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**POSTGRADUATE INSTITUTE OF MEDICINE  
UNIVERSITY OF COLOMBO**



**PROSPECTUS**

**SUBSPECIALTY TRAINING  
AND  
BOARD CERTIFICATION  
IN  
CORNEA AND REFLECTIVE SURGERY**

**2011**

**BOARD OF STUDY IN OPHTHALMOLOGY**

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# **Prospectus - Post MD (ophthalmology) Subspecialty Training in “Cornea and Reflective Surgery” Leading to Board Certification**

## **1. Justification:**

The specialty of Cornea and Refractive Surgery is broadly defined as the science of the cornea. Cornea is anterior the transparent part of the eye that covers the iris, pupil, and the anterior chamber. Together with the lens, the cornea refracts light, accounting for approximately two-thirds of the eye's total optical power. The corneal subspecialty encompasses the diagnosis and management of disorders related to structure and function of the cornea, and associated structures such as the conjunctiva and the tear film as well as the optics of the cornea , refractive errors and there correction .

Diseases affecting the cornea are a major cause of blindness worldwide, second only to cataract in overall importance. The epidemiology of corneal blindness is complicated and encompasses a wide variety of infections, inflammatory, and non inflammatory eye diseases such as Keratoconus with a very high incidence in Sri Lanka. Corneal stromal disorders as well as trauma that cause corneal scarring and loss of transparency, which ultimately leads to functional blindness is also high. Diseases and dysfunction of related structures such as the conjunctiva and tear apparatus also can cause corneal morbidity. In 2009 and 2010, 286 and 300 corneal grafts were done in Colombo eye hospital alone. Diseases of the cornea account for a substantial part of Ophthalmic practice.Chronic keratitis following epidemics of viral conjunctivitis has become huge problem.

Number of eyes are removed(evisceration) every year due to corneal ulcers. In 2009 fifty six eye and in 2010 forty six eyes were removed

Recent improvements in science and technology have enabled the surgical correction for refractive errors which it self is a highly specialized field.

The high incidence of corneal disease in Sri Lanka warrants the urgent need to improve human resources to the existing Ophthalmic health care delivery system to strengthen the delivery of specialized services, to the sizeable number of our population being afflicted with corneal disorders. This can only be delivered with equity and quality through an organized system of training of specialists who will contribute to the cornea services as a Sub-specialty in Ophthalmology. Cornea is an accepted subspecialty in U.K,

USA,Indiaetc.There are special ‘CORNEA’ days at international Ophthalmology congresses.

Furthermore a cohort of dedicated and trained Cornea and Refractive Surgeons will contribute to further research and development in this field in the region of South Asia.

The projected cadre for State Sector Hospitals of Board Certified Cornea and Refractive Surgeons by Ministry of Health is 1 by the year 2015. At present there are none. The Ministry of Health has created cadre positions in the Department of Health Services for which treasury approval has been obtained.(I requested a letter from the ministry confirming the cadre.)

## **2. Objectives/Training Outcomes at the End of the Programme:**

To develop a training module that ensures the Board Certification as Cornea and Refractive Surgeons who have the necessary commitment and expertise in consistently achieving superior clinical outcomes in a responsive and patient-focused manner. In addition to create expertise to perform research into corneal diseases and develop strategies to prevent blindness and visual impairment from corneal diseases. The Specialists will provide services to patients in Government as well as Private Hospitals in Sri Lanka.

## **3. Admission Criteria/Method of Selection/ Eligibility Requirement:**

The candidate who enters the above subspecialty training program should have qualified the M.D. (Ophthalmology) Examination conducted by PGIM, and completed 1 year of post MD training in Sri Lanka.

Admission will be done by the Board of Study in Ophthalmology for the allocated training slots in the subspecialty at the end of 1 year post MD training based on the merit position at the MD Examination.

#### **4. Program Duration**

The Total duration will be 3 years of which

##### **4.1 Two years will be in Sri Lanka**

- a) Year one of this will be in General Ophthalmology at a training center approved by the Board of study.
- b) Year two will be at a specialized corneal center (once established) or any training center approved by the Board of Study.

##### **4.2 Year three will be in a center of repute overseas approved by the Board of Study**

#### **5. Training Content/Curriculum/Programme Details**

##### **Part I underlying concepts of refractive Surgery**

##### **5.1 The science of refractive surgery**

Contribution of the corneal layers and shape to the optics of the eye

Computerized corneal topography

Axial power and curvature

Instantaneous power and curvature

Corneal shape

Other features

Indications for corneal topography in refractive surgery

Corneal topography and irregular astigmatism

Limitations of corneal topography

Clinical situations illustrating the role of corneal topography

In refractive surgery

Wavefront analysis

Wavefront analysis and irregular astigmatism

Measurement of Wavefront aberrations and graphical

Representations

Lower order aberrations

Higher – order aberrations

Biomechanics of the cornea

Effects of keratorefractive surgery

Corneal wound healing

Laser biophysics

- Laser – tissue interactions
- Types of photoablating lasers
- Wavefront – optimized and wavefront – guided laser ablations

## **5.2 Patient evaluation**

- Patient history

- Patient expectations
  - Social history
  - Medical history
  - Pertinent ocular history
  - Patient age, presbyopia, and monovision

- Examination

- Uncorrected visual acuity and manifest and cycloplegic refractive acuity
  - Papillary examination
  - Ocular motility, confrontation fields, and ocular anatomy
  - Intraocular pressure
  - Slit – Lamp examination
  - Dilated fundus examination

- Ancillary tests

- Corneal topography
  - Pachymetry
  - Wavefront analysis
  - Calculation of residual stromal bed thickness after LASIK

## **Part II Specific procedures in refractive Surgery**

### **5.3 Incisional corneal surgery**

- Incisional correction of myopia

- Radial keratotomy in the United States
  - Patient selection
  - Surgical technique
  - Outcomes
  - Complications
  - Ocular surgery after radial keratotomy

Incisional correction of astigmatism

Coupling

Arcuate keratotomy and limbal relaxing incisions

Instrumentation

Surgical techniques

Outcomes

Complications

Ocular surgery after arcuate keratotomy and limbal relaxing incisions

#### **5.4 Onlays and inlays**

Keratophakia

Homoplastic corneal inlays

Alloplastic corneal inlays

Epikeratoplasty

Background

Technique

Outcomes

Complications

Alloplastic corneal onlays

Intrastromal corneal ring segments

Background

Patient selection for myopia

Instrumentation

Technique

Outcomes

Intacs and keratoconus

Complications

Uses for intrastromal corneal ring segments after LASIK

Orthokeratology

#### **5.5 Photoablation**

Background

Surface ablation: Photorefractive keratectomy, Laser subepithelialkeratomileusis, and epithelial laser in situ keratomileusis

Patient selection

Surgical technique

Laser treatment

Outcomes

Complications

- Conclusions
- Laser in situ keratomileusis
  - Background
  - Instrumentation
  - Patient selection
  - Surgical technique
  - Outcomes
  - Complications
  - Conclusions
- Wavefront – guided surface ablation and LASIK
  - Background
  - Instrumentation
  - Preoperative preparation

### **5.6 Collagen shrinkage procedures**

- History
- Laser thermokeratoplasty
- Conductive keratoplasty
  - Patient selection and results
  - Safety
  - Other applications
- Collagen cross linking

## **Part III Refractive surgery in the setting of other conditions**

### **5.7 Refractive surgery in ocular and systemic disease**

- Introduction
- Ocular conditions
  - Dry eye
  - Herpesvirus
  - Keratoconus
  - Post – penetrating keratoplasty
  - Ocular hypertensive and glaucoma
  - Retinal disease
  - Amblyopia and strabismus in the adult and child
- Systemic conditions
  - Human immunodeficiency virus
  - Diabetes mellitus
  - Connective tissue and autoimmune diseases

## **5.8. Considerations after refractive surgery**

Corneal transplantation after refractive surgery

Contact lens use after refractive surgery

Indications

General principles

Contact lenses after radial keratotomy

Contact lenses after surface ablation

Contact lenses after LASIK

Contact lenses – assisted, pharmacologically induced  
keratosteepening

## **5.9 International perspectives in refractive surgery**

Introduction

Global estimates of refractive surgery

Variation in global prevalence of refractive errors

International trends in refractive surgery

International regulation of refractive surgery practices and devices

Summary

## **Part I Basic and Clinical Concepts of Corneal AND External Eye Disease**

### **5.10 Structure and Function of the External Eye and Cornea**

The Outer Eye and Cornea in Health and Disease

Development of the Anterior Segment

Anatomy

Eyelids

Conjunctiva

Cornea

Sclera

### **5.11 Examination Techniques for the External Eye and Cornea**

Vision

External Examination

Slit-Lamp Biomicroscopy

Direct Illumination Methods

Indirect Illumination Methods

Clinical Use

- Stains
  - Fluorescein
  - Rose Bengal and Lissamine Green
- Clinical Evaluation of Ocular Inflammation
  - Eyelid Signs of Inflammation
  - Conjunctival Signs of Inflammation
  - Scleral Signs of Inflammation
- Corneal Pachymetry
  - Corneal Edema
- Esthesiometry
- Anterior Segment Photography
  - External and Slit- lamp Photography
  - Specular Photmicroscopy
  - Anterior Segment Fluorescein Angiography
  - Anterior Segment Echography
  - Confocal Microscopy
- Measurement of Corneal Topography
  - Zones of the Cornea
  - Shape, Curvature, and Power
  - Keratometry
  - Computerized Corneal Topography
  - Retinoscopy
  - Wavefront Analysis
- Prevention Practices in Ophthalmology
  - Universal precautions
  - Public Health Ophthalmology

### **Part III Ocular Surface Disorders**

#### **5.12. Normal Physiology of the ocular Surface**

- Eyelids
- Tear Film
- Lipid Secretion
- Aqueous Secretion
- Mucin Tear Secretion
- The Ocular Surface
- Epithelium
- Blood Supply
- Mechanical Functions

### **5.13. Diagnostic Approach to Ocular Surface Disease**

- Tear- Film Evaluation
- Inspection
- Tests of Tear Production
- Tear Composition Assays
- Ocular Cytology
- Specimen Collection
- Interpretation of Ocular Cytology

### **5.14. Dry Eye Syndrome**

- Aqueous Tear deficiency
  - Sjogren syndrome
  - Non-sjogren syndrome
- Evaporative tear dysfunction
  - Meibomian gland dysfunction
  - Rosacea
  - Seborrheic blepharitis
  - Chalazion
  - Hordeolum
  - Sarcoidosis
  - Desquamating skin conditions
  - Ectodermal dysplasia
  - Xeroderma pigmentosum
- Noninflammatory vascular anomalies of the conjunctiva
  - Hereditary hemorrhage telangiectasia
  - Lymphangiectasia
- Nutritional and physiologic disorders
  - Vitamin A deficiency
  - Vitamin C deficiency
- Structural and exogenous disorders
  - Exposure keratopathy
  - Floppy eyelid syndrome
  - Superior limbic keratoconjunctivitis
  - Recurrent corneal erosion
  - Persistent corneal epithelial defect
  - Trichiasis and distichiasis
  - Factitious ocular surface disorders
  - Dellen
  - Ocular surface problems secondary to contact lens wear
  - Limbal stem cell deficiency

## **PART III Infectious diseases of the external eye and cornea**

### **5.15. Infectious diseases of the external eye:**

- Basic concepts
- Defense mechanisms of the external eye
- Normal ocular flora
- Pathogenesis of ocular infections
  - Virulence
  - Inoculum
  - Host defense
- Ocular microbiology
  - Virology
  - Bacteriology
  - Mycology
  - Parasitology
  - Prions
- Diagnostic laboratory techniques
  - Specimen collection and culturing
  - Staining methods

### **5.16. Infectious diseases of the external eye:**

- Clinical aspects
- Viral infections
  - Herpesvirus
  - Adenovirus
  - Poxvirus
  - Other virus – associated neoplasms of the eyelid and conjunctiva
  - Other viral infections of the ocular surface
- Microbial and parasitic infections of the eyelid margin and conjunctiva
  - Staphylococcal blepharitis
  - Fungal and parasitic infections of the eyelid margin
  - Bacterial conjunctivitis in children and adults
  - Bacterial conjunctivitis in neonates
  - Chlamydial conjunctivitis
  - Parinaudoculaglanular syndrome
- Microbial and parasitic infection of the cornea and sclera
  - Bacterial keratitis
  - Atypical mycobacteria
  - Fungal keratitis
  - Acanthamoeba keratitis

- Corneal stromal inflammation associated with systemic infections
- Microsporidiosis
- Loiasis
- Microbial scleritis

## **PARI IV Immune – mediated disorders of the external eye and cornea**

### **5.17. Ocular immunology**

- Immunologic features of the cornea and ocular surface
- Soluble mediators of inflammation
- Hypersensitivity reaction of the conjunctiva, cornea, and sclera
  - Anaphylactic or atopic reactions (Type I)
  - Cytotoxic hypersensitivity (Type II)
  - Immune – complex reactions (Type III)
  - Delayed hypersensitivity (Type IV)
- Patterns of immune – mediated ocular disease
  - Conjunctiva
  - Cornea
  - Sclera
- Diagnostic approach to immune – mediated ocular disorders

### **5.18. Clinical approach to immune – related disorders of the external eye**

#### **Immune – mediated diseases of the eyelid**

- Contact dermatoblepharitis
- Atopic dermatitis
- Immune –mediated disorders of the conjunctiva
  - Hay fever conjunctivitis and perennial allergic conjunctivitis
  - Vernal keratoconjunctivitis
  - Atopic keratoconjunctivitis
  - Ligneous conjunctivitis
  - Contact lens – induced conjunctivitis
  - Stevens – Johnson syndrome and toxic epidermal necrolysis
  - Ocular cicatricial pemphigoid
  - Graft –vs-Host disease
  - Other immune –mediated diseases of the skin and mucous membranes
- Immune-mediated disease of the cornea
  - Thygeson superficial punctuate keratitis
  - Interstitial keratitis associated with infections diseases

- Reiter syndrome
- Cogan syndrome
- Marginal corneal infiltrates associated with blepharoconjunctivitis
- Peripheral ulcerative keratitis associated with systemic immune-mediated disease
- Mooren ulcer
- Immune-mediated disease of the episclera and sclera
  - Episcleritis
  - Scleritis

## **PART V Neoplastic disorders of the eyelids, conjunctiva and cornea**

### **5.19 Tumor cell biology and diagnostic approaches to ocular surfaceneoplasia**

- The eyelid skin and ocular surface
  - Microanatomy
  - Stem cells and cell turnover
- Histopathologic processes and conditions
- Overview of oncogenesis
  - Tumor immunology
- Diagnostic approaches
  - Noninvasive investigation
  - Biopsy decisions and techniques
- Management

### **5.20 Clinical approach to neoplastic disorders of the conjunctiva and cornea**

- Cysts of the epithelium
  - Epithelial inclusion cyst
- Tumors of epithelial origin
  - Benign epithelial tumors
  - Preinvasive epithelial lesions
  - Malignant epithelial lesions
- Glandular tumors of the conjunctiva
  - Oncocytoma
  - Dacryoadenoma
  - Sebaceous gland carcinoma
- Tumors of neuroectodermal origin
  - Benign pigmented lesions

- Preinvasive pigmented lesions
- Malignant pigmented lesions
- Neurogenic and smooth muscle tumors
- Vascular and mesenchymal tumors
  - Benign tumors
  - Malignant tumors
- Lymphatic and lymphocytic tumors
  - Lymphangiectasia and lymphangioma
  - Lymphoid hyperplasia
  - Lymphoma
- Metastatic tumors
- Epibulbarchoristomas
  - Epidermoid and dermoid cyst
  - Epibulbardermoid
  - Dermolipoma
  - Ectopic lacrimal gland
  - Other choristomas

## **PART VI Congenital anomalies of the cornea and sclera**

### **5.21. Basic concepts of congenital anomalies of the cornea and sclera**

Causes of congenital corneal anomalies

Diagnostic approach

### **5.22. Clinical aspects of congenital anomalies of the cornea and sclera**

Development anomalies of the globe and sclera

Cryptophthalmos

Microphthalmos

Nanophthalmos

Blue sclera

Development anomalies of the anterior segment

Anomalies of size and shape of the cornea

Abnormalities of corneal structure and / or clarity

Congenital corneal opacities in hereditary syndromes and chromosomal aberrations

Secondary abnormalities affecting the fetal cornea

Intrauterine keratitis; bacterial and syphilitic

Congenital corneal keloid

Congenital corneal anesthesia  
Congenital glaucoma  
Birth tumor

## **PART VII Corneal dystrophies and metabolic disorders involving the conjunctiva, cornea, and sclera**

### **5.23 Molecular genetics of corneal dystrophies and metabolic disorders**

The value of molecular genetics  
Principles of genetics  
    Clinical genetics  
Diagnostic approach  
    Pedigree analysis  
    Molecular biologic technique

### **5.24 Clinical approach to corneal dystrophies and metabolic disorders**

Corneal dystrophies  
    Anterior corneal dystrophies  
    Stromal corneal dystrophies  
    Endothelial dystrophies  
Ecstatic disorders  
    Keratoconus  
    Pellucid marginal degeneration  
    Keratoglobus

Metabolic disorders with corneal changes  
    Disorders of carbohydrate metabolism  
    Disorders of lipid metabolism and storage  
    Disorders of amino acid metabolism  
    Disorders of protein metabolism  
    Disorders of immunoglobulin synthesis  
    Non inflammatory disorders of connective tissue  
    Disorders of nucleotide metabolism  
    Disorders of mineral metabolism  
    Corneal and external diseases signs of systemic neoplasia

## **PART VIII Degenerative disorders of the conjunctive, cornea and sclera**

### **5.25. Degenerative and aging processes of the conjunctive, cornea and sclera**

Aging of the conjunctiva

Aging of the cornea

    Degenerative changes in the cornea

Aging of the sclera

### **5.26. Clinical approach to depositions and degenerations of the conjunctive, cornea, and sclera**

Conjunctival degenerations

    Pinguecula

    Pterygium

    Conjunctival concretions

    Conjunctivochalasis

Corneal degenerations

    Epithelial and subepithelial degenerations

    Stromal degenerations – age related (involutional) changes

    Stromal degenerations – peripheral cornea

    Stromal degenerations – postinflammatory changes

    Endothelial degenerations

Drug – induced deposition and pigmentation

    Corneal epithelial deposits

    Pigmentation

Scleral degenerations: senile plaques

## **PART IX Toxic and traumatic injuries of the anterior segment**

### **5.27. Wound healing of the conjunctive, cornea and sclera**

Wound healing of the conjunctiva

Wound healing of the cornea

    Epithelial wound healing

    Stromal wound healing

    Endothelial wound healing

Wound healing of the sclera

## **5.28. Clinical aspects of toxic and traumatic injuries of the anterior segment**

Injuries caused by temperature and radiation

Thermal burns

Ultraviolet radiation

Ionizing radiation

Chemical injuries

Alkali burns

Acid burns

Management of chemical injuries

Toxic keratoconjunctivitis from medications

Animal and plant substance

Insect injuries

Vegetation injuries

Concussive trauma

Conjunctival hemorrhage

Corneal changes

Traumatic mydriasis and miosis

Traumatic iritis

Iridodialysis and cyclodialysis

Traumatic hyphema

Nonpenetrating mechanical trauma

Conjunctival laceration

Conjunctival foreign body

Corneal foreign body

Corneal abrasion

Posttraumatic recurrent corneal erosion

Penetrating trauma

Evaluation

Management

Surgical trauma

Corneal epithelial changes from intraocular surgery

Descemet's membrane changes during intraocular surgery

Corneal endothelial changes from intraocular surgery

Conjunctival and corneal changes from extraocular surgery

## **PART X Surgery of the ocular surface**

### **5.29 Introduction to surgery of the ocular surface**

Corneal and conjunctival epithelial wound healing

Role of stem cells

Conjunctival epithelium

Maintenance of the ocular surface and its response to wound healing

### **5.30 Surgical procedures of the ocular surface**

Conjunctival biopsy

Indications

Surgical technique

Tissue processing

Tarsorrhaphy

Postoperative care

Alternatives to tarsorrhaphy

Pterygium excision

Conjunctival transplantation

Conjunctival transplantation for pterygium

Other indications for conjunctival grafting

Limbal transplantation

Conjunctival flap

Indications

Surgical technique

Complications

Considerations in removal of the flap

Mucous membrane grafting

Indications

Superficial keratectomy and corneal biopsy

Indications

Surgical technique

Management of descemetocoele, corneal perforation, and corneal edema

Bandage contact lens

Cyanoacrylate adhesive

Reconstructive lamellar and patch grafts

Corneal tattoo

Indications and options

Surgical technique

## **PART XI Corneal transplantation**

### **5.31 Basic concepts of corneal transplantation**

- Transplantation immunobiology
  - Histocompatibility and other antigens
  - Immune privilege
- Eye banking and donor selection
  - Criteria contraindicating donor cornea use

### **5.32 Clinical approach to corneal transplantation**

- Penetrating keratoplasty
  - Indications
  - Preoperative evaluation and preparation
  - Surgical technique
  - Combined procedures
  - Intra operative complications
  - Post operative care and complications
  - Control of postoperative corneal astigmatism and refractive error
  - Diagnosis and management of graft rejection
- Pediatric corneal transplants
- Corneal autograft procedures
  - Rotational autograft
  - Contralateral autograft
- Lamellar keratoplasty
  - Indications
  - Surgical technique
  - Postoperative care and complications
  - Current developments

## **6. Evaluation Procedure**

### **6.1. Mechanism for programme evaluation**

Reliable indicators to assess the training programme should be identified in the area of educational process, resources available, organization and learning environment have to be included in program evaluation, description of the program and performance of the trainees should be considered as key factors

Performance of the Trainees after the training in the real world would be a true indicator

## 6.2. Feedback from trainers and Trainees

Systematic and regular feedback (at least once in six months) should be obtained from the Trainees and trainers.

Trainees also should be given the opportunity to write a report on their own on the programme

## 7. Assessment Procedure

7.1 Portfolio - Case Records 5patients (Annexure 1), Reflective writing, Preferably 1 Publication and 1 Presentation

7.2 Dissertation (Annexure 2) based on the Research Project

7.3Pre Board Certification Assessment (PBCA)

7.3.1 SEQ Paper – 2 hours – 4 Questions

7.3.2 Clinical Examination (3 short cases) – two examiners

7.3.3 Viva Portfolio and Dissertation

7.3.4 Presentation tothe BOS indicating the training received and future vision

### Marking Scheme

7.3.1, 7.3.2 and 7.3.3 shall be marked with a numeric mark and converted into a closed mark using the scale given below (the numeric mark does not range from 0-100)

<b>Closed Mark</b>		<b>Numeric Mark</b>
9+	-	55 – 59
9	-	50 – 54
8+	-	45 – 49
8	-	40 – 44

## **8. Requirements for Board Certification**

8.1 Completion of post MD Training Period acceptable to the Board of Study

**AND**

8.2 A closed mark of 9 or above for 7.3.1, 7.3.2 and 7.3.3 of the PBCA

**AND**

8.3 Completion of 7.3.4 and acceptance by the Board of Study

Board certification shall be deferred if above requirements are not completed. Such candidates following a counseling session/s should complete the failed component/s (10.1/10.2/10.3) again within a minimum period of 3-6 months. On successful completion at the first attempt after counseling, the date of Board certification shall be backdated. If unsuccessful, the date of Board certification will be the date of passing the subsequent assessment following further training for a minimum period of six months in a unit allocated by the BOS.

## **9. Method of Delivery and Learner Support System**

Clinical ward based training/discussion, tutorials, small group discussions

## **10. Training Setting/Units and Educational Resources**

Teaching will be done by the trainers approved by the board of study of Ophthalmology and the resources such as clinics, theater and library will be used as learning methods. Regular case discussions, Journal Clubs, presentations on new surgical methods will be held regularly.

## **11. Details of Trainers**

The current panel of Board approved trainers who are Board Certified Consultants with MD and Foreign Qualifications such as FRCS (UK) employed by the Ministry of Health. They provide an honorary service for which no payment is made by the University/PGIM

## **ANNEX 1**

### **Submission of the Case Book**

A case book encompassing the management of ten selected cases under the supervision of the Consultant Ophthalmologist should be submitted three months before applying for Board Certification.

The ten case reports must preferably include cases in which some new treatment methods have been carried out. The treatment method should be finished.

The requirements for a case record book are;

(1) Recommend use of A4 size paper

The book should be with a hard cover:

(2) Record should include a full diagnosis and treatment plan of the cases

(3) The aim and objectives of treatment should be clearly stated together with the reason for adapting the method used

(4) The records presented should fully explain the reasons for adapting the procedure and results. Also discuss the alternative methods available

(5) Problems encountered during the treatment must be discussed

(6) Cases should be adequately illustrated by either black and white or colour prints

(7) Record book should be accompanied by a signed statement from the supervising consultant confirming the trainee's involvement of the selected cases.

## **ANNEX 2**

### **Guidelines for the preparation of the Dissertation**

The objective of this exercise is to expose the trainee to the procedure of identification of a problem, conducting a literature search, planning an "experimental" protocol, conducting the study, management of data (collection, analysis and presentation) and presenting rational conclusions with discussion. The Dissertation would consist of either a corneal or ocular surface disorder presentation limited to 8000 words and should include a minimum of 20 relevant recent references from the literature.

The following guidelines should be used in planning and preparation of the dissertation.

- 1) The book should be submitted in ring bound or plastic edge bound form. This facilitates correction, which may be recommended by the assessors. The final form of the book may be in the sewn and bound form with a hard cover and this final bound book should be handed over to the PGIM seven days before commencement of the examination.
- 2) The book should be prepared in the English Language. Trainees are strongly advised to ensure that correct grammar is used and to check the text in the book and correct spelling mistakes, typographic errors, etc.
- 3) The book should be prepared on white A4 paper and typed on one side of the paper only, with minimum margins of 40 mm on the left-hand side (binding edge) and 20 mm on the other three sides (free edges). Use double spacing throughout the book. Any standard type of lettering is accepted but the same style and size should be used consistently throughout the book except when bold type for headings and italics for emphasis are used. Trainees are strongly advised to use a Word Processor for the typing of the book.
- 4) Pages, subsections, tables and figures should be numbered using Arabic numerals.

- 5) Pages should be numbered consecutively.
- 6) Subsections should be numbered as indicated in this section. (1, 2, 3 and 4 are subsections of section 1)
- 7) Tables and figures should be numbered sequentially and arranged in the appropriate place in the text.
- 8) The only exception to using Arabic numerals is when quoting from other sources where Roman numerals may be used.
- 9) The contents and arrangement of pages:

The contents should be given under the following headings:

- Title and Authors name
- Declaration by candidate
- Dedication - Optional
- Abstract
- Table of contents
- List of Symbols, abbreviations (if any)
- Introduction
- General and specific objectives
- Review of literature
- Materials and methods
- Results
- Discussion
- Limitations of the study
- Recommendations
- Acknowledgments
- References

9.1 Title: a brief and specific statement.

9.2 Abstract: Brief summary of the whole paper and not merely the conclusions in 500 words. Structured abstracts are preferred.

9.3 Introduction: state the information and facts known on the topic/problem selected for study. This would include a literature survey and a critical comment on the various aspects of these studies. From the information available the justification for the study can be stated. The objectives of the study should then be presented.

9.4 Material and Methods: Describe exactly what was done in specific terms and in sufficient details so that the study could even be repeated by another investigator.

The sections to be included are:

- Study design
- Setting
- Subjects
- Materials and equipment
- Procedures and protocols
- Types of measurements of observations
- Methods of data analysis.

9.5 Results and inferences: Summarize the data with a figure, table or by graph when necessary

9.6 Discussion: Interpret the results so as to provide answers to the study question(s). Comment on the relevance of these answers to the present knowledge of the subject. Consider alternate interpretations. Comment on interesting or unexpected observations and about the method. Always comment on further follow-up research available on the subject.

9.7 Conclusion: List the main points in the discussion section as conclusion.

9.8 Acknowledgements: Thank people for funding, facilities, equipment, materials or assistance. This statement should be brief.

9.9 References: List all references that are cited in the text. The Vancouver system of listing references should be used.

## Reference Style:

Type the references in double spacing in the Vancouver style (using superscript numbers and listing full references at the end of the paper in the order in which they appear in the text). Online citations should include date of access. Use Index Medicus for journal names. If necessary, cite personal communications in the text but do not include in the reference list. Unpublished work will not be accepted. References should be listed in the following style:

### Journal

Seitzman GD, Gottsch JD, Stark WJ. Caract surgery in patients with Fuch's corneal dystrophy: Expanding recommendations for cataract surgery without simultaneous keratoplasty. *Ophthalmology* 2005; 112:441-446

### Book

Sadler TW. *Langman's Medical Embryology* (5th edn). Williams & Wilkins: Baltimore, 1985; 224-226.

### Book chapter

Desmet VJ, Caller F. Cholestatic syndromes of infancy and childhood. In *Hepatology: a Text Book of Liver Disease*, Zakim D, Boyer TD (eds), vol 2. W.B. Saunders: Philadelphia, 1990; 1355-1395.

### Website

The Oncology Website, <http://www.mit.com/oncology/> [24 April 1999].

Trainees are advised to consult the "uniform requirements for manuscripts submitted to biomedical journals" published in the New England Journal of Medicine 1997; **336**: 309-315, for further information.

9.10 Dedication of the dissertation to a person(s) is optional.

9.11 Acknowledgments should be limited to those who have significantly contributed to the training of the Postgraduate and the preparation of the dissertation.

9.12 Table of contents: All sections of the book should be listed using Arabic numerals. The starting and end page numbers should be listed along the right margin.

9.13 List of symbols and abbreviations:

Trainees are strongly advised to use only symbols and abbreviations, which are accepted for use in scientific and medical literature. In the event of an uncommon symbol or abbreviation, which needs to be used, a brief explanatory note should be included in the list. All symbols and abbreviations with the complete terms or wording should be given in the respective lists in alphabetical order.

(Note: Units of measurements- Measurements of length, weight, and volume should be reported in metric units (meter, kilogram, litre) or their decimal multiples, Temperature should be given in degrees Celsius, Blood Pressure should be given in mm of mercury.

It is preferable if haematological and clinical chemistry measurements are reported in the metric system in terms of the International System of Units (SI). It is recommended that uniformity be maintained throughout the book. The candidate is advised to use conversion tables.

A panel nominated by the board of study will assess the candidate's dissertation and its acceptance will determine the successful completion of the training programme.

In the event of dissertation not being accepted the candidate will be notified whether a completely new dissertation is to be prepared or whether modification of the existing one will suffice for re-submission.

A copy of the Dissertation submitted should be retained by the candidate as a safeguard in case of loss or damage to the original.