

**GUIDELINES FOR COMPETENCY BASED POST GRADUATE TRAINING**  
**PROGRAM**  
**FOR MS – OPHTHALMOLOGY**

**Preamble**

The purpose of this program is to standardize Ophthalmology teaching at Post Graduate level so that it will achieve uniformity in postgraduate teaching, and create competent ophthalmic surgeons with appropriate expertise.

**Program Objectives**

A candidate upon successfully qualifying in the M.S. (Ophthalmology) examination shall be able to:

- 1) Offer to the community the current quality of ‘standard of care’ in ophthalmic diagnosis as well as therapeutics (medical or surgical) in most of the common and easily managed situations at the all levels of health service.
- 2) Periodically self assess his or her performance, keep abreast with ongoing advances in the field, and apply the same in his/her practice.
- 3) Be aware of his or her own limitations to the application of the specialty in situations which warrant referral to better qualified centers or individuals
- 4) Apply research and epidemiological methods during his/her practice. The candidate shall be able to present or publish work done by him/her.
- 5) Contribute as an individual / group towards the fulfillment of national objectives with regard to prevention of blindness.
- 6) Effectively communicate with patients and relatives so as to educate them sufficiently and give them the full benefit of informed consent for treatment, and ensure compliance.
- 7) Acquire the basic skills of teaching medical and paramedical professionals.

**Overall objectives**

The clinical postgraduate training program is intended at developing in the student a blend of qualities of a clinical specialist, a teacher, a researcher, and surgeon. A postgraduate should possess the following qualities, knowledge and skills:

- 1. Basic Sciences:** He/she should possess basic knowledge of the structure, function and development of the human body as related to ophthalmology, and of the factors with may disturb

these, the mechanisms of such disturbances, and the disorders of structure and function which may result.

- 2. Clinical Knowledge:** He/she should be able to practice and handle most day to day ophthalmic problems independently, should recognize the limitations of his clinical knowledge and know when to seek further help.
- 3. Environment and Health:** He/she should understand the effect of environment on health and be familiar with the epidemiology of at least the more common diseases in the field of ophthalmology. He/she should be able to integrate the preventive and promotive methods with the curative and rehabilitative measures in the treatment of disease.
- 4. Community Ophthalmology:** He/she should be familiar with common eye problems occurring in rural areas and be able to deal with them effectively. He/she should be aware of Mobile Ophthalmic Unit and its working and components.
- 5. Recent Advances:** He/she should be familiar with the current developments in Ophthalmic Sciences.
- 6. Teaching:** He/she should be able to plan educational programs in ophthalmology in association with senior colleagues, and be familiar with modern methods of teaching and evaluation.
- 7. Research:** He/she should be able to identify a problem for research, clearly state the objective, plan a rational approach to its solution, execute it, and critically evaluate the data in the light of existing knowledge.
- 8. Scientific Method:** He/she should know that conclusions should be reached by logical deduction; he/she should be able to assess evidence both as to its reliability and its relevance.
- 9. Medico-legal aspects:** He/she should have basic knowledge of medico legal aspects of medicine.
- 10. Patient counseling and consent:** He/she should be familiar with patient counseling and proper consent taking.

### **Specific Learning Objectives**

At the end of this 3-year training program the student should be able to:

- 1. Basic medical science:**

- Attain understanding of the structure and function of the eye and its parts in health and disease.
- Attain understanding and application of knowledge of the structure and function of the parts of Central Nervous System, and other parts of the body, which influence or control the structure and function of the eye.
- Attain understanding of, and develop competence in, executing common general laboratory procedures employed in diagnosis and research in Ophthalmology.

## **2. Clinical Ophthalmology:**

The student will be given adequate opportunity to work, on the basis of graded responsibilities, in outpatients, in patient, and operation theaters (on a rational basis). Thus, from the day of entry to the completion of the training program, the student shall be able to:

- Acquire scientific and rational approach to the diagnosis of ophthalmic cases.
- Acquire understanding of, and develop inquisitiveness to investigate, cause and effect of diseases.
- manage and treat all types of ophthalmic cases
- competently handle all ophthalmic medical and surgical emergencies
- Competently handle and execute safely all routine surgical procedures on lens, glaucoma, lid, sac, adnexa, retina and extra ocular muscles.
- be familiar with micro-surgery and special surgical techniques
- Demonstrate knowledge of the pharmacological aspects (including toxicity) of drugs used in ophthalmic practice, and of drugs commonly used in general diseases that affect the eyes.

## **3. Refraction:**

- Acquire competence in assessment of refractive errors and prescription of glasses for all types of refraction problems.
- Acquire basic knowledge of manufacture and fitting of glasses and competence in judging the accuracy and defects of the dispensed glasses.

## **4. Ophthalmic sub-specialties:**

The student will be given an opportunity to work on a rotational basis in various special clinics of sub-specialties of ophthalmology, if possible. The student shall be able to:

- Examine, diagnose and demonstrate understanding of management of the problems of neuro-ophthalmology, and refer appropriate cases to neurology and neuro-surgery.

- Examine, diagnose and demonstrate understanding of management of (medical and surgical) complicated problems in the field of (a) lens, (b) uvea, (c) cornea including transplant (d) retina including retinal detachment (e) squint (f) ophthalmoplasty and tumors of eye (g) glaucoma (h) plastic surgery of eye and (i) genetic problems in ophthalmology.

- To demonstrate understanding of the manufacture, and competence in prescribing and dispensing of contact lenses, low visual aids, and ocular prosthesis

### **5. Ophthalmic pathological/microbiological/biochemical sciences:**

- The student should be able to interpret the relevant pathological / microbiological / biochemical data, and correlate with clinical, operative, and radiological data.

### **6. Community Ophthalmology:**

- Postgraduate students may be posted to assist in the conduct of eye camps; community and school surveys may also be conducted by them.
- They shall be given an opportunity to participate in surveys, and as members of rehabilitation teams, and
- They shall be able to guide rehabilitation workers in the organization and training of the blind in the art of daily living, and in the vocational training of the blind, leading to their gainful employment.

### **7. Research:**

The student shall be able to

- Recognize a research problem.
- State the objectives in terms of what is expected to be achieved in the end.
- Plan a rational approach, with appropriate controls, with full awareness of the statistical validity of the size of the material.
- Spell out the methodology and carry out most of the technical procedures required for the study.
- Accurately and objectively record, systematically, results and observations made.
- Analyze the data with the aid of appropriate statistical analysis.
- Interpret the observations in the light of existing knowledge, and highlight in what ways the study has advanced existing knowledge on the subject and what further remains to be done.
- Write a thesis under guidance of a recognized PG teacher from the department, in accordance with prescribed instructions.

- Encouraged to write at least one scientific paper of International Standards from the material of this thesis.
- Have knowledge of ethical issues involved in research and publication.

### **Teaching-Learning Methods**

#### **A. Theoretical methods:**

**1. Lectures, demonstrations:** Didactic teaching in clinical, applied, and pre-clinical, para-clinical, and allied sciences (like forensic medicine, radiology, microbiology, pharmacology, pathology, biochemistry, biostatistics etc). These may be imparted by the members of the staff in respective disciplines or by clinicians themselves.

**2. Group Discussion:** The junior residents may present the seminar to the postgraduate student where it is fully discussed, before finally being discussed in front of the faculty or senior eye specialists. A free and fair discussion is encouraged. These discussions enable the postgraduate student to prepare for a general discussion in the class.

**a. Seminars:** seminars should be conducted at least once weekly. The duration should be at least one hour. The topics selected should be repeated once in 3 years so as to cover as wide a range of topics as possible. Seminars could be individual presentations or a continuum (large topic), with many students participating.

**b. Journals Clubs:** Journals will be reviewed covering all articles published on that topic over a 6 month period; these shall be presented by the student under the following headings. Aim 2) Methods 3) Observations 4) Discussions and 5) Conclusions. The student, to whom the journal club is allotted, presents the journal summaries to the senior postgraduates. They are expected to show their understanding of the aspects covered in the articles, clarify any of the points raised in the articles, offer criticisms, and evaluate the articles in the light of known literature.

#### **c. Case Discussion:**

I. Bedside discussion on the rounds and outpatient teaching take their toll with patient management. Therefore, in addition to these, clinical case discussion should form part of a department's schedule at a fixed time every week. This could range from 1-2 hours and could be held at least once a week. The choice and manner of presentation and discussion varies widely and is left to the discretion of the department. Every effort should be made to include as wide a

variety of cases as possible over three years with multiple repetitions. Problem oriented approach is better as it aids in decision making skills.

II. Consultant case presentation is another approach which should be encouraged as it aids in solving complex problems and also acts as a forum for discussion of interesting cases.

III. Case discussion on the patient-records written by the student is to be encouraged as it helps exercise the student's diagnostic and decision making skills. It also helps the consultant in critical evaluation of the student's progress academically.

IV. Case presentation at other in-hospital multidisciplinary forums should be encouraged.

**B) Practical training:** The training should be given in wards, out-patients department, specialty clinics and operation theatres.

**1. Out Patients:** For the first six months of the training program, students may be attached to a faculty member to be able to pick up methods of history taking and ocular examination in ophthalmic practice. During this period the student may also be oriented to the common ophthalmic problems. After 6 months, the student may work independently, where he/she receives new and old cases including refractions and prescribes for them. The students are attached to a senior resident and faculty member whom they can consult in case of difficulty.

**2. Wards:** Each student may be allotted beds in the in-patient section depending upon the total bed capacity and the number of the postgraduate students. The whole concept is to provide the student with increasing opportunity to work with increasing responsibility according to seniority. A detailed history and case record is to be maintained by the student.

**3. Specialty clinics:** The student must rotate in the various subspecialty clinics run by the department.

The **following practical skills** shall be acquired:

**A. Examination techniques along with interpretation**

1. Slit lamp Examination

Diffuse Examination / Focal Examination / Retrolumination-direct & indirect / Sclerotic scatter / Specular reflection / Staining modalities and interpretation

2. Fundus evaluation

i. Direct & Indirect ophthalmoscopy with fundus Drawing

- i. 3-mirror Examination of the fundus
- ii. 78-D/90-D/60-D Examination
- iii. Amsler's grid charting

**B) Basic Investigations along with their interpretation**

- i. Tonometry  
Applanation / Indentation / Non contact tonometry
- ii. Gonioscopy- grading of the angle
- iii. Tear/ Lacrimal function tests  
Staining- fluorescein, Rose Bengal / Schirmer's tests/ Break up time / Syringing /  
Dacrocystography
- iv Corneal Evaluation
  - Corneal scraping and cauterization
  - Smear preparation and interpretation (Gram's stain/KOH)
  - Media inoculation
  - Keratometry- performance & interpretation
  - Corneal topography- if available
  - Pachymetry
- v Colour Vision Evaluation
  - Ishihara pseudoisochromatic plates
  - Farnsworth Munsell 100hue test ; if available
- vi Refraction
  - Retinoscopy- streak/ Priestley Smith
  - Use of Jackson's cross-cylinder
  - Subjective and objective refraction
  - Prescription of glasses
- vii Diagnosis & Assessment of squint
  - Ocular position and motility examination
  - Synoptophore usage
  - Lees screen usage ; if available
  - Diplopia charting

- Assessment of strabismus - cover tests/ prism bars/ synoptophore
- Amblyopic diagnosis and treatment
- Assessment of convergence, accommodation, stereopsis, suppression

viii Exophthalmometry

Usage of Hertel's Exophthalmometry- proptosis measurement

ix Contact lenses: Hand-on training wherever possible

- Fitting and assessment of RGP and soft lenses
- Subjective verification of over refraction
- Common complications arising from contact lens use
- Educating the patient regarding CL usage, and of complications

x Low Vision Aids

- Knowledge of basic optical devices available and relative advantages and disadvantages of each.
- The basics of fitting, with knowledge of availability & cost

xi Community Ophthalmology

- Ability to organize institutional screening
- Ability to organize peripheral eye screening camps
- Knowledge and ability to execute guidelines of National programme for prevention of Blindness.

**C) Essential investigative skills: the postgraduate student should be able to perform / interpret the following tests:**

- i. Fundus Photography
- ii. Fluorescein in angiography
- iii. Ophthalmic ultrasound: A-scan /B-scan
- iv. Automated perimetry for glaucoma and neurological lesions
- v. OCT and basic knowledge of UBM
- vi. ERG, EOG, VER
- vii. Specular Microscopy
- viii. New modalities of glaucoma investigation
- ix. Radiological tests:
  - X rays – Antero Posterior/ Lateral View



- PNS (Water's view) / Optic canal views
- Localization of ocular and intra orbital Foreign Bodies
- Interpretation of – CT scan / MRI

**4. Operations:** The student shall be provided with an opportunity to perform operations, both extra-ocular and intra-ocular, with the assistance of the senior residents and / or under the direct supervision of a faculty member. He/she shall be provided with an opportunity to learn special and complicated operations by assisting the Senior Residents or the Senior Surgeon, in these operations. He/she shall be responsible for the post-operative care of these cases. It is desirable that the student be able to perform independently/under guidance various surgeries; the thrust areas include cataract, glaucoma, squint, lacrimal sac, entropion and enucleation. He/she is required to be proficient in some operations and show familiarity with others.

To provide surgical training, a phased program may be chalked out. In the first phase the student is given training in regional anaesthetic block, preparations of cases for operation, and pre-medication. In the next phase, the student shall assist the operating surgeon during the operation. In the third phase, the student operates independently assisted by senior resident, or a faculty member.

**a) Minor surgical procedures:** the student must know and be able to perform independently:

- i. Conjunctival and corneal foreign body removal on the slit lamp
- ii. Conjunctival cyst excision
- iii. Pterygium excision with modifications
- iv. Conjunctival flap/ peritomy
- v. Suture removal- skin / conjunctival/ corneal / corneoscleral
- vi. Subconjunctival injection
- vii. Posterior Sub-Tenon's injections
- viii. Repair of corneal / corneo – scleral perforations
- ix. Chalazion incision and curettage
- x. Biopsy of small lid tumors
- xi. Tarsorrhaphy
- xii. Artificial eye fitting

**b) Major surgical Procedures:**

**I) the student must know and be able to perform independently:**

Ocular Anesthesia

- a) Retro bulbar anesthesia
- b) Facial nerve blocks- O'Brien / Atkinson/ Van lint & modifications
- c) Frontal nerve blocks
- d) Infra orbital nerve blocks
- e) Blocks for sac surgery

**II) the student must be able to perform independently / under supervision / assist and deal with complications arising from the following surgeries:**

Lid Surgery

- a) Tarsorrhaphy
- b) Ectropion & entropion (simple procedures)
- c) Lid repair following trauma – including lid margin tears
- d) Epilation, electroepilation

Destructive procedures

- a) Evisceration with or without implant
- b) Enucleation with or without implant
- c) Enucleation for eye donation
- d) Cyclocryotherapy

Sac surgery

- a) Dacryocystectomy
- b) Dacryocystorhinostomy
- c) Probing for congenital obstruction of nasolacrimal duct

Strabismus surgery

Recession and resection procedures on the horizontal recti

Orbital surgery

Incision and drainage via anterior orbitotomy for abscess

**III) The student shall be well conversant with use of Operating microscope and must be able to perform the following surgeries competently using the microscope:**

a) Cataract surgery

- i. Standard ECCE with or without IOL implantation
- ii. Small incision ECCE with or without IOL implantation

He/she should have performed under guidance / assisted the following

- iii. Secondary AC or PC IOL implantation
- iv. Phacoemulsification

b) Vitreous Surgery

- i) Intra-vitreous and intra-cameral (anterior chamber) injection techniques and dosages, particularly for endophthalmitis management.
- ii) The student should know the basis of open sky vitrectomy (anterior segment) in the management of cataract surgery complications.

**IV) The student should have preferably assisted in the following microscopic surgeries**

1. Keratoplasty

Therapeutic and optical

2. Glaucoma surgery

- i) Trabeculectomy
- ii) Pharmacological modulation of trabeculectomy

**V) The student should have assisted in the following laser procedures:**

- Yag Capsulotomy
- Laser iridotomy
- Focal and panretinal photocoagulation

**VI) the student should have assisted/ have knowledge of Kerato-refractive procedures.**

**5. Ocular histopathology:** the student shall have basic knowledge of gross and microscopic features of various ocular pathologic conditions, to assist them in confirmation of clinical diagnosis, and help in management.

**6. Research Skills:**

Knowledge of the following is essential:

- Basic statistical knowledge
- Ability to undertake clinical & basic research
- Descriptive and inferential statistics

- Ability to publish results of one's work
- Knowledge of computers is helpful

This could be achieved during the course by attending workshops on Research Methodology, basic statistics classes and regularly having Journal Clubs etc. Where selected articles could be taken and evaluated for content quality presentation.

### **7. Conferences and Workshops**

The resident should attend one or two regional workshops and one or two regional/ national conferences if possible. Presentation of a free paper at these venues is to be encouraged.

### **Post Graduate Examination**

The Post Graduate examination shall be in three parts:-

**1. Thesis:** to be submitted by each candidate at least one year before the date of Commencement of the theory examination.

**2. Theory: There shall be four theory papers.**

Paper I: Basic Sciences related to Ophthalmology

Paper II: Clinical Ophthalmology

Paper III: Principles and Practice of Surgery of Eye and related topics

Paper IV: Recent Advances in Ophthalmology

**3. Practical**

Practical should consist of long case, short cases including fundus cases & refraction, instrument viva, X-rays, specimens, and demonstration of use of appliances and specialized diagnostic techniques.

### **Syllabus**

These are only broad guidelines and are illustrative; there may be overlap between sections.

#### **The Basic Sciences:**

1. Orbital and ocular anatomy

i. Gross anatomy

ii. Histology

iii. Embryology

2. Ocular Physiology

### 3. Ocular Pathology

### 4. Ocular Biochemistry

Biochemistry applicable to ocular function

### 5. Ocular Microbiology

Specific microbiology applicable to the eye

### 6. Immunology with particular reference to ocular immunology.

## **II Optics**

a. Basic physics of optics

b. Applied ophthalmic optics

c. Applied optics including optical devices

d. Disorders of Refraction

## **III. Clinical Ophthalmology**

i. Disorders of the lids

ii. Disorders of the lacrimal system

iii. Disorders of the Conjunctiva

iv. Disorders of the Sclera

v. Disorders of the Cornea

vi. Disorders of the Uveal Tract

vii. Disorders of the Lens

viii. Disorders of the Retina

ix. Disorders of the Optic Nerve & Visual Pathway

x. Disorders of the Orbit

xi. Glaucoma

xii. Neuro ophthalmology

xiii. Paediatric ophthalmology

xiv. Ocular involvement in systemic disease

xv. Immune ocular disorders

xvi Strabismus & Amblyopia

xvii Community ophthalmology

**Recommended reading** (to be updated from time to time)

Anatomy of the eye and orbit: Eugene Wolff

Clinical anatomy of the eye: Richard S Snell  
Adler's Physiology of the Eye: Francis H Adler  
Biochemistry of the eye: Elaine R. Berman  
Ocular Pathology: A Text and Atlas: Yanoff M & Fine BS  
Ophthalmic Pathology: An Atlas and Textbook: Zimmerman LE  
Ocular pharmacology: William H Havener  
Ocular Immunology: Gilbert Smolin  
Duke Elder's Practice of refraction: Sir Stewart Duke-Elder  
Clinical optics: A. R. Elkington, Helena J. Frank, Michael J. Greaney  
Paediatric Ophthalmology and strabismus: Kenneth W Wright  
Binocular vision and ocular motility: Gunter K von Noorden  
Diagnosis and Management of Ocular Motility Disorders: Mein J, Trimble R.  
Shields' textbook of glaucoma: Bruce M Shields  
Becker-Shaffer's Diagnosis and Therapy of the Glaucomas  
Uveitis: a clinical approach to diagnosis and management: Ronald E Smith, Robert A Nozik  
Uveitis: fundamentals and clinical practice: Robert B. Nussenblatt and Alan G. Palestine  
Vitreous Microsurgery: Steve Charles  
Ultrasound of the eye and orbit: Sandra F Byrne and Ronald L. Green  
Clinical neuroophthalmology: Walsh & Hoyt  
Diagnosis and management of intraocular tumors: Jerry A Shields  
Diseases of the orbit: a multidisciplinary approach: Jack Rootman  
Diseases of the orbit: Frederick A. Jakobiec and Ira S Jones  
Diagnosis and management of orbital tumors: Jerry A. Shields  
Grayson's diseases of the Cornea  
Smolin and Thoft's The Cornea: scientific foundations and clinical practice  
Stallard's Eye Surgery  
Ophthalmic Surgery: Principal and Practice. George L. Spaeth  
Cataract Surgery and its Complications. Normal S. Jaffe  
Principal and Practice of Ophthalmology. G. A. Peymen  
Basic and Clinical Science Course. American Academy of Ophthalmology  
Principles and Practice of Ophthalmology by FA Jakobiec.

Retina by Stephen J. Ryan

**JOURNALS**

Indian Journal of Ophthalmology

American Journal of Ophthalmology

Ophthalmology

Archives of Ophthalmology

Survey of ophthalmology

International Ophthalmology Clinics

British Journal of Ophthalmology

Cornea

Retina

Journal of Cataract and Refractive Surgery

Ophthalmic Surgery, Imaging and Lasers