**

Early closure of wounds of the periorbita is recommended and does not seem to increase the risk of infection. On the other hand, postponing wound closure by up to 24 hours does not appear to increase infection rates as long as prophylactic antibiotics are instituted promptly on presentation. Prior to any surgical treatment, it is a worthwhile clinical practice to routinely photograph the wound before and after cleaning. Look for any associated trauma such as occult globe rupture, trauma to the canaliculi, levator muscle, and extraocular muscles and also for bony fractures. Primary closure of wound is done immediately after formal and thorough debridement as it shortens the healing time of the wounds without increasing the rate of infection.<sup>6</sup>

**Open globe injuries:** Open globe injury from dog bites is rare, with only a few case reports in the literature. The low prevalence of ocular injury is attributed to blink reflex which protects the globe. In two other cases, it appears

that a distant site (in one case in the cranium, in the other on the cheek) acts as a fulcrum for the superior canine jaw, allowing the lower jaw to enter the orbit, usually infero-medially.

**Canalicular injuries:** Canalicular lacerations are common injuries from periocular dog bites. This is most likely due stretching of the eyelid resulting in shear forces at the canaliculus which has been found to be the weakest point of the eyelid or due to puncture wounds in this area. Repair with silicone intubation is indicated.

**Orbital fractures:** Orbital fractures are a relatively rare outcome of dog bites, with most sources stating the incidence to be less than 5%. Risk factors include age < 2 years, large dogs and severe bites. The most commonly involved bones are nasal, maxillary and orbital bones and mechanisms include blunt force and puncture wounds. It has been suggested that dog bites causing facial fractures are more likely to involve the nasal bones/ periorbital area.

**Prognosis:** Prognosis depends on extent and mechanism of injury.

#### **DISCUSSION**

Facial and ocular dog bite injuries have two important aspects that need to be addressed. Firstly, these patients are at a high risk of developing rabies, also known as hydrophobia, which is an acute viral disease of the central nervous system caused by type 1 *Lyssavirus* with a 100% fatality rate. Almost 17,000 develop rabies in India every year, mostly due to a low coverage of vaccine and lack of proper treatment. Thus, infiltration of the wound with anti-rabies immunoglobulin within 72 hours of injury combined with post-exposure prophylaxis is crucial for canine bite injuries. In addition to rabies, there is also a high risk of contracting infections from the pathogens commonly found in the canine oral flora leading to local wound infection or more severe septicemia, meningitis, and even death. Thus, canine bite wounds should be treated with prophylactic broad-spectrum antibiotics. Secondly, these injuries may lead to disfigurement with distressing physical and psychological consequences. Hence, along with prevention of rabies and other infections, achieving good cosmesis is also an important goal in facial dog bites.<sup>7,8</sup>

#### **CONCLUSION**

The principles of successfully managing periocular dog bites are thorough wound toilet, debridement, and subsequent reconstructive surgery. Concurrent

immunization against rabies and adequate infection control are equally important. Early management of complex periocular injuries gives good cosmesis and satisfactory functional outcomes

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## EYES ON THE FUTURE: ROP SCREENING AND AWARENESS INITIATIVES

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### ABSTRACT

Retinopathy of Prematurity (ROP) poses a significant threat to the vision of premature infants, especially in low and middle-income countries. This paper highlights key challenges such as a shortage of ROP-trained ophthalmologists, the role of neonatal care, lack of awareness among healthcare professionals, healthcare infrastructure issues, inadequate parental awareness, and the importance of counselling services. A comprehensive, multidisciplinary approach is crucial to address these challenges and prevent ROP-related blindness, necessitating improved training, infrastructure, awareness campaigns, and support systems.

**Keywords:** Retinopathy of Prematurity, infants, childhood blindness, preventable

### INTRODUCTION

Retinopathy of prematurity (ROP) is a pathophysiological condition predominantly affecting premature infants, particularly those with low birth weight. This disorder is intricately linked to the underdeveloped vascularization of the retina in premature neonates, where the normal intricate process of retinal vessel growth is disrupted. Retinopathy of prematurity (ROP) remains one of the most preventable causes of childhood blindness worldwide.<sup>1</sup> Despite being a highly preventable cause of childhood blindness globally, ROP continues to pose a substantial threat to the visual health of premature infants. As the survival rates of premature infants increase, it leads to increase in the incidence of ROP. There is an ongoing third epidemic of ROP in low and middle income countries due to various factors, such as increased survival of preterm babies, inadequate quality of neonatal care, and low coverage of screening and treatment services for ROP.<sup>2</sup> It is emerging as a major public health concern in low- and middle-income countries, including India.<sup>3</sup> It is crucial to raise awareness about this condition

to ensure early detection and intervention, ultimately safeguarding the vision of these vulnerable newborns.(Figure 1)



**Fig-1: Early detection and intervention plays key role in safeguarding the vision of premature infants**

Kumar *et al.* have stressed the importance of developing a need-based intervention package to improve knowledge, skills, and practices of preterm care providers to improve survival of preterm neonates without sight-threatening ROP.<sup>4</sup> ROP-related blindness can be prevented by a multidisciplinary team approach, which includes obstetricians, neonatologists/pediatricians, nurses, ophthalmologists, health care workers, and parents. The enhancement of access, availability, and affordability of services related to the care of premature babies is a critical imperative in India. Specifically, addressing the



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challenges surrounding retinopathy of prematurity (ROP) requires a comprehensive approach that tackles various interconnected issues.

- 1. Shortage of ROP-Trained Ophthalmologists-** The scarcity of trained ophthalmologists, particularly those affiliated with neonatal care facilities, poses a significant challenge to effective retinopathy of prematurity (ROP) screening and treatment programs.<sup>5,6</sup> This shortage is exacerbated by the absence of ROP in standard medical curricula, resulting in inadequate training for ophthalmologists in ROP screening. Currently, there are less than 200 ROP specialists nationwide, as reported by the Indian ROP Society, raising concerns about the healthcare system's capacity to meet the growing demand for ROP services.<sup>7</sup> To address this issue, there is a crucial need to integrate ROP training into ophthalmology curricula, implement continuing education programs, and establish specialized training courses. Incentivizing ophthalmologists to specialize in ROP and fostering collaborations between medical institutions, professional societies, and government bodies can contribute to mitigating the shortage of ROP specialists and improving neonatal care services.
- 2. Role of Neonatal Care Pediatricians:** Adhering to standard practices in neonatal care is crucial for preventing retinopathy of prematurity (ROP). A meta-analysis by Askie et al. revealed that maintaining a lower target range for oxygen saturation (85–89%) is associated with a reduced risk of ROP treatment compared to a higher saturation range (91–95%).<sup>8</sup> Proper oxygen management, including minimizing fluctuations, is essential for ROP prevention. Other key practices include early breastfeeding for weight gain, kangaroo mother care, and measures to reduce sepsis rates. However, challenges such as the inadequate availability of pulse oximeters and essential equipment in some newborn units highlight the need for improved infrastructure in neonatal care facilities to effectively implement these preventive measures.<sup>9,10</sup>
- 3. Lack of Awareness among Healthcare Professionals:** In India, where a significant proportion of the population resides in rural areas with limited access to healthcare facilities, community-based health workers emerge as a reliable force. Community health workers play a

pivotal role in implementing these measures. Although reducing preterm births is a difficult task, some cost-effective interventions such as family planning, nutritional supplementation can help. Community health workers play an important role in this aspect. Health care workers should ensure facility-based deliveries of women in preterm labour. Auxiliary nurse midwives (ANMs) can help by administering intramuscular injection dexamethasone as a prereferral dose to a pregnant woman in preterm labour (between 24 and 34 weeks of gestation) and appropriate referral to health facility utilizing the free referral transport.<sup>11</sup> In case the referral is delayed, refused, or referral is not possible, ANM may complete the full course of treatment (four doses 12 h apart). Health workers should educate the mothers in safe practices in bringing up their child. They can also improve compliance for ROP screening and follow-up.

- 4. Healthcare Infrastructure and Accessibility:** Strengthening healthcare infrastructure, especially in remote or underserved areas, is vital for improving accessibility to ROP care services. Establishing neonatal intensive care units (NICUs) equipped with the necessary facilities and trained staff can contribute to early identification and management of ROP. For scaling up ROP screening and treatment programs to every neonatal unit in India the National Neonatology Forum (NNF) accreditation must only be given to units which provide ROP services, as it should be standard of care.<sup>9</sup> Availability of infrastructure and standard facilities should be given attention. The United Kingdom's Queen Elizabeth Diamond Jubilee Trust has started a model program to reduce the incidence due to ROP by providing infrastructure (indirect ophthalmoscopes and laser machines) and capacity building which needs to be scaled up nationwide.<sup>7</sup>
- 5. Inadequate Parental Awareness:** Parents play a crucial role in the care of premature infants. The primary hurdle encountered in ROP screening programs is low compliance and follow-up, often attributed to a lack of awareness. Given the need for multiple screening episodes, especially post-discharge from neonatal units, the insufficient understanding of the disease and the importance of regular follow-ups, coupled with inadequate communication with parents, results in diminished compliance. Malladi et al. initiated a pilot project

titled "ROP Parent Support Group" aimed at providing counselling, information sharing, resource support, and general guidance to parents of infants affected by retinopathy of prematurity (ROP).<sup>12</sup> Currently in the implementation phase, the long-term impact of this initiative will be intriguing to observe. Public awareness campaigns targeting parents and caregivers are essential to disseminate information about ROP, its consequences, and the significance of early diagnosis and treatment.

- 6. Counselling Services and Support Groups:** Integrating counselling services into neonatal care units can provide emotional support and guidance to parents of premature infants. Additionally, support groups focusing on ROP awareness can serve as platforms for sharing experiences and disseminating information within the community.

### CONCLUSION

India must prepare to confront the challenges posed by the third epidemic and proactively address the prevention of retinopathy of prematurity (ROP)-related blindness, marking a critical need at this time. Retinopathy of Prematurity is a serious threat to the vision of premature infants, and while trained ophthalmologists are integral to its management, addressing the lacunae in their expertise is essential. The focus should be on enhancing the quality of neonatal care while expanding screening and treatment programs. A multidisciplinary team approach is imperative. Effective and timely care in India requires heightened awareness among community-based health workers and parents, coupled with the training of medical professionals such as pediatricians, ophthalmologists, and nurses. By acknowledging and addressing these challenges, we can collectively shine a light on Retinopathy of Prematurity and contribute to a brighter future for these vulnerable newborns.

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## TIPS FOR TACKLING STRABISMUS AT COMMUNITY LEVEL BY COMPREHENSIVE OPHTHALMOLOGIST

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Strabismus occurs in about 5 percent of the population. Strabismus surgery is a well described and ubiquitously performed surgery, albeit with unpredictable results.

Indications for strabismus surgery in children include alignment of eyes to prevent maldevelopment of sensory apparatus which can cause anomalous retinal correspondence, suppression and amblyopia. Another extremely common indication for squint surgery across all age groups is cosmetic deformity. (Figure 1)



Fig.-1: Cosmetic deformity due to squint

Studies documenting HRQOL (Health Related Quality of Life) in squint patients suggest that HRQOL improves significantly after squint surgery

Successful surgical outcome depends on

- **Surgeon related factors-** Expertise and experience of

the surgeon, meticulousness and attention to detail while performing the surgery, surgeon preference of a particular surgical technique, surgeon's intuition and surgical sixth sense, to name a few.

- **Patient related factors are largely -** Age of the patient, refractive error, etiology and magnitude of squint, anatomical variations, delays in seeking treatment and history of any previous squint surgery

### Tips for successful outcome of squint surgery-

#### 1. Accurate measurement

*Pre operative angle of deviation* is proven to be the *strongest factor* for predictability and success of squint surgery. It is measured with prism bars using Prism Bar Cover Test (PBCT) with documentation of two reproducible measurements on 2 different occasions.

*Greater the pre operative deviation, better is the surgical outcome.*

Studies have also shown that *pre operative deviations of less than 30 PD tend to have a better surgical outcome.*

*Causes for erroneous PBCT measurements need to be borne in mind, as taking care of the following factors can lead to perfect outcomes-*

- **Amblyopia-** Modified Krimsky test / PBRT is carried out for measuring deviation in amblyopes. Modified Krimsky's test is inherently less reliable than PBCT due to possibility of errors of parallax. Errors of parallax may be reduced by positioning examiner's own eye directly or behind the handheld light. Modified Krimsky test may also give errors because of individual variability in angle kappa.
- **Large deviations-** Large deviations need higher prism powers for measurement. (Figure 2) Stronger the prism applied, greater are the chances of error.

Large deviations may also need splitting of prisms between two eyes or stacking of prisms in front of one eye. Generally, stacking of horizontal



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Fig.-2: Large deviations

prisms is not recommended as prisms do not add up linearly and can really escalate probability of error. Splitting of prisms between the two eyes may also give error, though the magnitude is much lesser compared to stacking. Splitting of prisms can be practiced in large angle comitant strabismus.

Delineating the largest angle is of utmost importance for perfect cosmetic outcome. It prepares the surgeon for carrying out greater amount of surgery on the extra ocular muscles. This needs even greater care as larger surgery means more violation of muscle pulleys and possibility of orbital fat resection

- **Combined vertical and horizontal deviation** can also lead to variable PBCT findings. (Figure 3) This can be overcome by meticulous PBCT using stacking of horizontal and vertical prisms.
- **High refractive error**, and PBCT over thick glasses can also reduce the accuracy of the measurement. This occurs because of the prismatic effect induced by high refractive error of 5D or above. It should be remembered that plus glasses always measure less than actual deviation (both in eso and exo). Minus glasses always measure more than actual deviation (both in eso and exo).



Fig.-2: Combined horizontal and vertical deviation

2. **Proper refractive correction:** Cycloplegic refraction before planning surgery, helps to identify those having significant refractive error. Glasses should be prescribed and worn regularly for the period of *refractive adaptation*, which may take upto 18 weeks, following which the magnitude of deviation should be ascertained by PBCT.

Certain types of squint get completely corrected with glasses such as accommodative esotropia; or get reduced substantially with glasses such as partially accommodative esotropia.

For patients having significant squint after glass correction, PBCT measurements with glasses are the target angle for surgical correction.

*For myopic patients with strabismus, following additional points need to be borne in mind-*

- As minus lenses increase the amount of measured deviation, it can lead to surgical overcorrection. Hence it is recommended to increase the measured deviation by 2.5%
- Planned undercorrection can be carried out, as per refractive error of the patient, based on Hansen's data
- Measurement with contact lenses instead of glasses, to obviate the prismatic effect
- Careful surgery to avoid inadvertent scleral perforation due to thin myopic sclera

3. **Focus on stereopsis-** Testing for three dimensional vision before surgery, can help to predict the outcome of surgery. Impaired binocular vision implies worse long term outcomes. Early detection of loss of stereopsis can be used to ensure timely intervention especially in intermittent deviations .
4. **Amblyopia management-** Pro active management of amblyopia should precede surgery. Traditional occlusion therapy can be combined with adjuncts such as oral citicoline for improved results. If compliance to routine occlusion therapy with patches is low, LCD glasses can be used for carrying out occlusion. Dichoptic training can help to achieve higher level of plasticity than occlusion alone.
5. **Binocular vision therapy** pre operatively has been known to culminate into better post operative outcomes especially in terms of long term maintenance of orthotropia.
6. **Age at surgical intervention-** Surgery done at a younger age leads to more response because of the small size of the eye. Age is of significance for infantile deviations also as it is recommended to operate on them by one year of age.
7. **Per-operative pearls-** Hallmarks of a good squint surgery include meticulous dissection , reproducible technique, use of a microscope or loupe, good anesthesia – topical or sub tenon infiltration or general anaesthesia. Surgical trauma should be reduced to minimum as the subsequent surgical edema can cause refractive change by changing axial length and anterior chamber depth.
8. **Adjustable sutures** help to alter and adjust the surgical dose even post operatively in the form of a relatively simple and quick procedure which can be done under topical anaesthesia . It helps to improve short and long term outcomes by overcoming any unplanned under correction or over correction.
9. **Botulinum toxin** may be utilized in under or over corrections or as adjunct to surgery in large horizontal deviation , though reliance on botulinum toxin for enhancing squint outcomes is still not very widely practiced practically.
10. **Minimally invasive squint surgery (MISS)-** MISS has been shown to produce better outcome and earlier rehabilitation. Key hole incisions are the cornerstone of MISS. Advantages of MISS include reduced risk of post operative corneal complications , minimal post operative discomfort and better preserved muscle function. Also there are lesser chances of conjunctival congestion , chemosis , corneal dellen , tenon s prolapse because of minimal tissue disruption and minimal collateral damage. There are minimal chances of anterior segment ischaemia due to preserved perilimbal vasculature. MISS can be used to perform all types of surgeries.
11. **Type of surgery-** Unilateral recess-resect may have better outcome than bilateral lateral rectus surgery especially in deviations upto 60 PD. Though it depends widely on surgeon's preference and experience.
12. **Topical Brimonidine** has been advocated quite recently intra operatively and post operatively, for the purpose of reducing conjunctival injection. Even with perfect ocular alignment, post operative conjunctival injection can be a significant source of anxiety and disappointment and a cosmetic issue. Advantages of topical brimonidine include lesser systemic adverse effects, can be safely used in children more than 2 years of age and may help to counter steroid induced increase in IOP.
13. **Fibrin glue for conjunctival closure** gives the advantage of lesser operating time / GA time , lesser inflammation which culminates in lesser conjunctival congestion, leading to better patient comfort and cosmesis.
14. **Binocular vision therapy after strabismus surgery -** Even after perfect post op ocular alignment , there are some chances of recurrence of misalignment. To reduce recurrence , binocular vision therapy is utilized for improving sensory and motor visual skills. It can be advocated as active office based therapy or home therapy or a combination of both. It encompasses anti suppression exercises along with fusional and accommodative exercises. Perceptual learning and binocular integrative exercises result in improved binocular coordination and stereopsis.
15. **Role of imaging -** Imaging modalities such as CT scan , MRI , UBM , Swept Source AS- OCT have been used for understanding etiology and for planning surgery. For instance, high resolution MRI helps to define muscle pulleys . Heterotopic pulleys account for incomitant squint and pattern strabismus. Swept source AS- OCT / wide field UBM are used for detection of muscle insertion in previously operated

/fresh cases. Dose response curve of previously operated EOMs differs from unoperated muscles. Imaging is especially required in case of non availability of previous records or if the re surgery is carried out by another surgeon. Also patient information and history regarding type of strabismus and surgical history may be inaccurate. Additionally, stretched scars and muscle creep can change the insertion over years in previously operated cases.

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## **DOUBLE OPTIC DISC PIT ASSOCIATED WITH SEROUS DETACHMENT AT THE MACULA – A CASE REPORT**

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### **ABSTRACT**

Optic disc pit (ODP) is a rare, congenital, cavitory anomaly of the optic disc. Usually, single ODP occurs in an eye and only eleven cases of double ODP have been reported so far in the literature. In the present study, we report a case of unilateral double ODP, with both the pits present in the temporal segment of optic disc. ODP was associated with serous retinal detachment at the macula and retinal pigment epithelium degeneration. The case was managed with pars plana vitrectomy with internal limiting membrane peeling with endolaser and gas tamponade.

**Keywords:** Optic disc pit maculopathy, endo laser, vitrectomy.

### **CASE REPORT**

We report the successful management of a patient presenting with unilateral, symptomatic, double ODP involving temporal segment of the disc with central serous maculopathy.

A 28 year, male patient presented in our out patient department (OPD) with gradual progressive loss of vision in left eye for one year. Patient was apparently normal 1 year ago. There was no history of any chronic systemic illness along with it there was no history of ocular trauma or ocular surgery. Patient was then admitted to our in-patient department.

On admission visual acuity was Right Eye-6/6 and Left Eye-Finger counting at 2ft. Projection of rays was accurate in all quadrants. Anterior segment examination with slit lamp was within normal limits in both the eyes. Pupillary reaction to light was normal. Intraocular pressure (IOP) by applanation tonometry was 17 mm of Hg in right eye and 18 mm of Hg in left eye. Gonioscopy shows wide open angle in both the eyes.

On dilated fundoscopic examination by indirect ophthalmoscope right eye -vertical cup disc ratio (VCDR)

was 0.5 and macula was within normal limit. Left eye had double optic disc pit with central serous chorioretinopathy and VCDR was 0.8 (Figure: 1). On OCT Right eye was normal, Left eye OCT: central serous chorioretinopathy with intraretinal fluid accumulation with pigment epithelial detachment and macular thickness = 847 micron (Figure: 2)

**Management:** The patient was managed by pars plana vitrectomy, internal limiting membrane peeling with endolaser with C3F8 gas tamponade.

**Result :** Visual acuity postoperatively after 1 day Right Eye-6/6, Left Eye-3/60.

After 1 week visual acuity was 6/6 in right eye and 6/60



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**Fig-1:** Fundus picture of left eye showing double optic disc pit with central serous maculopathy.

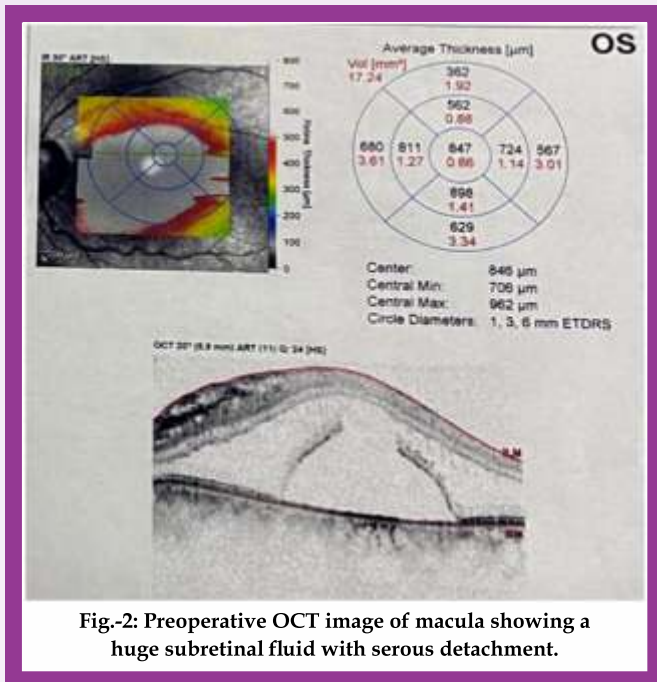


Fig.-2: Preoperative OCT image of macula showing a huge subretinal fluid with serous detachment.

in left eye. Post operative OCT image (Figure 3) showing decrease in subretinal fluid and serous detachment. Then patient was lost to follow up.

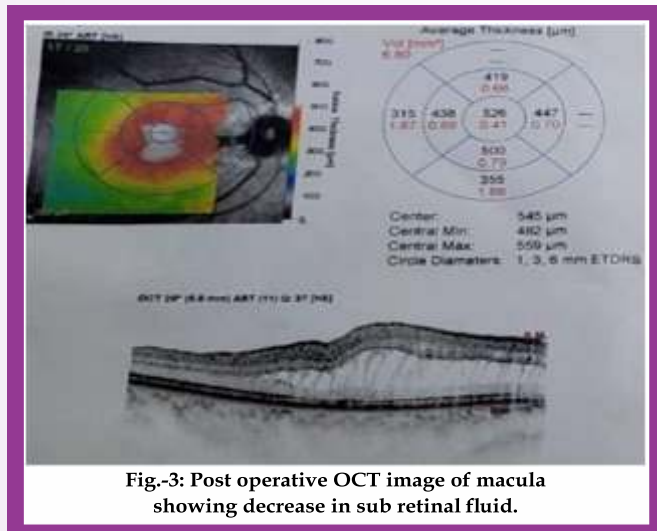


Fig.-3: Post operative OCT image of macula showing decrease in sub retinal fluid.

**DISCUSSION**

OPTIC DISC PIT [ODP] is a rare, congenital, cavitory anomaly of optic disc and caused due to imperfect closure of embryonic fissure during development in intrauterine life. It is most commonly located in the inferotemporal segment of the Optic disc. Usually, single ODP occurs in an eye and only 11 cases of double ODP have been reported so far in the literature. Out of these eleven cases, five eyes had pits in opposite segments of the disc i.e. nasal and temporal; while the rest six eyes had both the pits in the single segment i.e. temporal.<sup>6-10</sup> Out of the five eyes with

nasal pit, only two eyes had tell-tale retinal signs.<sup>2,3,4,5</sup> Overall, two cases underwent vitrectomy along with posterior hyaloid separation, endolaser, and gas tamponade. In both cases vision improved from 20/200 to 20/50 and from 20/60 to 20/20 after a follow-up of 1 and 6 years, respectively.<sup>5</sup>

In the present study we report a case of unilateral ODP. ODPs are rare and occur equally in male and female with an estimated incidence of 1 in 11,000 people<sup>1</sup>. They are typically unilateral but may be bilateral in up to 15% cases.

Optic disc pit with maculopathy (ODP-M) is characterized by intraretinal and subretinal fluid accumulation at the macula, causing visual disturbance. The source of the fluid is unclear and several competing theories have suggested that it may be vitreous fluid, cerebrospinal fluid, leakage from blood vessels at the base of the pit or leakage from the choroid.

**CONCLUSION**

Treatment of ODP-M is warranted as the majority of cases suffer gradual progressive deterioration with significant visual los. A multitude of interventions had been designed for the treatment of ODP-M, but none has been established as the treatment of choice. In series if 10 patients treated with PPV, laser and gas tamponade visual improvement was achieved in 90% cases and complete resolution of fluid in 70% cases.

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# A RARE CASE OF INFECTED SUTURE GRANULOMA FOLLOWING STRABISMUS SURGERY IN A YOUNG GIRL

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## ABSTRACT

A rare case of infected suture granuloma masquerading as conjunctival abscess as complication of strabismus surgery in a school going girl belonging to lower socioeconomic status with esotropia. Despite administration of local antibiotics following strabismus surgery, a patient presented with localised redness and discharge after two weeks. The patient was afebrile with no signs of pre-septal or orbital cellulitis. Patient was prescribed intravenous ceftriaxone to cover both gram positive and negative spectrum and patient was kept for granuloma exploration and excision under general anaesthesia. Granuloma biopsy and suture material sent for culture sensitivity and histopathological evaluation. A 35 mm<sup>2</sup> infected suture granuloma was noted. Biopsy specimen indicated inflammatory and histiocytic cells. The addition of steroid eyedrop postoperatively fastened the recovery leading to quiet eye with in 2 weeks.

**Keywords:** Suture granuloma, Strabismus, Excision biopsy, Absorbable suture.

## INTRODUCTION

Strabismus surgery is an effective treatment with minimum complications.<sup>1</sup> Although rare, complications like foreign body granuloma/ pyogenic granuloma have been reported in 2.1 percent population after strabismus surgery.<sup>2</sup> It can impair aesthetical results and ocular motility. Ophthalmic surgeries may cause an iatrogenic stimulus for conjunctival and other benign tissue growth such as pyogenic granuloma.<sup>3</sup> The risk of granuloma occurring appears to be related to the suture material. With the elimination of gut sutures in most strabismus surgeries, granulomas have become uncommon.<sup>4</sup> Therefore, postoperative meticulous follow ups and prompt diagnosis and management of complications reduce the risk of visual morbidity. This case report documents the presentation and management of a rare case of infected suture granuloma after strabismus surgery in a young female.

## CASE REPORT

A 9-year-old girl was diagnosed with esotropia and was scheduled for strabismus surgery. The eyes were prepared in a sterile fashion with 1% povidone-iodine solution and instillation of one drop of povidone iodine, the surgery was performed under general anesthesia. The patient underwent 7.00 mm unilateral lateral rectus muscle resection and medial rectus recession. The muscle was approached through a limbal incision. The muscle ends were sutured using double-armed 6-0 Coated Vicryl (polyglactin 910) suture. Two interrupted 8-0 Coated VICRYL (polyglactin 910) sutures were used to close the conjunctiva. After two weeks, the patient presented with complaints of localized redness and mild discharge from the right eye. Clinically, nodular painless and reddish mass was present near nasal limbus. Slit lamp examination indicated localized conjunctival injection with large granuloma at the surgical site of the right eye with underlying suture material soaked in pus material (Figure 1). She was afebrile, without any other signs and symptoms of pre-septal or orbital cellulitis. Conjunctival swab was obtained for culture sensitivity testing. She was started on intravenous ceftriaxone and moxifloxacin eyedrops four times a day. She was scheduled next day for granuloma exploration and excision under general anaesthesia. The examination



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under anaesthesia revealed suture granuloma measuring 8mm × 5mm present at the site of medial rectus insertion in the right eye (Figure 2). Granuloma specimen and suture material was sent for culture sensitivity and histopathological evaluation. Conjunctival swab revealed *Staphylococcus aureus* organisms and histopathology showed inflammatory cells and histiocytes. Steroid eye drops were added to the existing medical therapy of oral and topical antibiotics. After two weeks, the eye was quiet and granuloma was completely



Fig.-1: Right eye with localized conjunctival injection and infected foreign body granuloma two weeks after performing medial rectus recession.

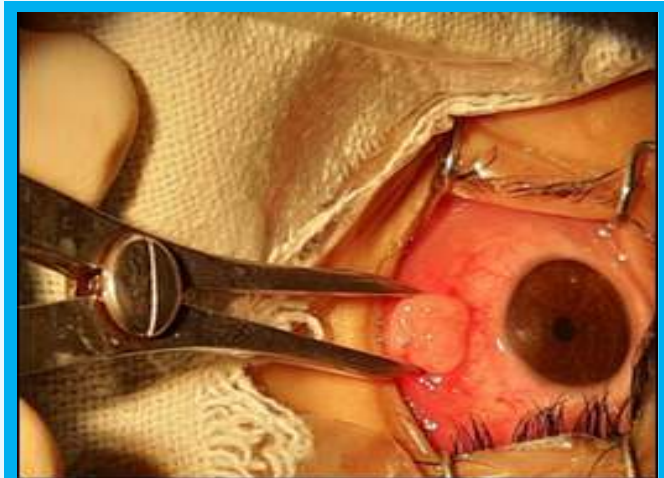


Fig.-2: Foreign body granuloma measuring 8 mm × 5 mm at the insertion of medial rectus of right eye.

resolved (Figure 3).

## DISCUSSION

Suture granuloma and inflammatory reaction is a rare occurrence in strabismus surgery.<sup>4</sup> They usually occur within the three week postoperatively over the site of the muscle reattachment with nonabsorbable sutures, and rarely with synthetic absorbable sutures. Treatment consists of topically applied corticosteroid drops,



Fig.-3: Right eye 2 weeks after granuloma excision and topical steroids treatment.

drainage of the inflammatory material, excision of the granuloma, and removal of the suture. Suture granulomas may be mistaken for vascular tumors, cysts or pyogenic granulomas.

In the present case, we believe that despite the unexpected findings following squint surgery during postoperative follow ups, exploration and excision of granuloma was the correct strategy for this patient which fasten the healing and recovery of the patient and also aids in relieving psychological stress associated with it.

## CONCLUSION

Surgical exploration and excision aids in early treatment and diagnosis of suture granuloma and provides specimen which can be sent for culture sensitivity and histopathological examination and avoids dreaded side effects on intraocular pressure following long term steroid therapy for granuloma treatment.

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# QUIZ!



1. You are evaluating a community ophthalmology program's impact. Which of the following indicators would be LEAST appropriate for measuring success:
  - a. Change in visual acuity of program participants
  - b. Increase in program utilization by the target population
  - c. Reduction in healthcare costs associated with eye diseases
  - d. Number of scientific publications produced by the program
2. The first aid treatment for chemical burns of the eye is:
  - a. Patching of the eye
  - b. Immediate copious irrigation with water or normal saline solution
  - c. Putting a plenty of ointment into the eye
  - d. Instilling a drop of local anaesthetic into the eye
3. A farmer was injured by a wooden stick in his eye. Two weeks later, he developed redness and defective vision (Figure 1). He received topical antibiotics for two weeks but with no improvement.



The proper management would be:

- a. Culture and sensitivity for the proper antibiotic
  - b. Additional of systemic antibiotic
  - c. Culture for viruses
  - d. Culture for fungi
4. Under the National programme for control of Blindness in India, medical colleges are classified as eye care centre of:
    - a. Primary level
    - b. Secondary level
    - c. Tertiary level
    - d. Intermediate level
  5. Under the WHO "Vision 2020" Programme, the

"SAFE" strategy is recommended for the control of:

- a. Trachoma
  - b. Glaucoma
  - c. Diabetes mellitus
  - d. Cataract
6. In addition to limbal ischaemia, which of the following signs has been shown to have a poor prognostic value in chemical eye injury? (Figure 2)



- a. More than 2+ cells in anterior chamber
  - b. Central epithelial defect of > 80%
  - c. Raised intraocular pressure (IOP) of 28 mmHg or more
  - d. Severe conjunctival involvement of > 80%
7. A patient calls the eye department 3 days following cataract surgery. They feel that the vision is reduced, and the eye is red and light sensitive (Figure 3). Please select the most appropriate answer from the following:



- a. Advise the patient to increase the topical steroid drops, but have a low threshold for attending the eye casualty.
- b. The most common causative organisms include Staphylococcus aureus, Staphylococcus epidermis, and Streptococcus spp.
- c. Consider early vitrectomy if the vision is better than perception of light.

- d. In addition to intravitreal antibiotics, topical or intravitreal corticosteroids should also always be administered
8. For the treatment of a case of dog bite, all of the following are correct except:
    - a. Give Immunoglobulins for passive immunity
    - b. Give Anti Rabies Vaccine
    - c. Immediately stitch wound under antibiotic coverage
    - d. Immediately wash wound with soap and water
  9. When managing a community-based diabetic eye clinic, what preventive measure can be emphasized to reduce the risk of diabetic retinopathy progression?
    - a. Regular eye examinations and early intervention
    - b. Prescribing high-dose oral steroids
    - c. Performing laser surgery for all diabetic patients
    - d. Recommending eye exercises
  10. When conducting a community-based study on the prevalence of myopia, which objective measurement technique would be most accurate for assessing axial length?
    - a. Autorefractometry
    - b. Keratometry
    - c. Optical coherence tomography (OCT)
    - d. A-scan ultrasonography

ANSWERS	
1. (d)	2. (b)
3. (a)	4. (c)
5. (a)	6. (d)
7. (b)	8. (c)
9. (a)	10. (d)



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## UNVEILING THE EYES OF HIV - OCULAR MANIFESTATIONS AT A GLIMPSE

### INTRODUCTION

Human Immunodeficiency Virus (HIV) is a global health challenge that primarily targets the immune system, leading to acquired immunodeficiency syndrome (AIDS). While the systemic effects of HIV are well-documented, its impact on the eyes is a critical aspect that deserves attention. Ocular manifestations of HIV encompass a spectrum of conditions, ranging from infections to neoplasms, each posing unique challenges to those living with the virus. In this article, we provide a glimpse into the ocular manifestations associated with HIV.

### EPIDEMIOLOGY

The World Health Organization (WHO) approximates that over 50 million individuals worldwide have contracted HIV since the early 1980s, with a global prevalence rate believed to be 0.8%.<sup>1</sup> Approximately 75% of individuals with HIV are thought to experience ocular disease, with the majority of HIV patients residing in developing countries. The diseases of retina and choroid are most common in HIV patients, potentially leading to visual impairment.

### OCULAR MANIFESTATIONS

#### 1. Adnexa

- a. Blepharitis
- b. Molluscum Contagiosum: A dermatitis caused by a poxvirus and characterized by multiple, small, painless umbilicated lesions on the eyelid skin.
- c. Kaposi's Sarcoma: A highly-vascularized, mesenchymal tumor and may present as painless, violaceous lesions on the eyelid skin or conjunctiva.
- d. Herpes Zoster Ophthalmicus (HZO): Marked by viral activity affecting the ophthalmic division (V1) of the trigeminal cranial nerve (V), this condition can lead to ocular manifestations such as conjunctivitis, uveitis, episcleritis, keratitis, and retinitis.<sup>2</sup>

#### 2. Anterior Segment

- a. Keratoconjunctivitis sicca: Occurring due to HIV-mediated inflammatory destruction of lacrimal glands.
- b. Keratitis: Most common causes are Herpes simplex virus and varicella-zoster virus.
- c. Conjunctival Microvasculopathy: Characterized by segmental dilatation and narrowing of blood vessels, comma-shaped vascular segments, and sludging of blood column.
- d. Iridocyclitis: Could be associated with VZV or CMV retinitis, toxoplasmosis, syphilis, tuberculosis, as well as bacterial or fungal retinitis. Medications, like Rifabutin and Cidofovir, may also cause iridocyclitis.
- e. Kaposi's Sarcoma
- f. Ocular surface squamous neoplasia (OSSN): Reported as the first presenting sign of HIV/AIDS in 26%-86% cases.<sup>3</sup>

#### 3. Posterior Segment

- a. Retinal Microangiopathy: Associated with low CD4 T-cell counts. Characterized by the presence of cotton wool spots, retinal hemorrhages, and microaneurysms.
- b. Cytomegalovirus (CMV) Retinitis: Commonly observed when CD4 counts are below 100/microliters, a fundus examination shows complete thickness intraretinal opacification coupled with retinal hemorrhages. There is typically minimal anterior chamber (AC) reaction, and the vitreous is generally clear. Vision loss can result from direct involvement of the macula or optic nerve, retinal detachment, and immune recovery uveitis.

<ul style="list-style-type: none"> <li>c. Acute Retinal Necrosis/Progressive Outer Retinal Necrosis</li> <li>d. Retinochoroiditis: Toxoplasma gondii, Pneumocystis, Cryptococcus or Tuberculosis.</li> </ul>
<p><b>4. Neuro-Ophthalmic</b></p> <p>Occurs secondary to meningitis or encephalopathy due to opportunistic infections like toxoplasma gondii, cryptococcus, neurosyphilis or neoplastic lesions like CNS lymphoma.<sup>4</sup> This can lead to:</p> <ul style="list-style-type: none"> <li>a. Cranial Nerve Palsies</li> <li>b. Ocular Motility Disorders</li> <li>c. Papilledema</li> <li>d. Visual Field Defect</li> </ul>
<p><b>5. Orbit</b></p> <ul style="list-style-type: none"> <li>a. Orbital Cellulitis - Caused by Aspergillus, contiguous sinus infection</li> <li>b. Orbital Lymphoma (B-Cell lymphoma)</li> </ul>
<p><b>6. Ocular Toxicities</b></p> <p>Can occur from medications for HIV or opportunistic infections</p> <ul style="list-style-type: none"> <li>a. Uveitis - With Cidofovir and Rifabutin.</li> <li>b. Retinal pigment epithelial abnormalities - With high dose Didanosine.</li> <li>c. Corneal epithelial inclusions - With intravenous Cidofovir or Acyclovir.</li> <li>d. Corneal subepithelial deposits - With Atovaquone.</li> </ul>
<p><b>7. Immune Recovery Uveitis</b></p> <p>Might occur in patients with CMV retinitis on HAART and causes diminution of vision characterized by cataract, vitritis, macular edema, optic disc edema, and epiretinal membrane [4].</p>

**CONCLUSION**

As the global fight against HIV/AIDS continues, recognizing the ocular manifestations of the virus is crucial for comprehensive patient care. Early detection through regular eye examinations and timely intervention can significantly impact the prognosis of ocular complications associated with HIV. Healthcare professionals and individuals living with HIV alike must remain vigilant, working collaboratively to preserve vision and enhance the overall quality of life for those affected by this complex and multifaceted virus.

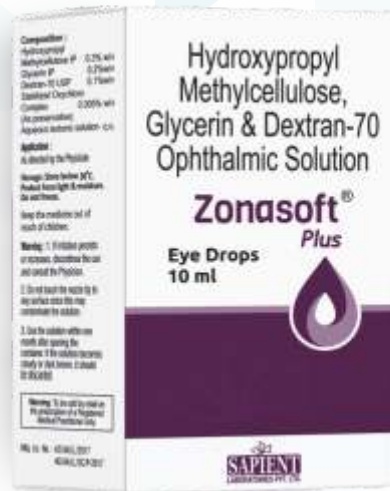
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