WEST AFRICAN COLLEGE OF SURGEONS

FACULTY OF OPHTHALMOLOGY

TRAINING CURRICULUM FOR THE FELLOWSHIP PROGRAMME

Preamble

The mandate of the faculty of ophthalmology of the West African College of Surgeons (WACS) is to produce a first class body of ophthalmologists and subspecialists. This body should cover all aspects of the subject and lead eye care teams in delivering high quality comprehensive integrated eye care services throughout the region. This should be patient centred and based on a human rights and equity approach to health and the development of human resources for health for universal coverage in West Africa.

This subspecialty curriculum is further to the membership curriculum. It is to be used for the training of subspecialists in various specialties to meet the especially challenging and important eye care needs in the sub-region.

Having successfully completed the membership qualification of WACS, trainees may elect to further their training in ophthalmology with a view to gaining fellowship of WACS (FWACS). This further training involves choosing one of the specialties listed in this curriculum. The minimum training period for the FWACS is two (2) years.

The training has two elements. A generic element consists of two mandatory modules for all trainees. These are the basic research and management modules. The basic research module must be taken within six months of the commencement of the fellowship programme; this module will be mainly an online course and trainees are expected to create time for self-learning with a short period of face to face contact with faculty for necessary guidance. This module mainly prepares trainees to undertake research and also produce a dissertation as part fulfillment for the award of the fellowship. The management module will be similarly online with a short period of face to face contact with faculty. This module prepares trainees to take leadership of the eye care team.

The second element relates to the chosen sub-specialty. Each sub-specialty has modules which must all be completed before appearing for the final examination leading to the award of the fellowship. Trainees will need to satisfactorily complete all modules specified in their specialties before appearing for the final exams leading to the award of the FWACS. The exit examination involves the production and successful defense of a dissertation, satisfactory performance at the written and clinical examinations in their specialties.

This training is designed to introduce candidates to the key elements of their chosen sub-specialty and ensure competence in the key procedures they will need in order to practice as a sub-specialist. All of the sub-specialties have a wide range of additional care, diagnostic, educational, managerial, public health and procedural elements that may be acquired either during the training period or as part of continuing medical education following award of FWACS.

WACS Subspecialist Ophthalmology Curricula

Shared teaching, learning and assessment practice

This short collection of good practice draws on your work on your curricula. Please add these texts/variations of these texts to your curricula where appropriate.

Attitude – Management and educational skills:
The ophthalmologist must understand that they are part of a team that cares for a patient. There has to be an adoption of attitude that prompts them to liaise with other members of that team, including the patient, in the management of the relevant condition. They need to be able to recognise that:

- The ultimate goal is to set up and run a sub-specialist service in a department of ophthalmology of a teaching or general hospital.
- Another goal for the sub-specialist to achieve is to be able to organise and lead the multidisciplinary team in screening in the population where possible and appropriate.
- The sub-specialist must understand that some conditions may be the first signs of other complications; where appropriate, they may need to:
    - Educate general practitioners
    - Feedback information to the physician who is responsible for the overall care of the patient
    - Establish referral and feedback pathways, tools (forms) and networks
    - Provide information to the patient about the effective management of their condition and any associated complications
    - Educate the public especially if family history is relevant.

Hands-on learning
Lectures
Interactive lectures will form the basis of the training programme and will involve mainly digitally displayed presentations with images, videos and handouts. For further continuous professional development of the learner, copies of all lectures, videos and relevant other information will be provided in USB format.
The lecture room will also be the place where teaching after clinics will take place. The learner will be expected to present the cases they have seen and the relevant images will be displayed. Group discussion will occur.

Workplace-Based Learning
It is envisaged that the learners attending the course will be involved in managing patients attending clinics. The candidate would be expected to take a brief history, examining patients using slit lamp biomicroscopy, formulate a management plan and document all their findings. The throughput of the patients attending clinics may be aided by dedicated assistants who record and document on a proforma some basic measurements such as acuity and intraocular pressure and can complete appropriate questionnaires where relevant. The learners observe every aspect of the patient pathway and then examine the patient's eyes using a slit lamp. The trainer will be on hand to observe and provide direct feedback on performance. The learners will document all their findings onto a proforma.

Case Based Discussion
This is designed to explore the thinking behind decision-making and practice. It provides an opportunity for the trainer to make their thinking accessible to the learner and access the learners' thinking as a way of ensuring that they are on the right track. Case based discussion on the course ideally should take place at the end of clinics where in a small group setting photographs and the relevant images of patients examined are displayed. The learner that examined the patient using the slit lamp would be expected to present the patient and discuss the image findings, explain the relevant diagnosis, and discuss further management.

Clinical Skills Training

The most important practical skills that will need to be taught on the course need to be thoroughly practised. Training of clinical skills basically consists of two aspects:

Simulation

A preliminary training aspect of these practical skills will take the form of simulation. During the hands-on training course, the learner will perform the relevant key procedures.

Treatment application

One way to directly teach clinical skills using the patient would be to use an adaptation of the four step approach:

i. Demonstration: The trainer demonstrates the procedure at normal speed without commentary. The learner would directly observe the procedure.
ii. Deconstruction: The trainer demonstrates the procedure using a patient whilst describing steps. The learner would directly observe the procedure.
iii. Comprehension: The trainer demonstrates the procedure while the learner describes the steps. This can be done theoretically or with the equipment away from the patient.
iv. Performance: The learner demonstrates the procedure and describes each step as they are doing it on the model and then the patient.

Depending upon the previous experience of the learner, following simulation training, one could omit steps i, ii and iii and observe the learner performing stage iv.

Pre-and post-treatment photographs should also be taken of every patient treated where possible to enable group discussion, provide feedback and facilitate further learning.

Logbook

The purpose of this record is for the learner to record clinical cases, surgical procedures, management and leadership insights and key learning points during the two year training programme. Each entry should be reviewed and confirmed meaningful by their mentor with comments. It is expected that a minimum of 4 meaningful entries are made every four months throughout training. Self-audits, field work reports and other course work is allowable as a meaningful entry. It is expected that the training record will properly reflect the chosen sub-specialty. Training courses may be included as meaningful entries, all mandatory training courses should be included.

Clinical cases

A clear history of the case including relevant examination and investigations should be documented. The learning point of the case should be detailed with reflection and a literature review where applicable.

Surgical procedures

A clear history of the case including relevant examination and investigations should be documented together with details of the surgical procedure. The learning point of the case should be detailed with reflection and a literature review where applicable.

Management and leadership insights

These entries should detail a meaningful event during the learner's training in which they have participated in, gained increased self-awareness or observed notable leadership or management errors or successes. A minimum of four entries are expected from all learners.

Trainees must add a certification declaring they own their work.

'I declare that all entries in this training manual represent my own experience.'
Sign and date

Successful completion of FWACS involves:

1. Satisfactory completion of all summative assessments in their course work

2. Submission of a completed training record

3. Satisfactory completion of their dissertation

4. Satisfactory completion of the final examination
    - Defence of dissertation
    - Clinical examination in relevant sub-speciality
    - Written paper
    - Viva-voce

WACS Basic Research and Dissertation Module Curriculum

Background
Research and information are transformative in the development of institutions. Medical research is geared towards providing evidence and subsequent translation of research into clinical practice, programme planning and policy agendas. In the basic research and dissertation module, we will focus on key areas of research that are of particular interest to physician researchers; and on the steps in producing a high quality dissertation. The module is cross-cutting across all subspecialties and support will be given to trainees according to their areas of subspecialty interest. This course will use blended and flip classroom techniques - where participants will undertake an online course, and be given materials/lectures ahead of the discussions; followed by face-to-face didactic and interactive sessions. There will be lots of opportunities to discuss your prospective dissertations, research ideas and plans.

The primary aims of the Basic Research and Dissertation module (online and hands-on components) are to enable participants to:

- Conceptualise research ideas and formulate them into research questions
- Prepare to create a high quality dissertation
- Undertake quality research
- Produce and report valid and reliable evidence base

Duration: 3 months (didactic online)

Prerequisites
This is a separate research module in the first year of the subspecialist course period and spans across all subspecialties. It is a 3-part module undertaken in month 3, month 6 and last 6 months of the fellowship programme.
Before starting the research and dissertation module, participants must have obtained their WACS membership and enrolled in a fellowship subspecialty programme.

COURSE TOPICS AND INTENDED LEARNING OUTCOMES:

BLENDED COURSE

At the end of the study of each topic below, participants are expected to be able to:

1. Types of studies
   - Outline and describe the different types of epidemiological studies and their applications
   - Describe methods for qualitative and quantitative studies
   - Know which study to undertake for the research in question

2. Development and design of a project
   - Conceptualise a research idea and formulate a research question
   - Consider ethics in research
   - Outline project rationale, aim and objectives
   - Decide on method to use
   - Access, identify and obtain relevant literature, including use of local/relevant literature depositories and platforms
   - Develop project flow dynamics/diagram with timelines
   - Produce a high quality dissertation
   - Prepare the project findings for presentation and/or publication

3. Epidemiological studies
   - Know when to use the different methods of epidemiological research
   - Determine the sampling strategy
   - Analyse quantitative (categorical and continuous) data – Basic statistics

4. Introduction to qualitative studies
   - Know when to use the different methods of qualitative research
   - Determine the qualitative research sampling strategy
   - Analyse qualitative data

5. Introduction to operational/health services research
   - Outline the practicalities of operational/health systems research
   - Outline a systems approach
   - Analyse operational/services data

6. Questionnaire design and construction
   - Outline the principles of questionnaire construction
   - Identify internal and external consistency variables
   - Develop a topic guide for qualitative studies
   - Assess the validity of a questionnaire e.g. piloting
   - Determine when translation and back-translation are needed

7. Data collection and data management
   - Determine the instrument for data collection
   - Collect relevant data
   - Handle data – Entry, crosscheck and cleaning, anonymity

8. Grant application and proposal writing
   - Determine appropriate funding partners
   - Formulate letters of intent (LOI) and grant applications making full use of the components which are likely to attract funding

9. Getting published
    - Take account of choice of communication (e.g. poster, journal article, mass/social media) and journal type
    - Know the ethical principles of publishing and avoid plagiarism and falsification of data
    - Partake in collaborative writing

10. Attitude and communication
    - Take account of the principles of community entry and engagement
    - Recruit study participants and obtain informed consent
    - Develop communication skills – interacting with and listening to participants
    - Work safely on the field
    - Consider community service and modalities for participants' referral (service for the survey/study)

TEACHING AND LEARNING

How participants develop the knowledge and skills to enable them to achieve research learning outcomes.

The module is a 3-part module:

Part 1 - in the first 3 months of the fellowship programme: Introduction to basic research through online learning
Part 2 – by month 6 of the fellowship programme: Preparing to create a dissertation; production of a research proposal/outline and literature review
Part 3 – in the last 6 months of the fellowship programme: Production of a dissertation

Teaching and learning activities
Lectures, reading and videos for basic knowledge (online course)
Observe and practise in the field and in the computer lab

Knowledge
Online learning involving self-study, writing comments and engaging in discussion in the virtual learning environment, watching videos and animations and checking own learning through online quizzes.

Research skills
Learning through active engagement, undertaking a group project, working in teams, supporting and giving each other feedback; where the learner can demonstrate the different skills with their project, enough to meet course learning outcomes.

Technical skills
Developing own project according to course learning outcomes and produce a high quality dissertation; with each step of the dissertation being reviewed by a supervisor/trainer

Attitude and communication skills
Online learning to understand the principles of community engagement and participants' interaction, and undertaking group practicals/project.

ASSESSMENT AND FEEDBACK

Participants show that they are working towards the attainment of course learning outcomes, in the online basic research module through participation in quizzes, (either standard multiple choice

or image-based) and develop further based on regular guidance and appraisal of their progress. Participants finally demonstrate that they have achieved course learning outcomes.

Assessment criteria
Each component of production of the dissertation (project development and design) is regarded as a teaching and learning activity and therefore, assessed.

Formative assessment will include:
- Discussion and feedback on the research question, project title and rationale;
- Producing a draft of literature search and review by month 6 and reviewed/assessed over a period of 2 months.

Summative assessment entails reviewing and scoring the dissertation.

Marking schemes
Ensure all supervisors and those who support participants' learning as well as participants know how their attainment of course learning outcomes is expected to be tested.
Dissertation will be scored according to weighted marks for each section (to be specified)

Knowledge*
Demonstrate knowledge of the types of epidemiological and research studies

*The above will be assessed using MCQs at months 3 - 6 following the online course for 'Introduction to basic research'.

Research and Technical skills I**
- Generate a research question and project title
- Describe the rationale for the research
- Produce a draft of literature search and review
- Produce a research proposal/outline

**The above will be assessed at month 6 with ongoing review and revision over the following 2 months. Progression to the remaining course is dependent on satisfactory performance.

Research and Technical skills II***
- Produce a questionnaire and data collection instruments
- Collect data
- Handle data
- Produce a high quality dissertation

***The above will be assessed in the last 6 months of the fellowship programme. The award of the fellowship is dependent on satisfactory performance and completion/submission of the dissertation.

Refer to "The conceptual framework for dissertation writing" as guide.

Marking Scheme
The pass mark for the dissertation is 50; out of a full score of 100. The following weighted scores are applied to 10 components of the dissertation:

1: Not acceptable - more than 2 important areas are not sufficiently presented. Re-do all dissertation.

2: Not acceptable; but may be approvable with revisions - 1 or 2 important areas are not sufficiently presented but can be improved with revisions.

3: Good - all vital components are satisfactory.

4: Excellent - all components are very well presented; a well-executed and presented research.

5: Outstanding - all components are clearly presented and complete; focus and rigorous discussion; and cutting-edge results opening new areas for research.

	1	2	3	4	5
Abstract					5
Introduction **Statement of problem** **Context** **Strategy**					5 5
Literature review **Current summary and analysis**					5 5
Rationale adequately explained					5
Research question clearly stated					5
Aim					5
Objectives SMART					5
Methods **Adequate description** **Addressing problem**					5 5 5
Results/Analysis **Visualisation** **Relevance and alignment with stated problem**					5 5 5
Discussion and conclusion **Summarises and integrates findings, implications and future direction**					5

	1	2	3	4	5
References according to uniform agreed format and appendices					5
Overall - original, significant addition to knowledge base, coherent flow					5
Dissertation presentation/formatting					5

0-29: Not acceptable. A totally inadequate dissertation, which does not specify a research question, fails to present an argument, is largely descriptive, shows little or no knowledge of the topic, or its intellectual context, does not refer adequately to the relevant literature, fails to follow an appropriate methodology, and is poorly presented.

30-39: Not acceptable. An inadequate dissertation, which fails to identify a research question adequately, does not present a clear argument, includes some relevant material, but does not have evidence of sufficient reading and is overly descriptive.

40-49: Not acceptable, but can be improved with revision. A poor dissertation, which identifies a research question, states an argument, shows some knowledge of the literature and addresses the question, but does not sustain the argument, is overly descriptive, and lacks originality, sufficient knowledge of the relevant literature, issues and debates, and organisation.

50-59: Good. A satisfactory dissertation, which defines a research question adequately, makes an argument, shows an awareness of the major issues, shows some knowledge of the sources and of alternative approaches to the subject, but does not adequately develop or sustain the argument, does not show a clear understanding of alternative arguments, and makes uncritical use of sources.

60-69: A good dissertation, which offers a precise specification of the research question, presents a clear and coherent argument that is well-substantiated by evidence, treats the issues in a critical and balanced way, shows an awareness of context, sources and different explanations, and achieves a high standard of presentation.
70-79: Excellent. A dissertation of distinction quality, which addresses a well-defined research question, displays exceptional knowledge of the literature and/or a substantial measure of originality, and achieves a high standard of presentation.

80-100: Outstanding. A dissertation of distinction quality, which is outstanding in virtually all areas of a calibre far beyond what would be expected at this level. Contains substantial evidence of original and independent thought.

WACS Subspecialty Curriculum: Anterior Segment and Cornea

BACKGROUND

Fellowship training in the Cornea and Anterior segment specialty is aimed at upgrading the knowledge, technical and surgical skills acquired at the Membership level. The trained specialist is equipped with the targeted knowledge and set skills to manage advance and complicated cases of cornea and anterior segment disorders. They should be able to train residents and fellows at secondary or tertiary level of health care. S/he is expected during the training to acquire leadership and management skills needed to lead a team of eye care professionals, manage health care facilities or programmes, conduct scientific researches and publish the findings in peer reviewed journals. They should also be able to write proposals for and attract grants. S/he is expected to acquire good communication skills to manage crisis related to work and also be a good public speaker. As a specialist, s/he is expected to exhibit high level of professionalism and ethics in their practice.

Duration: 24 months

Prerequisites
Trainees should have successfully completed the membership training of WACS or its equivalent.

Overview
The proposed two-year fellowship program requires a trainee to complete all modules and such a trainee becomes an anterior segment specialist

Module 1: Introduction 3 months
Module 2: Next 6 months: Management of cataract and complex cataract cases/trauma
Module 3: Next 1 months: Indications use and complications of contact lenses
Module 4: Next 2 month: Management of microbial keratitis
Module 5: Next 3 months: Ocular surface diseases
Module 6: Next 3 months Inflammatory disease of the anterior segment
Module 7: Next 3 months: Keratoplasties
Module 8: Next 3 months: Dissertation writing, consolidate surgical skills and revision, tidying up and exams

Logbook
It is expected that at least 4 meaningful entries are summarized and documented in the logbook, every six months, representing the trainees experience in patient evaluation, investigation, treatment and outcome. The case report should include a review of relevant literature and a list of differential diagnoses. Each trainee is expected to document not more than 2 examples of the same condition, and should describe their experience with at least 5 different conditions.

The aim of the logbook is to supply a clear, accurate record of the participant's clinical practice. These are the characteristics of a satisfactory logbook.

1. The patient profile is supplied (age, sex, general health, including relevant co-morbidities.
2. The steps taken to evaluate and investigate the patient's condition are provided.
3. Clear details of the treatment including any modifications made with reasons are included.
4. Any complications are detailed and actions taken to mitigate these are described.
5. Outcomes are detailed with dates
6. Each logbook case is signed off by the clinician who supervised the case

The logbook will be evaluated periodically and will contribute to the summative assessment.

An example of the training record:

Patient evaluation	Date	
	Hosp No.	
	Name of Patient	
	Age	
	Sex	
	Pre-op Visual acuity	
	Visual Acuity Method/Chart Used	
	Type/Aetiology of Cataract	
	Pupil	
	Lens Morphology	
	IOP	
	Other findings- Ocular e.g Nystagmus, strabismus, microphthalmous etc	
Investigations	Systemic associations e.g syndromes, cardiac anomalies etc	
	BIOMETRY (AXL, K1,K2, IOL power)	
	B-Scan	
Treatment	Surgical procedure	
	Performed /Performed under Supervision/ Assisted	
	Complication- Intra-op	
	Optical Rehabilitation	
	Post-op complication- VAO, Glaucoma, Amblyopia	
Outcome	VA Day 1	
	VA ≥6weeks	
	Final outcome (As at when?)	
Key Learning points	Key Learning points	

	Other COMMENTS	

Training record for Microbial keratitis

An example of the training record:

Patient evaluation	Date	
	Hosp No.	
	Name of Patient	
	Age	
	Sex	
	Pre-op Visual acuity	
	Ocular discharge	
	Light projection	
	Lid examination	
	Other findings- Ocular e.g proptosis, orbital cellulitis, lacrimal apparatus, etc	
	EOMM	
	Conjunctiva exam	
	Cornea drawing	
	AC description	
	Iris findings	
	Pupil	
	Lens Status	
	IOP (Method)	
	Clinical photograph	
Investigations	Blood glucose, Corneal scraping for MCS	
	Ocular imaging	
	B-Scan	
Treatment	Microscopy result, culture and sensitivity result	
	Treatment instituted based on microscopy	
	Definitive treatment after culture and sensitivity report	
	Daily cornea drawing	

	Surgical intervention TA +BCL, AMG, Patch graft, Conj graft, Th.PK	
Outcome	VA Day 1	
	VA ≥6weeks	
	Final outcome (As at when?)	
Key Learning points	Key Learning points	
	Other COMMENTS	

Module 1: Introduction

Duration: 3 months

Research and dissertation module: 2 months

Introduction to anterior segment (1 month): Orientation into subspecialty module: Epidemiology, Basic aspects of anterior segment and cornea diseases,

Overall objectives: To enable trainees understand the basic of research, and online introduction courses in anterior segment and cornea

Knowledge
Trainees are expected to be able to:

1. Anatomy and physiology of the external eye, ocular surface, cornea, anterior segment and the lens
   - Describe the anatomy of the conjunctiva, cornea/sclera, anterior segment, lens, and anterior vitreous, with special emphasis on corneal transplantation and related procedures;

2. Cataracts
   I. Describe the epidemiology of cataracts
   II. Enumerate the major risk factors for cataracts
   III. Explain aetiopathogenesis of cataract
   IV. Be able to explain the management plan of simple cataracts

3. Microbial keratitis
   a. Explain the risk factors for microbial keratitis
   b. Ophthalmic microbiology, pathology and pharmacology in relation to anterior segment diseases

4. Ocular surface diseases
   a. Explain ocular surface anatomy and physiology
   b. Describe the role of inflammation in ocular surface diseases
   c. Discuss therapeutic approaches in the management of ocular surface diseases
   d. Describe the risk factors for ocular surface diseases

5. Describe the principles of contact-lens fitting and management of complications of contact-lens wear; and

6. Discuss the principles and practice of keratorefractive surgery

7. Explain the pathophysiology of corneal opacification

8. Describe the steps involved in corneal tissue harvesting, processing and storage

Clinical skills
- Take relevant clinical history appropriate for the common anterior segment diseases
- Perform detailed clinical examination for anterior segment disease
- Take an informed consent and provide appropriate counsel for eye tissue donation

Teaching methods

Didactic teaching, self-study, writing comments and engaging in discussion in the virtual learning environment, watching videos and animations and checking own learning through online quizzes, clinical conferences and mortality/morbidity seminars.

Assessment
Trainees show that they are working towards the attainment of course learning outcomes in the online course through discussions and quizzes, MCQs, DOBS for slit lamp examination and use of vital stains. Direct observation of giemsa and gram staining.

Module 2: Diagnosis and Treatment of Cataract and Complex Cataract Cases/Trauma

Diagnosis and treatment of cataract with small incision cataract surgery, and phacoemulsification (6 months)

OVERALL OBJECTIVES

To enable trainees diagnose and assess the human lens, and surgically treat cataract achieving the best possible outcomes for patients.

The objectives of this module are:
- Access the cataract patient
- Evaluate the options for conservative and surgical treatment of cataract
- Prepare, perform and follow up small incision cataract surgery,
- Prevent and manage cataract surgical complications
- Prepare and perform phacoemulsification for cataract
- Identify indications for cataract surgery and decide when surgery is appropriate
- Identify contraindications for cataract surgery
- Take account of risk factors for complications such as:
    - Capsular rupture
    - Zonular dialysis
    - Vitreous loss
    - co-existing pathology e.g. uveitis, glaucoma
    - Previous surgery e.g. glaucoma, vitreoretinal
    - Systemic disease e.g. diabetes mellitus
- Use and principles of surgical sutures

LEARNING OUTCOMES

Knowledge
Trainees are expected to:

Simple cataracts
1. Adequate knowledge of cataract classification
2. Determine the appropriate surgical techniques for each type of cataract
3. Detail the indications, pre-operative assessment, and preparation required for cataract surgery
4. Define management plan for cataract extraction and rehabilitation (biometry, surgical plan and optical rehabilitation)
5. Explain choice of IOL by design, types, indication and contraindications for implantation
6. Explain the principles of phacoemulsification (phacodynamics and machine settings)
7. Discuss the properties, types and indications for the use of ophthalmic viscoelastic devices (OVD)

Complicated cataracts

1. Identify complicated cataracts and prognosticate visual outcomes
2. Identify the surgical challenges with complicated cataracts e.g. small undilating pupil, ectopia lentis, traumatic, uveitic, pseudoexfoliation, glaucoma and retinal detachment

Ocular Trauma

1. Explain the mechanism and aetiopathogenesis of ocular trauma
2. Describe the ocular trauma score and prognostication.
3. Understand the principle of management of trauma affecting ocular adnexa including suturing techniques.
4. Explain the principles of management of corneo-scleral trauma
5. Describe the principles of management of traumatic hyphema
6. Describe the principles and management of iridodialysis
7. Describe the principles and management of ectopia lentis

Clinical Skills

1. Trainees must be proficient in slit lamp examination techniques.
2. Trainees must be able to perform and interpret anterior segment imaging techniques (ASOCT, topography and tomography) and pachymetry,
3. Evaluate the appropriate surgical options in cataract surgery (eg post glaucoma surgeries, post PKP, vitrectomised eye or management of aphakia)
4. Recognise and manage early and late complications of cataract surgery

Surgical Skills

Small incision cataract surgery

Trainees must be proficient at performing small incision cataract surgery:

I. Local anaesthesia
II. Conjunctival peritomy and dissection
III. Wound construction
IV. Capsulorhexis or capsulotomy
V. Hydrodelineation and hydrodissection
VI. Nucleus prolapse and delivery
VII. Cortical aspiration
VIII. IOL implantation
IX. Wound management
X. Check posterior capsule integrity
XI. Use of scleral-fixated lens when required
XII. Use of Iris claw lens when indicated
XIII. Complication recognition and management
XIV. Postoperative management

Management of retained cortical matter

I. Assessment of retained cortical matter for conservative and or surgical removal
II. Role of steroid and NSAIDS

Management of intraocular infections/inflammations following cataract surgery

I. Injecting intracameral antibiotics
II. Use of subconjuctival injections
III. Use of intravitreal antibiotics

Yag Laser capsulotomy:

I. Trainees should be proficient in the use of lasers for the management of posterior capsule opacification
II. Recognize and manage complications arising from laser treatment

Technical Skills

Examine the eye using the slit-lamp bio-microscopy

TEACHING AND LEARNING

How trainees develop the knowledge and skills to enable them to achieve subspecialist learning outcomes

Knowledge

Learning and acquisition of knowledge will be mainly self- driven. Online learning involving self-study, writing comments in the virtual learning environment, watching videos and animations and checking own learning through online quizzes. Trainees to prepare lectures on these topics and present to trainers and other trainees. Trainees will draw on the evidence base (major clinical trials) to inform management of cataracts. Lectures, videos and reading journals and articles applying the evidence base to cases. Trainees will practice the use of imaging technologies as they observe how patients are managed every day.

Assessment methods of knowledge

Trainees to prepare seminars on these topics and present to trainers and other trainees
On line assessment prior to course (pre-test) and after the course (post-test)

Achieving the Clinical skills

Learning through active observation and emulation, practice, and repeat the 'observe/emulate/practice' cycle until the participant has developed the clinical skill well enough to meet course learning outcomes. Most of the skills will be learnt by direct observation in clinic and practice

Assessment methods

Work based assessments using patients attending/ being screened for surgery
Logbooks and clinical case reports
OSCE

Teaching and learning activities

Practice the procedures in the wet lab under supervision. Observe, discuss, outline and practice the procedures with guidance in the operating theatre. Lectures, reading and videos for basic knowledge (online course). Observe and practice assessing patients in clinic in the post op period.

Achieving the surgical skills set

- Lectures, reading and videos
- Wet lab practice/ simulator
- Work with examples (cases) to practice identifying indications/contraindications for cataract
- Practice using simulators and wet lab
- Practice identifying and explaining risk factors for cataract complications
- Watch and discuss videos of patient counselling and consent for cataract; identify critical stages of counselling, patient expectation and its management
- Learning activities can be face to face and/or written online, working in small groups, drawing on video material
- Observe and practice each skill repeatedly until these surgical skills learning outcomes are met

Assessment methods for surgical skills acquisition

1. Pre course preparation of case studies: Presented and discussed
2. Extended matching questions (EMQs) - assessment of patient case study

3. Observation of role play / reviewing videos of trainees counselling patients and taking consent
4. Work–based assessments (taking consent for surgery and performing SICS/phaco stepped surgery)
5. Objective Structured Assessment of Technical Skills (OSATS) (capsulorhexis, scleral tunneling and phacoemulsification)

Module 3: Indications Use and Complications of Contact Lenses

OVERALL OBJECTIVES

To enable trainees to identify the different types of contact lenses and their properties. Know the indications and contraindications of contact lenses and manage contact lens related complications.

The objectives of this module are:

- Enumerate the principles of visual rehabilitation using contact lens
- Identify indications and contraindications for contact lens use
- Proficiency in the fitting of contact lenses
- Identify complications of contact lens use

LEARNING OUTCOMES

Knowledge
Trainees are expected to:

Contact lens

1. Adequate knowledge of contact lens design and properties
2. Detail the indications, assessment, and preparation for contact lens use
3. Define management plan for contact lens related complications (biometry, surgical plan and optical rehabilitation)

Clinical Skills

1. Trainees must be proficient in contact lens care, fitting and removal.
2. Recognition and management of early and late complications of contact lens

Module 4. Management of Infectious Diseases of External Eye and Cornea

Overall objective is to ensure that a trainee is able to make a clinical and laboratory backed diagnosis of infection of the external eye and cornea, design and make a treatment plan based of good understanding of microbiology, pharmacology, medical and surgical principles of management of these infections

The objectives of this module are to enable the trainee to:

- Recognize clinical features of external eye and cornea infection (infections of the lid margin and associated structures, conjunctiva and cornea)
- Identify the pen light and slit lamp microscopic features of different types of external eye and cornea infection
- Take serial clinical photograph as well as coloured corneal drawings of the lesions
- Take a specimen for laboratory identification of the microorganism in the lesion
- Plan for other investigations to help diagnosis and treatment of the infection
- Design and execute a management protocol (medical, surgical and rehabilitative)

LEARNING OUTCOMES

Knowledge

1. Describe in detail the differential features of viral, bacterial, fungal and parasitic infection through history taking and slit lamp examination
2. Enumerate the pathogenetic factors involved in external eye infection and microbial keratitis
3. Describe in details the microbiology and pharmacology of viral, bacterial fungal and parasitic pathogens in external eye infection and microbial keratitis
4. Describe the diagnostic laboratory techniques (specimen collection, staining methods, culturing)
5. List the treatment options and the application for external eye diseases and microbial keratitis (medical, surgical and rehabilitative)

Clinical skills

Trainees should be able to:

a. Differentiate viral, bacterial, fungal and parasitic keratitis through slit lamp biomicroscopy examination
b. Make a colour coded drawing of the corneal lesions for serial documentation
c. Take a serial clinical photograph of the cornea for documentation

Technical skills

The trainee should be able to:

a. Take specimens of the corneal lesion for microscopy and culture (corneal scraping, smear on slides, inoculate the culture media)
b. Perform a corneal biopsy for microbiology and histopathology whenever required
c. Perform specimen (slide) staining and microscopy independently
d. Medically treat external eye infections and microbial keratitis based on clinical findings and microbiology laboratory findings

Surgical

- Apply tissue adhesive and bandage contact lens for cornea perforation or imminent perforation
- Perform corneal patch or amniotic membrane graft, or therapeutic penetrating keratoplasty
- Plan and execute optical rehabilitation for microbial keratitis/corneal graft

TEACHING AND LEARNING

How trainees develop the knowledge and skills to enable them to achieve subspecialist learning outcomes

Knowledge

Learning and acquisition of knowledge will be mainly self-driven. Online learning involving self-study, writing comments in the virtual learning environment, watching videos and animations and checking own learning through online quizzes. Trainees to prepare lectures on these topics and present to trainers and other trainees. Trainees will draw on the evidence base (major clinical trials) to inform management of microbial keratitis. Sessions in the microbiology laboratory, working with the laboratory technicians on smearing and staining techniques, learning from the medical microbiologists how to identify organisms on microscopy (2 weeks recommended). Videos and reading journals and articles applying the evidence base to cases.

Assessment methods of knowledge:

Trainees to make seminar presentation of Clinico-Microbiological Correlation (CMC) of cases, present to trainers and other trainees.
Review of case records log with evaluation by trainer as part of formative assessment.

Achieving the surgical skills set

- Lectures, reading and videos
- Wet lab practice/simulator
- Work with examples (cases) to practise identifying indications/contraindications for tissue glue application and therapeutic keratoplasty and explaining why the chosen intervention is appropriate
- Practice penetrating keratoplasty in wet lab
- Learning activities can be face to face and/or written online, working in small groups, drawing on video material.
- Observe and practise each skill repeatedly until these surgical skills' learning outcomes are met.

Assessment methods for surgical skills acquisition:

1. Pre course preparation of case studies: Presented and discussed
2. Extended matching questions (EMQs) - assessment of patient case study
3. Assessment of the practice PKP by the trainer (at least 10 practice wet lab PKPs)
4. Observation of role play/reviewing videos of trainees counselling patients and taking consent

Module 5. Ocular Surface Diseases

Overall objective is for the trainee to have a good understanding of the basic science of the ocular surface and the application in the diagnosis of any disorders arising there, be able to appropriately plan and execute a medical and/or surgical management.

Primary aims of this module are to enable trainees to be able to:

- Assess and diagnose ocular surface diseases
- Evaluate the medical and surgical options and plan appropriately
- Treat ocular surface diseases by medical and/or surgical means to achieve anatomical and physiological functions

LEARNING OUTCOMES

Knowledge

- Explain the basic sciences of the ocular surface
- List the ocular surface disorders and the clinical features
- Explain the rationale of investigations in ocular surface disorders
- Explain the role of ocular appendages in the etiopathogenesis of ocular surface disorders
- Describe the recent advances in the management of dry eye and cornea stem cell deficiency
- List the systemic conditions associated with ocular surface disorders

Technical

- Identify ocular surface disorders on slit lamp
- Interpret the laboratory/imaging investigations ordered
- Identify early/late complications of treatment of ocular surface disorders by slit lamp examination

Surgical

- Be competent at performing common ocular surface surgical procedures like pterygium excision and conjunctival autograft
- Surgically manage perforated Mooren's ulcer
- Perform mucous membrane graft

- Perform amniotic membrane graft
- Perform simple limbal epithelium transplant (SLEt)

TEACHING AND LEARNING

How trainees develop the knowledge and skills to enable them to achieve subspecialist learning outcomes

Knowledge
Learning and acquisition of knowledge will be mainly self-driven. Online learning involving self-study, writing comments in the virtual learning environment, watching videos and animations and checking own learning through online quizzes. Trainees to prepare lectures on these topics and present to trainers and other trainees. Trainees will draw on the evidence based (major clinical trials) to inform management of ocular surface diseases. Videos and reading journals and articles applying the evidence base to cases.

Assessment methods of knowledge
Trainees to make seminar presentation of cases, present to trainers and other trainees.
Review of case records log with evaluation by trainer as part of formative assessment.

Achieving the surgical skills set
- Lectures, reading and videos
- Wet lab practice/simulator
- Work with examples (cases) to practice identifying indications/contraindications for amniotic membrane transplant, SLET or mucous membrane transplant and explaining why the chosen intervention is appropriate
- Learning activities can be face to face and/or written online, working in small groups, drawing on video material
- Observe and practice each skill repeatedly until these surgical skills' learning outcomes are met.

Assessment methods for surgical skills acquisition
1. Pre course preparation of case studies: Presented and discussed
2. Extended matching questions (EMQs) - assessment of patient case study
3. Observation of role play/reviewing videos of surgical procedures performed by trainees

Module 6: Immune Related Disorders of the External Eye and Cornea

Overall objective of this module is to make the trainee to acquire the necessary knowledge and skills to diagnose and treat immune related disorders of the external eye and cornea

Primary aims

LEARNING OUTCOMES

Knowledge
- Describe the advance immunological principles of diagnosing and treating immune related disorders of the external eye and cornea
- List the different types of immune related conjunctivitis and the clinical features
- Describe the immunology of the corneal transplant rejection
- List the systemic conditions that are associated with immune related disorders of the external eye and the cornea
- List the diagnostic tests to diagnose immune related disorders of the anterior segment and cornea

- Describe the medical and surgical management of early and late complications of Stevens Johnson syndrome
- Describe the medical and surgical management of Mooren's ulcer
- Describe the local and systemic complications that can occur with medical treatment of immune related disorders of external eye and cornea

Technical

- Make a slit lamp diagnosis of common immune related disorders of the external eye and cornea
- Interpret the result of investigations ordered to enable trainee to make a treatment plan.
- Recognise the clinical response of the patient to therapy through slit lamp examination
- Recognise the complications of medical therapy, especially as related to immunomodulating drugs

Surgical

- Perform amniotic membrane graft for Stevens Johnson syndrome at the acute stage, vernal keratoconjunctivitis ulcers when required
- Perform mucous membrane graft and mini salivary gland transplant
- Perform tectonic corneal transplant for severe Mooren's ulcer

TEACHING AND LEARNING

How trainees develop the knowledge and skills to enable them to achieve subspecialist learning outcomes

Knowledge

Learning and acquisition of knowledge will be mainly self-driven. Online learning involving self-study, writing comments in the virtual learning environment, watching videos and animations and checking own learning through online quizzes. Trainees to prepare lectures on these topics and present to trainers and other trainees. Trainees will draw on the evidence base (major clinical trials) to inform management of immune related disorders of the external eye and cornea. Sessions with clinical immunologists to participate and learn about medical management of immunological diseases, (2 weeks recommended). Videos and reading journals and articles applying the evidence base to cases.

Assessment methods of knowledge

Trainees to make seminar presentation of cases, present to trainers and other trainees.
Review of case records log with evaluation by trainer as part of formative assessment.

Achieving the surgical skills set

- Lectures, reading and videos
- Work with examples (cases) to practice identifying indications/contraindications for surgical procedures and explaining why the chosen intervention is appropriate
- Practice penetrating keratoplasty in wet lab
- Learning activities can be face to face and/or written online, working in small groups, drawing on video material.
- Observe and practice each skill repeatedly until these surgical skills' learning outcomes are met.

Assessment methods for surgical skills acquisition

1. Pre course preparation of case studies: Presented and discussed
2. Extended matching questions (EMQs) - assessment of patient case study
3. Observation of role play/reviewing videos of trainee's surgical procedures

Module 7: Keratoplasties

Overall objective is to enable trainees to have competency at performing keratoplasty surgeries, identify early and late complications and be able to manage appropriately in order to have a functional graft.

LEARNING OUTCOMES

Knowledge
The trainee should be able to:

- Describe the anatomy, physiology, microbiology, wound healing of the anterior segment
- Describe the principles of corneal transplantation and should be able to counsel the patient requiring a transplant, explain the risks and benefits of the procedure
- Describe the processes involved in eye banking and donor selection
- Explain the differences between penetrating keratoplasty and lamellar keratoplasty and the indications for each
- Describe the principles of keratoprosthesis and its limitations
- Explain the principles of graft rejection and failure, prevention and the management
- Map out a surgical plan for the patient with a view of preventing anticipated complications
- Develop a follow up plan and optical rehabilitation
- Describe assessment of donor tissue from the Eye Bank donor information and also by slit lamp tissue evaluation
- Describe the necessary assessment and investigations on the recipient and prognosticate
- Identify potential risk factors for complications on examination
- Describe early and late complications of keratoplasties on slit lamp examination
- Demonstrate sound keratoplasty surgery in the wet lab

TEACHING AND LEARNING

Knowledge
Learning and acquisition of knowledge will be mainly self-driven. Online learning involving self-study, writing comments in the virtual learning environment, watching videos and animations of corneal transplants and checking own learning through online quizzes in. Trainees to prepare lectures on these topics and present to trainers and other trainees. Trainees will draw on the evidence base (major clinical trials) to inform management of keratoplasties and complications.

Assessment methods of knowledge
Trainees to make seminar presentation on cases co-managed or solely managed
Review of case records log with evaluation by trainer as part of formative assessment.
Quizzes, and assessment through MCQ, DOPS, face to face interaction

Achieving the surgical skills set

- Lectures, reading and videos
- Wet lab practice/simulator
- Work with examples (cases) to practice identifying indications/contraindications for corneal transplantation
- Practice penetrating keratoplasy in wet lab
- Learning activities can be face to face and/or written online, working in small groups, drawing on video material
- Observe and practice each skill repeatedly until these surgical skills learning outcomes are met.

Assessment methods for surgical skills acquisition

- Pre course preparation of case studies: Presented and discussed

- Extended matching questions (EMQs) - assessment of patient case study
- Review of wet lab using the necessary rubrics

Last 1 month

- Revision, tidying up and exams

Module 8: Dissertation writing, consolidate surgical skills and revision, tidying up and exams

Using the skills gained from module 1 the trainee will discuss a topic for their dissertation with their mentors. It is expected they will work on their dissertation throughout the training using this final period to refine and produce the completed document. Support in this process will be by one to one meetings with a trainer assigned to them for this purpose. The expectations, structure and marking of the dissertation are outlined in the dissertation module.

Surgical Competency Assessment Rubric: Small Incision Cataract Surgery (ICO-OSCAR: SICS)

Date _____ Resident _____ Evaluator _____		Novice (score = 2)	Beginner (score = 3)	Advanced Beginner (score = 4)	Competent (score = 5)
1	Draping:	Unable to start draping without help.	Drapes with minimal verbal instruction. Incomplete lash coverage.	Lashes mostly covered, drape at most minimally obstructing view.	Lashes completely covered and clear of incision site, drape not obstructing view.
2	Scleral access & Cauterization	Unable to successfully access sclera. Cauterization insufficient or excessive both in intensity and localization.	Accesses sclera but with difficulty and hesitation. Cauterization insufficient or excessive in location or intensity.	Achieves good scleral access with mild difficulty. Adequate cauterization.	Precisely and deftly accesses sclera. Appropriate and precise cauterization.
3	Sclerocorneal Tunnel	Inappropriate incision depth, location, and size, hesitant dissection. Iris prolapse may occur	One of the following correct: incision depth, location or size. Able to dissect forward but not able to perceive depth	Two of the following are correct: incision depth, location or size. Understands that tunnel depth is incorrect but unable to correct.	Good incision depth, location and size. Tunnel constructed at right plane, if inappropriate plane, able to rectify.

4	Corneal entry	Hesitant keratome entry into AC. Unable to extend the internal valve. Significant shallowing of anterior chamber. Require wound extension or suturing.	Enters into AC but difficulty in extension. Follows a different plane. Entry either anterior or posterior to dissection site. Mild AC shallowing. Require wound extension or suturing.	Entry at right plane. Able to extend but with repeated use of viscoelastic. Internal valve irregular. Require wound extension or suturing.	Fluently enters in right plane. Wound length adequate with no further need for extension. Retains viscoelastic during extension. Self-sealing, provides good access for surgical maneuvering.
5	Paracentesis & Viscoelastic insertion	Chamber collapses on performing paracentesis. Inappropriate width, length and location. Pierces anterior capsule on entry. Unsure of when, what type and how much viscoelastic to use. Has difficulty accessing anterior chamber through paracentesis.	Appropriate incision width, location or length. Anterior chamber shallows mildly. Requires minimal instruction. Knows when to use but administers incorrect amount or type of viscoelastic.	Inappropriate location, width or length. Anterior chamber almost stable Requires no instruction. Administers viscoelastic at appropriate time, amount, type, and cannula position.	Wound of adequate length, width, and correct location. Viscoelastics administered in appropriate amount, at appropriate time, with cannula tip clear of lens capsule and endothelium.
6	Capsulorrhexis: Commencement of Flap & follow-through.	Instruction required, tentative, chases rather than controls rhexis, cortex disruption may occur.	Minimal instruction, occasional loss of control of rhexis, cortex disruption may occur.	In control, few awkward or repositioning movements, no cortex disruption.	Delicate approach and confident control of the rhexis, no cortex disruption.
7	Capsulorrhexis: Formation and Circular Completion	Size and position are inadequate for nucleus density, tear may occur.	Size and position are barely adequate for nucleus density, difficulty achieving circular rhexis, tear may occur.	Size and position are almost exact for nucleus density, shows control, and requires only minimal instruction.	Adequate size and position for nucleus density, no tears, rapid, unaided control of radialization, maintains control of the flap and AC depth throughout the capsulorrhexis.

8	Hydrodissection: Visible Fluid Wave and Free prolapse of one pole of nucleus	Hydrodissection fluid not injected in quantity or place to achieve nucleus rotation or prolapse.	Multiple attempts required, able to prolapse nuclear pole after multiple efforts. Manually forces nucleus prolapse before adequate hydrodissection; cheese wiring.	Fluid injected in appropriate location, able to prolapse one pole of nucleus but encounters more than minimal resistance.	Ideally see free fluid wave, adequate for free nuclear hydroprolapse or mechanical prolapse with minimal resistance. Aware of contraindications to hydrodissection.
9	Prolapse of nucleus completely into AC	Unable to dial nucleus into AC. Hooks anterior or posterior nuclear surface, nucleus rotates in the bag, iris and corneal touch, pupillary constriction, may damage capsule or zonules.	Prolapses nucleus after repeated awkward attempts, needs instruction, churns cortex causing reduced visibility; iris or corneal touch; no damage to capsule or zonules.	Prolapses nucleus into AC with more than minimal resistance. No corneal touch.	Prolapse with minimal resistance. No damage to pupil and iris.
10	Nucleus extraction	Damages endothelium, iris or capsule, unable to hold and extract nucleus, movements not coordinated.	Movements coordinated but unable to extract nucleus, iris or corneal damage, unable to assess wound size in relation to nuclear density.	Removes nucleus after repeated attempts, more than one piece, might need wound extension prior to extraction.	Extracts nucleus with one or two attempts; proper wound size in relation to nuclear density.
11	Irrigation and Aspiration Technique with Adequate Removal of Cortex	Great difficulty introducing the aspiration tip under the capsulorrhexis border, aspiration hole position not	Moderate difficulty introducing aspiration tip under capsulorrhexis and maintaining hole up	Minimal difficulty introducing the aspiration tip under the capsulorrhexis, aspiration hole usually up, cortex will	Aspiration tip is introduced under the free border of the capsulorrhexis in irrigation mode with the aspiration hole up, Aspiration is activated in just

		controlled, cannot regulate aspiration flow as needed, cannot peel cortical material adequately, engages capsule or iris with aspiration port.	position, attempts to aspirate without occluding tip, shows poor comprehension of aspiration dynamics, cortical peeling is not well controlled, jerky and slow, capsule potentially compromised. Prolonged attempts result in minimal residual cortical material.	engaged for 360 degrees, cortical peeling slow, few technical errors, minimal residual cortical material. Some difficulty in removing sub incisional cortex	enough flow as to occlude the tip, efficiently removes all cortex. The cortical material is peeled gently towards the center of the pupil, tangentially in cases of zonular weakness. No difficulty in removing subincisional cortex
12	Lens Insertion, Rotation, and Final Position of Intraocular Lens	Unable to insert IOL.	Difficult insertion, manipulation of IOL, rough handling, unstable anterior chamber. Repeated hesitant attempts placing lower haptic in capsule, repeated attempts rotate upper haptic d into place with excessive force.	Insertion and manipulation of IOL accomplished with minimal anterior chamber instability, the lower haptic is placed with some difficulty, upper haptic is rotated with some stress.	Insertion and manipulation of IOL is performed in a deep, and stable anterior chamber and capsular bag, with incision appropriate for implant type. The lower haptic is smoothly placed inside the capsular bag; the upper haptic is rotated or gently bent and inserted into place without exerting excessive stress to the capsulorrhexis or the zonule fibers.
13	Wound Closure (Including Suturing, Hydration, and	If suturing is needed, instruction is required and stitches are placed in an	If suturing is needed, stitches are placed with some difficulty, resuturing	If suturing is needed, stitches are placed with minimal difficulty tight	If suturing is needed, stitches are placed tight enough to maintain the wound closed, but not too tight as to

	Checking Security as Required)	awkward, slow fashion with much difficulty, astigmatism, bent needles, incomplete suture rotation and wound leakage may result, unable to remove viscoelastics thoroughly. unable to make incision watertight or does not check wound for seal. Improper final IOP.	may be needed, questionable wound closure with probable astigmatism, instruction may be needed, questionable whether all viscoelastics are thoroughly removed, Extra maneuvers are required to make the incision water tight at the end of the surgery. May have improper IOP.	enough to maintain the wound closed, may have slight astigmatism, viscoelastics are adequately removed after this step with some difficulty, The incision is checked and is water tight or needs minimal adjustment at the end of the surgery. May have improper IOP.	induce astigmatism, viscoelastics are thoroughly removed after this step, the incision is checked and is water tight at the end of the surgery. Proper final IOP.
	Global Indices				
14	Wound Neutrality and Minimizing Eye Rolling and Corneal Distortion	Nearly constant eye movement and corneal distortion.	Eye often not in primary position, frequent distortion folds.	Eye usually in primary position, mild corneal distortion folds occur.	The eye is kept in primary position during the surgery. No distortion folds are produced. The length and location of incisions prevents distortion of the cornea.
15	Eye Positioned Centrally Within Microscope View	Constantly requires repositioning.	Occasional repositioning required.	Mild fluctuation in pupil position.	The pupil is kept centered during the surgery.
16	Conjunctival and Corneal Tissue Handling	Tissue handling is rough and damage occurs.	Tissue handling borderline, minimal damage occurs.	Tissue handling decent but potential for damage exists.	Tissue is not damaged nor at risk by handling.
17	Intraocular Spatial Awareness	Instruments often in contact with capsule, iris, corneal endothelium; blunt second instrument not kept in appropriate position.	Occasional contact with capsule, iris, corneal endothelium; sometimes has blunt second	Rare contact with capsule, iris, endothelium. Often has blunt second hand instrument in appropriate position.	No accidental contact with capsule, iris, corneal endothelium. Blunt, second hand instrument, is kept in appropriate position.

			instrument in appropriate position.		
18	Iris Protection	Iris constantly at risk, handled roughly.	Iris occasionally at risk. Needs help in deciding when and how to use hooks, ring or other methods of iris protection.	Iris generally well protected. Slight difficulty with iris hooks, ring or other methods of iris protection.	Iris is uninjured. Iris hooks, ring, or other methods are used as needed to protect the iris.
19	Overall Speed and Fluidity of Procedure	Hesitant, frequent starts and stops, not at all fluid.	Occasional starts and stops, inefficient and unnecessary manipulations common, case duration about 60 minutes.	Occasional inefficient and/or unnecessary manipulations occur, case duration about 45 minutes.	Inefficient and/or unnecessary manipulations are avoided, case duration is appropriate for case difficulty. In general, 30 minutes should be adequate.

GUIDELINES FOR ACCREDITATION VISITS (MINIMUM REQUIREMENTS)

ANTERIOR SEGMENT SUBSPECIALTY

The Anterior segment Subspecialty Training Centre should meet the following requirements:

1. **PERSONNEL (20%)**
   a. At least 1 anterior segment subspecialist who has undergone a hands-on fellowship and has practiced as an anterior segment specialist actively for at least 3 continuous years post training
   b. Intake of trainee should not exceed 2 per trainer at any particular time (one per trainer per year).

2. **INFRASTRUCTURE (30%)**
   a. A minimum of one fully equipped consulting rooms with:
      - One visual acuity chart
      - One indirect ophthalmoscope with scleral indenter
      - One slit lamp with applanation tonometer, digital camera
      - One 3-mirror contact lens
      - One non-contact retinal examination lens e.g. +20D, +90D, +78D
      - Examination couch

   b. Minor Theatre
      - Operating microscope/Loupe
      - Reclining chair or couch
      - Minor procedure instruments for foreign body removal, chalazion excision, subconjunctival injections, suture removal etc

   c. Investigation room
      - A/B ultrasound scan
      - Keratometer
      - Yag laser capsulotomy
      - Corneal imaging (topography and tomography)
      - ASOCT
      - Pachymeter

   d. Side Room Laboratory
      - Bench microscope
      - Immerson oil
      - Facilities for Gram and Giemsa staining
      - 10% KOH solution
      - Slides
      - Bursen burner and gas cylinder

   e. Eye theatre: Fully equipped for anterior segment surgery,
      - Operating Microscope with facility for camera, monitor and recording (Minimum 1)
      - Phacoemulsification machine with two phacoprobes (Minimum 1)
      - Anterior vitrectomy
      - Anaesthetic machine for general anesthesia
      - Cataract sets (Minimum of six)
      - Cornea trephines, Teflon block, corneal punch, corneal markers, artificial anterior chamber, corneal spatula, anterior chamber maintainer, Simcoe canula, I/A canula (single port), reverse Sinskey's hook.
      - Refrigerator (Tissue / Preservative solutions)
      - Bipolar cautery
      - PKP set

- Fleringa rings

3. CLINIC DAYS, THEATRE DAYS, WARDROUNDS (10%)

A minimum of:

- Two clinics per week
- Two theatre day per week
- 1 teaching round per week
- 1 seminar per week

4. SURGICAL VOLUME (20%)

Cataract minimum of 200 per center per annum.
Penetrating keratoplasty minimum of 5 per annum
YAG laser capsulotomy minimum of 20 per annum
Post trabeculectomy cataract surgery minimum of 20per annum

5. RESEARCH AND PUBLICATION (5%)

Evidence of anterior segment related research activity and publications by the trainer(s)

6. LIBRARY (5%)

The library should have a stock of anterior segment related works and journals either in print or electronic form.

7. STRUCTURED TEACHING (5%)

Evidence of routine anterior segment related presentations e.g. Case presentations, OCT sessions, Journals club, Tutorials etc.

8. VISITING FACULTY AND SHARING OF KNOWLEDGE (5%)

Evidence of visiting anterior segment specialist with active participation in knowledge sharing activity by way of lectures, conferences, workshops, clinical or surgical activities.

9. GENERAL COMMENTS AND OBSERVATIONS

WACS Subspecialist Curriculum: Comprehensive Ophthalmology

Fellowship programme year 1					Fellowship programme year 2					
3 months	3 months	2 months	1 month	3 months	3 months	2 months	2 months	2 months	1 month	2 months
Basic research and introduction	Glaucoma	Anterior segment	Leave	Cataract	Paediatric ophthalmology	Oculo-plastics	Medical retina	Elective period	Leave	Dissertation/revision/ exams

Notes

The residency should be structured according to these modules/rotations, but these can be arranged in any order but with the following caveats

- The Dissertation/revision/examination is the last rotation
- The elective period is at some point in the second year (not allowed in the first year)
- The resident should decide on the area of excellence early and make that one of the first two rotations
  - Ideally the resident should submit the dissertation proposal during that rotation in the posting of special interest
  - As an example, the programme above could be for a comprehensive ophthalmologist with an interest in glaucoma

Uveitis is an integral part of the anterior segment (anterior uveitis) and medical retina (posterior and intermediate uveitis)

Rotations may be combined where the expertise is available e.g. cataract and anterior segment may be combined for a total of 5 months.

Background

The Fellowship programme in Ophthalmology is designed to further advance and develop the General Ophthalmologist to provide a higher level of ophthalmic care, to be confident tackling more complex but common ophthalmic medical and surgical cases and have a sphere of excellence in one sub-specialty.

Duration: 24 months

Prerequisites

- Membership in ophthalmology of the West Africa College of Surgeons, or an equivalent as approved by WACS Council
- Two years of working experience at the Membership level is desirable

Overview

Rotations do not have to be in the sequence below, and two relevant rotations can be done simultaneously. E.g. Cataract and Anterior Segment rotations may be combined.

- CATARACT – 3 months
- ANTERIOR SEGMENT – 2 months
- GLAUCOMA – 3 months
- NEUROOPHTHALMOLOGY – 2 months
- OCULOPLASTICS – 2 months
- PAEDIATRIC OPHTHALMOLOGY – 3 months
- UVEITIS – integrated
- MEDICAL RETINA – 2 months

Logbook

It is expected that at least 4 meaningful entries are summarized and documented in the logbook, every six months.

Case reports should represent the trainees experience in patient evaluation, investigation, treatment and outcome. This would involve a review of relevant literature and a list of differential diagnoses.

LEARNING OUTCOMES

By the end of this training programme, the Comprehensive Ophthalmology Resident is expected to build on the knowledge, skills, and competencies of the Membership level and develop into an all-round competent Ophthalmologist with special capabilities in one sub-specialty area:

- Exhibit a high level of confidence in all aspects of general ophthalmic care and management
- Confidently diagnose, develop management plans, and manage complex ophthalmic conditions
- Develop confidence in the basics of several Ophthalmology sub-specialties, with the confidence and knowledge to know where their skill and experience lies and refer to sub-specialists as necessary
- Develop special capacity in one subspecialty, spending at least 6 months in that specific sub-specialty. The Resident will be able to take care of more common and less complex ophthalmic sub-specialty medical and surgical services in the chosen field, thereby improving overall access to specialist eye health care
- Exhibit confidence as a trainer and health care manager and be confidently able to establish and develop tertiary level health care and training programmes for all eye health care cadres

- Develop the generic core competencies common to the Fellowship level, including administrative, and medical education skills

TEACHING AND LEARNING METHODS

As with Membership, the activities of teaching, training and assessment should follow a well-structured plan using the methods below.

- Tutorials/seminars – Weekly
- Grand Round – Weekly
- Journal club – Biweekly
- Refraction clinics - 2x/week
- Case presentations - Weekly/clinic
- Clinical meetings/Audits – Quarterly
- Investigation days - Weekly
- Hands-on surgical training (as evidenced by Surgical logbook)
- Hands-on clinical training
- Wet-lab practice should precede all complex surgical procedures on human subjects
- E-learning methods
- Video-conferencing
- At least half-day per Resident per week for self-study
- Monthly assessment of logbooks
- Supervision of dissertation by trainers
- Keeping of Surgical and Procedures logbook – Resident's Portfolio Management
- End of Posting/Rotation Assessments
- End of Level Examination (mock examination - institution based) Essays/SAQs, Clinicals and Orals

ASSESSMENT AND FEEDBACK

Appraisal of the trainers and the training process

Internal quarterly appraisals of the training process using a structured appraisal format. This should be done by each training department at the base level and in each training facilities' network where it exists.

Feedback during the training programme

Regular and timely feedback on formative and summative assessment or performance is essential for successful work-based experiential learning.
Specific details of who should give feedback to the College through the Faculty and the timing in relation to training placements will be the responsibility of the Residency Training Co-ordinators and HODs of each accredited training institution.
Feedback should include the following important elements:

1. An initial appraisal meeting shortly after the start of a training placement to establish learning goals
2. An interim appraisal meeting to discuss progress against the learning goals
3. An appraisal meeting towards the end of the training placement to agree which learning goals have been achieved
4. Structured written feedback from clinical supervisors to the Residency Training Coordinator
5. Appropriately structured written feedback from other departmental staff (multi-source feedbacks) at whatever posting the Resident is undergoing. This should include members of the eye care team, medical staff in relevant directorates e.g. Radiology, Pathology, Anaesthesia and Managerial staff
6. Feedback from patients and carers obtained from patient surveys etc.
7. Feedback from College Examination Department, if a trainee has been unsuccessful

8. Feedback from the Resident on his/her training process

The results of such feedback will form part of the Residents' Portfolio Management system.

Supervision of the trainee throughout the training programme

The overall supervision of the Resident lies with the Residency Training Co-ordinator. Trainees will work to a level of clinical supervision commensurate with their clinical experience and level of competence. This will be the responsibility of the relevant clinical supervisor.

Centres are encouraged to allocate personal tutors to each Resident in addition to the Clinical supervisor and Residency training co-ordinator.

The Comprehensive Ophthalmology curriculum is arranged as follows:

The core competencies for the ophthalmology Fellow of West Africa College of Surgeons (Please see WACS Training Curriculum for Membership and Fellowship Programme document pg. iii).

The clinical rotations: The additional knowledge, clinical skills, and technical skills in various areas in ophthalmology. The requirements in each area/subject are described under the following headings.

- Knowledge
- Clinical Skills
- Technical skills

The dissertation

To be undertaken in the area of special interest to the Fellowship resident.

Research in Ophthalmology and Vision Sciences usually embrace supports from basic, clinical and epidemiological sciences that are geared to meeting the local and global needs of the public with a view of developing novel, socio-culturally acceptable and cost-effective therapy for conditions that are beyond an individual patient and are currently without known effective, appropriate, equitable and readily available treatment or remedy. Three broad categories are desirable as follows: I) Operational Research. II) Epidemiologic Risk Profile. III) Clinical Research. Residents are encouraged to consult the chapter – Research in Ophthalmology and Vision in "Vision for the Future". [1] and the faculty guidance for the Fellowship dissertation (See dissertation module)

Module 1: Basic research and introduction

Duration: 3 months

Research and dissertation module: 2 months

Introduction to comprehensive ophthalmology (1 month): Orientation into subspecialty module: Epidemiology, Basic aspects of ocular diseases,

Overall objectives: To enable trainees understand the basic of research, and introduction to all module subjects.

Module 2: Cataract

Duration 3 months

Knowledge

The Fellow should be able to:

- Accurately diagnose all forms of cataract and their possible aetiology
- Recognise signs of a complicated cataract
- Detail surgical procedures, advantages and disadvantages of each
- Describe the cost effectiveness of SICS vs Phaco
- Describe the aetiology of ectopia lentis and its management
- Manage cataract in special situations: Traumatic cataracts, after filtration surgery, diabetes, uveitis, high myopia, nanophthalmos, pseudoexfoilation, compromised endothelium, keratorefractive surgery and in a vitrectomized eye
- Determine a treatment plan that is appropriate for the type of cataract/ lens condition and the patient needs
- Appropriately treat complicated cataract
- Deliver on such a plan/surgery with a high level of competency – using procedures that are most appropriate for the condition and patient needs
- Demonstrate a detailed understanding of design and choice of IOLs. Including the history and evolution of IOL design, and knowledge of the principles applied to current IOL designs

Clinical Skills

- Examination and diagnostics
- Appropriate choice of surgical procedure/precautions
- Proficiency in management of cataract surgery complications
- Recognise and manage intraoperative and postoperative complications
- Recognize malpositioned/unstable IOLs

Technical skills

- Competently carry out SICS and ECCE, with or without intraocular lens implantations
- Surgery in complicated cataracts/special situations
- Proficiency in phacoemulsification where available. All Fellowship residents are to have at least an introduction to phaco
- Ability to implant various types of IOLs
- Demonstrate skills to do cataract surgeries with capsular rings
- Explant/replace IOLs
- Demonstrate competency in pseudophakic and aphakic refraction/optical correction
- The use of immersion and contact methods of A-scan, practical experience with manual as well as automated keratometers, and the use of various formulae to calculate the appropriate IOL power
- Advanced biometry skills. The use of immersion and contact methods of A-scan, practical experience with manual as well as automated keratometers. Detailed knowledge of A-scan spikes and interpretation of A-scan and Keratometry readings
    - Recognition of errors
    - Knowledge of IOL calculation formulae and how to choose
    - Biometry in special situations
- Nd-YAG laser capsulotomy

Module 3: Anterior segment

Duration: 2 months

ANTERIOR SEGMENT

Knowledge

- Understand fundamentals of corneal topography/tomography, endothelial cell function and maintenance of corneal clarity
- Diagnosis and medical management of the diseases of the eyelid, conjunctiva, cornea, sclera and anterior segment
- Diagnosis and management of tear film abnormalities
- Recognize and manage acute and chronic blepharitis
- Meibomian glands dysfunction/Ocular surface diseases
- Recognize acute and chronic microbial as well as allergic and toxic conjunctivitis (associated with cutaneous and systemic diseases)
- Recognize acute and chronic infectious keratitis including fungal keratitis.
- Know about principles of contact lens fitting and management
- Recognise and manage contact lens associated problems
- Recognize non-infectious keratitis
- Recognize anterior segment anomalies including specific genetic abnormalities, cornea dystrophies, ectasia and degenerations
- Recognize and manage autoimmune and immunological diseases of anterior segment – vernal conjunctivitis, allergy, marginal ulcers, cornea graft rejection
- Manage ocular and periocular burns and chemical injuries
- Basic knowledge of refractive surgery (Cornea, Intracameral contact lens/phakic IOLS)
- Knowledge of cornea cross linking and intra-corneal rings

Clinical Skills

- Use of slit lamp techniques for diagnostics
- Medical and surgical management of corneal thinning and perforation – pharmacological, application of tissue glue and therapeutic contact lens
- Recognize conditions amenable to various complex corneal procedures and refer appropriately
- Recognize signs of conjunctiva and cornea graft rejection and failure, and their management
- Demonstrate proficiency in corneal repairs, and management of multiple anterior segment trauma.

Technical skills

- Keratometry/corneal topography
- Laser iridotomy and iridoplasty/pupilloplasty
- Demonstrate proficiency in pterygium excision with graft & conjunctival flaps and biopsies
- Tarsorrhaphy
- Punctal occlusion

Module 4: Glaucoma

Duration 3 months

Teaching and Learning Methods

At the end of the rotation, it is expected that the trainee should be able to function independently; take responsibility for the management of glaucoma cases at the tertiary level and filter patients appropriately for Glaucomatologist.

Knowledge

- Management of Glaucoma including Normal Tension and Low Tension Glaucoma
- Patients selection criteria for surgery
- Counselling of Patients and their relations
- Identification of intraoperative, early and late postoperative complications

Clinical Skills

- Gonioscopy and Pachymetry and Perimetry (Procedures and interpretations)
- Bleb classification and appropriate management
- Peripheral surgical iridectomy and laser iridotomy
- Posttraumatic angle Recession Glaucoma Management
- Subacute, acute and chronic Angle Closure Glaucoma Management
- Secondary Angle Closure and Malignant Glaucoma Management

Technical Skills

- Laser Trabeculoplasty
- Safe Trabeculectomy
- Combined Procedures
- Nd-YAG & surgical iridotomy

OCULOPLASTICS

Teaching and Learning Methods

At the end of the rotation, it is expected that the trainee should have received additional training in the diagnosis and management of oculo-orbital disorders under the supervision of a Consultant Oculo-Plastic Surgeons/Orbitologist. The trainee will be expected to perform preoperative and postoperative assessment and coordination of care of patients with oculoplastic-related disorders.

Knowledge

- Punctal and canaliculi stenosis diagnosis and management
- Proptosis diagnosis and management
- Ultrasound, Orbital and Skull X-rays, CT Scan, MRI and PET Scan imaging indications and interpretation of Results
- Diagnosis and accurate management of Facial/Orbital Trauma including Burns (Chemical and Thermal)
- Management of lids abnormality (Ptosis, ectropion, entropion including trauma)

Clinical Skills

- Diagnosis and management of Congenital Lacrimal Drainage Obstruction
- Orbital Cellulitis and Inflammation management
- Management of lids abnormality (Ptosis, ectropion, entropion including trauma)
- Appropriate uses of Steroids and antimetabolites, its complications and the roles of Biologics

Technical Skills

- Enucleation, evisceration and exenteration with appropriate implants and rehabilitation
- Indications for temporary and permanent tarsorrhaphy
- Lacrimal Sac Syringing and Probing
- Repair of lids and torn lacrimal canaliculus

- Good understanding of Orbital indication and interpretation of Skull X-rays, Brain/sinuses CT-Scans, PET Scan
- Correlate and revise the Orbital disorders that affects the pupillary functions, vision, orbits, Cavernous sinus and the globe

Module 5: Paediatric ophthalmology

Duration: 3 months

TEACHING AND LEARNING METHODS

At the end of the rotation, it is expected that the trainee should have received additional training in the diagnosis and management of paediatric ophthalmologic disorders under the supervision of a Consultant Paediatric Ophthalmologist. The trainee will be expected to appreciate that paediatric ophthalmic manifestation and managements are not similar to that of a miniaturized adult patient. The tissue handling techniques, healing, surgical anatomy, physiology and biochemical responses are unique in children.

Knowledge

- Ophthalmic evaluation and investigation
- Management of cataract and paediatric glaucoma
- Anterior segments disorders management such as vernal conjunctivitis, anterior uveitis and oculoplastic (Nasolacrimal duct obstruction and ptosis)
- Strabismology in Paediatric and adult patients
- Diagnosis and accurate management of Retinoblastoma and other Oculo-orbital Tumours
- Retinopathy of Prematurity and other retinal diseases diagnosis and management
- Management of lids abnormality (Ptosis, ectropion, entropion including trauma)

Clinical Skills

- Examination of a child
- Assessment of ocular movement
- Assessment of strabismus including use of Prisms to measure angle of deviation
- Assessment of stereopsis and motor fusion
- Assessment of vision in different ages of children
- Competence in Paediatric refraction
- Competence in Indirect Ophthalmoscopy
- Pupillary reaction evaluation and understanding
- Squint surgery
- Counselling of care givers

Technical Skills

- Acquire and develop appropriate excellent communication and teaching skills with Parents/Guardians, medical and non-medical staff
- Promote Community diagnosis and effective referral system for Childhood Eye Diseases
- Diagnose, classify and manage Retinoblastoma
- Ability to conduct a successful examination under anaesthesia (sedation) in cases of congenital glaucoma, squints, retinopathy of Prematurity

Module 6: Medical retina

Duration: 2 months

TEACHING AND LEARNING METHODS

At the end of the rotation, it is expected that the trainee should have received additional training in the diagnosis and management of Retina and Vitreous diseases under the supervision of a Consultant Vitreo-Retinal Ophthalmologist. The trainee must be abreast with recent discoveries, genetics and possible future treatment modalities for vitreoretinal disorders.

Knowledge

- Anatomy, physiology and pathology of vitreoretinal diseases
- Clinical features, presentations, investigations, complications and management of intermediate, posterior and panuveitis
- The role of Presumed toxoplasmosis, tuberculosis, leprosy, sarcoidosis, onchocerciasis and syphilis in uveitis
- Fundamentals of ancillary investigations and demonstrate basic understanding of Fluorescein/Indocyanine Green angiography and optical coherence tomography
- Indications and basic differential diagnosis for the ancillary tests
- Fundamentals of retinal electrophysiology and basic ophthalmic ultrasound
- Competence in the use of indirect Ophthalmoscope

Clinical Skills

- Diagnosis and management of diabetic retinopathy, Central vein occlusion, branch vein occlusion, arterial occlusion and hypertensive retinopathy
- Classification, diagnosis and management of Retinal Detachment
- Diagnosis, classifications and therapeutic options in intermediate, posterior and pan uveitis
- Principles of Laser photocoagulation, photodynamic therapy
- Technique and safety of intravitreal injections
- Diagnose, evaluate and treat postoperative/post traumatic endophthalmitis
- Diagnose and refer sickle cell disease
- Competence in the use YAG Laser capsulotomy

Technical Skills

- Measurement of visual acuity
- Slit lamp biomicroscope with +90 D / + 78D/ wide field fundus lens/ 3 -Mirror Goldman contact lenses
- Competence in indirect Ophthalmoscopy with and without scleral indentation.
- Competence in fundal diagram record using the standard colour codes
- Diagnosis of common retinal disorders (Exudative AMD, Diabetic Retinopathy, Cystoid Macula Oedema, Central Serous Retinopathy) based on results of fundus photography, OCT, Fluorescein angiography
- Interpretation of ocular imaging technique with Ultrasound, OCT
- Scleral Buckle surgery

Module 7: Oculoplastics

Duration: 2 months

Module 8: Elective period

Duration: 2 months

During the training it is expected that each candidate will have a subject of particular interest. In discussion with their tutor they will pursue this subject during the elective period. This needs to be done by individual arrangement with the unit of their choice**.**

Module 9: Dissertation writing, consolidate surgical skills and revision, tidying up and exams

Using the skills gained from module 1 the trainee will discuss a topic for their dissertation with their mentors. It is expected they will work on their dissertation throughout the training using this final period to refine and produce the completed document. Support in this process will be by one to one meetings with a trainer assigned to them for this purpose. The expectations, structure and marking of the dissertation are outlined in the dissertation module.

Duration: 2 months

ASSESSMENT AND FEEDBACK

Participants must demonstrate that they are working towards the attainment of course learning objectives/outcomes, and develop further based on regular guidance and appraisal of their progress. Participants should finally demonstrate that they have achieved course learning outcomes.

Assessment criteria
Clarify how OSATS, DOPS and other forms or types of assessment task are to be used and specify the threshold for pass.

Marking schemes – ensure all those who support participants' learning as well as participants know how their attainment of course learning outcomes will be tested.

Feedback to participants and summative assessment are based on:
Examples of assessment tasks:

- Practice-based assessment
- Mini clinical evaluation exercises
- Case-based testing
- Objective structured assessment of technical skills (OSATS)
- Direct Observation of Procedural Skills (DOPS)
- Case-based discussion
- Accurate record keeping in the Resident's Portfolio Management System.

Proposal and Dissertation assessment can follow the Rubrics as outlined in Dissertation Research Grading Rubric.[2]

Training Centre
The training centre should have WACS accreditation for this subspecialty (see appendix).

ACCREDITATION REQUIREMENTS

1. **FUNDAMENTAL REQUIREMENTS**

a. The centre shall possess full accreditation of the West African College of Surgeons for Membership training in Ophthalmology
b. Or the centre shall meet all the minimum requirements for accreditation for Membership training in Ophthalmology (See guidelines for accreditation for Membership training).

2. PERSONNEL REQUIREMENTS 20%

a. At least 1 Comprehensive Ophthalmologist who has been designated as a subspecialist and trainer in Comprehensive Ophthalmology by the West African College of Surgeons
b. The ratio of trainers to trainees must not be less than 1:2.
c. One or more clinical faculty member(s) who have 5 years post fellowship experience. They should:
    - Possess appropriate training in clinical and teaching skills eg the train the trainers course
    - Demonstrate a strong interest in the education of fellows
    - Possess sound clinical research and/or teaching abilities, support goals and objectives of programs, participate in scholarly, activities and be committed to their own continuing education
    - Have regular scheduled (minimally every quarter) documented meeting in order to review the program‘s goals and objectives as well the program‘s effectiveness in achieving its goals and objectives

3. INFRASTRUCTURE REQUIREMENTS 30%

The institution must possess accreditation for sub-specialty training in at least three sub-specialties one of which must be in Anterior segment and Cornea, Glaucoma or Medical retina. There must be arrangement for residents to undergo rotation in accredited centres for any of the other two specialties among the three compulsory specialties (Anterior segment and Cornea, Glaucoma or Medical retina) the trainee must rotate through.

4. SURGICAL VOLUME (30%)

The minimum numbers of surgical cases that must be performed at the centre annually are listed below:

- Glaucoma Surgeries (trabeculectomy) – minimum of 20
- Lasers and scleral buckle procedures – minimum of 25
- Cataract surgeries- minimum of 100
- Paediatric interventions minimum of 10

5. STRUCTURED CLINICS AND TEACHING (10%)

The centre should have a Program Director for the fellowship training program.
Program Directors must organize regular teaching sessions /demonstrations with the fellow(s)
There should also be at least two clinic days, one theatre day and one clinical round weekly
These regular teaching sessions must include the following:

- Journal clubs
- Departmental seminars
- Grand ward rounds
- Clinical presentation sessions

6. RESEARCH AND PUBLICATION (5%)

Evidence of research activity and publications by the trainer (s)

7. LIBRARY (5%)

The library should have a stock of ophthalmology books and journals either in print or soft copies

References

1. Vision for the Future – Nigeria. Ophthalmological Society of Nigeria (OSN). Ibadan; Aike BOOKS; 2005: 36-48. Available from http://www.icoph.org/pdf/visionforthefuturenigeria.pdf [Cited 4/12/2018]
2. Dissertation Research Gradings Rubric Available from https://www.liberty.edu/media/1118/PhD_CES_Dissertation_Rubric.pdf [Cited on 4/12/2018]

WACS Subspecialty Curriculum: Glaucoma

Background
Glaucoma patients constitute a large proportion of patients seen by the Ophthalmologist in Sub – Saharan Africa. Although the general principles of glaucoma management shall be taught at the membership level, the WACS glaucoma fellowship curriculum has been designed to enable the glaucoma specialist develop clinical and surgical competencies to handle all complex and complicated glaucoma cases including pediatric glaucomas. The overall goal of this curriculum is to support the delivery of excellent eye care to glaucoma patients in Sub-Saharan Africa. The curriculum will cover several aspects of glaucoma care to make the glaucoma specialist adequately prepared to handle all difficult glaucoma cases. The training has been separated into three broad sections (Introductory, glaucoma knowledge and skills acquisition and dissertation writing) divided into 7 modules. Each module directed at teaching specific aspects of glaucoma care.

Duration: 24 months

Prerequisites
Candidates should have successfully completed the membership training of WACS or its equivalent.

Overview
The proposed two-year fellowship program requires a trainee to complete all modules and such a Fellow becomes a GLAUCOMA SPECIALIST.

Module 1: Introduction 3 months
Module 2: Next 6 months: Diagnosis and treatment of open angle glaucoma (medical laser and trabeculectomy)
Module 3: Next 3 months: Diagnosis and treatment of Angle closure disease
Module 4: Next 1 month: Community oriented glaucoma
Module 5: Next 3 months: Glaucoma drainage devices module
Module 6: Next 2 months Paediatric Glaucomas
Module 7: Next 3 months: Community oriented glaucoma
Module 8: Next 3 months: Dissertation writing, consolidate surgical skills and revision, tidying up and exams

Logbook
Logbook assessment criteria

Aim: to supply a clear, accurate record of the participant's clinical practice.
These are the characteristics of a satisfactory case report book.

1. The patient profile is supplied (age, sex, general health, including relevant co-morbidities
2. The steps taken to evaluate and investigate the patient's condition are provided
3. Clear details of the treatment including any modifications made with reasons are included
4. Any complications are detailed and actions taken to mitigate these are described
5. Outcomes are detailed with dates
6. Each case in the report book is signed off by the clinician who supervised the case

The following information should be included in the training record

Patient evaluation	Date	
	Hospital No.	

	Name of Patient	
	Age	
	Sex	
	Pre-op Visual acuity	
	Visual Acuity Method/Chart Used	
	Conjunctiva	
	Cornea	
	Pupil	
	Lens Morphology and presence of other materials on the lens	
	IOP and time of measurement	
	Gonioscopy	
	Dilated fundoscopy with 90D and 78D	
Investigations	Central corneal thickness	
	Central visual field (24-2) and or 10-2	
	OCT	
	Phasing results (if indicated)	
	Fundus pictures	
	CT scan results in NTG (if indicated)	
Treatment	Anti-glaucoma Medications	
	Surgical procedure	
	Performed /Performed under Supervision/ Assisted	
	Complication-Intra-op	
	Complication-immediate post-op (up to 1 week postop)	
	Complications in the intermediate postop (Between 1-12 weeks	
	Complications in the long term (After 3 months post op)	
	Optical Rehabilitation	
	Management of intraop complications	
	Management of post op complications	

Outcome	VA Day 1	
	VA ≥6weeks	
	Final outcome (As at when?)	
	Final IOP at 3months, 6 months, 12 months and 24 months	
	Any need for adjunctive aniglaucoma medications. Mention the names of the antiglaucoma medications	
	Was any cataract surgery done and date if done	
	Any other complications	
	Any Bleb revisions	
Key Learning points	Key Learning points	
	Other COMMENTS	
Comments and signature of trainer		

Module 1: Introduction

Duration: 3 months

- Research and dissertation module – 2 months
- Introductory to Glaucoma subspecialty training (1 month): Orientation into subspecialty module: Epidemiology, Basic aspects of glaucoma, clinical forms, and management of the glaucomas using on-line lectures in glaucoma and introduction to basic examination skills

OVERALL OBJECTIVES

To enable trainees understand the basics of research, and undertake online introduction courses on glaucoma and examination of the glaucoma patient.

LEARNING OUTCOMES

Knowledge

Trainees are expected to be able to:

1. **Epidemiology**
    - Outline the prevalence of glaucoma (open angle and angle closure)
    - Describe the epidemiology of (open angle and angle closure) glaucoma
    - Enumerate the major risk factors for (open angle and angle closure) glaucoma
    - Outline the findings of key landmark studies on glaucoma

2. **Anatomy and physiology of the anterior segment with emphasis on the anterior chamber**
    - Describe the Cellular and molecular biology of aqueous humor dynamics
    - Describe the detailed anatomy of the anterior chamber

3. **The Optic Disc**

- Describe and recognise the key changes that indicate glaucomatous pathology in the optic disc
- Differentiate between glaucomatous optic disc pathology and normal discs/other pathology
- Describe the laminar cribrosa and trans-laminar pressure

4. **Clinical Trials**
   - Outline the key clinical studies in open angle glaucoma diagnosis and therapy
   - Outline the key clinical studies in ACD diagnosis and therapy
   - Explain the practical implications of these studies in clinical management of glaucoma

5. **Visual Fields**
   - Determine the appropriate visual field test strategy to use in glaucoma
   - Interpret the reliability of visual field results and evaluate the findings presented
   - Enumerate and recognise the abnormalities in visual field testing associated with glaucomatous disease.
   - Determine visual field changes associated with progression of glaucomatous disease
   - Match visual field findings with optic disc findings

6. **Gonioscopy**
   - Explain the principles and techniques of gonioscopy
   - Describe the clinical features and pathological changes that may occur in the various subtypes of glaucoma
   - Assess the anterior chamber width, depth and iris configuration and insertion.
   - Demonstrate knowledge of grading the anterior using various grading systems.

7. **Tonometry**
   - Outline the principles of tonometry
   - Identify the key variables in tonometry
   - Describe the normal changes in intraocular pressure and factors affecting intraocular pressure.

Clinical Skills
Trainees must be able to perform tonometry, gonioscopy and visual field assessment

Assessment
Trainees show that they are working towards the attainment of course learning outcomes in the online course through discussions, MCQs, DOPS and quizzes.

Module 2: Diagnosis and Treatment of Open Angle Glaucoma (Medical Laser and Trabeculectomy)

Duration: 6 months

OVERALL OBJECTIVES

To enable trainees diagnose and assess open angle glaucoma, and surgically treat open angle glaucoma achieving the best possible outcomes for patients.

The objectives of this module is to enable trainees to:
- Diagnose and assess the glaucoma patient
- Evaluate the options for medical, laser and surgical treatment of open angle glaucoma
- Prepare, perform and follow up trabeculectomy,
- Prevent and manage surgical complications

- Prepare and perform laser therapy for open angle glaucoma
- Identify indications for trabeculectomy and decide when trabeculectomy is appropriate
- Identify contraindications for trabeculectomy
- Take account of risk factors for failure and complications such as:
    - ocular surface management
    - co-existing pathology e.g. uveitis
    - Previous surgery
    - Systemic disease
- Safe use of antimetabolites
- Counsel patients and take consent for trabeculectomy

LEARNING OUTCOMES

Knowledge

Trainees are expected to:

1. Describe primary and secondary open angle glaucoma

Medical therapy

2. Describe the indications for the use of drugs in glaucoma therapy and their side effects
3. Detail the mode of action of drugs in glaucoma therapy
4. Follow the principles of prescribing and take account of compliance
5. Evaluate the relative merits of differing therapeutic strategies

Trabeculectomy

6. Detail the indications, pre-operative assessment, and preparation required for trabeculectomy surgery
7. Describe the surgical principles of trabeculectomy surgery

Lasers

- Demonstrate the knowledge of the principles of laser safety
- Demonstrate the knowledge of the principles of lasers in the management of open angle glaucoma
- Explain the indications, risks and benefits of laser therapies for glaucoma

Clinical Skills

- Trainees must be able to diagnose primary and secondary open angle glaucoma
- Trainees must be able to perform and interpret visual fields and other glaucoma related investigations such as pachymetry, ultrasound biomicroscopy (UBM), fundus photos, red free photos, optical coherence tomography (OCT)
- Evaluate the options for medical, laser and surgical treatment of open angle glaucoma
- Describe the principles involved in the choice of medicines for the glaucoma patient (mono/fixed combinations/multiple therapy)

Surgical Skills

Trabeculectomy

1. Trainees must be proficient at performing trabeculectomy:
    a. Local anaesthesia (subtenons anaesthesia)
    b. Conjunctival peritomy and dissection
    c. Application of antimetabolite
    d. Scleral flap formation
    e. Pre-placement of releasable sutures into scleral flap
    f. Sclerostomy
    g. Iridectomy
    h. Assessment of aqueous flow through scleral flap
    i. Watertight conjunctival closure

j. Use of anterior chamber maintainer when required

I. Know when and how to remove releasable sutures post trabeculectomy
II. Diagnose and manage all types of post-operative complications of trabeculectomy surgery (See appendix 1)

Bleb management

I. Grade and classify blebs using the different grading systems
II. Manage the bleb and recognize the failing bleb

Laser

I. Trainees should be proficient in the use of lasers for the management of glaucoma: laser trabeculoplasty, suturelysis and diode cyclophotocoagulation
II. Recognise and manage complications arising from laser management

Technical Skills

Examine the eye using the slit-lamp biomicroscopy with 90D, 78D, 60D lenses

TEACHING AND LEARNING

How trainees develop the knowledge and skills to enable them to achieve subspecialist learning outcomes.

Knowledge

Learning and acquisition of knowledge will be mainly self- driven. Online learning involving self-study, writing comments in the virtual learning environment, watching videos and animations and checking own learning through online quizzes. Trainees to prepare lectures on these topics and present to trainers and other trainees. Trainees will draw on the evidence base (major clinical trials) to inform management of ocular hypertension, primary open angle glaucoma and primary angle closure glaucoma. Lectures, videos and reading journals and articles applying the evidence base to cases. Trainees will practise the use of imaging technologies as they observe how patients are managed every day.

Assessment methods of knowledge

Trainees to prepare seminars on these topics and present to trainers and other trainees
On line assessment prior to course (pre-test) and after the course (post- test)

Achieving the Clinical skills

Learning through active observation and emulation, practise, and repeat the 'observe/emulate/practise' cycle until the participant has developed the clinical skill well enough to meet course learning outcomes. Most of the skills will be learnt by direct observation in clinic and practise

Assessment methods

Work based assessments using patients attending/ being screened for surgery
Logbooks and clinical case reports
OSCE

Teaching and learning activities

Practise the procedures in the wet lab under supervision. Observe, discuss, outline and practise the procedures with guidance in the operating theatre. Lectures, reading and videos for basic knowledge (online course). Observe and practise assessing patients in clinic in the post op period

Achieving the surgical skills set

- Lectures, reading and videos
- Wet lab practice/simulator

- Work with examples (cases) to practise identifying indications/contraindications for trabeculectomy and explaining why trabeculectomy is appropriate
- Practise using antimetabolites under supervision
- Practise identifying and explaining risk factors for failure and complications to patients undergoing trabeculectomy
- Watch and discuss videos of patient counselling and consent for trabeculectomy; identify critical stages of counselling
- Learning activities can be face to face and/or written, online, working in small groups and drawing on video material
- Observe and practise each skill repeatedly until these surgical skills learning outcomes are met.

Assessment methods for surgical skills acquisition

1. Pre course preparation of case studies: Presented and discussed
2. Extended matching questions (EMQs) - assessment of patient case study
3. Observation of role play / reviewing videos of trainees counselling patients and taking consent
4. Work–based assessments (taking consent for surgery and performing trabeculectomy stepped surgery)
5. Objective Structured Assessment of Technical Skills (OSATS) (Antimetabolite use)
6. OSATS for trabeculectomy

Module 3: Diagnosis and Management of Angle Closure Disease

OVERALL OBJECTIVES

To enable trainees diagnose manage and surgically treat angle closure disease achieving the best possible outcomes for patients.

The objectives of this module are to enable trainees

- Assess and diagnose angle closure disease
- Evaluate the options for surgical treatment of angle closure disease
- Prepare, carry out and follow up angle closure disease preventing and managing surgical complications

LEARNING OUTCOMES

Knowledge

1. Describe the mechanisms of primary angle closure disease
2. Explain acute angle closure glaucoma
3. Outline the management algorithms for acute angle closure and primary angle closure glaucoma
4. Explain the indications for laser iridotomy (including Argon pre-treatment/yag iridotomy)
5. Explain the indication for surgical iridectomy

Clinical Skills

1. Take a proper history in patients with angle closure disease including acute angle closure
2. Plan the preoperative and post-operative management of the patients with ACG

Surgical Skills

1. Determine the appropriate surgical/laser option for the patient
2. Describe the specific apsects to be aware of when undertaking trabeculectomy surgeon on eyes with short axial lengths and/or angle closure noting the following safe techniques:

I. Use of releasable/tight sutures intraoperatively to ensure the anterior chamber is well formed post operatively
II. Gradual release of sutures in the early post-operative period

3. Trainees should be proficient in the use of lasers for the management of angle closure disease: laser iridotomy, iridoplasty, transcleral cyclophotocoagulation (CPC)

Technical Skills

1. Examine the eye using the slit-lamp biomiicroscopy
2. Perform gonioscopy to grade angle closure disease

Course topics and intended learning outcomes

At the end of this module participants are expected to be able to do the following

1. Medical treatment of Acute ACG
    a. Describe in detail the role of medical management in Acute ACG
    b. Describe the role of systemic and topical hyperosmotic agents
    c. Describe the role of topical antiglaucoma agents
2. Lasers in angle closure disease (ACD)
    a. Explain the indications, risks and benefits of laser iridotomies in the management of ACD
    b. Explain the role of prophylactic iridotomies
3. Surgical management of ACD
    a. Explain the indications for combined surgeries trabs/SICS, and or phacotrabs and or SICS/phaco and or clear lens extraction
    b. Explain the role of trabeculectomy in ACD
    c. Explain the role of surgical iridectomy
    d. Explain the principals behind endolaser therapy for glaucoma

Knowledge

Learning and acquisition of knowledge will be mainly self- driven. Online learning involving self-study, writing comments in the virtual learning environment, watching videos and animations and checking own learning through online quizzes. Trainees to prepare lectures on these topics and present to trainers and other trainees. Trainees will draw on the evidence base (major clinical trials) to inform management of ocular hypertension, primary open angle glaucoma and primary angle closure glaucoma. Lectures, videos and reading journals and articles applying the evidence base to cases. Trainees will practise the use of imaging technologies as they observe how patients are managed every day.

Assessment methods

Trainees to prepare seminars on these topics and present to trainers and other trainees
Online assessment prior to course (pre-test) and after the course (post- test)

Diagnostic and Clinical Skills

- Take histories
- Assess risk factors for primary angle closure disease
- Perform Goldmann applanation tonometry
- Perform a gonioscopy examination and identify the corneal wedge, iris configuration
- Perform an optic disc examination at the slit-lamp
- Interpret data from visual field tests, interpret UBM and anterior segment optical coherence tomography (ASOCT)
- Make appropriate diagnosis of angle closure disease

Acquisition of Clinical skills

Learning through active observation and emulation, practise, and repeat the ‘observe/emulate/practise’ cycle until the trainee has developed the clinical skill well enough to meet course learning outcomes

Assessment Methods
Work based assessments using patients being screened for surgery and patients who have had surgeries.
OSCE.

Surgical Skills
Trainees must be able to perform:

- Trabeculectomy for ACG taking particular note of techniques to ensure a formed anterior chamber
- SICS/Trabeculectomy and or phacotrabeculectomy and or SICS/phacoemulsification and or clear lens extraction
- Perform 2 stage procedures
- Surgical iridectomy
- Laser iridotomy

Describe and outline management options for intraoperative complications during combined surgeries or staged procedures

- Complications from the trabeculectomy
- Complications from cataract surgery
- Indications for complex bleb revisions including excision of cystic bleb, tenons or scleral patch graft, use of antimetabolites, conjunctival advancement and closure
- Use of antimetabolites in bleb management
- Post-operative management after bleb revisions
- Complications of bleb revisions
- Indications for repeat surgery

Teaching and learning activities
Practise the procedures in the wet lab under supervision. Observe, discuss outline and practise the procedures with guidance in the operating theatre.

Assessment methods:

1. EMQs using case examples and management of angle closure glaucoma cases online
2. Video recordings of trainees removing releasable sutures, massaging blebs/subconjunctival injections, bleb revision, and performing laser procedures or surgical iridectomies
3. Work based assessments
4. Stepped surgical procedures and formative assessments by trainee.

Module 4: Use of Glaucoma Drainage Devices

OVERALL OBJECTIVES

To enable trainees have the knowledge of the indications for the use of glaucoma drainage devices, and surgically treat glaucoma using glaucoma drainage devices achieving the best possible outcomes for patients.

Specific aim of this module is to enable participants to

- Enumerate the indications for glaucoma drainage device
- Diagnose complicated glaucomas which require drainage devices
- Be surgically proficient in the use of the drainage devices
- Identify and manage complications of tube surgeries

LEARNING OUTCOMES

Knowledge

Trainees are expected to achieve the following:

a. Describe the mechanics of different glaucoma drainage devices
   - Valved glaucoma drainage device (e.g. Ahmed)
   - Non valved devices (e.g. Baerveldt glaucoma drainage device)
   - Minimally invasive glaucoma drainage devices (MIGS)
b. Describe the principals and pros and cons of tube surgery for:
   - Inflammatory glaucomas (uveitis, NVG)
   - Failed trabeculectomies
   - Pseudophakic glaucomas
   - Other secondary glaucomas e.g. glaucoma post PKP
   - As primary procedures in glaucoma
c. Intraocular surgery preparation
   - Consider preoperative factors that should be assessed prior to glaucoma drainage device surgery
   - Enumerate the principles of glaucoma drainage device surgery
   - Detail the anaesthetic options
d. Tube surgery
   - Describe the surgical procedure
   - Diagnose and manage the common postoperative complications of tube surgeries

Clinical skills: Pre-operative assessment of patients for the glaucoma drainage device (**GDD)**

- Clinical history and examination
- Appropriate examination

Post-operative assessment of patients for glaucoma drainage devices

- Early management and post-op treatment regime
- Identification of early complications
- Assessing tube function and flow
- Management of high and low IOP post-surgery
- When and how to increase flow

Surgical skills

Wetlab and operating theatre.

- Describe and demonstrate the principals behind local and general anaesthesia for glaucoma surgery
- Step by step surgery for valved and non-valved tube insertion:
  - Operation site exposure and identifying muscles and placing the plate
  - Insertion of tube into AC
  - Flow assessment and restriction
  - Covering the tube – tunnel or patch
- Antimetabolite use

Trainees will gain skills in the management of the following by learning through observations videos and hands on training

Intraoperative complications:

- Difficulty placing plate
- Over-drainage at time of surgery
- Where to place the tube in difficult cases

Early post op complications:

- Hypotony +/- shallow AC
- High IOP

- Suprachoroidal hemorrhage
- Scleritis/Inflammation

Late post op complications:
- Tube/plate exposure
- Endophthalmitis
- Corneal decompensation
- Tube failure
- Cataract
- Diplopia

Acquisition of knowledge
Presentations of seminars based on the knowledge acquired through reading. Standard texts and review articles to understand current management of these diseases. Online learning involving self-study, writing comments in the virtual learning environment, watching videos and animations and checking own learning through online quizzes. Trainees to prepare lectures on these topics and present to trainers and other trainees. Trainees will draw on the evidence base (major clinical trials) to inform management of glaucoma with glaucoma drainage devices. Lectures, videos and reading journals and articles applying the evidence base to cases. There will also be case based discussions.

Clinical skills
Clinic case-based discussions, lectures. Learning through active observation and emulation, practise, and repeat the observe/emulate/practise cycle until the participant has developed the clinical skill well enough to meet course learning outcomes which is understanding the use of tubes and glaucoma drainage devices.

Assessment methods
1. EMQs using case examples and drainage device images in the eye
2. Video recordings of trainees inserting a glaucoma drainage device
3. Work based assessments
4. OSCE

ASSESSMENT AND FEEDBACK

Trainees show that they are working towards the attainment of course learning outcomes, and develop further based on regular guidance and appraisal of their progress. Participants finally demonstrate that they have achieved course learning outcomes.

Assessment
Summative assessment shall be based on:
- Practice-based assessment
- Mini clinical evaluation exercises
- Case-based testing
- Objective structured assessment of technical skills (OSATS)
- Direct Observation of Procedural Skills (DOPS)
- Case-based discussion
- OSCE

Module 5: Paediatric Glaucoma/Complex Cases of Glaucoma

OVERALL OBJECTIVES

To enable trainees understand the management of paediatric glaucomas and complex glaucoma cases achieving the best possible outcomes for patients.

Specific aim of this module is to enable participants to

- Understand and be able to manage all forms of paediatric glaucomas
- Understand and be able to manage complex cases of glaucoma

LEARNING OUTCOMES

1. Describe the particular challenges and points of surgical attention for undertaking combined trabeculectomy/trabeculotomies in infants and children
2. Describe the indications and method of undertaking goniotomies in paediatric glaucomas with clear corneas
3. Describe the particular challenges and points of surgical attention for undertaking tubes surgeries and managing complications in paediatric glaucomas
4. Describe the particular challenges and points of surgical attention for undertaking Cyclodiode laser therapy in paediatric glaucomas
5. Outline the principals in managing complex glaucomas (cataract and glaucoma, pseudophakic glaucomas, secondary glaucomas and developmental glaucomas

Acquisition of knowledge

Presentations of seminars based on the knowledge acquired through reading. Standard texts and review articles to understand current management of these diseases. Online learning involving self-study, writing comments in the virtual learning environment, watching videos and animations and checking own learning through online quizzes. Trainees to prepare lectures on these topics and present to trainers and other trainees. Trainees will draw on the evidence base (major clinical trials) to inform management of paediatric glaucomas and complex glaucoma surgeries. Lectures, videos and reading journals and articles applying the evidence base to cases. There will also be case based discussions. Practical discussion on community eye outreach and family screening

Clinical skills

Clinic case-based discussions, lectures. Learning through active observation and emulation, practise, and repeat the observe/emulate/practise cycle until the participant has developed the clinical skill well enough to meet course learning outcomes which is understanding the management of paediatric glaucomas and complex glaucoma cases

Assessment methods

1. EMQs using case examples and drainage device images in the eye
2. Video recordings of trainees inserting a glaucoma drainage device
3. Work based assessments
4. OSCE

ASSESSMENT AND FEEDBACK

Participants show that they are working towards the attainment of course learning outcomes, and develop further based on regular guidance and appraisal of their progress. Participants finally demonstrate that they have achieved course learning outcomes.

Final Assessment

Summative assessment shall be based on:

- Practice-based assessment
- Clinical evaluation exercises
- Case-based testing
- Objective structured assessment of technical skills (OSATS)
- Direct Observation of Procedural Skills (DOPS)

- Case-based discussion
- OSCE

Module 6: Community Oriented Glaucoma

OVERALL OBJECTIVES

To enable trainees have the knowledge necessary for screening and referral of glaucoma patients at the community level achieving the best possible outcomes and to further enable trainees create awareness about glaucoma in the community.

The objectives of this module is to enable trainees to

- Describe the appropriate screening techniques in the local setting (inclusive of what is standard even if not available)
- Assess of local eye care needs and resources
- Advocate for glaucoma care and awareness
- Acquire knowledge for family and opportunistic screening

LEARNING OUTCOMES

1. Trainees must be able to sensitize other health care workers including general ophthalmologists on the diagnosis of glaucoma, and the reasons why management of these patients is often urgent and should be decisive
2. Interact with other care providers such as public health nurses, family of glaucoma patients, social workers, drug companies to ensure that patients get the maximum benefit from a well-coordinated team approach to patient management. Ensure training for health and health related workers
3. Understand the health systems as they affect glaucoma patients. Be able to advise and give necessary support to the Glaucoma Patient Association.

Acquisition of knowledge
Presentations of seminars based on the knowledge acquired through reading. Standard texts, review articles, online learning involving self-study, writing comments in the virtual learning environment, watching videos and animations and checking own learning through online quizzes. Trainees to prepare lectures on these topics and present to trainers and other trainees. Practical discussion on community eye outreach and family screening

ASSESSMENT AND FEEDBACK

Participants show that they are working towards the attainment of course learning outcomes, and develop further based on regular guidance and appraisal of their progress. Participants finally demonstrate that they have achieved course learning outcomes.

Final Assessment
Summative assessment shall be based on:

- Practice-based assessment
- Logbook entry assessment

Module 6: Data Analysis, Write-up, Submission for the Exams, Revision for Exams

Duration: 3 months

Using the skills gained from module 1 the trainee will discuss a topic for their dissertation with their mentors. It is expected they will work on their dissertation throughout the training using this final period to refine and produce the completed document. Support in this process will be by one to one meetings with a trainer assigned to them for this purpose. The expectations, structure and marking of the dissertation are outlined in the dissertation module.

ACCREDITATION REQUIREMENTS

MINIMUM REQUIREMENTS FOR ACCREDITATION FOR THE SUBSPECIALTY FELLOWSHIP TRAINING IN GLAUCOMA PROGRAMME

FUNDAMENTAL REQUIREMENTS

- The centre must possess full accreditation of the West African College of Surgeons for Membership training in Ophthalmology
- The centre shall meet all the minimum requirements for accreditation for Membership training in Ophthalmology as outlined in the guidelines for accreditation (see Section A).

1. PERSONNEL REQUIREMENTS (20%)

- At least 1 glaucoma specialist who has been designated as a subspecialist and trainer in Glaucoma by the West African College of Surgeon
- The ratio of trainers to trainees must not be more than 1:2
- The institution must be willing and able to allow the trainees to attend courses, conferences both local and international conferences.

2. INFRASTRUCTURE REQUIREMENTS (25%)

The following minimum requirements must be met before a centre may be accredited for glaucoma subspecialty training:

1. Slit lamps fitted with Goldmann's tonometer
2. Indirect ophthalmoscopes with teaching mirror
3. Direct ophthalmoscopes
4. Lenses for indirect fundoscopy. At least 2 of any two of the following: 78D, 60D,90D
5. Goniolenses preferably 4 mirror (Zeis design) or Goldmann's design
6. Functional operating theatre
7. Four cataract/glaucoma sets
8. An anterior vitrector
9. Automated visual field analyser
10. Others:
    - Fundus camera
    - OCT
    - Laser
    - Hand held tonometers, e.g. Perkins, Tonopen
    - Low vision services
    - Pachymeter
    - Biometry facilities (A-scan and keratometer)
    - Facilities for X-rays, ocular, ultrasonography, CT scan

3. Outreach and or glaucoma family screening clinic (5%)

Centre should be going for outreaches regularly

4. SURGICAL VOLUME (30%)

The minimum numbers of surgical cases that must be performed at the centre annually are listed below:

1. Glaucoma Surgeries (trabeculectomy) – minimum of 100
2. Laser procedures – minimum of 50
3. Cataract surgeries- minimum of 100

4. Cataract post trabeculectomy- minimum of 20
5. Paediatric glaucoma interventions minimum of 10

5. STRUCTURED CLINICS AND TEACHING (10%)

- The centre should have a Program Director for the fellowship training program
- Program Directors must organize regular teaching sessions /demonstrations with the fellow(s)
- There should also be two clinic days, one theatre day and one clinical round weekly
- These regular teaching sessions must include the following:
  - Journal clubs
  - Departmental seminars
  - Grand ward rounds
  - Clinical presentation sessions

7. RESEARCH AND PUBLICATION (5%)

Evidence of glaucoma related research activity and publications by the trainer(s).

8. LIBRARY (5%)

The library should have a stock of glaucoma related works and journals either in print or electronic form.

Appendix 1

Identify and manage intraoperative complications:

- Tearing/Buttonholing of conjunctiva
- Premature anterior chamber entry
- Scleral flap complications
- Suprachoroidal haemorrhage
- Identify and manage early post-operative complications:
- Conjunctival leak
- Shallow anterior chamber and early hypotony
- Early bleb/ scleral flap failure
- Aqueous misdirection
- Identify and manage late post-operative complications
- Cystic blebs and late bleb leak
- Cataract
- Late hypotony
- Overextending bleb
- Bleb/ trabeculectomy failure
- Bleb related infection
- Indications for complex bleb revisions including excision of cystic bleb, tenons or scleral patch graft, use of antimetabolites, conjunctival advancement and closure
- Use of antimetabolites in bleb revisions
- Post-operative management after bleb revisions
- Complications of bleb revisions
- Indications for repeat surgery
- Bleb related endophthalmitis late and early

Identify and manage the failing bleb/failed bleb

- Give subconjunctival antimetabolites
- Perform transconjunctival needling

WACS Medical Retina Subspecialist Curriculum

Background

Summary of Medical Retina Curriculum

The WACS medical retina (MR) curriculum arose form collaboration during consensus meetings that took place from 2009 to 2016.

The MR curriculum will follow an educational pathway that will enable MR sub-specialist to develop clinical competencies that will support the delivery of eye care to patients suffering from the commonest MR conditions. MR is a vast sub-specialty and as such, the curriculum will concentrate on four main topics covering MR conditions of highest volume and will also include a module in management:

1. Research and dissertation module and introduction to MR
2. Diabetic Retinopathy
3. Sickle Cell Retinopathy
4. Age related Macular Degeneration
5. Cataract surgery in patients with MR disease
6. Setting up and running a medical retina service
7. Dissertation writing, consolidate surgical skills and revision, tidying up and exams

It is expected that the aforementioned topics are transferable in the sense that they will form the basis for the management of other MR conditions.
In addition to these topics, the trainee for the Fellowship in medical retina will be expected to acquire skills in scleral buckling which have been captured under the vitreo-retina fellowship curriculum.

Duration: 24 months

Prerequisites
To possess the Membership of the West African College of surgeons (MWACS) or its equivalent

Medical Retina Fellowship Time Plan
First 3 months

- Research and dissertation module - 2 months
- Orientation into subspecialty module - 1 month
    - Online DR Course - 2 weeks
    - Hands-on DR Course - 2 weeks

Next 18 months

- Subspecialty based practice and extension from MR online course
- Data collection for dissertation
- Data analysis, write-up and submission for the exams

Next 3 Months

- Revision, tidying up and exams

Logbook
It is expected that at least 5 meaningful entries are summarized and documented in the logbook book for every module, representing the trainees' experience in patient evaluation, investigation, treatment and outcome. The case report should include a review of relevant literature and a list of differential diagnoses. Each trainee is expected to document not more than 2 examples of the same condition.

These are the characteristics of a satisfactory logbook entry.

1. The patient profile is supplied (age, sex, general health, including relevant co-morbidities).
2. The steps taken to evaluate and investigate the patient's condition are provided.
3. Clear details of the treatment including any modifications made with reasons are included.
4. Any complications are detailed and actions taken to mitigate these are described.
5. Outcomes are detailed with dates
6. Each logbook case is signed off by the clinician who supervised the case

ASSESSMENT AND FEEDBACK

Clinical pictures, video recording and logbook of procedures to be submitted and graded in summative evaluation.

Module 1: Research and dissertation module and introduction to MR

Research and dissertation module - 2 months

Orientation into subspecialty module - 1 month

This will involve the trainee undertaking the online diabetic retinopathy course followed by hands-on training in skills for basic management of diabetic retinopathy, the skills for which are generic to medical retina.

Module 2: Diabetic Retinopathy Management Course

Diabetic retinopathy (DR) represents 50-75% of MR disease in West Africa. The majority of patients with diabetes present late to eye clinics with advanced retinopathy. Although sub-specialist training in MR will begin with the management of DR, this will form the basis for management of other retinovascular conditions such as retinal vein occlusions and retinal artery occlusions.

Clinical Skill Set to Acquire

In summary, the DR training programme will produce an MR ophthalmologist that will have skills in:

- Diabetic retinopathy diagnosis and management
- Diabetic retinopathy treatment

Aims

The primary aims of the DR management course are to produce an MR ophthalmologist that is able to:

- Manage DR using a multidisciplinary approach with optimal control of risk factors
- Support and encourage other doctors to screen for and diagnose DR
- Assign a grade to determine the severity of DR and the need for appropriate follow-up and treatment
- Use and interpret ancillary tests such as fundus fluorescein angiography (FFA) and optical coherence tomography (OCT)
- Achieve competency in the laser treatment of clinically significant macular oedema (CSMO), proliferative diabetic retinopathy (PDR) and very severe preproliferative diabetic retinopathy
- Achieve competency in the pharmacotherapy of DR, including intravitreal anti-VEGF agents and steroid

- Manage other ocular co-morbidities (including cataract) in a patient with diabetic retinopathy
- Perform intravitreal injections and take vitreous biopsies
- Manage the potential complications that may occur following intravitreal injections
- Manage the potential post-operative complications that may occur following cataract and vitrectomy surgery
- Communicate and educate the patient on the nature of the disease and prognosis
- Obtain consent for any procedure (e.g. retinal laser, intravitreal injections, etc)

Learning Objectives and Course Content

Knowledge

On completion of the course The MR sub-specialist would be expected to be able to:

- Describe the pathophysiology of diabetic retinopathy
- Identify the most important risk factors for progression of retinopathy: glycaemic, blood pressure and serum lipid control.
- Outline the findings of the randomised control trials (RCTs. i.e. Diabetes Control and Complication Trial-DCCT and United Kingdom Prospective Diabetes Study - UKPDS,) and large cohort studies (Wisconsin Epidemiological Study in Diabetic Retinopathy – WESDR) that have evaluated the role of risk factors on the progression of diabetic retinopathy.
- Classify diabetic retinopathy using Evidence Based Medicine (EBM) from RCTs, i.e. modified Early Treatment of Diabetic Retinopathy Study (ETDRS) grading of diabetic retinopathy into none, mild non-proliferative diabetic retinopathy (NPDR), moderate NPDR, severe NPDR and PDR.
- Define CSMO using the ETDRS definition.
- Determine the appropriate interval for follow-up of patients with diabetes depending upon the severity of the retinopathy.
- Use FFA in cases of diffuse diabetic maculopathy as an aid to guide subsequent appropriate treatment.
- Use FFA in cases of suspected retinal ischaemia and neovascularisation.
- Identify the side effects and evaluate the risks of FFA.
- Take account of the indications for laser in the treatment of diabetic macular oedema (DMO) and PDR from findings of RCTs (i.e. Diabetic Retinopathy Study (DRS) and ETDRS).
- Take account of the indications for intravitreal anti-VEGF agents in the treatment of DMO and PDR from findings of RCTs (i.e. DRCRnet Protocol I & CLARITY trials).
- Take account of the indications for intravitreal steroid in the treatment of DMO from findings of RCTs.
- Judge the appropriate timing and follow-up after laser and intravitreal anti-VEGF treatment.
- Detail the potential complications and side effects of retinal argon laser treatment, intravitreal anti-VEGF and steroid.
- Evaluate the indications for referral for vitrectomy in the management of diabetic retinopathy in cases of a dense non-clearing vitreous haemorrhage, tractional retinal detachment involving the macula, DMO related to vitreo-macular traction (VMT) and combined tractional retinal detachment and rhegmatogenous retinal detachment.
- Describe the complications which may arise following cataract and vitrectomy surgery.
- Explain the benefits and risks of procedures (FFA) and treatment (laser, intravitreal anti-VEGF, cataract surgery and vitrectomy surgery) and obtain informed consent.

Skills

The MR sub-specialist would be expected to have the following skills on completion of the course:

- Assess for diabetic retinopathy using clinical skills such as measurement of visual acuity (LogMAR) with dilated fundoscopy using slit lamp biomicroscopy and an appropriate lens (90D or 78D)
- Assess for diabetic retinopathy using fundus photography
- Interpret FFA findings with respect to management of diabetic maculopathy, retinal ischaemia and PDR
- Interpret OCT findings in the quantitative and qualitative assessment of diabetic macular oedema
- Interpret ultrasonography
- Apply focal, grid and modified grid laser in the treatment of focal and diffuse diabetic macular oedema respectively
- Administer intravitreal anti-VEGF and steroid agents using aseptic techniques
- Apply pan-retinal photocoagulation laser in the treatment of proliferative diabetic retinopathy
- Apply laser in the management of significant retinal ischaemia
- Manage the complications that may arise following cataract and vitrectomy surgery.

Attitude – Management and Educational Skills

The MR ophthalmologist must understand that they are part of a team that cares for a patient with diabetes. There has to be an adoption of attitude that prompts them to liaise with other members of that team, including the patient, in the management of the condition. They need to be able to recognise that:

- The ultimate goal is to set up and run a medical retina sub-specialist service in a department of ophthalmology of a teaching or general hospital
- Another goal for the MR sub-specialist to achieve is to be able to organise and lead the multidisciplinary team in the screening of diabetic retinopathy in the population
- The MR sub-specialist must understand that diabetic retinopathy may be the first signs of other microvascular complications from diabetes and as such they must:
    - Educate the general practitioners and diabetologists/endocrinologists about the systemic control of diabetes and blood pressure and its impact of the progression of retinopathy
    - Feedback information on the status of diabetic retinopathy and maculopathy to the physician who is responsible for the overall care of the diabetic patient
    - Establish referral and feedback pathways, tools (forms) and networks
    - Provide information to the patient about how effective management of their diabetes, hypertension and lipid levels will delay progression of diabetic retinopathy and other diabetes associated complications.
    - Educate the public about diabetic retinopathy; especially if there is a family history.

Diabetic Retinopathy Course Structure

The DR course is comprised of two main components:

1. **Online Pre-Course Preparation and Assessment**

Learners are expected to have completed some background reading and own learning in preparation for the hands-on course which will take place in the Lions International Eye Centre at Korle Bu teaching hospital, Accra, Ghana. In order to help with the process of background knowledge, an on-line course with assessment has been developed. The candidate must achieve a pass rate of 80% in the online course to progress to the hands-on course.

The primary aims of the online DR course are to:

- Outline the epidemiology, pathogenesis, natural history and complications of diabetic retinopathy
- Diagnose and describe the classification of diabetic retinopathy

- Describe the investigation of diabetic retinopathy and know when to request optical coherence tomography and fundus fluorescein angiography
- Explain the importance of systemic management of diabetes and other conditions such as hypertension on the progression of diabetic retinopathy
- Choose between and provide laser and intravitreal therapy for diabetic retinopathy and thereby judge when each therapy is appropriate

2. Hands-On Course

The DR training programme will take place within the lecture rooms, clinics, laser and intravitreal injection rooms at the Lions International Eye Centre at Korle Bu teaching hospital in Accra, Ghana.

Lectures

Interactive lectures will form the basis of the MR training programme and will involve mainly digitally displayed presentations with images, videos and handouts. For further continuous professional development of the learner, copies of all lectures, videos and relevant other information will be provide in USB format.
The lecture room will also be the place where teaching after DR clinics will take place (see later). The learner would be expected to present the cases they have seen and the digital fundus, OCT and FFA images will be displayed. Group discussion would occur.

Workplace-Based Learning

It is envisaged that the learners attending the DR course would be involved in managing patients attending the DR clinics. The candidate would be expected to take a brief history, examining patients using slit lamp biomicroscopy, formulate a management plan and document all their findings. The throughput of the patients attending the DR clinics is aided by two dedicated MR Nurses who record and document on a proforma LogMAR visual acuity, RAPD and I-CARE IOP. The MR Nurses also record random blood sugar and take the blood pressure of each patient. They also complete a diet and lifestyle questionnaire. Following pupil mydriasis, digital fundus photography (macula and nasal field) and an OCT scan is taken of each patient. The learners observe every aspect of the patient pathway and then examine the anterior and posterior segment of the patient's eyes using slit lamp biomicroscopy. The trainer will be on hand to observe and provide direct feedback on performance. The learners will document all their findings onto the same proforma.

Case Based Discussion

This is designed to explore the thinking behind decision-making and practice. It provides an opportunity for the trainer to make their thinking accessible to the learner and access the learners' thinking as a way of ensuring that they are on the right track. Case based discussion on the DR course ideally should take place at the end of clinics where in a small group setting the colour fundus photographs, OCT and FFA images of patients examined are displayed (see above). The learner that examined the patient using slit lamp biomicroscopy would be expected to present the patient and discuss the image findings, assign a diabetic retinopathy grade and discuss further management.

Clinical Skills Training

The most important practical skills that will need to be taught on the MR course are retinal laser and intravitreal injection administration. Training of clinical skills basically consists of two aspects:

Simulation

A preliminary training aspect of these practical skills will take the form of simulation. During the hands-on training course, the learner will perform:

i. Simulation intravitreal anti-VEGF injections using model eyes
ii. Simulation Dexamethasone implant intravitreal injections using model eyes

iii. Simulation laser application using the Gloucestershire QUILT (Quality Improvement In Laser Training) tool which is computer based
iv. Simulation laser using the unit laser machine, laser lenses, RetiEye and Gloucestershire laser inserts

Treatment application
One way to directly teach clinical skills using the patient would be to use an adaptation of the four step approach:

i. Demonstration: The trainer demonstrates the procedure at normal speed without commentary. The learner would directly observe the procedure.
ii. Deconstruction: The trainer demonstrates the procedure using a patient whilst describing steps. The learner would directly observe the procedure.
iii. Comprehension: The trainer demonstrates the procedure while the learner describes the steps. This can be done theoretically or with the equipment away from the patient.
iv. Performance: The learner demonstrates the procedure and describes each step as they are doing it on the model and then the patient.

Depending upon the previous experience of the learner, following simulation training, one could omit steps i, ii and iii and observe the learner performing stage iv.
Pre-and post-laser fundus photographs should also be taken of every patient treated to enable group discussion, provide feedback and facilitate further learning.

Other Retinovascular Conditions to consider
In the course of the MR sub-specialist programme, there will be opportunity to encounter patients with other retinovascular conditions where the skills acquired in the management of diabetic retinopathy can be used to manage the following conditions:

- Retinal vein occlusions – including, central (CRVO), branch (BRVO) hemi- (HRVO) and macula branch vein occlusions (BVO)
- Arterial occlusions – including branch (BRAO) and central (CRAO)
- Ocular ischaemic syndrome
- Arterial and venous macroaneurysms
- Retinal telangiectasia (Coats disease)
- Eales disease
- Hypertensive retinopathy

Module 3: Sickle Cell Retinopathy

Pathology of the anterior and posterior segment of the eye can occur in any individual with sickle cell disease (SCD). Retinal disease occurs more frequently and is considered to have greater morbidity due to the sight threatening sequelae of sickle cell retinopathy (SCR) which represents 30% to 40% of the MR disease in West Africa.

Clinical Skill Set to Acquire
In summary, the MR training programme will produce an MR ophthalmologist that will have skills in:

- Sickle cell retinopathy diagnosis and management
- Sickle cell retinopathy treatment

Aims
The overall primary aims of the SCR module are to produce an MR ophthalmologist that is able to:

- Outline the epidemiology, pathogenesis, natural history and complications of SCR
- Manage SCR using a multidisciplinary approach with optimal control of SCD together with the haematologist

- Support and encourage other doctors in the management of the individual with SCD to refer the patient to the eye service for retinal screening
- Diagnose and describe the classification of SCR, assign a grade to determine the severity of SCR and the need for appropriate follow-up and treatment
- Use and interpret ancillary tests such as fundus fluorescein angiography (FFA) and optical coherence tomography (OCT) in the investigation of SCR and know when to request such test
- Choose between and provide laser and intravitreal therapy for SCR and thereby judge when each therapy is appropriate
- Achieve competency in the laser treatment of proliferative sickle cell retinopathy (PSR)
- Achieve competency in the pharmacotherapy of PSR, involving intravitreal anti-VEGF agents
- Manage other ocular co-morbidities (including cataract) in a patient with SCR
- Manage the potential post-operative complications that may occur following cataract and vitrectomy surgery
- Obtain consent for any procedure (e.g. retinal laser, intravitreal injections, etc)

Learning Objectives and Course Content

Knowledge

On completion of the course The MR sub-specialist would be expected to be able to:

- Describe the pathophysiology of SCR.
- Identify the most important risk factors for progression of SCR: genotype of SCD, poor systemic treatment/management of SCD.
- Outline the findings of the randomised control trials (RCTS) that have demonstrated the benefit of laser photocoagulation as a treatment for PSR compared to observation alone in reducing rates of visual loss and decreasing the incidence of vitreous haemorrhage.
- Classify SCR according to Goldberg.
- Determine the appropriate interval for follow-up of patients with SCR depending upon the severity of the retinopathy.
- Use OCT as an aid to diagnose ischaemia sickle cell maculopathy and predict risk of progression to PSR.
- Use FFA in cases of suspected retinal ischaemia and neovascularisation.
- Take account of the indications for laser in the treatment of PSR.
- Take account of the indications for intravitreal anti-VEGF agents in the treatment PSR.
- Judge the appropriate timing and follow-up after laser and intravitreal anti-VEGF treatment.
- Detail the potential complications and side effects of retinal argon laser treatment and intravitreal anti-VEGF agents.
- Evaluate the indications for referral for vitrectomy in the management of PSR in cases of a dense non-clearing vitreous haemorrhage, tractional retinal detachment involving the macula, vitreo-macular traction (VMT) and combined tractional retinal detachment and rhegmatogenous retinal detachment.
- Describe the complications which may arise following vitrectomy surgery.

Skills

The MR sub-specialist would be expected to have the following skills on completion of the course:

- Assess for SCR using clinical skills such as measurement of visual acuity (LogMAR) with dilated fundoscopy using slit lamp biomicroscopy and an appropriate lens (90D or 78D)
- Assess for SCR using ultra widefield fundus photography
- Interpret FFA findings with respect to management of SCR
- Interpret OCT findings in the quantitative and qualitative assessment of SCR
- Interpret ultrasonography
- Apply pan-retinal photocoagulation laser in the treatment of PSR
- Administer intravitreal anti-VEGF using aseptic techniques

- Manage the complications that may arise following vitrectomy surgery.

Attitude – Management and Educational Skills
The MR ophthalmologist must understand that they are part of a team that cares for a patient with SCD. They need to be able to:

- Organise and lead the multidisciplinary team in the screening of SCR in the population
- Feedback information on the status of the SCR to the haematologist or physician who is responsible for the overall care of the patient
- Establish referral and feedback pathways, tools (forms) and networks
- Provide information to the patient about their eye condition
- Educate the public about SCR and the impact on vision

Module 4: Age Related Macular Degeneration

Age related macular degeneration (AMD) is considered rare in sub-Saharan Africa but it does exist more commonly than people realise. Whilst the emphasis of training will be on dry AMD, other neovascular causes of wet AMD will also be considered.

Clinical Skill Set to Acquire
In summary, the MR training programme will produce an MR ophthalmologist that will have skills in:

- Dry and wet AMD diagnosis and management
- Wet AMD treatment

Aims
The overall primary aims of the AMD module are to produce an MR ophthalmologist that is able to:

- Outline the epidemiology, pathogenesis, natural history and risk factors for AMD
- Diagnose and describe the classification of AMD according to the Age Related Eye Disease Study (AREDS)
- Determine the severity of AMD and the need for appropriate follow-up and treatment
- Use and interpret ancillary tests such as fundus fluorescein angiography (FFA) and optical coherence tomography (OCT) in the investigation of AMD and know when to request such test
- Provide intravitreal therapy anti-VEGF for wet AMD and thereby judge when such therapy is appropriate
- Achieve competency in the administration of intravitreal anti-VEGF
- Manage the potential complications that may occur following intravitreal anti-VEGF therapy
- Manage other ocular co-morbidities (including cataract) in a patient with AMD
- Manage the potential post-operative complications that may occur following cataract surgery
- Obtain consent for any procedure (e.g. intravitreal injections, etc)

Learning Objectives and Course Content

Knowledge
On completion of the course The MR sub-specialist would be expected to be able to:

- Describe the pathophysiology of AMD.
- Identify the risk factors for the development and progression of AMD.
- Outline the findings of the randomised control trials (RCTS) that have demonstrated the benefit of intravitreal anti-VEGF as treatment for wet AMD (ANCHOR, MARINA, CATT).
- Classify AMD according to the Age Related Eye Disease Study (AREDS).

- Determine the appropriate interval for follow-up of patients with AMD depending upon the classification.
- Use OCT as an aid to diagnose AMD.
- Use FFA in cases of suspected wet AMD to confirm diagnosis and classify angiographically.
- Take account of the indications for intravitreal anti-VEGF in the treatment of wet AMD.
- Judge the appropriate timing and follow-up after intravitreal anti-VEGF treatment.
- Detail the potential complications and side effects of intravitreal anti-VEGF agents.

Skills
The MR sub-specialist would be expected to have the following skills on completion of the course:
- Assess for AMD using clinical skills such as measurement of visual acuity (LogMAR) with dilated fundoscopy using slit lamp biomicroscopy and an appropriate lens (90D or 78D)
- Assess for AMD using OCT
- Interpret FFA findings with respect to management of AMD
- Interpret OCT findings in the quantitative and qualitative assessment of AMD
- Administer intravitreal anti-VEGF using aseptic techniques
- Manage the complications that may arise following intravitreal anti-VEGF therapy

Attitude – Management and Education Skills
The MR ophthalmologist must be able to communicate and educate the patient, in the management of the condition which requires regular attendance and treatment for patients with wet AMD. They need to be able to:
- Set up a rapid access pathway for the management of the patient with wet AMD. In addition set up a feedback pathways, tools (forms) and networks
- organise and lead the multidisciplinary team in the diagnostic tests (OCT & FFA)
- Provide information to the patient and the general practitioner about how diet and ocular nutritional supplements can delay progression of AMD
- Educate the patient about AMD; especially if there is a family history
- Know when to refer on for low visual aids and blind registration (if available)

Other Macula Conditions to consider
In the course of the MR sub-specialist programme, there will be opportunity to encounter patients with other macula conditions where the skills acquired in the management of AMD can be used to manage the following conditions:
- Idiopathic polypoidal choroidal vasculopathy (IPCV)
- Retinal angiomatous proliferation (RAP)
- Secondary causes of choroidal neovascular membrane
- Macula telangiectasia

Module 5: Cataract Surgery in Diabetic Retinopathy

Module 4 will consist of Higher Specialist Training and comprises:
- Cataract surgery in the diabetic
  - Pre-operative assessment
  - Intra-operative management
  - Post-operative care
- Combined cataract surgery and laser in the diabetic
- Leadership and management skills for the medical retina service

The primary aims are to produce a MR Sub-specialist with higher specialist training skills that is able to:

- Determine when it is appropriate perform cataract surgery in a diabetic patient.
- Undertake and appreciate the need for meticulous follow-up in a diabetic patient after cataract surgery.
- Determine when it is appropriate to refer for vitrectomy surgery.
- Undertake cataract surgery in post-vitrectomy eyes and follow-up appropriately.
- Undertake cataract surgery with intra-operative indirect retinal laser treatment and follow-up appropriately.
- Undertake cataract surgery with pre-operative intravitreal anti-VEGF or steroid agents and follow-up appropriately
- Evaluate the indications and use of intravitreal anti-VEGF and steroid agents in the management of a diabetic patient with cataract.

Clinical and Surgical Skills

Course Teaching Methods: Clinics, Wet Lab, Simulator and Operating Theatre

- Determine when it is appropriate to perform cataract surgery in a diabetic
- Local anaesthesia
- Undertake, understand and appreciate the need for meticulous follow-up in a diabetic patient after cataract surgery
- Determine when it is appropriate to refer for vitrectomy surgery
- Undertake cataract surgery in post-vitrectomy eyes and follow-up appropriately
- Undertake cataract surgery with intra-operative indirect retinal laser treatment and follow-up appropriately.

Clinical skills: Cataract surgery in the diabetic

Course Teaching Methods: Clinics, Interactive Lectures, Case-based Discussions

- Pre-operative assessment
- Clinical assessment in the immediate post-operative period
- Management of co-existing retinopathy or rubeosis
- Retinopathy progression management
- Use of pre-, intra- and post-operative treatment and medications
- Identification and management of early post-operative complications – posterior capsular rupture, endophthalmitis, uveitis, cystoid macular oedema, retinopathy, rubeosis etc

Knowledge, diagnostic and clinical skills: Diagnosis and management of complications of diabetic cataract surgery

Course Teaching Methods: Interactive Lectures (photos, videos) and Theatre

- Intraoperative complications:
  - Iris problems (small pupil, iris trauma, iris prolapse)
  - Posterior capsular rupture +/- vitreous loss
  - Dropped nucleus
  - Suprachoroidal haemorrhage

- Post-operative complications
  - Post-operative uveitis
  - Post-operative cystoids macular oedema
  - Endophthalmitis
  - Progression of diabetic retinopathy and maculopathy

Module 6: Setting Up and Running a Medical Retina Service

The MR Ophthalmologist must understand that they are part of a multidisciplinary team that cares for a patient MR disease. The team will involve other ophthalmologists, imaging technicians, nurses and clerical staff. There also has to be wider consideration of the multidisciplinary team which would involve the physicians caring for the patient with diabetes and sickle cell disease. There has to be an adoption of attitude by the MR sub-specialist that prompts them to liaise with other members of that team, including the patient, in the management of the condition. Please consider the following management skills that the MR sub-specialist would need and forms the basis of Module 5 of the MR course:

Medical Retina Service Development

There are many things to consider when trying to set up an MR service. During the fellowship programme candidates will learn about the following:

1. The development, set-up and running of a medical retina sub-specialist service within the base unit. Things to consider are:
    - clinic capacity
    - day(s) in the week when clinics can be run
    - slit-lamp numbers

2. Human resources
    - The composition of the team members (doctors, nurses, allied health professionals [AHP], ophthalmic technicians, administration)
    - The skill mix and match of the team members (trainees, AHP-led clinics, failsafe)

3. Establishment of the relevant infrastructure and technology
    - fundus camera, OCT, FFA, ICG etc (including reasonable access to any these tests)
    - posterior segment laser & lenses – slit lamp based and indirect

4. Organising and leading the multidisciplinary team (MDT) in the screening and management of diabetic retinopathy in the population. MDT to consider
    - screeners, graders, GPs, other physicians, trainees, other consultant colleagues, Endocrinology team, Haematology team and their nurses etc

5. Implementation of treatment protocols and pathways for referral, diagnosis, management and treatment of patients with diabetic retinopathy.

Education

1. Training healthcare workers in support skills required for the MR sub-specialty clinics
    - Establishing links with other health workers including ophthalmologists, physicians, general practitioners, optometrists, dieticians and nurses involved in the care of the diabetic and sickle cell disease patient

2. Emphasise the need for early referral for screening/eye care to all stakeholders including health workers, patients and their relatives
    - National campaigns, advertising, information booklets etc

3. Feedback information on the status of DR and SCR to the physician who is responsible for the overall care of the diabetic and sickle cell disease patient

4. Educate the patient about how effective management of their sickle cell disease can modify the development of SCR. Also educate the patient with diabetes, hypertension and high lipid levels that optimising control of all risk factors will delay progression of diabetic retinopathy and other diabetes associated complications.
    - Patient education material, patient passport for HbA1c, BP, Lipid levels etc

Additional management skills that the MR sub-specialist should aim to acquire are:

Care Pathways and Protocols

1. Establish care, referral and feedback pathways, tools and networks
    - paper, fax, email etc
2. Establishing links with regional subspecialists
3. For example Vitreoretinal and pathways for referring patients on for more complex care.

Finance

1. Fundraising and advocacy to purchase equipment to support the medical retina service provision
2. Government involvement via the Health Minister

Quality Assurance

1. Quality assurance and safety of the patient and provider
    - test and training (TAT) (grading tests) of key medical team members
    - Failsafe, lost-to-follow-up (L2FU) audit
2. Establishment of an infrastructure and technology for medical records
- Includes potential EPR

Other things to consider:

- Low visual aids
- Psychologist/Eye Clinic Liaison Officer (ECLO)
- ??Blind registration
- Ocular prosthetics

Assessment Methods for the MR Course

Assessments are important to determine whether the MR sub-specialist has achieved the learning outcomes. The two main procedures that should be assessed are:

1. Retinal laser
2. Intravitreal injections

The following assessment method is proposed:

Direct Observation of Procedural Skills (DOPS)

It is helpful to determine whether a clinical skill performed by the trainee has been done well. A guide to this is a Competence Rating Scale (CRS) which could be used as a qualitative method to assess performance of the procedural skill observed as follows:

- No errors observed
- Occasional errors, corrected by trainee
- Frequent errors, corrected by trainee
- Frequent errors, not corrected by trainee
- Trainee unable to proceed without step-by-step instruction by trainer

On the basis of the above CRS, the trainer would be able to determine the difference between a very good trainee or a poor trainee.

The following tables are proposed for the retinal laser and intravitreal injection DOPS assessment.

Direct Observation of Procedural Skills for Laser

	Poor	**Fair**	**Good**	**Very Good**	**N/A**
1. <u>Safe Procedure</u>: Checks the patient's identity at the start of the procedure by confirming the name and date of birth.					

2. <u>Consent</u>: Explains the procedure and obtains the patient's written consent.					
3. <u>Hygiene</u>: Sanitizes the chin rest and fundus contact lenses before use. Cleans hands.					
4. **<u>Anaesthesia</u>**: instils anaesthetic drops into patient's eyes.					
5. <u>Communication with patient</u>: Ensures the patient comfort throughout the procedure. Warns the patients about any noises from the laser machine. Reassures the patient after the procedure.					
6. <u>Knowledge of instruments & equipment</u>: Choses the appropriate fundus contact lens. Applies the appropriate settings on the laser machine. Has good control of the laser and the fundus contact lens.					
7. <u>Insight and knowing own limitations</u>: Seeks help where appropriate					
8. <u>Overall assessment</u>					
<u>Feedback on retinal laser</u>: Trainer to document anything that was particularly good					
<u>Feedback on retinal laser</u>: Trainer to document anything that requires further development					
<u>Agreed action plan</u>: between trainer and trainee					

Direct Observation of Procedural Skills for Intravitreal Injection

	Poor	Fair	Good	Very Good	N/A
1. Safe Procedure: Checks the patient's identity at the start of the procedure by confirming the name and date of birth.					
2. Consent: Explains the procedure and obtains the patient's written consent.					
3. Anaesthesia: instils anaesthetic drops into patient's eyes.					
4. Reduction of contamination: Instills povidone iodine 5% into the patient's eye					
5. Hygiene: Good standard of hand washing and glove technique.					
6. Asepsis: Good skin preparation with 10% povidone iodine and drape. Aseptic handling/drawing up of intravitreal drug.					
5. Communication with patient: Ensures the patient comfort throughout the procedure. Explains what is happening during the procedure. Reassures the patient after the procedure.					
6. Knowledge & handling of instruments: Has knowledge of the instruments to be used and handles them easily					
7. Respect for tissue: Avoids the lashes and handles the tissues well. Uses the caliper to measure. Inserts the needle perpendicular to the globe and avoids the lens.					
8. Overall assessment					
Feedback on intravitreal injection: Trainer to document anything that was particularly good					
Feedback on intravitreal: Trainer to document anything that requires further development					
Agreed action plan: between trainer and trainee					

GUIDELINES FOR ACCREDITATION VISITS (MINIMUM REQUIREMENTS)
MEDICAL RETINA SUBSPECIALTY

1. **FUNDAMENTAL REQUIREMENTS**

In addition to the requirements for full accreditation for Ophthalmology Membership of the West African College of Surgeons, the MR Subspecialty Training centre should meet the following additional requirements

2. PERSONNEL (20%)

At least 1 medical retina specialist who has been designated as a subspecialist and trainer in medical retina by the West African College of Surgeons

- The ratio of trainers to trainees must not be more than 1:2.
- One or more clinical faculty member who have completed the fellowship program at least 5 years and have also completed 3 years of practice experience in the subspecialty . They should:
- Possess appropriate clinical and teaching skills either by subspecialty training or by subspecialty oriented clinical practice
- Demonstrate a strong interest in the education of fellows
- Possess sound clinical research and/or teaching abilities, support goals and objectives of programs, participate in scholarly, activities and be committed to their own continuing education
- Have regular scheduled (minimally every quarter) documented meeting in order to review the program's goals and objectives as well as the program's effectiveness in achieving its goals and objectives.

3. INFRASTRUCTURE (30%)

a. A minimum of one Medical Retina dedicated Consulting Room with
b. One Log Mar Visual acuity chart
c. One Indirect Ophthalmoscope with 20D, 28D Lenses
d. One 3-Mirror Contact lens
e. One non-contact retinal examination lens e.g. +90D, +78D
f. A functional retinal laser with slit lamp and LIO X1 (preferably a Green laser)
g. Appropriate laser lenses
h. Fundus camera capable of FFA x1
i. Optical coherence Tomography x1

4. CLINIC DAYS, WARD ROUNDS (10%)

A minimum of:

- At least one subspecialty clinic day per week
- At least one general clinic per week
- Laser clinic day at least 1 per week
- A Theater day at least 1 per week
- Ward rounds

5. LASER/ SURGICAL VOLUME (25%).

- Lasers
- Minimum of 100 Medical Retina Lasers per annum in the past 2 years
- Intra-vitreal Injections
- Minimum of 100 intra-vitreal injections per annum in the past 2 years
- Minimum of 25 cataract surgeries in diabetic retinopathy, and post vitrectomy per annum.

6. RESEARCH AND PUBLICATION (5%)

Evidence of retinal related research activity and publications by the trainer(s).

The library should have a stock of retina related works and journals such as Retina either in print or electronic form.

7. STRUCTURED TEACHING (10%)

Evidence of routine retina related presentations e.g. fluorescein angiography discussion sessions (FAN club), case presentations, OCT sessions, Journals club, Tutorials etc.

Evidence of visiting Medical-retinal Subspecialist with active participation in knowledge sharing activity by way of lectures, clinical or surgical activities is encouraged.

Module 7: Dissertation writing, consolidate surgical skills and revision, tidying up and exams

Using the skills gained from module 1 the trainee will discuss a topic for their dissertation with their mentors. It is expected they will work on their dissertation throughout the training using this final period to refine and produce the completed document. Support in this process will be by one to one meetings with a trainer assigned to them for this purpose. The expectations, structure and marking of the dissertation are outlined in the dissertation module.

WACS Subspecialist Curriculum Neuro-ophthalmology

Neuro-ophthalmology Fellowship

Background
Neuro-ophthalmology is a relatively young subspecialty in Africa and it is still evolving, even within the field of ophthalmology, as well as worldwide. The neuro-ophthalmology fellow is specialized in the diagnosis and management of visual disturbances and eye movement disorders resulting from neurological disease. Clinical practice of neuro-ophthalmology varies widely. However, neuro-ophthalmological disorders can be broadly classified into afferent pathway or efferent pathway disorders. The training has therefore been condensed into six modules. Each module is directed at teaching specific skills. Trainee will continue to perform regular general ophthalmic surgeries throughout their training such as cataract extraction, pterygium excision etc. (as performed at membership level)

Duration: 24 months – surgical option

Prerequisites
Before starting the Neuro-ophthalmology subspecialist course, trainees are expected to have fulfilled the following conditions:

- Membership of the WACS in the Faculty of Ophthalmology or equivalent
- Provide evidence of attendance at a neuro-ophthalmology refresher course within the previous 1 year

Overview
Module 1: Introduction (first 3 months)
Module 2: Diagnosis and management of afferent system dysfunction (1 months)
Module 3: Diagnosis and management of efferent system dysfunction including nystagmus and nystagmoid disorders (2 months)
Module 4: Investigations in neuroophthalmology including electrophysiology, neuroradiology (1 months)
Module 5: Neuroophthalmic manifestations of orbital pathology and systemic diseases (1 months)
Module 6: Low vision and neurorehabilitation including botulinum toxin use in neuroophthalmology (1 month)
Module 7: Dissertation writing, consolidate clinical skills, knowledge, revision and exams (last 3 months)
Module 8: Extra 12 months Surgical skills rotations *Surgical option

Logbook
It is expected that at least 4 meaningful entries are summarized and documented in the logbook, every six months.

Case reports should represent the trainees experience in patient evaluation, investigation, treatment and outcome. This would involve a review of relevant literature and a list of differential diagnoses. Clinical cases may be drawn from the range of conditions listed below. However, each trainee is expected to document not more than 2 examples of the same condition, and should describe their experience with at least 5 different conditions
List of common neuroophthalmological disorders of the afferent visual pathway:

1. Optic chiasm lesions
2. Optic neuritis
3. Optic atrophy
4. Papilledema
5. Compressive optic neuropathy including pituitary tumours and sellar/parasellar tumours
6. Non-arteritic anterior ischemic optic neuropathy
7. Arteritic anterior ischemic optic neuropathy

8. Congenital disc anomalies
9. Pseudotumor cerebri
10. Tumours of the optic nerve
11. Tumours of the optic nerve sheath
12. Neurovascular diseases/intracranial vasculopathies
13. Neuro-ophthalmic manifestation of systemic diseases

ASSESSMENT AND FEEDBACK

Trainees show that they are working towards the attainment of course learning outcomes, in the online neuro-ophthalmology fellowship through participation in quizzes, (either standard multiple choice or image-based) and develop further, based on regular guidance and appraisal of their progress. Trainees finally demonstrate that they have achieved learning outcomes through supervision/observation and logbook entries. Knowledge will be evaluated through formative and summative assessment.

Clinical and technical skills will be evaluated through continuous assessment involving mentor interactions, trainee reflections and feedback.

Clinical case reports
There will be case discussion with mentors/trainers to aid reflection both face to face (in clinic/ward) and at academic case review sessions (seminars/grand rounds) these should be duly documented in the clinical case report book and will form part of continuous assessment
The logbook will be evaluated periodically and will contribute to the summative assessment

Module 1: Introduction

Duration: 3 months

- Research and Dissertation training module
- Anatomy and physiology for the neuroophthalmologist
- Orientation to neuroophthalmology subspecialty

OBJECTIVES

At the end of this module, trainees will understand the basics of research, and would have undertaken online introductory courses on neuroanatomy, neurophysiology and pharmacology relevant to clinical evaluation of the neuroophthalmology patient. This will be assessed using MCQ and DOPS during the first three months of the course.

LEARNING OUTCOMES

At the end of this period, the trainee is expected to:

Knowledge
a. Epidemiology
Trainees shall be required to:

- Explain the economics and compliance requirements of neuro-ophthalmologic disorders including international classification of disease (ICD) and current procedural terminology (CPT) codes.
- Discuss the genetics of specific disorders relevant for neuro-ophthalmology including multiple sclerosis, stroke, migraine and other disorders.
- Describe basic principles of medical statistics, including: relative risk, odds ratio, attributable risk, prevalence rate, case control study, cohort study, absolute/relative benefit, risk reduction, number needed to treat, etc.

b. Anatomy and physiology
    - Describe anatomical structures relating to the afferent and efferent visual pathways
    - Describe the surgical anatomy of the eye and orbits
    - Discuss the function of the visual system and its control

Topics to be covered include but are not limited to:
Bony anatomy of the orbit, superior and inferior orbital fissure, optic canal, foramina of the skull, anterior, middle and posterior cranial fossa and anatomy of the brain including cranial nerve pathways. Trainees shall also be required to know the anatomy of the visual pathway, supranuclear and infranuclear control centers for ocular motility, vascular anatomy of the brain including the circle of Willis, External carotid artery and its branches as well as the vertebrobasilar system.

c. Orientation to neuroophthalmology subspecialty

Trainees shall be able to:
    - Outline the approach to history taking in neuroophthalmology with emphasis on the description of chronological order of pathologies
    - Describe the steps of a neuroophthalmological examination

Clinical skills
- Obtain an accurate history from uncooperative patients, children, and relatives or eye witnesses
- Assess and quantify visual acuity, visual potential, vision loss under various conditions, in patients of all ages

Technical skills
- Assess pupillary responses without introducing error
- Perform a visual field assessment by confrontation
- Perform and document a detailed evaluation of the optic nerve head

Module 2: Diagnosis and Management of Afferent System Dysfunction

Duration: 2 months

OBJECTIVES

At the end of this training the trainee should be able to outline the diagnosis and management of afferent visual pathway disorders such as: optic neuropathy, visual field defects, visual pathway disorders, visual perception disorders etc. learning will involve self-study, writing comments and engaging in discussion in the virtual learning environment, watching videos and animations and self-evaluation using online quizzes including face to face discussion and didactic lectures

Core Topics
- Headache and migraine
- Non-glaucomatous optic neuropathy

LEARNING OUTCOMES

At the end of this training the trainee should be able to:

Knowledge
- Differentiate between primary and secondary headache from history taking and examination

- Demonstrate appropriate evaluation for the investigation of primary and secondary headache and the role of neuroimaging
- Diagnose and classify primary headaches especially migraine headache
- Demonstrate appropriate evaluation for assessment of optic nerve function

1. Headache and migraine
    a. Describe the neurosensory pain pathways for headache
    b. Describe the concepts of nociception and allodynia
    c. Describe the pathophysiological concepts of migraine and migraine aura
    d. Describe the epidemiology of migraine
    e. Identify and list migraine triggers
    f. Discuss current migraine treatment guidelines
    g. Discuss the options for medical management of a patient with migraine headache from diagnosis to treatment and follow-up
2. Anterior visual pathway
    a. Describe the anatomy of the anterior visual pathway from the optic nerve head to the visual (striate) cortex including the visual association areas
    b. Describe the anatomy of the sellar region and the pituitary gland
    c. Describe the physiology of the pituitary gland and hypothalamo-pituitary axis
    d. Explain possible reasons for progressive painless vision loss associated with headache
    e. Explain possible reasons for non-glaucoma related unilateral and bilateral visual field defects e.g. central scotoma, homonymous hemianopia, heteronymous hemianopia, quadrantanopia
    f. Describe the differences between glaucomatous and non-glaucomatous optic nerve head changes
    g. Describe the differences between glaucomatous and non-glaucomatous visual field changes

Clinical skills

Learning through active observation and emulation, practise, and repeating the 'observe/emulate/practise' cycle until the trainees have developed the clinical skills

- Evaluate patients with acute and chronic vision loss
- Identify, describe and quantify afferent pupillary defects
- Identify, describe and quantify optic nerve head abnormalities
- Differentiate between glaucomatous and non-glaucomatous optic nerve head changes
- Describe the typical features, evaluation, and management of the most common optic neuropathies (e.g., infectious, demyelinating, ischemic, inflammatory, hereditary, toxic, nutritional, compressive, infiltrative)

Technical skills

Observe and practise each skill repeatedly until learning outcomes are achieved

- Perform direct, indirect, and magnified ophthalmoscopic examination of the optic disc, macula, vessels, and periphery of the retina (e.g. recognize optic disc swelling, optic atrophy, neuroretinitis, optic nerve head vascular abnormalities, and macular abnormalities, such as edema, pigmentary changes, subretinal fluid, retinal vessel abnormalities, pigmentary changes) and use the findings to generate a differential diagnosis
- Perform visual function tests (e.g. color vision testing, Amsler grid, photostress test, contrast sensitivity testing)
- Perform static automated and kinetic perimetry
- Determine reliability of visual field results, interprete visual field changes and localise lesions to prechiasmal, chiasmal or retrochiasmal location

Module 3: Diagnosis and Management of Efferent System Dysfunction including Nystagmus and Nystagmoid Disorders

Duration: 2 months

OBJECTIVES

At the end of this training the trainee should be able to outline the diagnosis and management of efferent visual pathway disorders such as: Horner's syndrome, ocular cranial motor neuropathy

- Differentiate between monocular and binocular diplopia from history taking and examination
- Demonstrate appropriate evaluation for the investigation of double vision and the role of neuroimaging
- Diagnose and classify Nystagmus
    - Nystagmus with vision loss
    - Nystagmus without vision loss
    - Brain sites for localizing acquired nystagmus
- Demonstrate appropriate evaluation for assessment of ocular motility disorders and adult strabismus
- Evaluate a patient with abnormalities of pupil shape, size and reactions to light and accommodation and interpret their findings

Knowledge

- Describe the anatomy of the efferent visual pathway
- Detail the anatomical course of the ocular motor cranial nerves and their anatomical relations
- Describe the anatomy of the cerebellum and its ocular motor pathways and its impact ocular motility
- Discuss supranuclear control of ocular motility and its abnormalities
- Differentiate between infranuclear and supranuclear eye movement disorders

Efferent visual pathway

a. Describe the parasympathetic pathways for accommodation
b. Identify the sympathetic pathways for pupil dilatation
c. Describe the aetiopathogenesis of Anisocoria
d. Differentiate between the different causes of anisocoria (Horner's syndrome, Adie's pupil, traumatic mydriasis, pharmacological dilatation, third nerve palsy)
e. Describe the anatomy of the midbrain, pons and the location of the ocular motor cranial nerve nuclei
f. Describe the relations of the ocular motor cranial nerve nuclei and their fascicles from the brainstem to their respective extraocular muscles (supranuclear, nuclear and infranuclear pathways)
g. Describe supranuclear control of eye movement
h. Enumerate the differences between infranuclear and supranuclear gaze paly
i. Describe the neuroophthalmological presentation of midbrain lesions (midbrain syndromes e.g. Wallenburg syndrome, Dorsalmidbrain syndrome, Weber's syndrome, Benedickt's syndrome etc.) and other abnormalities of the brainstem
j. Define and classify nystagmus
k. Discuss the aetiopathogenesis of the different forms of nystagmus and nystagmoid movements

Clinical skills

- Take a clinical history in a patient with complaints of double vision
- Perform a complete evaluation of the major ocular motor systems (e.g. fixation, pursuit, saccades, convergence, vestibuloocular reflex)
- Evaluate anisocoria and diagnose Horner's syndrome, light-near dissociation, Adie's tonic pupil, third nerve palsy
- Recognise aberrant regeneration of the oculomotor nerve
- Differentiate and characterise different types of nystagmus and nystagmoid movements

- Describe and distinguish congenital nystagmus versus acquired nystagmus.

Technical skills

- Measure ocular alignment using simple observational techniques (e.g. Hirschberg test, Krimsky method)
- Perform cover-uncover testing for tropia
- Perform alternate cover testing for phoria
- Perform simultaneous prism and cover testing
- Measure ocular deviations with prisms
- Perform tests of binocularity and fusion (e.g. polarized Titmus stereo test, Worth 4-dot test)

Module 4: Investigations in Neuroophthalmology including Electrophysiology, Neuroradiology

Duration: 1 month

OBJECTIVES

Trainees are required to be knowledgeable about the indications for, use of, and limitations of pharmacological, radiological, and surgical therapies that may be recommended for patients with neuro-ophthalmological disorders. Furthermore, regular neuro-imaging consultation and conferences are required for a more profound understanding of the indications for, and techniques of, magnetic resonance imaging (MRI), computed tomography (CT) scanning, and endovascular therapeutic neuroradiology as they apply to the practice of neuro-ophthalmology. Neuroimaging workshops and conferences shall be conducted in collaboration with the radiologists (or neuroradiologists)

Knowledge

- Describe the indications for obtaining neuroimaging studies, including computerized tomography (CT) scanning, magnetic resonance imaging (MRI), MR and CT angiography, orbital ultrasonography, conventional catheter and digital subtraction angiography (DSA).
- Describe the indications for and interpret basic echography (ultrasound) of the eye and orbits: A-scan, B-scan and duplex Doppler ultrasonography
- Describe features and evaluation of the less commonly encountered visual field defects (e.g. sectoranopia, checkerboard, monocular temporal crescent).
- Describe more advanced aspects of visual field testing indications, selection, and interpretation (e.g., artifacts of automated perimetry, testing, and thresholding strategies)
- Perform and interpret basic ocular coherence tomography (OCT) imaging of the eye (e.g. optic disc, retinal nerve fiber layer, macula)
- Describe the indications and interpret basic ocular electrophysiology (e.g., visually-evoked potential [VEP], electroretinogram [ERG], electrooculogram [EOG], ocular motility recording techniques)
- Describe the indications for and interpret basic fundus fluorescein angiography

Clinical skills

Perform basic neurologic screening examination (e.g. tandem walk, sensory examination, cerebellar function testing, basic cognitive evaluation)

Technical skills

- Interpret neuro-radiologic images in neuro-ophthalmology (e.g. interpretation of orbital imaging for orbital pseudotumor and tumors, thyroid eye disease, intracranial imaging modalities and strategies for tumors, aneurysms, infection, inflammation, ischemia), and appropriately discuss, in advance of testing, the localizing clinicoradiological features with the neuroradiologist in order to obtain the best study and interpretation of the results

- Perform (and interpret the results of) the intravenous edrophonium (i.e. Tensilon) and prostigmin tests for myasthenia gravis; recognize and treat the complications of the procedures
- Describe the advantages, disadvantages, indications, and contraindications of special perimetric methods (e.g. blue-yellow perimetry, automated kinetic perimetry, motion perimetry, microperimetry)

Module 5: Neuroophthalmic Manifestations of Orbital Pathology and Systemic Diseases

Duration: 1 month

OBJECTIVES

To expose the trainees to a wide range of systemic medical conditions, common in neuroophthalmology practice. Trainees will be expected to gain proficiency in evaluation of pathologies of the eye and orbit and demonstrate an understanding of the pathogenesis, presentation and management of optic neuropathy in different orbital diseases. Trainees will obtain some of these exposures in an orbit/oculoplasty unit.

Knowledge

- Systemic disorders with neuro-ophthalmological complications such as thyroid and other endocrine disorders
- Giant cell arteritis and other rheumatologic disorders
- Metastatic and para-neoplastic disorders
- Coagulation abnormalities and other hematologic disorders
- Other systemic conditions include chronic progressive external ophthalmoplegia (CPEO), cerebrovascular disease, pregnancy, AIDS, drug toxicity

Clinical skills

- Examine patients with orbital pathologies and localize the lesion to the relevant orbital space (preseptal, orbital septum, superior fissure, inferior orbital fissure, orbital apex, peribulbar, retrobulbar, intraconal, extraconal space etc.)
- Assess patients with orbital trauma for fractures and optic nerve injury
- Examine patients with orbital space occupying lesions with and without ocular displacement or misalignment
- Evaluate, describe and outline management for a patient with ptosis, laophthalmos or lid retraction
- Evaluate, describe and outline management for a patient with blepharospasm

Technical skills

- Describe and perform temporary and permanent tarsorrhaphy in patients with facial nerve palsy and corneal exposure
- Assess ocular motility and alignment in patients with orbital pathology
- Perform forced duction test to differentiate restrictive from paralytic
- Auscultate for orbital bruit
- Interprete the results of temporal artery biopsy in the context of the clinical presentation
- Perform temporal artery biopsy (surgical neuro-ophthalmology)

Module 6: Low Vision and Neurorehabilitation including Botulinum Toxin use in Neuroophthalmology

Duration: 1 month

Objectives
Trainees will learn to perform low vision assessment of patients
Trainees will learn the different types of low vision devices; their attributes, advantages and disadvantages and how to prescribe different low vision devices to meet specific needs
Neurorehabilitation will focus on visual rehabilitation for patients with visual field and mobility disorders following neurological, neurosurgical or neuroophthalmological disorders. Trainees will learn how to assemble a multidisciplinary team for vision and neuro-rehabilitation and to coordinate care between the different rehabilitation professionals.
Botulinum toxin use in neuroophthalmology will focus on the application of botulinum toxin in the management of paralytic strabismus, blepharospasm, lid retraction, hemifacial spasms, migraine.

At the end of this module, trainees are expected to be able to do the following:

Knowledge
- Describe the different types of low vision devices
- Outline the steps in low vision assessment
- Discuss the principles and side effects of botuninum toxin therapy
- Describe indications, dosage, and administration of Botox for neuro-ophthalmic disorders (including, hemifacial spasm, blepharospasm, paralytic strabismus)
- Describe the anatomy of the head and neck as it relates to botulinum toxin injections
- Discuss the concept of neuro-rehabilitation
- Define orientation mobility training and its relationship to neurorehabilitation
- Explain the concept of quality of life and holistic care model

Clinical skills
- Perform low vision evaluation and prescribe appropriate low vision aids
- List indications for botulinum toxin injection in neuroophthalmology
- Counsel and obtain patient consent for botulinum toxin injection
- Administer botulinum toxin injection
- Identify and manage complications of botulinum toxin injection
- Identify and characterize the neuroophthalmological complications of stroke and their impact on activities of daily living and quality of life
- Evaluate the impact of visual impairment on quality of life (vision-related quality of life)

Technical skills
- Establish a multidisciplinary neurorehabilitation team
- Outline and evaluate a neurorehabilitation plan, which includes orientation and mobility training

Module 7: Data Analysis, Write-up, Submission of Dissertation, Consolidation of Clinical Skills and Revision for Exams

Duration: Final 3 months

Using the skills gained from module 1 the trainee will discuss a topic for their dissertation with their mentors. It is expected they will work on their dissertation throughout the training using this final period to refine and produce the completed document. Support in this process will be by one to one meetings with a trainer assigned to them for this purpose. The expectations, structure and marking of the dissertation are outlined in the dissertation module.

During this period, trainee is expected to ensure they have met all requirements to meet the eligibility criteria for the final fellowship assessment examination. All neuroophthalmology (non-surgical and surgical) trainees must take this examination at the end of 12 months of training. Trainees pursuing the surgical option will then be free to complete a further 12 months of purely surgically focused rotations in module 8 (additional 12 months).

Module 8: Surgical Rotations (Surgical Option)

Duration: 12 months

LEARNING OUTCOMES

By the end of the module, neuroophthalmology fellows should be able to support a surgically-oriented neuroophthalmology practice.

They should be able to perform cataract surgery and at least 5 of the following operations:

- simple trabeculectomy
- ocular trauma
- uncomplicated ptosis and lid retraction repair
- adult strabismus
- lateral orbitotomy
- medial orbitotomy
- optic nerve sheath neurotomy
- orbital biopsies
- temporal artery biopsy
- correction of nystagmus

TEACHING AND LEARNING

Fellows will develop these surgical skills by arranging surgical rotations to the appropriate subspecialties:

- Orbit and oculoplastics
- Paediatric ophthalmology
- Neurosurgery
- Otorhinolaryngology

Knowledge
Trainees are to be able to describe relevant surgical anatomy for the following surgical procedure and should be able to list the indications for these surgeries.
Furthermore, they should be able to outline the surgical steps and list the surgical instruments required.

- Discuss contraindications and complications of the following surgeries:
    - cataract extractions
    - simple trabeculectomy
    - ocular trauma
    - uncomplicated ptosis and lid retraction repair
    - adult strabismus
    - lateral orbitotomy
    - medial orbitotomy
    - optic nerve sheath neurotomy
    - orbital biopsies
    - temporal artery biopsy including one or two procedures for the surgical correction of nystagmus (if available)

Clinical skills
Trainees should be able to perform relevant pre-operative assessment and obtain consent for the above-listed surgeries.

Technical skills
Trainees should be able to demonstrate surgical landmarks for the above-listed procedures.
Trainees should be able to describe techniques for the above-listed surgeries as well as management of common complications.

Assessment
Trainees shall show that they are working towards the attainment of course learning outcomes, through participation in quizzes, (either standard multiple choice or image-based), seminars and workshops and will develop further, based on regular guidance and appraisal of their progress.
Trainees finally demonstrate that they have achieved course learning outcome through supervision/observation and logbook.
Final assessment will entail DOPS and a 1-hour viva voce and evaluation of a surgical case record. The surgical case record should contain the following information

NEUROOPHTHALMOLOGY CASE REPORT BOOK/ SURGICAL RECORD

Patient evaluation	Date	Performed/Performed under Supervision/Assisted
Hosp No.		
Name of Patient		
Age		
Sex		
Visual acuity with best correction		
Visual Acuity Method/Chart Used		
Colour vision (specify chart used: Ishihara, AO)		
Visual field (confrontation)		
Pupil reaction (in the dark and in the light)		
Ocular alignment (Hirschberg)		
Prism cover test		
Ocular motility		
Other findings-Ocular e.g. Nystagmus, strabismus, microphthalmous etc		
Investigations		
Systemic associations (e.g. syndromes, cardiac anomalies etc.)		
Automated visual field analysis		
OCT		
Temporal artery biopsy		
Treatment		
Complications		
Optical/Orthoptic Rehabilitation		
Outcome	VA Day 1	

	VA ≥6weeks	
	Final outcome (As at when?)	
Key Learning points	Key Learning points	
	Other COMMENTS	
Comments and signature of trainer		

Assessment Rubric for neuroophthalmology trainees (DOPS)

S/N	Topic/ knowledge area	Beginner (score=2)	Intermediate (score=3)	Experienced (score=4)	Expert (score=5)
1	**Clinical history taking (diplopia)**	Does not establish the difference between monocular and binocular diplopia following presenting complaint	Establishes the difference between monocular and binocular diplopia following presenting complaint, before proceeding to history of presenting complaint	Establishes the difference between monocular and binocular diplopia following presenting complaint, before proceeding to history of presenting complaint, establishes a difference between near vision and distance vision but not the orientation of the duplicated images	Establishes the difference between monocular and binocular diplopia following presenting complaint, before proceeding to history of presenting complaint, establishes a difference between near vision and distance vision and also determines the orientation of the duplicated images
2	**Examination of pupil (Efferent pathway)**	Examines pupil responses to direct and consensual light reflex only, does not identify anisocoria/comment on sizes	Examines pupil responses to direct and consensual light reflex, identifies anisocoria/comment on difference in size	Examines pupil responses to direct and consensual light reflex, identifies anisocoria/comment on difference in size, tests the difference under different ambient light conditions (light and darkness)	Examines pupil responses to direct and consensual light reflex, identifies anisocoria/comment on difference in size, tests the difference under different ambient light conditions (light and darkness), tests for pupillary response to accommodation (light/near dissociation)

3	**Ocular motility (3rd nerve palsy)**	Describes ptosis, exotropia and hypotropia but fails to describe displacement objectively (using at least Hirschberg's reflex); overlooks a face turn	Describes ptosis, exotropia and hypotropia and measures ocular misalignment objectively (using at least Hirschberg's method/corneal reflex); overlooks a face turn	Describes ptosis, exotropia and hypotropia, measures ocular misalignment using at least Hirschberg's method/corneal reflex for both horizontal and vertical deviation, correctly identifies any face turn and tests ocular motility in all directions but fails to differentiate ductions from versions to identify underaction/overaction	Describes ptosis, exotropia and hypotropia, measures ocular misalignment using Hirschberg reflex for both horizontal and vertical deviation, correctly identifies any face turn and tests ocular motility in all directions also differentiates ductions from versions to identify underaction/overaction; examines for signs of aberrant regeneration
4	**Ocular motility (4th nerve palsy)**	Unable to identify hypertropia or misrepresents it as contralateral hypotropia; overlooks a head tilt	Identifies hypertropia correctly and performs extraocular motility testing, identifying superior oblique underaction but fails to perform Parks-Belschowsky's three-step test; overlooks a head tilt	Identifies hypertropia correctly and performs extraocular motility testing, identifying superior oblique underaction, performs Parks-Belschowsky's three-step test; correctly identifies a head tilt	Identifies hypertropia correctly and performs extraocular motility testing, identifying superior oblique underaction, performs Parks-Belschowsky's three-step test; correctly identifies head tilt and can differentiate decompensating congenital (long-standing) 4th nerve palsy from recent onset usingvertical fusion amplitude

5	**Ocular motility (6th nerve palsy)**	Identifies only face turn or only esotropia but fails to quantify ocular misalignment objectively (at least using Hirchsber's method/corneal reflex)	Correctly identifies face turn and esotropia, describes ocular misalignment objectively (using at least Hirschberg's method/corneal reflex), performs ocular motility, but fails to perform alternate cover test to identify primary and secondary deviation	Correctly identifies face turn and esotropia, describes ocular misalignment objectively (using at least Hirschberg's method/corneal reflex), performs ocular motility and performs prism cover test to identify primary and secondary deviation	Correctly identifies face turn and esotropia, describes ocular misalignment objectively (using at least Hirschberg's method/corneal reflex), performs ocular motility and performs prism cover test to identify primary and secondary deviation; also examines facial nerve function in an attempt to localise
6	**Ptosis**	Describes ptosis but fails to exclude pseudoptosis i.e. contralateral lid retraction	Describes ptosis and excludes pseudoptosis i.e. contralateral lid retraction	Describes ptosis and excludes pseudoptosis i.e. contralateral lid retraction, examines for fatiguability and other lid signs e.g. Cogan's lid twitch, Lid hopping, paradoxical reversal,	Describes ptosis and excludes pseudoptosis i.e. contralateral lid retraction, examines for fatiguability and other lid signs e.g. Cogan's lid twitch, Lid hopping, paradoxical reversal, performs ocular motility

Accreditation requirements for neuroophthalmology fellowship training institutions

S/N	REQUIREMENT FOR ACCREDITATION	DETAILS	SCORE (%)
1.	Personnel	a) At least 1 Neuro-Ophthalmologist who has been designated as a subspecialist and trainer in Neuro-Ophthalmology by the West African College of Surgeons with minimum **5 years** post fellowship and 3 years working experience in the field of neuro-ophthalmology b) The ratio of trainer to trainees should not exceed 1:3 at any time.	15%
2.	Infrastructure requirement	a) Consulting room having Maddox rod, muscle light, ***ophthalmoscope,*** tuning forks, OKN drum or OKN tape, VA charts etc. (OKN = optokinetic nystagmus) b) One automated visual field analyser or Tangent screen, c) Facility for radiological investigations including: magnetic resonance imaging and/ or computed tomography d) Desirable additional services and equipment (such services may be shared with other institutions within the region) include: Electrophysiology i.e. visual evoked potentials (flash VEP, pattern VEP), Electroretinography (ERG), multifocal VEP ±Electrooculography(EOG),Electromyography(EMG), Orthoptics, low vision, Hess chart, fundus camera with facilities for angiography; optical coherent tomography machine	25% extra 10% for category (d)
3.	Clinic days, Theatre days, ward round	A minimum of: a) One general clinic day per week b) One subspecialty clinic day per week **separate** from the general clinic. c) One theatre day per week including general and subspecialty cases d) One teaching round per week e) Outreach activities	10% extra 5% for outreach
4.	Surgical volume *(optional)	Minimum number of procedures required to be done by the training institution: a) Paediatric or adult strabismus surgeries - 10 b) Ptosis surgeries – 5 c) Temporal Artery Biopsy – 3 d) Optic nerve sheath neurotomy – 2	15%

		e) Medial and lateral orbitotomy 5 f) Orbital biopsy - 3 g) Other surgeries - 7	
5.	Structured teaching	The Fellowship Programme Director shall ensure that these activities are conducted on a regular basis: Tutorials, seminars, lectures; grand rounds, case presentations, journal clubs (weekly, fortnightly, monthly and quarterly)	10%
6.	Research and publication	The trainer should have publications and research activities in neuro-ophthalmology	5%
7.	Library	The library should have current books, journals, audio visuals aids and other materials relevant to Neuro-Ophthalmology. These may be in electronic form or hard copies	5%
	Aggregate		**100%**

WACS Ophthalmic plastic and reconstructive surgery Curriculum

Background

Ophthalmic plastic surgery is a vast subspecialty within the field of ophthalmology comprising disorders of the eyelids, lacrimal drainage system, orbit and to a large extent ophthalmic tumors. Training in the management of some of the simple disorders is handled at Membership level. The ophthalmic plastic surgery curriculum will follow a training pathway that will enable trainees to develop the competencies required to support the delivery of eye care to patients with more complex and complicated disorders. The training has been separated into three broad modules with each module directed at teaching specific aspects of Ophthalmic plastic surgery. The Fellow in Ophthalmic plastic surgery will be expected to acquire skills to train at Membership level to prevent complications arising from poor management of the common disorders as well as manage such complicated cases.

Duration: 24 months

Prerequisites
To possess the Membership of the West African College of surgeons (MWACS) or its equivalent

Overview
Introduction (3 months)

- Research and dissertation module - 2 months
- Orientation into subspecialty module

Next 18 months

- Subspecialty based practice
- Data collection for dissertation
- Data analysis, write-up and submission for the exams

Next 3 months
Revision, tidying up and exams

Logbook
It is expected that at least 5 meaningful entries are summarized and documented in the logbook for every module, representing the trainees experience in patient evaluation, investigation, treatment and outcome. The case report should include a review of relevant literature and a list of differential diagnoses. Each trainee is expected to document not more than 2 examples of the same condition
These are the characteristics of a satisfactory logbook entry.

1. The patient profile is supplied (age, sex, general health, including relevant co-morbidities
2. The steps taken to evaluate and investigate the patient's condition are provided
3. Clear details of the treatment including any modifications made with reasons are included
4. Any complications are detailed and actions taken to mitigate these are described

5. Outcomes are detailed with dates
6. Each logbook case is signed off by the clinician who supervised the case

ASSESSMENT AND FEEDBACK

Video recording, clinical pictures and logbook of procedures to be submitted and graded in summative evaluation

Module 1: Research and dissertation and orientation into subspecialty

Duration: 3 months

- Research and Dissertation training module
- Anatomy and physiology
- Orientation to orbit and oculoplasty subspecialty

OBJECTIVES

At the end of this module, trainees will understand the basics of research, and would have undertaken training in anatomy, physiology and pharmacology relevant to clinical evaluation of the orbit and oculoplasty patient. This will be assessed using MCQ and DOPS during the first three months of the course.

Module 2: Lid Entropion/Ectropion and Cicatricial Disease Correction+ Complex Eyelid Laceration Repair

OVERALL OBJECTIVES

The objectives of the Orbit and oculoplastic course (online and hands-on components) are to enable participants to:

- diagnose and assess the patient with entropion, ectropion and cicatricial lid disease
- evaluate the options for treatment of entropion, ectropion and cicatricial lid diseases
- demonstrate competent assessment, performance and management of lid corrective surgery including graft use and repair of complex eyelid lacerations

Before starting the fellowship programme, trainees are expected to be able to:

Knowledge

- Describe in detail the anatomy of eyelid and ocular adnexa
- Explain possible reasons for development entropion or ectropion

Clinical skills

Take detailed and relevant patients' history

Technical skills

- Examine for eyelid margin alignment
- Examine for lacrimal drainage system injures

- Suture using micro-sutures to the tarsal plate and skin

These will be assessed during the first three months of the course as part of the formative assessment using MCQ, OSCI, DOPS.

COURSE TOPICS AND INTENDED LEARNING OUTCOMES
At the end of the study of each topic below, participants are expected to be able to:

Epidemiology
- Outline the prevalence of ectropion, entropion and cicatricial lid disease and ocular trauma leading to complex eyelid laceration
- Describe the epidemiology of these conditions
- Enumerate the major risk factors for developing cicatricial disease, ectropion and entropion and how to mitigate them.

The Eyelid
- Describe the Anatomy and physiology of the eyelid
- Explain the function of the glands found in the eyelid
- Describe Eyelid retraction, dermatochalasis, blepharochalasis, eyelid tumors, blepharospasm and facial nerve palsy
- Describe the process of cicatrisation affecting the eyelids, midface, and brow as it relates to ocular exposure
- Describe and recognise eyelid abnormalities
- Discriminate between upper and lower eyelid position with particular reference to dermatochalasis, retraction, entropion, ectropion, ptosis, and eyelid tumours
- Discriminate between full thickness eyelid defect or laceration requiring canalicular repair and partial thickness defects

Grafts
- Describe the types and indications for skin graft use
- Enumerate potential sources of graft material
- Explain the preparation of graft donor and recipient sites
- Explain the principles of graft care including post-operative complications and their management

Ectropion
- Detail the indications, pre-operative assessment and preparation required for ectropion repair
- Describe the surgical principles behind ectropion repair
- Diagnose and manage the common post-operative complications of ectropion repair
- Describe the anaesthetic options for ectropion repair
- Demonstrate competent performance of ectropion repair

Entropion
- Detail the indications, pre-operative assessment and preparation required for entropion repair
- Describe the surgical principles behind entropion repair

- Diagnose and manage the common post-operative complications of entropion repair
- Describe the anaesthetic options for entropion repair
- Demonstrate competent performance of entropion repair

Cicatricial lid abnormalities

- Detail the indications, pre-operative assessment and preparation required for repair of cicatricial lid abnormalities
- Describe the surgical principles of cicatricial lid repair
- Diagnose and manage the common post-operative complications of cicatricial lid repair
- Describe the anaesthetic options for cicatricial lid repair
- Demonstrate competent performance of cicatricial lid repair including use of grafts
- Describe the cosmetic options following cicatricial lid repair

Complex eyelid laceration repair

- Detail the pre-operative assessment and preparation required for repair of complex eyelid laceration
- Describe the surgical principles of complex eyelid laceration repair
- Diagnose and manage the common post-operative complications of complex eyelid laceration repair
- Describe the anaesthetic options for complex eyelid laceration repair
- Demonstrate competent performance of complex eyelid laceration repair
- Describe the cosmetic options following complex eyelid laceration repair

TEACHING AND LEARNING

How trainees develop the knowledge and skills to enable them to achieve subspecialist learning outcomes.

Knowledge

Didactic teaching, self-study, writing comments and engaging in discussion in the virtual learning environment, watching videos and animations and checking own learning through online quizzes, clinical conferences and mortality/morbidity seminars.

Clinical skills

Learning through active observation and emulation, practise, and repeat the ‘observe/emulate/practise’ cycle until the trainee has developed the clinical skill well enough to meet course learning outcomes.

Technical skills

Observe and practise each skill repeatedly until course learning outcomes are met.

ASSESSMENT AND FEEDBACK

Trainees show that they are working towards the attainment of course learning outcomes. In the online course this will be through participation in quizzes. Face to face assessment will be through case-based discussion with mentors and developing further through regular guidance and appraisal of their progress. Trainees finally demonstrate

that they have achieved course learning outcomes by passing the summative online/written test of knowledge and OSATS and DOPS for procedural skills.

These will be assessed during the course, until trainees achieve satisfactory results.

Module 3: Trauma and Socket Management Post Eye Removal Procedures

OVERALL OBJECTIVES

The objectives of module 2 are to enable trainees to:

- Evaluate the options for treatment of traumatic injury to the eye and ocular adnexa
- Describe the epidemiology, presentation, examination and therapeutic options for retinoblastoma, ocular surface tumours, and orbital tumours
- Competently undertake exenteration and socket repair

Trainees are expected to be able to:

Knowledge

- Describe the anatomy of eyeball, orbit and ocular adnexa
- Describe the anatomy of the bony orbit, paranasal sinuses and nasal cavity
- Describe the anatomy of the lacrimal drainage system.

COURSE TOPICS AND INTENDED LEARNING OUTCOMES

At the end of the study of each topic below, trainees are expected to be able to:

Epidemiology

- Outline the prevalence of ocular injuries and ocular tumours with particular reference to retinoblastoma, ocular surface tumours and orbital tumours
- Describe the epidemiology of these conditions

The Orbit

- Describe the Anatomy of the orbit
- Describe the assessment, investigation and management options for trauma affecting the orbit
- Describe the assessment, investigation and management options for retinoblastoma and other intraocular tumours
- Describe the assessment, investigation and management options for ocular surface and orbital tumours

Socket

- Describe the various approaches to orbitotomy
- Describe the various approaches to canthotomy and canthoplasty
- Describe the various approaches to socket reconstruction

Exenteration (including eyelid sparing surgery)

- Detail the indications, pre-operative assessment and preparation required for exenteration

- Describe the surgical principles of exenteration
- Diagnose and manage the common post-operative complications of exenteration
-
- Demonstrate competent performance of exenteration surgery (including eyelid sparing surgery)
- Demonstrate simple peri-ocular flap rotations to cover large defects following exenteration
- Describe the aesthetic options for exenteration

Socket repair

- Detail the indications, pre-operative assessment and preparation required for socket repair
- Describe the surgical principles of socket repair
- Diagnose and manage the common post-operative complications of socket repair
- Describe the anaesthetic options for socket repair
- Demonstrate competent performance of socket repair
- Describe the cosmetic options following socket repair including prosthesis

TEACHING AND LEARNING

How trainees develop the knowledge and skills to enable them to achieve subspecialist learning outcomes.

Knowledge
Didactic teaching, self-study, writing comments and engaging in discussion in the virtual learning environment, watching videos and animations and checking own learning through online quizzes, clinical conferences and mortality/morbidity seminars.

Clinical skills
Learning through active observation and emulation, practise, and repeat the ‘observe/emulate/practise’ cycle until the trainee has developed the clinical skill well enough to meet course learning outcomes.

Technical skills
Observe and practise each skill repeatedly until course learning outcomes are met.

ASSESSMENT AND FEEDBACK

Trainees show that they are working towards the attainment of course learning outcomes, in the online course in oculoplastics through participation in quizzes and develop further based on regular guidance and appraisal of their progress. Trainees finally demonstrate that they have achieved course learning outcomes.

Module 4: Blepharoptosis

OVERALL OBJECTIVES

The objectives of the Oculoplastic course (online and hands-on components) are to enable trainees to:

- diagnose and assess the patient with blepharoptosis
- evaluate the options for treatment of blepharoptosis
- demonstrate competent assessment, performance and management of blepharoptosis corrective surgery including use of various synthetic and non-synthetic materials

Knowledge
- Describe in detail the anatomy of eyelid and ocular adnexa
- Explain the different types of blepharoptosis

Clinical skills
Take detailed and relevant patients' history.

Technical skills
- Examine in detail the eyelid position, margin alignment
- Suture using micro-sutures to the tarsal plate and skin

COURSE TOPICS AND INTENDED LEARNING OUTCOMES

At the end of the study of each topic below, participants are expected to be able to:

Epidemiology
- Outline the prevalence of blepharoptosis
- Describe the epidemiology blepharoptosis
- Enumerate the risk factors for developing acquired blepharoptosis and how to prevent them
- Describe associations with complex congenital ptosis

The Eyelid
- Describe the anatomy and physiology of the eyelid
- Describe the protective eye mechanisms (PEM) that determine full correction/undercorrection in blepharoptosis
- Describe the relationship between the eyelids, midface, and brow to blepharoptosis
- Describe and recognise eyelid abnormalities
- Discriminate between upper and lower eyelid position with particular reference to dermatochalasis, retraction, entropion, ectropion, and eyelid tumours.

Blepharoptosis surgery
- Detail the indications, pre-operative assessment and preparation required for surgical correction of blepharoptosis
- Describe the surgical principles behind blepharoptosis surgical correction
- Diagnose and manage the common post-operative complications of blepharoptosis surgery
- Describe the anaesthetic options for blepharoptosis surgery
- Demonstrate competent performance of levator resection and brow suspension surgeries
- Describe the cosmetic options following blepharoptosis surgery

Grafts

- Describe the types and indications for graft use in ptosis correction
- Enumerate potential sources of graft material
- Explain the preparation of graft donor
- Explain the post-operative complications and their management

TEACHING AND LEARNING

How trainees develop the knowledge and skills to enable them to achieve subspecialist learning outcomes.

Knowledge

Didactic teaching, self-study, writing comments and engaging in discussion in the virtual learning environment, watching videos and animations and checking own learning through online quizzes, clinical conferences and mortality/morbidity seminars.

Clinical skills

Learning through active observation and emulation, practise, and repeat the 'observe/emulate/practise' cycle until the trainee has developed the clinical skill well enough to meet course learning outcomes.

Technical skills

Observe and practise each skill repeatedly until course learning outcomes are met.

ASSESSMENT AND FEEDBACK

Trainees show that they are working towards the attainment of course learning outcomes. In the online course this will be through participation in quizzes, (either standard multiple choice or image-based) in the regional setting this will be through case discussion with mentors and developing further through regular guidance and appraisal of their progress. Trainees finally demonstrate that they have achieved course learning outcomes by passing the summative online/written test of knowledge and OSATS and DOPS for procedural skills (aponeurotic repair/reattachment, levator resection, tarso-frontal sling surgery).

ASSESSMENT AND FEEDBACK

Feedback on learning and progress is provided throughout the hands-on course.
Summative assessment is through Objective Structured Clinical Examination (OSCE).

The table below details procedures and assessment criteria.

Procedure		**Novice** (score = 2)	**Beginner** (score = 3)	**Advanced Beginner** (score = 4)	**Competent** (score = 5)	**Not applicable. Done by preceptor** (score= 0)
1	**Draping**	Is unable to prepare or drape the patient using sterile technique without instruction. Unaware of importance of identifying correct eye and procedure prior to draping.	Is able to prepare and drape the patient but sterile technique is inconsistent. Difficulty attaining proper head position.	Is able to consistently prepare and drape patients using sterile technique however steps are performed inefficiently. Attains proper head position.	Is able to consistently and efficiently prepare and drape patients with appropriate head position.	
2	**Tumour excision and conjunctival closure**	Is unable to excise ocular surface tumours and close the conjunctiva. Unable to differentiate Tenon's capsule from conjunctiva. Unable to differentiate wing sutures from mattress sutures and running sutures	Is able to excise ocular surface tumours and perform basic conjunctival closure technique but is inefficient and requires significant guidance. Additional sutures are	Is able to excise ocular surface tumours and safely close conjunctiva with good tissue approximation but is inefficient.	Is able to excise ocular surface tumours and safely and efficiently close conjunctiva with good tissue approximation	

		and when appropriate to place.	required. May have buttonhole of conjunctiva.			
3	Entropion correction by tarsal fracture and eyelid margin rotation	Is unable to identify the distal tarsal sulcus to be incised. Unable to incise the tarsus and pass everting eyelid margin sutures	Is able to identify the distal tarsal sulcus to be incised, incise the tarsus but unable to pass everting eyelid margin sutures	Is able to identify the distal tarsal sulcus to be incised, incise the tarsus and pass everting eyelid margin sutures but lacks good apposition/acceptable eversion	Is able to identify the distal tarsal sulcus to be incised, incise the tarsus and pass everting eyelid margin sutures with acceptable eyelid margin eversion and eyelids apposition	
4	Ectropion/cicatricial eyelid correction with full thickness skin graft	Is unable to prepare the recipient bed for grafting by scar excision, measure appropriate graft size, identify possible donor sites, harvest and suture the graft	Is unable to prepare the recipient bed for grafting by scar excision, but can measure appropriate graft size and identify possible donor sites. Is unable to harvest and suture the graft	Is able to prepare the recipient bed for grafting by scar excision, measure appropriate graft size, identify possible donor sites, harvest and suture the graft, however with not too good cosmetic results	Is able to prepare the recipient bed for grafting by scar excision, measure appropriate graft size, identify possible donor sites, harvest and suture the graft with good cosmetic results	
5	Blepharoptosis-levator resection/aponeurosis reattachment	Is unable to make appropriate skin crease incision, dissect to the tarsus, identify the levator aponeurosis and resect/reattach the aponeurosis to the tarsus	Is able to make appropriate skin crease incision, dissect to the tarsus, but cannot identify the levator aponeurosis, appropriately	Is able to make appropriate skin crease incision, dissect to the tarsus, identify the levator aponeurosis, appropriately resect or reattach the aponeurosis to the	Is able to make appropriate skin crease incision, dissect to the tarsus, identify the levator aponeurosis, appropriately resect or reattach the aponeurosis to the	

			resect or reattach the aponeurosis to the tarsus	tarsus however with not too good cosmetic results	tarsus with good cosmetic results	
6	Orbital soft tissue reconstruction	Is unable to prepare the socket bed for grafting, measure appropriate graft size, identify possible donor sites, harvest and suture the graft	Is unable to prepare the socket bed for grafting, but can measure appropriate graft size and identify possible donor sites. Is unable to harvest and suture the graft	Is able to prepare the recipient bed for grafting, measure appropriate graft size, identify possible donor sites, harvest and suture the graft, however with not too good cosmetic results	Is able to prepare the recipient bed for grafting, measure appropriate graft size, identify possible donor sites, harvest and suture the graft, however with good cosmetic results	
7	Orbitotomy	Is unable to identify and make the appropriate incisions into the orbit, dissect the orbital tissue planes, carry out the appropriate intervention and close the wound	Is able to identify and make the appropriate incisions into the orbit, but cannot dissect the orbital tissue planes, carry out the appropriate intervention and close the wound	Is able to identify and make the appropriate incisions into the orbit, dissect the orbital tissue planes, but cannot carry out the appropriate intervention and close the wound	Is able to identify and make the appropriate incisions into the orbit, dissect the orbital tissue planes, carry out the appropriate intervention and close the wound	
8	Eyelid-sparing exenteration	Is unable to make the appropriate incisions and dissection into the orbit, excise the orbital tissue, control bleeding and close the wound	Is able to make the appropriate incisions but unable to perform dissection of the orbit, excise the orbital tissue, control bleeding	Is able to make the appropriate incisions, perform tissue dissection into the orbit, excise the orbital tissue, control bleeding and directly close the wound	Is able to make the appropriate incisions, perform tissue dissection into the orbit, excise the orbital tissue, control bleeding, directly close the wound and also raise	

			and close the wound		rotation flaps to cover large defects	
9	Complex eyelids laceration repair	Is unable to adequately debride the wound, dissect tissue plane, measure the residual defect and raise peri-ocular rotation flaps to cover the defect	Is able to adequately debride the wound, dissect tissue plane, measure the residual defect but cannot raise peri-ocular rotation flaps to cover the defect	Is able to adequately debride the wound, dissect tissue plane, measure the residual defect and raise peri-ocular rotation flaps to cover the defect however, cosmetic appearance is not ideal	Is able to adequately debride the wound, dissect tissue plane, measure the residual defect and raise peri-ocular rotation flaps to cover the defect with acceptable cosmetic appearance	

Module 5: Dissertation writing, consolidate surgical skills and revision, tidying up and exams

Using the skills gained from module 1 the trainee will discuss a topic for their dissertation with their mentors. It is expected they will work on their dissertation throughout the training using this final period to refine and produce the completed document. Support in this process will be by one to one meetings with a trainer assigned to them for this purpose. The expectations, structure and marking of the dissertation are outlined in the dissertation module.

MINIMUM REQUIREMENTS FOR ACCREDITATION FOR THE SUBSPECIALTY FELLOWSHIP TRAINING PROGRAMME

1. **FUNDAMENTAL REQUIREMENTS**

The centre must possess full accreditation of the West African College of Surgeons for Membership training in Ophthalmology

2. **PERSONNEL REQUIREMENTS (30%)**

1. At least 1 Oculoplasty Ophthalmologist who has been designated as a subspecialist and trainer in Orbit and Oculoplasty by the West African College of Surgeons
2. The ratio of trainers to fellows must not be more than 1:2 at any particular time
3. One or more clinical faculty members who have completed the fellowship program at least 5 years and have also completed 3 years of practice experience in the subspecialty. They should:

- Possess appropriate clinical and teaching skills either by subspecialty training or by subspecialty oriented clinical practice
- Demonstrate a strong interest in the education of fellows
- Possess sound clinical research and/or teaching abilities, support goals and objectives of programs, participate in scholarly, activities and be committed to their own continuing education
- Have regular scheduled (minimally every quarter) documented meeting in order to review the program's goals and objectives as well the program 's effectiveness in achieving its goals and objectives

3. **INFRASTRUCTURE REQUIREMENTS (20%)**

In addition to the infrastructure and equipment requirements for accreditation for Membership training, the following minimum requirements must be met before a centre may be accredited:

1. 2 Angle-poise lamps in the clinic
2. Imaging viewing box in the clinic and theater
3. Operating light in the theatre
4. Loupe for minor procedures
5. 1 Adjustable operating table
6. Complete sets of instruments for lid procedures, orbitotomy and dacryology (annex)
7. Facilities for cryotherapy and/or laser thermotherapy in treatment of intraocular retinoblastoma

4. **CLINIC DAYS, THEATRE DAYS, WARDROUNDS (20%)**

A minimum of:

- 1 general clinic day per week
- 1 Subspecialty clinic day per week separate from the general clinic

- 1 theatre day per week dedicated to the subspecialty cases
- 1 teaching round per week

5. SURGICAL VOLUME (20%)

The minimum number of surgical cases that must be performed at the centre annually are listed below:

1. Ptosis correction (5)
2. Ectropion correction (10)
3. Entropion correction (10)
4. Severe lid trauma repair (10)
5. Enucleation with orbital implant (20)
6. Evisceration with/without implant (20)
7. Exenteration- lid sparing/radical with defect repair (5)
8. Orbitotomies (5)
9. Incision/excision biopsies (10)
10. DCR with/without intubation (3)
11. Punctoplasty (5)
12. Syringing and probing (10)

6. STRUCTURED TEACHING (10%)

- The center should have a Training Coordinator for the fellowship training program
- Training coordinators must organize regular teaching sessions /demonstrations with the fellow(s)
- These regular teaching sessions must include the following:
    - Journal clubs
    - Departmental seminars
    - Grand ward rounds
    - Clinical presentation sessions

Appendix

DCR set
Kerrison bone punch- 3 sizes
Catpaw retractor
Desmarre retractor
Barde parker blade holder
Toothed forceps- 1:2, 2:3
Periosteal elevator
Blunt dissecting forceps
Puntum dilator
Bowman’s probe- complete set
Lacrimal canula
Needle holder
Artery forceps
Functional sunction machine
Functional diathermy machine

Orbitotomy set
Kerrison bone punch
Catpaw retractor

Desmarre retractor
Langenbeck retractor
Malleable brain retractor
Lid guard
Barde parker blade holder
Toothed forceps- 1:2, 2:3
Periosteal elevator
Blunt dissecting forceps
Needle holder
Artery forceps: different sizes
Functional sunction machine
Functional diathermy machine

Eyelid surgical set
Catpaw retractor
Desmarre retractor
Barde parker blade holder
Lid guard
Toothed forceps- 1:2, 2:3
Blunt dissecting forceps
Needle holder
Artery forceps
Functional diathermy machine

WACS Paediatric and Strabismus Subspecialist Curriculum

Background

Paediatric Ophthalmology and Strabismus curriculum was developed to cover a wide and expanded spectrum of clinical conditions that routinely present to the specialist in West African sub-region.

There are few number of Paediatric Ophthalmology specialists to a large and mostly young population in the sub-region where about 44% of the population are children under 15 years, it is expedient that the specialist is able to competently assess, plan, manage and provide training covering different types of diseases as well as work in conjunction with other ophthalmologists and critical stakeholders for early detection and early intervention for optimal visual outcome. The curriculum is built on having adequate knowledge of general ophthalmology and specialist level expertise covering: Basic Paediatric Ophthalmology, Paediatric cataract, Strabismus, Paediatric glaucoma, Retinoblastoma, Retinopathy of prematurity, Congenital Naso- Lacrimal Duct Obstruction management in addition to Teaching and Management skills

Duration:

Prerequisites

All candidates should have MWACS or equivalent.

Overview

Module 1: Basic paediatric ophthalmology skills [clinical & technical] (3 months)
Module 2: Paediatric cataract module
Module 3: Strabismus module
Module 4: Paediatric glaucoma module
Module 5: Retinoblastoma module
Module 6: Dissertation writing, consolidate surgical skills and revision, tidying up and exams
Appendix: Additional topics, teaching and management skill sets

Logbook

Clinical cases

It is expected that at least 4 entries are summarized and documented in the training record logbook, every four months, representing the trainees experience in patient evaluation, investigation, treatment and outcome. Clinical cases may be drawn from the range of conditions listed under each module. Each trainee is expected to document not more than 2 examples of the same condition.

Logbook assessment criteria

Aim: to supply a clear, accurate record of the participant's clinical practice.
These are the characteristics of a satisfactory Logbook.

1. The patient profile is supplied (age, sex, general health, including relevant co-morbidities
2. The steps taken to evaluate and investigate the patient's condition are provided

3. Clear details of the treatment including any modifications made with reasons are included
4. Any complications are detailed and actions taken to mitigate these are described
5. Outcomes are detailed with dates
6. Each Logbook is signed off by the clinician who supervised the case.

The following information should be included in the training record:

Patient evaluation	Date	
	Hosp No.	
	Name of Patient	
	Age	
	Sex	
	Pre-op Visual acuity	
	Visual Acuity Method/Chart Used	
	Type/Aetiology of Cataract	
	Pupil	
	Lens Morphology	
	IOP	
	Other findings-Ocular e.g. Nystagmus, strabismus, microphthalmous etc.	
Investigations	Systemic associations e.g. syndromes, cardiac anomalies etc.	
	BIOMETRY (AXL, K1,K2, IOL power)	
	B-Scan	
Treatment	Surgical procedure	
	Performed /Performed under Supervision/ Assisted	

	Complication-Intra-op	
	Optical Rehabilitation	
	Post-op complication-VAO, Glaucoma, Amblyopia	
Outcome	VA Day 1	
	VA ≥6weeks	
	Final outcome (As at when?)	
Key Learning points	Key Learning points	
	Other COMMENTS	
Comments and signature of trainer		

Module 1: Introduction

Duration: 3 months

Research and dissertation module: 2 months

Introduction basic paediatric ophthalmology skills (1 month):

Trainees shall be able to:

- Examine a child
- Assess vision in different ages of child
- Plan Amblyopia Management
- Use a portable slit lamp
- Carry out paediatric refraction and prescribe glasses including reading additions in children following paediatric cataract surgery
- Perform and interpret indirect ophthalmoscopy
- Do ultrasound and biometry in children
- Describe IOP measurement principals using-Goldmann, ICare, Tonopen, Perkins & Pulsair
- Demonstrate competence in IOP measurement using at least two of the above insturments
- Draw on experience of a minimum of 100 adult cataract operations
- Close corneo-scleral wounds
- Counsel care givers
- Diagnose and manage paediatric low vision
- Identify and evaluate the risk factors of general anaesthesia
- Prepare the patient for safe anaesthesia

Assessment
DOPS

Module 2: Paediatric Cataract

OVERALL OBJECTIVES

The objectives of the paediatric cataract module (online and hands-on components) are to enable trainees to:

- Diagnose and assess a patient with paediatric cataract
- Evaluate the options for optical, medical and surgical treatment of paediatric cataract
- Prepare the child and competently perform paediatric cataract surgery
- Demonstrate competence in post-operative management with specific reference to: visual rehabilitation, opacification of the visual axis, amblyopia and aphakic glaucoma

Course Topics and Intended Learning outcomes

BLENDED LEARNING COURSE

At the end of this course trainees are expected to be able to:

1. **Epidemiology**
   - Describe the epidemiology of childhood cataract
   - Describe the impact of paediatric cataract in the individual and community

2. **The Paediatric lens**
   - Describe the anatomy and embryology of the lens
   - Describe the classification and aetiology of paediatric cataract
   - Describe the differences between an adult and paediatric lens

3. **Clinical Trials**
   - Outline the key clinical studies in paediatric cataract
   - Explain the practical implications of these studies in clinical management

4. **Clinical Evaluation**
   - Demonstrate competency in history taking, and assessment of a child with cataract
   - Explain the rationale of key investigations for paediatric cataract: B-Ultrasound, Biometry, refraction, Cardiac evaluation
   - Interpret findings of B-Ultrasound, biometry and refraction in children with paediatric cataract
   - Demonstrate competency in drawing up a management plan for children with paediatric cataracts

5. **Paediatric Cataract Surgery**

- Detail the indications and contraindication for paediatric cataract surgery
- Describe the principles of paediatric cataract surgery
- Describe the various techniques for paediatric cataract surgery
- Describe the set up for vitrectomy, keratometer and ultrasound machines
- Describe the steps in performing paediatric cataract surgery

6. Post-operative paediatric cataract management

Describe the principles of post-operative management of paediatric cataract in terms of:

- Visual rehabilitation
- Opacification of the visual axis
- Amblyopia
- Aphakic glaucoma

7. Prevention

a) Primary prevention
   I. Family screening
   II. Antenatal screening
   III. Rubella immunization
   IV. Ocular Trauma prevention
b) Secondary prevention
   I. Early detection and referral
   II. Red reflex test
   III. Early surgery where indicated
c) Tertiary prevention
   I. Amblyopia management
   II. Low vision rehabilitation

Mode of Assessment

Seminar presentation, journal reviews, grand rounds

Hands-on Learning Course

Clinical skills

Able to:

- Take a history
- Carry out pre-operative evaluation of the child with cataract, identifying the indications and contraindications for cataract surgery:
  - Assess risk factors for paediatric cataract
  - Determine the type of cataract (slit lamp, indirect ophthalmoscopy)
  - Use the following diagnostic tools - perform and interpret:
    - Biometry
    - B-scan ultrasonography
    - indirect ophthalmoscopy
  - Ensure fitness for anaesthesia
- Determine:
  - The goal(s) of surgery
  - The timing of surgery
- Avoid and manage identified risk factors for complications:
  - ocular

        - systemic
        - ocular surface management
        - co-existing pathology e.g. rubella, cardiac problems, microcornea
        - Previous surgery
        - Systemic disease
    - Counsel the patient and caregivers and obtain consent for cataract operation
    - Plan postoperative management

    - Carry out post-operative management following cataract surgery:
        - Evaluate
            - clarity of visual axis
            - IOP
            - Refraction: eye glasses prescription, contact lenses
            - Amblyopia
        - Manage medication
        - Identify and manage post-operative complication:
            - Visual axis opacification
            - state of the wound
            - IOP
            - Endophthalmitis
            - Retinal detachment.
    - Participate in an audit of clinical outcome

Mode of Assessment
The trainee will be observed examining a child, demonstrating the ability to assess general appearance, visual behaviour and visual acuity.
To demonstrate use of the equipment in clinic, wetlab and theatre.
Case based testing: patient case presentation, counselling.

Cataract Surgical skills: SURGERY/TECHNIQUES
Able to:
- Perform cataract surgery:
    - ECCE
    - Lensectomy
    - Primary posterior capsulectomy
    - anterior vitrectomy ± IOL Implantation

Cataract surgical steps
- Conjunctival peritomy and dissection
- Wound construction
- Anterior capsulectomy
- Lens aspiration
- Posterior capsulotomy
- Anterior vitrectomy
- Intra-ocular lens insertion
- Corneo/sclera wound closure
- Conjunctival closure
- Administer Intra-op medication

Mode of Assessment

Direct observation of procedural skill and using OSCAR rubrics. Assist and assess then submit a signed logbook/portfolio/case based discussions.

TEACHING AND LEARNING

Mode of teaching

Pre- and post-course video sessions/DVD/Online resources, discussions, lectures, hands-on in clinic, theatre, community

ASSESSMENT AND FEEDBACK

One on one.

Logbook entry topics

1. Congenital unilateral cataract in a child under 2 years old
2. Congenital bilateral cataract in a child under 2 years old
3. Developmental unilateral cataract in a child over 2 years old
4. Developmental bilateral cataract in a child over 2 years old
5. Traumatic cataract in a child of any age
6. Aphakic/Pseudophakic glaucoma
7. Secondary visual axis opacitfication
8. Uveitic cataract in a child of any age
9. Paediatric cataract with systemic associations/syndrome
10. Amblyopia secondary to paediatric cataract

ICO-Ophthalmology Surgical Competency Assessment Rubric: Pediatric Cataract Surgery (ICO-OSCAR: Pediatric Cataract Surgery)

See table below.

Date _____ Resident _____ Evaluator _____		Novice (score = 2)	Beginner (score = 3)	Advanced Beginner (score = 4)	Competent (score = 5)	Not applicable. Done by preceptor (score= 0)
1	Draping:	Unable to start draping without help.	Drapes with minimal verbal instruction. Incomplete lash coverage.	Lashes mostly covered, drape at most minimally obstructing view.	Lashes completely covered and clear of incision site, drape not obstructing the view.	
2	Incision (corneal or corneo-scleral) &paracentesis: formation& technique	Inappropriate incision architecture, location, and size.	Leakage and/or iris prolapse with local pressure, provides poor surgical access to and visibility of capsule and bag.	Incision either valvular or of good internal length not both.	Incision parallel to iris, valvular and of good internal length provides good access for surgical maneuvering.	
3	Staining of the anterior capsule	Unsure about the technique of injecting 0.1%Trypan Blue dye, the amount to be injected and the waiting time before washing off the dye to stain the anterior capsule.	Knows the technique but requires instruction on injecting, waiting time. Anterior chamber fluctuates while injecting the dye. Does not use sterile air to protect the corneal endothelium. Administers incorrect amount or washes off the dye too quickly.	Requires no instruction. Uses adequate sterile air bubble to protect the corneal endothelium. Administers adequate amount and waits for adequate time. Washes off the dye with saline a little too early causing improper and patchy staining of the capsule. May cause endothelial staining due to excess trypan or inadequate air bubble.	Administers adequate amount. . Uses adequate sterile air bubble to protect the corneal endothelium Waits for one minute and or wait for the dye to stain the anterior capsule uniformly and then washes away the dye with saline. The anterior chamber remains stable during the whole process. There is no staining of the corneal endothelium.	

4	Viscoelastic: Appropriate use and safe Insertion	Unsure of when, what type and how much OVDto use. Has difficulty accessing anterior chamber through paracentesis. .	Requires minimal instruction. Knows when to use but administers incorrect amount or type.	Requires no instruction. Uses at appropriate time. Administers adequate amount and type. Cannula tip in good position. Unsure of correct OVD if multiple types available.	OVDs are administered in appropriate amount and at the appropriate time with cannula tip clear of lens capsule and endothelium. Appropriate OVDs used if multiple types of OVD are available.	
5	Anterior capsulorrhexis: commencement of flap& follow-through.	With Forceps: Instruction required, tentative, chases rather than controls rhexis, lens matter disruption may occur. With Vitrector: Instruction required for initiation of capsulorrhexis, unsure of vitrectomy settings, anterior chamber (AC) fluctuates frequently.	With Forceps: Minimal instruction, predominantly in control with occasional loss of control of rhexis, lens matter disruption may occur. With Vitrector: Minimal instruction needed, has knowledge of machine settings for capsulotomy, AC is stable throughout.	With Forceps: In control, few awkward or repositioning movements, no lens matter disruption. With Vitrector: In control, No lens matter disruption or AC fluctuation, Few awkward movements noticed.	With Forceps: Delicate approach and confident control of the rhexis, no lens matter disruption. With Vitrector: Has a sound knowledge of vitrector machine settings for capsulotomy, well controlled initiation and completion of rhexis.	
6	Anterior capsulorrhexis: Formation and circular completion	With Forceps or vitrector: Size and position are inadequate for a pediatric cataract.	With Forceps or vitrector: Size and position are barely adequate, difficulty achieving circular rhexis, tear may occur.	With Forceps or vitrector: Size and position are almost exact, shows control, and requires only minimal instruction. Nearly all of the optic edge covered by the capsule edge.	With Forceps or vitrector: Adequate size (5-6 mm) and position for pediatric cataract, no tears, rapid, unaided control of radialization, maintains control of the flap and AC depth throughout the capsulorrhexis.	

7	Hydrodissection:	Hydrodissection fluid not injected in sufficient quantity or place to achieve desired displacement of the soft nucleus. Unaware of contraindications to hydrodissection such as posterior polar cataract or a suspected preexisting posterior capsule dehiscence.	Multiple attempts required to achieve the desired displacement of the soft nucleus.	Fluid injected in appropriate location, has sound knowledge of contraindications to hydrodissection.	Adequate if free nuclear rotation with minimal resistance is achieved or adequate separation of nucleus and epinucleus from the cortex is obtained. Aware of contraindications to hydrodissection.	
8(a)	Aspiration probe and second instrument: insertion into eye	Has great difficulty inserting the probe or second instrument, AC collapses, may damage wound, capsule or Descemet’s membrane	Inserts the probe or second instrument after some failed attempts, may damage wound, capsule or Descemet’s membrane.	Inserts probe and second instrument on first attempt with mild difficulty, no damage to wound, capsule or Descemet’s membrane.	Smoothly inserts instruments into the eye without damaging the wound or Descemet's membrane.	
8(b)	Aspiration probe and second instrument: effective use and stability	Tip frequently not visible, has much difficulty keeping the eye in primary position and uses excessive force to do so.	Tip often not visible, often requires manipulation to keep eye in primary position.	Maintains visibility of tip at most times, eye is generally kept in primary position with mild depression or pulling on the globe.	Maintains visibility of instrument tips at all times, keeps the eye in primary position without depressing or pulling up the globe.	

9	Management of lens: aspiration technique	Great difficulty in aspirating the nucleus, introducing the tip under the capsulorrhexis border, position of aspiration hole not controlled, cannot regulate aspiration flow as needed, cannot peel cortical material adequately, and engages capsule or iris with aspiration port.	Moderate difficulty introducing aspiration tip under capsulorrhexis and maintaining hole up position, attempts to aspirate without occluding tip, shows poor comprehension of aspiration dynamics, cortical peeling is not well controlled, jerky and slow, capsule potentially compromised. Prolonged attempts result in minimal residual cortical material.	Minimal difficulty introducing the aspiration tip under the capsulorrhexis, aspiration hole usually up, cortex well engaged for 360 degrees, cortical peeling slow, few technical errors, minimal residual cortical material.	Aspiration tip is introduced into the nucleus to aspirate and then under the free border of the capsulorrhexis in irrigation mode with the aspiration hole up, Aspiration is activated in just enough flow as to occlude the tip, efficiently removes all cortex, The cortical material is peeled gently towards the center of the pupil, tangentially in cases of zonular weakness	

10	Primary posterior capsulorrhexis (PPC) initiation	Tentative, needs instructions, unable to clearly visualize the posterior capsule. **With Forceps:** Not sure if a nick has been made in the posterior capsule. Unable to grasp the lifted posterior capsule with forceps. **With Vitrector:** Struggles while making a sclerotomy site and inserting the irrigating cannula, Anterior chamber (AC) keeps fluctuating. Wrong site for initiating posterior capsulotomy.	Requires minimal instructions **With Forceps:** Able to clearly appreciate the posterior capsule and nick made with a cystitome and initiate PPC, moderate vitreous disturbance. Able to grasp the posterior capsule with minimal difficulty. **With Vitrector:** Needs minimal instructions while deciding the site and technique of sclerotomy, AC remains stable. Site of initiating the capsulotomy is correct.	**With Forceps:** In control, few awkward movements while making the nick and trying to grasp the posterior capsule, no vitreous disruption. **With Vitrector:** Performs proper sclerotomy and inserts infusion cannula with ease, AC does not fluctuate, visualizes the vitrector probe in the centre before starting capsulotomy, requires minimal instructions for initiating capsulotomy.	**With Forceps:** Able to grasp the posterior capsule with ease and at will. Delicate approach and confident control of the rhexis, no vitreous disruption. **With Vitrector:** Understands the difference in surgical anatomy of pars plana for age, makes a proper sclerotomy at the desired distance with an MVR blade, properly places the infusion port to maintain the AC, Starts posterior capsulotomy from the centre.	

11	Primary posterior capsulorrhexis (PPC) formation and completion	**With Forceps:** Poor control when proceeding with the capsulotomy. Vitreous disturbance occurs. Inadequate size and position of PPC. **With Vitrector:** Does not have knowledge of machine settings while performing capsulotomy and vitrectomy. Improper technique and inadequate size of capsulotomy. Peripheral extension of posterior capsular tear may occur.	**With Forceps:** predominantly in control with occasional loss of control of rhexis. Size and position are barely adequate, difficulty achieving circular rhexis, tear may occur. **With Vitrector:** Moderate difficulty in performing capsulotomy and vitrectomy, unable to decide if size of capsulotomyis adequate. Knowledge on machine settings not complete. Difficulty in achieving circular rhexis and may cause peripheral tears.	**With Forceps:** Able to proceed and complete capsulotomy with minimal instructions. Size and position are almost exact, shows good control. Needs minimal instructions if capsulotomystarts extendingperipherally. Able to use appropriate OVD to help facilitate PPC at appropriate stage **With Vitrector:** Able to perform adequate capsulotomy with ease. Has a sound knowledge on the change in settings while performing capsulotomy. Needs minimal instructions if capsulotomy starts extending peripherally.	**With Forceps:** Adequate size and position for age, no tears, rapid, unaided control of radialization, maintains control throughout. Able to manage independently if posterior capsulotomy starts extending peripherally.Able to use appropriate OVD to help facilitate PPC at appropriate stage **With Vitrector:** Adequate size (4-5 mm) and position for age, no tears. Has a sound knowledge on the change in settings while performing capsulotomy. Able to manage independently if posterior capsulotomy starts extending peripherally.	

12	Anterior vitrectomy	Needs Instruction, Difficulty in appreciating vitreous in anterior chamber or the bag, Technique of holding the bimanual irrigation cannula and vitrector is wrong, not sure of settings for vitrectomy. May cut the posterior capsule inadvertently.	Requires minimal instructions, holds the vitrector properly, minimal fluctuation in the anterior chamber during vitrectomy, able to appreciate the presence of vitreous. Unable to perform complete vitrectomy, stays too anterior in vitreous cavity. May cut the posterior capsule inadvertently.	Performs anterior vitrectomy with control, able to clear the anterior and posterior chamber free of vitreous but unable to judge if adequate vitrectomy has been performed, maintains the anterior chamber during vitrectomy. Maintains the posterior Capsulorrhexis margins intact. Peaking of posterior capsule due to inadequate vitrectomy may be noted.	Knows the goals of performing anterior vitrectomy in pediatric age. Knows the end point of complete anterior vitrectomy, Anterior and posterior chamber completely cleared of vitreous, adequate depth of vitrectomy performed in vitreous cavity all around the posterior Capsulorrhexis. Maintains the anterior chamber throughout.	
13	IOL insertion, rotation, and final position of intraocular lens	Unable to insert IOL, unable to produce adequate incision for implant **FOLDABLE:** unable to load IOL into injector or forceps, no control of lens injection, doesn't control tip placement, lens is not in the capsular bag or is injected upside down.	Insertion and manipulation of IOL is difficult, eye handled roughly, anterior chamber not stable, repeated attempts result in borderline incision for implant type **FOLDABLE:** difficulty loading IOL into injector or forceps, hesitant, poor control of lens injection, difficulty controlling tip placement, excessive manipulation required to get both haptics into capsular bag.	Insertion and manipulation of IOL is accomplished with minimal anterior chamber instability, incision just adequate for implant **FOLDABLE:** minimal difficulty loading IOL into injector of forceps, hesitant but good control of lens injection, minimal difficulty controlling tip placement, both haptics are in the capsular bag.	Insertion and manipulation of IOL is performed in a deep and stable anterior chamber and capsular bag, with incision appropriate for implant type. **FOLDABLE**: Able to load IOL into injector or forceps, lens is injected in a controlled fashion, fixation of IOL is symmetric; the optic and both haptics are inside the capsular bag.	

14	Wound closure (including suturing, hydration, and checking security as required)	When suturing is needed, instruction is required and stitches are placed in an awkward, slow fashion with much difficulty, astigmatism, bent needles, incomplete suture rotation and wound leakage may result, unable to remove OVDs thoroughly. Unable to make incision water tight or does not check wound for seal. Improper final chamber depth IOP	When suturing is needed, stitches are placed with some difficulty, resuturing may be needed, questionable wound closure with probable astigmatism, instruction may be needed, questionable whether all viscoelastics are thoroughly removed, Extra maneuvers are required to make the incision water tight at the end of the surgery. May have improper IOP.	When suturing is needed, stitches are placed with minimal difficulty tight enough to maintain the wound closed, may have slight astigmatism, viscoelastics are adequately removed after this step with some difficulty,The incision is checked and is water tight or needs minimal adjustment at the end of the surgery.May have improper IOP.	When suturing is needed, stitches are placed tight enough to maintain the wound closed, but not too tight as to induce astigmatism, OVDs are adequately removed, and the incision is checked and is water tight at the end of the surgery. Proper final IOP.	
Global Indices						
15	Wound neutrality and minimizing eye rolling and corneal distortion	Nearly constant eye movement and corneal distortion.	Eye often not in primary position, frequent distortion folds.	Eye usually in primary position, mild corneal distortion folds occur.	The eye is kept in primary position during the surgery. No distortion folds are produced. The length and location of incisions prevents distortion of the cornea.	
16	Use of dilating agents and devices	Does not have knowledge of dilating agents or devices	Has a good knowledge of dilating agents or devices but unsure of dose and technique.	Has adequate knowledge of dilating agents, of dose and devices but needs minimal instructions while usage	Has adequate knowledge of dilating agents, of dose and devices. Needs no instructions while performing the technique.	
17	Eye positioned centrally within microscope view	Constantly requires repositioning.	Occasional repositioning required.	Mild fluctuation in pupil position.	The pupil is kept centered during the surgery.	

18	Conjunctival and corneal tissue handling	Tissue handling is rough and damage occurs.	Tissue handling borderline, minimal damage occurs.	Tissue handling decent but potential for damage exists.	Tissue is not damaged nor at risk by handling.	
19	Intraocular spatial awareness	Instruments often in contact with capsule, iris and corneal endothelium**,**	Occasional accidental contact with capsule, iris and corneal endothelium.	Rare accidental contact with capsule, iris and corneal endothelium	No accidental contact with capsule, iris and corneal endothelium, when appropriate,	
20	Iris protection	Iris constantly at risk, handled roughly.	Iris occasionally at risk. Needs help in deciding when and how to use hooks, ring or other methods of iris protection.	Iris generally well protected. Slight difficulty with iris hooks, ring, or other methods of iris protection.	Iris is uninjured. Iris hooks, ring, or other methods are used as needed to protect the iris.	
21	Overall speed and fluidity of procedure	Hesitant, frequent starts and stops, not at all fluid.	Occasional starts and stops, inefficient and unnecessary manipulations common, case duration about 60 minutes.	Occasional inefficient and/or unnecessary manipulations occur, case duration about 45 minutes.	Inefficient and/or unnecessary manipulations are avoided, case duration is appropriate for case difficulty. In general, 30 minutes should be adequate.	

22	Communication with surgical team	Does not know role of surgical team members. Lacks confidence or has too much. Does not establish good rapport with team. Unable to request instruments from scrub nurse using proper instrument and suture names and/or instructions to surgical assistant are vague or nonexistent.	Knows role of most surgical team members. Lacks confidence. Has difficulty establishing good rapport with team members. Able to request most instruments from scrub nurse using proper instrument and suture names but instructions to surgical assistant are inadequate to perform procedure safely.	Knows role of each surgical team member. Is somewhat confident and usually treats team with respect. Establishes good working relationship. Able to request most instruments from scrub nurse using proper instrument and suture names in correct order. Instructions to surgical assistant are adequate for a skilled assistant but inadequate for an unskilled assistant.	Knows role of each surgical team member. Is confident and treats team with respect. Establishes good working relationship. Able to efficiently request instruments from scrub nurse using proper names in correct order. Able to consistently give clear instructions to surgical assistant.	

ICO-Ophthalmology Surgical Competency Assessment Rubric: Pediatric Cataract Surgery (ICO-OSCAR: Pediatric Cataract Surgery)

Comments:

Swaminathan M, Ramasubramanian S, Pilling R, Li J, Golnik KC. ICO-OSCAR for pediatric cataract surgical skill assessment. J AAPOS 2016; 20(4):364-5.

Module 3: Strabismus

OVERALL OBJECTIVES

The objectives of the strabismus module (online, hands-on and continuous in-clinic learning components) are to enable trainees to:

- Diagnose and assess a patient with strabismus
- Evaluate the options for optical, medical and surgical treatment of strabismus
- Prepare the child and competently perform strabismus surgery
- Demonstrate competence in post-operative management with specific reference to: undercorrection, overcorrection, and amblyopia

COURSE TOPICS AND INTENDED LEARNING OUTCOMES ONLINE/BLENDED LEARNING

At the end of this course trainees are expected to be able to:

1. **Epidemiology, classification and aetiology**
   - Describe the epidemiology of strabismus
   - Explain the impact of strabismus on the individual and community
   - Detail the classification and aetiology of strabismus

2. **Relevant Anatomy and Physiology**
   - Describe the anatomy of conjunctiva, tenons, pulleys, extraocular muscles, orbit, Cranial nerves
   - Explain the physiology of the eye movements
   - Detail the physiology of binocular single vision
   - Describe the process of normal and abnormal visual development in relation to amblyopia

3. **Clinical Trials**
   - Outline the key clinical studies in strabismus and amblyopia
   - Explain the practical implications of these studies in clinical management of strabismus and amblyopia

4. **Clinical Evaluation**
   - Take a history competently and assess an individual with strabismus
   - Draw up a management plan for individuals with strabismus

5. **Strabismus Surgery**
   - Detail the indications and contraindication for strabismus surgery
   - Describe the principles in strabismus surgery
   - Detail the various techniques for strabismus surgery
   - Describe the management of complications of strabismus surgery

ASSESSMENT AND FEEDBACK

Trainees show that they are working towards the attainment of course learning outcomes, and develop further based on regular guidance and appraisal of their

progress. Trainees finally demonstrate that they have achieved course learning outcomes.

Mode of Assessment: Seminar presentation, journal reviews, grand rounds

HANDS-ON LEARNING

Clinical skills
Able to:
- Take a history of an individual with strabismus
- Assess vision in children of different ages including children who are challenged

Perform:
- ophthalmic examination in a child
- Assessment of ocular movements
- Assessment of strabismus including use of prisms to measure angle in different positions of gaze
- Binocular tests: stereopsis and motor fusion
- Accurate Paediatric refraction
- Binocular Indirect ophthalmoscopy

Recognise and appropriately evaluate:
- More complex congenital ocular syndromes (e.g., bilateral Duane syndrome, Möbius syndrome, Brown syndrome).

Counsel the patient and caregivers regarding treatment plan and options as well as take consent for strabismus surgery
Carry out pre-operative evaluation of an individual with strabismus including ensuring fitness for surgery

Mode of Assessment
Direct observation of procedural skills (DOPS)
Observation of the examination of a child, demonstrating the ability to assess general appearance, visual behaviour and visual acuity
Objective structured assessment of technical skills (OSATS) to demonstrate use of the equipment in clinic through case based testing

Strabismus Surgical skills: SURGERY/TECHNIQUES
Able to:
Describe the technique and steps for
- Recession
- Resection
- Transposition
- Oblique muscle surgery
- Advancement
- “Y” splitting
- Faden sutures
- Posterior myopexy

Demonstrate competent performance of resection/recession and at least one other of the above procedures

Carry out the following strabismus surgical steps safely:

- Forced duction test
- Globe stabilization
- Conjunctival incision & Tenon’s dissection
- Hooking rectus muscle
- Exposure of rectus muscle
- Placement of suture in muscle
- Disinsertion of rectus muscle
- Use of caliper/scleral ruler
- Reattachment of muscle: Intrascleral needle pass
- Conjunctival closure (when appropriate)

ASSESSMENT AND FEEDBACK

Trainees show that they are working towards the attainment of course learning outcomes, and develop further based on regular guidance and appraisal of their progress. Trainees finally demonstrate that they have achieved course learning outcomes.

Mode of Assessment

Formative: Demonstrate use of equipment in wetlab.
Summative: Objective structured assessment of technical skills (OSATS) to demonstrate use of the equipment in clinic and theatre.

TEACHING AND LEARNING

How trainees develop the knowledge and skills to enable them to achieve subspecialist learning outcomes.

Teaching and learning activities for both the online/in clinic and hands-on learning

- Clinical demonstrations
- Theatre demonstrations
- Videos Wet lab sessions
- Training systems and resources
- Didactic Lectures
- Seminar Presentations
- Journal reviews/clubs
- Clinical/ ward rounds
- Stepped Surgery
- Recommended Textbooks and resources

Logbook entry topics

1. Congenital esotropia
2. Intermittent exotropia
3. Accommodative esotropia
4. Oblique muscle dysfunction (overaction/underaction)
5. Sensory esotropia
6. Sensory exotropia
7. Paralytic strabismus
8. Strabismic amblyopia

9. Consecutive strabismus
10. Restrictive strabismus

ASSESSMENT AND FEEDBACK

Trainees must show that they are working towards the attainment of course learning outcomes, in the online/blended course through participation in quizzes, and develop further based on regular guidance and appraisal of their progress. Trainees finally demonstrate that they have achieved course learning outcomes.

Assessment tasks:

- Observation of trainees as they carry out the clinical evaluation and surgical procedures
- DVD recording of trainee's surgery
- Use of the rubrics – OSCE (for surgery) and feedback
- Peer assessment, discussion and feedback
- Online/written
- Essay questions
- Multi-disciplinary meetings

ASSESSMENT AND FEEDBACK: HANDS-ON COURSE

Feedback on learning and progress is provided throughout the hands-on course. Summative assessment is through Objective Structured Clinical Examination (OSCE)

The table below details procedures and assessment criteria.
[Example – please write key criteria for the appropriate procedure/s]

2	Forced duction test	Is unaware of forced duction testing for muscle restriction.	Is familiar with the test but is unaware of its relevance, timing and is unable to perform it.	Is able to state the purpose of the test and is able to perform the test at the appropriate time(s) and detect moderate to severe restriction.	When appropriate, is able to consistently detect and describe all degrees of rectus muscle restriction and comment on relevance to surgical options.	
3	Globe stabilization	Is able to describe one method of globe stabilization but is unable to perform it.	Is able to describe one method of globe stabilization but needs assistance to perform it.	Is able to perform one method of globe stabilization with minimal verbal supervision.	Is able to perform one method of globe stabilization without verbal supervision and with ease.	
4	Conjunctival incision & tenon's dissection	Is unable to describe limbal or fornix conjunctival incision for rectus muscle surgery.	Is able to describe but not able to perform limbal or fornix conjunctival incision for rectus muscle surgery.	Is able to perform limbal or fornix conjunctival incisions but is inefficient and requires guidance.	Is able to efficiently perform either limbal or fornix conjunctival incision.	
5	Hooking rectus muscle	Is unable to describe proper technique of hooking the muscle and is unable to perform technique.	Is able to describe proper technique but unable to hook muscle on first attempt.	Usually hooks the muscle on first attempt but is inefficient.	Is able to efficiently and precisely hook the muscle on first attempt.	
6	Exposure of rectus muscle	Is unable to describe proper dissection technique to expose rectus muscle.	Is able to describe dissection technique for muscle exposure but requires constant guidance to perform the basic steps.	Is able to perform basic exposure but is inefficient and/or occasionally disrupts multiple tissue planes or branches of the anterior ciliary arteries.	Is able to efficiently expose muscle using a combination of sharp and blunt dissection as appropriate and avoids branches of anterior ciliary arteries.	

7	Placement of suture in muscle	Is unable to accurately describe muscle suture technique.	Is able to describe muscle suture technique. Multiple attempts required to load or unload the needle-holder. Suture placement inaccurate. Requires assistance to properly place suture.	Is able to safely secure muscle with suture but is inefficient. May cause bleeding and muscle fiber cuts. Needs supervision for locking bites at two ends of muscle.	Is able to safely, efficiently and accurately secure the muscle with minimal tissue trauma without supervision.	
8	Disinsertion of rectus muscle	Is unable to describe technique for rectus muscle disinsertion.	Is able to describe but attempts to disinsert the muscle results in inadvertently cutting or nearly cutting the muscle suture or sclera.	Is able to perform disinsertion but occasionally causes inappropriate bleeding or leaves muscle tissue attached to sclera. Requires some verbal instruction.	Is able to safely and efficiently disinsert rectus muscle.	
9	Use of caliper/scleral ruler	Is unable to mark the sclera with calipers or does not check the caliper setting to confirm planned action or is too aggressive with indenting the sclera with caliper. Does not understand the potential discrepancy between arc-length and chord-length measurement.	Is able to mark sclera with calipers or scleral ruler but measurement is often not perpendicular to the original rectus insertion. Checks caliper for correct measurement. Understands arc-length vs. chord length measurements.	Is able to accurately mark sclera with calipers and/or scleral ruler but marks fade because not prepared to make needle pass.	Is able to efficiently and accurately mark sclera with calipers and/or scleral ruler and is prepared to make needle pass immediately after marking sclera.	

10	Reattachment of muscle: Intrascleral needle pass.	Is unable to describe safe technique for intrascleral pass.	Is able to describe safe technique for intrascleral pass but does not approach the globe with needle directed tangentially or does not unlock needle holder before starting the intrascleral pass. Unable to accurately obtain correct needle depth or length.	Safely approaches the globe with needle tip directed tangential to the globe. Visualizes needle tip after entering the sclera and has no difficulty exiting the sclera but intrascleral passes are frequently too short or too shallow. Minimal muscle belly sagging.	Approaches the globe with needle directed tangentially and intrascleral passes are consistently of correct length and depth. No muscle belly sagging.	
11	Conjunctival closure (when appropriate)	Is unable to close conjunctiva. Unable to differentiate Tenon's capsule from conjunctiva.	Is able to perform basic conjunctival closure technique but is inefficient and requires significant guidance. Additional sutures are required.	Is able to safely close conjunctiva with good tissue approximation but is inefficient. .	Is able to safely and efficiently close conjunctiva with good tissue approximation.	
	Global Indices					
12	Maintaining hemostasis	Is unable to describe proper rectus muscle dissection, suture placement and disinsertion to avoid bleeding and/or unable to describe electrocautery technique.	Can describe techniques for avoiding and controlling bleeding but requires significant guidance to perform proper dissection, suture placement, muscle disinsertion and electrocautery to minimize bleeding.	Usually applies proper tissue technique to avoid bleeding and is able to control bleeding using electrocautery but requires multiple attempts to cauterize and may leave burnt carbon marks.	Consistently applies proper tissue technique to avoid bleeding and is able to efficiently control bleeding using electrocautery.	

13	Tissue handling	Is excessively aggressive or timid in manipulating tissue. Inadvertent tissue damage occurs (including significant corneal epithelium disruption).	Aware of techniques for avoidance of tissue damage and bleeding but needs supervision to accomplish proper handling. Mild corneal epithelium disruption may occur.	Tissue handling is safe but sometimes requires multiple attempts to achieve desired manipulation of tissue. Minimal corneal epithelium disruption may occur.	Tissue handling is efficient, fluid and almost always achieves desired tissue manipulation on first attempt.	
14	Knowledge of instruments	Can only identify instruments in simple terms such as “muscle hook” and “forceps” but no knowledge of necessary sutures or needle types.	Can identify some but not most of the surgical instruments by proper names and can identify necessary suture sizes and materials but not needle types.	Can identify most but not all of the surgical instruments by proper name and can identify necessary suture sizes/materials but not needle types.	Can identify all surgical instruments by proper names and can identify necessary suture sizes/materials and needle types.	
15	Technique of holding suture needle in needle holder	Frequently loads needle incorrectly.	Loads needle in proper direction for a forehand pass but sometimes loads incorrectly for backhand pass. Loads too close or too far from the swaged end of the needle.	Loads needle properly for forehand and backhand needle pass but is inefficient and often requires multiple attempts.	Loads needle properly and efficiently for forehand and backhand needle passes.	
16	Technique of surgical knot tying	Unable to tie knots.	Require multiple extra hand maneuvers to make first throw lay flat and/or loosens first throw while attempting to perform the second throw.	Is able to tie a flat surgeon’s knot first throw but second and third throws are inefficient. Does not inadvertently loosen the first throw.	Is able to efficiently tie a flat, square surgeon’s knot.	

17	Communication with surgical team	Does not know role of surgical team members. Lacks confidence or has too much. Does not establish good rapport with team. Unable to request instruments from scrub nurse using proper instrument and suture names and/or instructions to surgical assistant are vague or nonexistent.	Knows role of most surgical team members. Lacks confidence. Has difficulty establishing good rapport with team members. Able to request most instruments from scrub nurse using proper instrument and suture names but instructions to surgical assistant are inadequate to perform procedure safely.	Knows role of each surgical team member. Is somewhat confident and usually treats team with respect. Establishes good working relationship. Able to request most instruments from scrub nurse using proper instrument and suture names in correct order. Instructions to surgical assistant are adequate for a skilled assistant but inadequate for an unskilled assistant.	Knows role of each surgical team member. Is confident and treats team with respect. Establishes good working relationship. Able to efficiently request instruments from scrub nurse using proper names in correct order. Able to consistently give clear instructions to surgical assistant.	

ICO-Ophthalmology Surgical Competency Assessment Rubric: Strabismus (ICO-OSCAR: Strabismus)

Resident: _____ Evaluator: _____ Date: _____

Overall difficulty of procedure (circle): Simple Intermediate Difficult

Good points:

_____

Suggestions for development:

_____

Agreed action:

_____

Signature of Assessor: _____ Signature of Trainee: _____

Golnik KC, Motley WW, Atilla H, Pilling R, Reddy A, Sharma P, Yadarola MB, Zhao K. The ophthalmology surgical competency assessment rubric for strabismus surgery. J AAPOS 2012; 16(4):318-21.

Module 4: Paediatric Glaucoma

Goal
Specialist diagnosis and management of paediatric glaucoma

Objective
- To be able to diagnose, classify and manage paediatric glaucoma
- History taking and risk factor assessment for paediatric glaucoma
- Pre-operative evaluation of the child with glaucoma
    - Evaluation of the type of glaucoma (slit lamp, indirect ophthalmoscopy)
    - A/B-scan ultrasonography (to check Progression and assessment of post segment)

Knowledge
To be able to:
- Relate the anatomy of the anterior segment and in particular the angle to surgical decision-making; Cornea: diameter, Haab's striae, posterior embryotoxon, Iris, pupil, lens abnormalities
- Discuss the following about Tonometry:
    - different methods/tonometers available and how they compare
    - the factors that influence measurement
    - how different examination conditions maximize accuracy
    - correlate IOP with other findings
- Describe the principles underlying pachymetry, Gonioscopy, optic disc assessment
- Classify types of paediatric glaucomas
- Discuss the role of axial length measurements, B scan, perimetry results and their interpretation
- Discuss possible etiology, systemic association/syndromes underlying the glaucoma and how it impacts on the choice of treatment options
- Draw on evidence base for surgical management of paediatric glaucoma
- Discuss the Indications for paediatric glaucoma surgery and surgical options

- Discuss complications of glaucoma surgery including:
    - Intraoperative complications:
        - Tearing/Buttonholing of conjunctiva
        - Premature anterior chamber entry
        - Scleral flap complications
        - Suprachoroidal haemorrhage
    - Early post-operative complications
        - Conjunctival leak
        - Shallow anterior chamber and early hypotony
        - Early bleb/scleral flap failure
        - Aqueous misdirection
    - Late post-operative complications
        - Cystic blebs and late bleb leak
        - Cataract
        - Late hypotony
        - Overextending bleb
        - Bleb/trabeculectomy failure

        - Bleb related infection

- **Discuss the risk factors for failure and complications**
    - Previous surgery
    - Systemic disease e.g. rubella, phacomatosis, anterior segment dysgenesis
    - Discuss post-operative management
    - Post-op medications
    - Assessing surgical success and progression of glaucoma

ASSESSMENT AND FEEDBACK

Trainees show that they are working towards the attainment of course learning outcomes, and develop further based on regular guidance and appraisal of their progress. Trainees finally demonstrate that they have achieved course learning outcomes.

Mode of Assessment
Seminar presentation, journal reviews, grand rounds

SURGICAL SKILLS
Trabeculectomy
Trainees must be proficient at performing trabeculectomy:

- Conjunctival peritomy and dissection
- Application of antimetabolite
- Scleral flap formation
- Pre-placement of releasable sutures into scleral flap
- Sclerostomy
- Iridectomy
    - Assessment of aqueous flow through scleral flap
    - Watertight conjunctival closure
    - Use of anterior chamber maintainer when required
- Know when and how to remove releasable sutures post trabeculectomy
    - Diagnose and manage post-operative complications of trabeculectomy surgery
    - Manage the bleb and recognize the failing bleb
    - Demonstrate clinical skill in post-operative management of paediatric glaucoma

Trabeculotomy
Trainees must demonstrate knowledge of the steps to perform trabeculotomy and familiarity with the indications for this procedure alone and in combination with trabeculectomy together with the principals of post-operative management.

Teaching and learning activities
Practise the procedures in the wet lab under supervision. Observe, discuss, outline and practise the procedures with guidance in the operating theatre. Lectures, reading and videos for basic knowledge (online course). Observe and practise assessing patients in clinic in the post op period

Achieving the surgical skills set

- Lectures, reading and videos
- Wet lab practice/simulator
- Work with examples (cases) to practise identifying indications/contraindications for trabeculectomy and explaining why trabeculectomy is appropriate
- Practise using antimetabolites under supervision
- Practise identifying and explaining risk factors for failure and complications to patients undergoing trabeculectomy
- Watch and discuss videos of patient counselling and consent for trabeculectomy; identify critical stages of counselling
- Learning activities can be face to face and/or written, online, working in small groups and drawing on video material
- Observe and practise each skill repeatedly until these surgical skills learning outcomes are met.

Assessment methods for surgical skills acquisition

1. Pre course preparation of case studies: Presented and discussed
2. Extended matching questions (EMQs) - assessment of patient case study
3. Observation of role play/reviewing videos of trainees counselling patients and taking consent
4. Work–based assessments (taking consent for surgery and performing trabeculectomy stepped surgery)
5. Objective Structured Assessment of Technical Skills (OSATS) (Antimetabolite use)
6. OSATS for trabeculectomy

Logbook entry topics

ICO-Ophthalmology Surgical Competency Assessment Rubric: Trabeculectomy (ICO-OSCAR: Trabeculectomy)

Resident: _____ Assessor: _____ Year of Training: _____ Date: _____

Surgical step		Novice (score = 2)	Beginner (score = 3)	Advanced Beginner (score = 4)	Competent (score = 5)	Not applicable. Done by preceptor (score= 0)
1	Universal precautions	Has not heard of universal precautions.	Aware of time-out process but not confident to perform. May perform with guidance/ prompting, but misses some information.	Able to perform team time-out but needs prompting to do so.	Independently initiates team time-out at beginning of case, identifies correct patient, procedure and side. Team members have been introduced. Alerts / allergies noted.	
2	Draping and placement of speculum	Unable to start draping without help.	Drapes with minimal verbal instruction. Incomplete lash coverage.	Lashes mostly covered, drape at most minimally obstructing view. Attains proper head position.	Lashes completely covered and clear of incision site, drape not obstructing view.	
3	Corneal traction suture	Unable to describe purpose and method of inserting corneal traction suture.	Difficulty loading needle, needs instruction for correct needle placement and completion of suture placement.	Able to load and handle needle appropriately. Some difficulty in finding correct depth of suture, needs instruction, needle track too deep or too shallow or bite not of ideal size.	Is able to consistently perform the step with the appropriate length of bite, depth of suture and achieve the desired rotation of the eye for exposure.	

4	Conjunctival incision and dissection	Is able to describe but not able to perform limbal or fornix conjunctival incision for trabeculectomy surgery.	Is able to perform limbal or fornix conjunctival incision but is inefficient and requires guidance. Has difficulty with judging appropriate length of incision, dissection down to sclera of both conjunctiva and Tenon's and the necessary force to apply to the tissue. Has difficulty avoiding damage to the superior rectus muscle with limbal-based conjunctival flap.	Is able to perform limbal or fornix conjunctival incisions but is inefficient or tentative and requires guidance with technique and/or position and size of incision.	Performs conjunctival incision without creating buttonholes and with no disruption of adjacent tissues. Incision is of correct size (i.e. enough to give proper exposure for performance of posterior subTenon's dissection and formation of scleral flap.	
5	Hemostasis	Is unable to describe the need for hemostasis, type of cautery required, appropriate technique. Is unable to perform.	Is able to describe the need for hemostasis, type of cautery required, appropriate technique. Has difficulty performing proper technique.	Is able to apply cautery but has difficulty with scleral burns, shrinkage of tissue, obtaining hemostasis.	Is able to efficiently and precisely apply hemostasis without significant scleral burns, shrinkage of tissues and obtains hemostasis. Understands advantages and disadvantages of different types of cautery tips.	
6	Application of antimetabolite	Is unable to accurately describe role of antimetabolites in trabeculectomy, types of antimetabolites and the relative indication for use of each type, safety considerations and use of pledget material.	Is able to accurately describe role of antimetabolites in trabeculectomy, types of antimetabolites and the relative indication for use of each type, safety considerations and use of pledget material. Needs guidance for choice of anti-metabolite and exposure time. Needs guidance for fashioning of sponges.	Is able to safely apply antimetabolite onto eye but may have difficulty creating pledget material to appropriate size and thickness. Appropriately discards materials into toxic waste and rinses eye of residual antimetabolite material.	Is able to safely, efficiently and accurately, apply antimetabolite onto eye and has no difficulty creating pledget material to appropriate size and thickness. Appropriately discards materials into toxic waste and thoroughly rinses eye of residual antimetabolite material. Keeps surgical count of pledgets used.	

			Inefficient or inappropriate placement of sponges. Needs to be reminded to keep surgical count. Does not protect conjunctival edge. Inefficient removal of sponges and /or irrigation.			
7	Creation of scleral flap	Is unable to describe dissection technique for flap creation.	Is able to describe dissection technique for flap creation but requires constant guidance to perform the basic steps. Needs reminding to grasp sclera outside flap construction area.	Is able to perform basic flap creation but is inefficient and/or creates flaps that may be too thin, deep, small, or posterior or at risk of avulsion.	Is able to efficiently create flap to the appropriate size and depth without constant guidance. Able to describe the complications and management of faulty scleral flap creation including buttonholing and avulsion of the flap.	
8	Paracentesis	Puts anterior lens capsule or iris at risk when entering anterior chamber Inappropriate incision architecture, location, and size.	Needs instruction on how to perform. Leakage and/or iris prolapse with local pressure, provides poor surgical access.	Incision not in correct position or leaks.	Incision parallel to iris, self-sealing, adequate size, provides good access for surgical maneuvering.	
9 (a)	Sclerostomy (with kelly punch)	Has difficulty with entry into anterior chamber, either ineffective or trauma to ocular tissue. Uncontrolled entry into AC. Difficulty using Kelly punch.	Is able to create an entry plane into anterior chamber but has significant difficulty with using Kelly punch. Damages scleral flap. Makes sclerostomy too large /small or too anterior/posterior for appropriate filtration.	Is able to use the Kelly punch, but may be prone to creating a shelving wound with the punch. Makes sclerostomy too large or too small for appropriate filtration.	Is able to create an appropriate entry plane into the anterior chamber and is able to use Kelly punch with dexterity. Sclerostomy appropriate size for filtration.	

9 (b)	Sclerostomy (without kelly punch)	Needs constant direction. Size of sclerostomy inappropriate or not in correct position	Difficulty outlining and dissecting deep scleral flap. There may be damage to surrounding tissues.	Able to outline deep scleral flap and perform dissection, but has difficulty performing this smoothly, needs direction, unable to cleanly remove deeper scleral tissue.	Outlines deep scleral flap with ease, dissects flap sclera from underyling tissue without trauma to other structures, excises deep scleral flap cleanly. Deep scleral flap/ sclerostomy of appropriate size and correctly positioned. Avoids damage to the underlying ciliary body.	
10	Peripheral iridectomy (pi)	Cannot grasp iris tissue, damages surrounding structures.	Needs direction in grasping iris tissue and performing iridectomy. Unable to control size of PI.	Able to grasp iris tissue without damage to intraocular structures, but PI either too large or too small. May need more than one attempt	Able to grasp iris tissue without damage to surrounding structures, PI is of correct size.	
11	Scleral flap suturing	Instruction is required and stitches are placed in an awkward, slow fashion with multiple passes to sclera or tear of flap, bends needles, incomplete suture rotation.	Stitches are placed with some difficulty, re-suturing may be needed, instruction needed. Difficulty achieving proper IOP at end of case.	Stitches are placed with minimal difficulty; tight enough to achieve wound closure and allow for appropriate filtration.	Stitches are placed with correct tension to allow for appropriate filtration. Able to place both fixed and releasable sutures proficiently. Appropriate final IOP.	
12	Anterior chamber reformation	Cannot cannulate anterior chamber via paracentesis. Unable to assess whether anterior chamber of appropriate depth. Unable to assess whether IOP is	Has difficulty cannulating anterior chamber via paracentesis to reform anterior chamber. Needs guidance.	Cannulates anterior chamber with ease to reform anterior chamber, but has difficulty assessing ideal AC depth/IOP.	Cannulates AC with ease and is able to assess correct AC depth/ IOP for eye	

		satisfactory to proceed to next step.				
13	Conjunctival closure	Is unable to close conjunctiva. Unable to differentiate Tenon's capsule from conjunctiva.	Is able to perform basic conjunctival closure technique but is inefficient and requires significant guidance. Additional sutures are required. Significant bleb leak at the end of surgery with unstable, shallow anterior chamber. May have buttonhole of conjunctiva.	Is able to safely close conjunctiva with good tissue approximation but is inefficient. Requires guidance to ensure closure is effective without a leak. Placement of additional sutures or replacement of loose sutures required before closure is complete and Seidel negative.	Is able to safely and efficiently close conjunctiva with good tissue approximation, no bleb leak and stable anterior chamber. Has good understanding of various suture types, appropriate needles and different closure techniques.	
Global indices						
1	Maintaining hemostasis	Is unable to describe types of cautery, settings for cautery and/or unable to describe electrocautery technique.	Can describe techniques for avoiding and controlling bleeding but requires significant guidance to perform proper cautery to minimize bleeding.	Usually applies proper tissue technique to avoid bleeding and is able to control bleeding using cautery but requires multiple attempts to cauterize and may leave burnt carbon marks.	Consistently applies proper tissue technique to avoid bleeding and is able to efficiently control bleeding using cautery.	
2	Tissue handling	Is excessively aggressive or timid in manipulating tissue. Inadvertent tissue damage occurs to conjunctiva or sclera. Needs direction to grasp sclera outside margins of intended scleral flap.	Aware of techniques for avoidance of tissue damage and bleeding but needs supervision to accomplish proper handling. Needs direction to grasp sclera outside margins of intended scleral flap. Conjunctival buttonholes present.	Tissue handling is safe but sometimes requires multiple attempts to achieve desired manipulation of tissue. No direction required to avoid grasping sclera within margins of intended scleral flap. Conjunctiva is intact but manipulated aggressively/unsafely e.g. toothed forceps.	Tissue handling is efficient, fluid and almost always achieves desired tissue manipulation on first attempt. No conjunctival buttonholes present.	

3	Knowledge of instruments	Can only identify instruments in simple terms such as “scissors” and “forceps” but no knowledge of necessary sutures or needle types.	Can identify some but not most of the surgical instruments by proper names and can identify necessary suture sizes and materials but not needle types.	Can identify most but not all of the surgical instruments by proper name and can identify necessary suture sizes/materials but not needle types.	Can identify all surgical instruments by proper names and can identify necessary suture sizes/materials and needle types.	
4	Technique of holding suture needle in needle holder	Frequently loads needle incorrectly.	Loads needle in proper direction for a forehand pass but sometimes loads incorrectly for backhand pass. Loads too close or too far from the swaged end of the needle.	Loads needle properly for forehand and backhand needle pass but is inefficient and often requires multiple attempts.	Loads needle properly and efficiently for forehand and backhand needle passes.	
5	Technique of surgical knot tying	Unable to tie knots.	Require multiple extra hand maneuvers to make first throw lay flat and/or loosens first throw while attempting to perform the second throw.	Is able to tie a flat surgeon’s knot first throw but second and third throws are inefficient. Does not inadvertently loosen the first throw.	Is able to efficiently tie a flat, square surgeon’s knot.	
6	Communication with surgical team	Does not know role of surgical team members. Lacks confidence or has too much. Does not establish good rapport with team. Unable to request instruments from scrub nurse using proper instrument and suture names and/or instructions to surgical assistant are vague or nonexistent.	Knows role of most surgical team members. Lacks confidence. Has difficulty establishing good rapport with team members. Able to request most instruments from scrub nurse using proper instrument and suture names but instructions to surgical assistant are inadequate to perform procedure safely.	Knows role of each surgical team member. Is somewhat confident and usually treats team with respect. Establishes good working relationship. Able to request most instruments from scrub nurse using proper instrument and suture names in correct order. Instructions to surgical assistant are adequate for a skilled assistant but	Knows role of each surgical team member. Is confident and treats team with respect. Establishes good working relationship. Able to efficiently request instruments from scrub nurse using proper names in correct order. Able to consistently give clear instructions to surgical assistant. Communicates with anesthetist, if present.	

				inadequate for an unskilled assistant.		

Overall difficulty of case (circle): Standard Intermediate Difficult

Comments:

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http://www.icoph.org/downloads/ICO-OSCAR-Trabeculectomy.pdf Accessed 2nd July 2018

Addendum for Trabeculotomy- (Steps 1-7, 11 and 13 same as for trabeculectomy)

8	Identification and entry of the Schlemm's canal using trabeculome or suture	Cannot cannulate the Schlemm's canal via the scleral.	Has difficulty cannulating the Schlemm's canal. Needs guidance.	Cannulates the Schlemm's canal, but has difficulty breaking the Trabelular meshwork into the Anterior chamber.	Cannulates the Schlemm's canal, and easily breaks the Trabecular meshwork into the Anterior chamber.	

Module 5: Retinoblastoma

Able to:

- Describe in relation to retinoblastoma the epidemiology, clinical presentations, genetics, pathology, management considerations, treatment options and challenges, pharmacology of drugs used
- Describe classification and staging of retinoblastoma
- Enumerate and discuss clearly the message for care givers of retinoblastoma patients.

Knowledge:

- Genetics of retinoblastoma
- Orbital anatomy
- High risk signs in retinoblastoma
- Classification of retinoblastoma - International classification and how it impacts on the choice of treatment options
- Various treatment options available, indications and challenges
- Setting of goals for treatment
- Message content to care giver
- Counselling techniques
- Advocacy tools
- Stakeholder assessment

Diagnostic and clinical skills:

- History taking and risk factor assessment for retinoblastoma
- Evaluation of the child with retinoblastoma
    - Evaluation of both eyes for retinoblastoma (indirect ophthalmoscopy)
    - Documentation of location and dimensions of tumours with retinal drawings
    - B-scan ultrasonography
    - Interpretation of MRI/CT brain & orbit slides
    - Determination of high risk signs
    - Justification of treatment goals
- Counseling of care givers
- Genetic studies and outcome interpretation and counseling
- Skills in paediatric low and uniocular vision care

Decision making and communication skills:

- Decision making process for chemotherapy, focal therapy (laser, cryotherapy, brachytherapy), external beam radiation therapy, enucleation, Intra-arterial chemotherapy, intra-vitreal chemotherapy.
- Systemic evaluation before treatment
- Risk factors for failure and complications
        - High risk signs
        - Extraocular and Systemic disease
- Counselling care givers and taking consent for retinoblastoma care

TEACHING AND LEARNING

How trainees develop the knowledge and skills to enable them to achieve subspecialist learning outcomes.

Knowledge
Learning and acquisition of knowledge will be mainly self- driven. Online learning involving self-study, writing comments in the virtual learning environment, watching videos and animations and checking own learning through online quizzes.

Assessment methods of knowledge
Trainees to prepare seminars on these topics and present to trainers and other trainees

Surgical skills

- Examination under anaesthesia (EUA) and staging of retinoblastoma
- Cryotherapy to the retina/trans pupillary diode laser
- Metastatic workup for retinoblastoma
- Plan for treatment including the use of chemotherapy, cryotherapy and

Trans pupillary thermotherapy (TTT) & radiations (brachytherapy and external beam radiation therapy)

- Skills in enucleation technique (with minimum of 15mm of optic nerves) with orbital implants
- Fitting of prosthesis

Clinical skills
Post-operative Management of Retinoblastoma

- Clinical assessment in immediate post-operative period
- Use of post-operative medications
- Identification of early post-operative complications - Retrobulbar haemorrhage, implant exposure and extrusion
- Complication of brachytherapy and EBRT
- Follow up protocol

Teaching and learning activities
Practise the procedures in the wet lab under supervision. Observe, discuss, outline and practise the procedures with guidance in the operating theatre. Lectures, reading and videos for basic knowledge (online course). Observe and practise assessing patients in clinic in the post op period

Achieving the surgical skills set

- Lectures, reading and videos
- Wet lab practice/simulator
- Work with examples (cases) to practise identifying indications/contraindications for surgical intervention
- Practise identifying and explaining risk factors for failure and complications to patients and parents
- Watch and discuss videos of patient counselling and consent for surgery; identify critical stages of counselling
- Learning activities can be face to face and/or written, online, working in small groups and drawing on video material
- Observe and practise each skill repeatedly until these surgical skills learning outcomes are met.

Assessment methods for surgical skills acquisition

- Pre course preparation of case studies: Presented and discussed
- Extended matching questions (EMQs) - assessment of patient case study
- Observation of role play/reviewing videos of trainees counselling patients and taking consent
- Work–based assessments
- Objective Structured Assessment of Technical Skills (OSATS)

Logbook entry topics

Module 6: Dissertation writing, consolidate surgical skills and revision, tidying up and exams

Using the skills gained from module 1 the trainee will discuss a topic for their dissertation with their mentors. It is expected they will work on their dissertation throughout the training using this final period to refine and produce the completed document. Support in this process will be by one to one meetings with a trainer assigned to them for this purpose. The expectations, structure and marking of the dissertation are outlined in the dissertation module.

Appendix

Additional Topics
Retinopathy of Prematurity
Congenital Naso Lacrimal Duct Obstruction Management

Teaching skill sets to acquire

- Training of medical and non-medical staff in testing of vision
- Paediatric refraction
- Training in others in paediatric squint surgery

Management skill sets to acquire

- Public education
- Training of other team members
- Multidisciplinary team working
- Education of paediatricians, midwives, immunisation, growth monitoring workers to diagnose squint and paediatric cataract early in life

Teaching skill sets strabismus

- Training of medical and non-medical staff in testing of vision
- Paediatric refraction
- Training in paediatric squint surgery

Management skill sets strabismus

- Public education
- Training of other team members

- Multidisciplinary team working
- Education of paediatricians, midwives, immunisation, growth monitoring workers to diagnose squint early in life

Management skills glaucoma

- Developing a team approach to maximally care for children with glaucoma
- Education:
    - Midwives, immunisation & growth monitoring workers, general doctors, paediatricians, ophthalmologists about paediatric glaucoma and the suggestive signs
    - public about paediatric glaucoma including juvenile open angle glaucoma (JOAG) especially if there is a family history
- Fundraising and advocacy to purchase equipment, for treatment of the needy (subsidy/full payment) and for education

Management skills retinoblastoma

- Setting up and running retinoblastoma screening for early detection & management programs
- Advocacy and fundraising skills
- Public education
- Training of other team members
- Collaboration with other stakeholders in the management of retinoblastoma patients
- Developing a primary level early detection of retinoblastoma protocol through Education of paediatricians, midwives, immunisation, growth monitoring workers etc.
- Establishment of retinoblastoma support group
- Establishing links with regional subspecialists and pathways for referring patients on for more complex care
- Establishing international collaboration through telemedicine, conference/ seminar participation etc.

GUIDELINES FOR ACCREDITATION OF TRAINING CENTRES

MINIMUM REQUIREMENTS FOR ACCREDITATION FOR THE SUBSPECIALTY FELLOWSHIP TRAINING PROGRAMME

1. FUNDAMENTAL REQUIREMENTS

1. The centre must possess full accreditation of the West African College of Surgeons for Membership training in Ophthalmology
2. Or the centre shall meet all the minimum requirements for accreditation for Membership training in Ophthalmology (See guidelines for accreditation for Membership training).

2. PERSONNEL REQUIREMENTS 20%

1. At least 1 Paediatric Ophthalmologist who has been designated as a subspecialist and trainer in Paediatric Ophthalmology by the West African College of Surgeons
2. The ratio of trainers to trainees must not be less than 1:2.

3. One or more clinical faculty member who have completed the fellowship program at least 5 years and have also completed 3 years of practice experience in the subspecialty. They should:

- Possess appropriate clinical and teaching skills either by subspecialty training or by subspecialty oriented clinical practice
- Demonstrate a strong interest in the education of fellows
- Possess sound clinical research and/or teaching abilities, support goals and objectives of programs, participate in scholarly, activities and be committed to their own continuing education
- Have regular scheduled (minimally every quarter) documented meeting in order to review the program ‘s goals and objectives as well the program ‘s effectiveness in achieving it's goals and objectives

3. INFRASTRUCTURE REQUIREMENTS 30%

1. One Portable slitlamp
2. One Binocular Indirect ophthalmoscope with teaching mirror
3. Two retinoscopes
4. One set of materials for age appropriate visual acuity estimation charts/items e.g.
   - Picture charts
   - Illiterate charts, tumbling ‘E’, Landolt’s Broken ring charts,
   - Lea Symbols, and HOTV charts
   - Preferential looking charts e.g. Teller Acuity cards, Lea Paddles
   - Snellen’s charts
5. Play area with toys
6. One functional operating theatre with instruments for paediatric ophthalmic surgeries (Strabismus, cataract, Trabeculectomy, trabeculotomy, goniotomy - 2 sets of instruments for each type of surgery)
7. One anterior vitrectomy machine.
8. Availability of Paediatric-oriented Anaesthetists and Anaesthetic machine to support provision of general anaesthesia
9. One Hand held tonometer, e.g. Icare, Perkins, Tonopen - At least 1
10. Low vision services
11. Biometry facilities (A-scan, B-scan and keratometer)
12. One Box of loose prisms
13. One set of prism bars
14. One set of Charts to test for fusion and binocular single vision (Stereopsis tests, Worth’s 4 dot test)
15. Children play area
16. Others: Phacoemulsification machine, 1 set of Lacrimal probes and dilators, Handheld Fundus camera, Amblyoscope

Additional optional infrastructure requirements

1. One set of instruments for enucleation
2. Equipment for good cosmetic rehabilitation after enucleation, orbital implants, conformers etc.
3. Facilities for X-rays, ocular, ultrasonography, CT scan
4. A Paediatric Oncologist in the same institution is an advantage
5. A Histopathologist in the same institution for speedy provision of histology reports on specimens is also desirable

6. A department of Social Works to follow up patients that are defaulting on their chemotherapy
7. A good support laboratory (able to carry out basic tests such as FBC, PCV, E/U, ESR Urinalysis, etc.)
8. One Diode Laser for treatment of localised intraocular tumours
9. One set of equipment for ROP screening
10. A trained retina specialist in the same institution is desirable.
11. Facilities for electrophysiological tests
12. Cryotherapy and laser facilities

4. OUTREACH 5%

Active plan/ program for Paediatric ophthalmic case finding as part of general outreach should be in place

5. CLINIC DAYS, THEATRE DAYS, WARDROUNDS 10%

A minimum of:

- 1 Subspecialty clinic day per week
- 1 theatre day per week
- 1 specialty teaching programme per week

6. SURGICAL VOLUME 25%

The minimum number of surgical cases that must be performed at the centre annually are listed below:

1. Paediatric Cataract Surgeries – 20
2. Strabismus surgery- 15
3. Paediatric glaucoma surgeries- 5
4. Additional Paediatric Ophthalmology Surgeries
   a) Ptosis repair – 5
   b) Probing and syringing – 10
   c) Enucleation – 10

7. STRUCTURED TEACHING 10%

These regular teaching sessions must include the following:

- Journal clubs
- Departmental seminars
- Grand ward rounds
- Clinical presentation sessions

8. GENERAL COMMENTS AND OBSERVATIONS:

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WACS Subspecialty Curriculum: Public Health for Eye Care

Background

Public health is the approach to medicine that is concerned with the health of the community as a whole. The Public health for Eye care subspecialty enables the trainee develop an evidence-based public health approach for the control and management of blinding eye diseases. There is a short course in Public Health for eye care at the Membership level which enables the trainee understand the basic principles of public health approach to eye care management. The subspecialty curriculum has been separated into seven modules each of which trains on an aspect of advanced Public Health for Eye care. The trainees in the Public Health for eye care subspecialty will be expected to: acquire competencies required to carry out advanced research, epidemiological and operational research; understand the role of health economics in the management of eye care programmes, understand the principles of how to strengthen health care systems and the implementation of the health education and health promotion components. They will also be expected to acquire cognitive skills on the principles of prevention of blindness from communicable and non-communicable diseases, eye care policy and planning as well as Public Health advocacy. The course will use face-to-face didactic lectures, seminar and interactive sessions, self-study. There will be fieldwork after which the trainee will be expected to write up a dissertation.

Duration: 24 months

Prerequisites
Before starting the Public Health for Eye Care course, trainees are expected to have successfully completed the Membership in Ophthalmology of WACS or its equivalent.

Overview
Module 1 Introduction Basic research Methodology and dissertation
Module 2 Biostatistics, health economics, health systems strengthening, health education and health promotion as applicable to PHEC (Duration: 3 months)
Module 3: Principles for prevention of blindness from common non-communicable eye diseases (Duration: 3 months)
Module 4: Principles for prevention of blindness from communicable eye diseases (Duration: 3 months)
Module 5: Eye care policy and planning (Duration: 6 months)
Module 6: Public health advocacy, dissertation, revision and exams (Duration: 6 months)

Logbook
It is expected that trainees will complete a minimum of 6 meaningful entries every 6 months. Reports in needs assessment, GAP analysis, and formulating eye care programmes are valid entries with reflection. These would be under the topic of leadership and management. Other meaningful entries might include leadership and management lessons learnt during the course.

Each logbook is signed off by the clinician who supervised the case.

The following is an example of the information that might be included in a clinical case report which should also include a literature review and discussion of the case in relation to the literature.

Patient evaluation	Date	
	Hosp No.	
	Name of Patient	
	Age	
	Sex	
	Pre-op Visual acuity	
	Visual Acuity Method/Chart Used	
	Type/Aetiology of Cataract	
	Pupil	
	Lens Morphology	
	IOP	
	Other findings- Ocular e.g Nystagmus, strabismus, microphthalmous etc	
Investigations	Systemic associations e.g syndromes, cardiac anomalies etc	
	BIOMETRY (AXL, K1,K2, IOL power)	
	B-Scan	

Treatment	Surgical procedure	
	Performed /Performed under Supervision/ Assisted	
	Complication- Intra-op	
	Optical Rehabilitation	
	Post-op complication- VAO, Glaucoma, Amblyopia	
Outcome	VA Day 1	
	VA ≥6weeks	
	Final outcome (As at when?)	
Key Learning points	Key Learning points	
	Other COMMENTS	
Comments and signature of trainer		

COURSE TOPICS AND INTENDED LEARNING OUTCOMES

Module 1: Introduction

Basic research methodology and dissertation.

Module 2: Biostatistics, Health Economics, Health Systems Strengthening, Health Education and Health Promotion as Applicable to PHEC

Duration: 3 months

At the end of the study of each topic below trainees are expected to be able to:

Objectives

1. Demonstrate knowledge of advanced research (quantitative and qualitative) methods and biostatistics
2. Explain the role of health economics in the management of eye care programmes

3. Demonstrate knowledge of the principles of how to strengthen health systems
4. Explain the components of health education and health promotion and how to implement them

LEARNING OUTCOMES

1. Describe the principles of epidemiology, as applicable to public health for eye care
2. Describe the principles of research methods, as applicable to public health for eye care
3. Describe the principles of biostatistics, as applicable to public health for eye care
4. Describe the principles of health economics, as applicable to public health for eye care
5. Describe the principles of health systems strengthening, as applicable to public health for eye care
6. Describe the principles of health education and health promotion, as applicable to public health for eye care
7. Describe the principles of project and program management, as applicable to public health for eye care
8. Describe the relevant WHO global programs (e.g., sustainable development goals, disability framework).

Module 3: Principles for Prevention of Blindness from Common Non-Communicable Eye Diseases

Duration: 3 months

At the end of the study of each topic below trainees are expected to be able to:

OBJECTIVES

1. Demonstrate understanding of the prevalence and incidence of common non-communicable eye diseases
2. Conduct situational analysis and rapid assessment of common non-communicable eye diseases in the community
3. Develop eye care plans to prevent blindness from common non-communicable eye diseases

LEARNING OUTCOMES

A: CATARACT
Cognitive skills

1. Describe the prevalence and incidence of blindness due to cataract in different socioeconomic settings
2. Describe the cataract surgery rates in different socioeconomic settings
3. Describe cataract surgery coverage, including its use and limitations as an indicator to measure program output
4. Outline the possible strategies to overcome the barriers to cataract surgery
5. Define cataract surgery efficiency and cataract surgery volume

6. Outline the factors affecting cataract surgery capacity
7. Outline the principles of an efficient cataract surgical service
8. Describe a model for the staffing and running of a cataract surgical unit
9. Describe the components of a model for the costing of cataract surgery
10. Describe the possible strategies for cataract surgery cost containment
11. Describe the possible strategies for cataract surgery cost recovery
12. Outline the components of a system for monitoring the visual acuity outcomes following cataract surgery
13. Outline the components of the cataract surgery costs

Technical skills

1. For planning purposes, calculate estimates of numbers of people blind due to cataract in different countries and regions
2. For planning purposes, calculate cataract surgery rate in different countries and regions
3. For planning purposes, identify and include suitable strategies for overcoming the barriers to cataract surgery in a blindness prevention program. Consider how patients may be affected differently based on their age, gender, other impairments, poverty, ethnic group, faith community, etc.
4. For planning purposes, identify and include suitable strategies for improving the efficiency of a cataract surgical unit in a blindness prevention program.

B: REFRACTIVE ERROR

Cognitive skills

1. Describe the prevalence of refractive error in different countries/regions
2. Outline the possible strategies for the provision of spectacles in a blindness prevention program.

Technical skills

1. Evaluate the coverage and impact of school screening, and make recommendations for improvement
2. Evaluate the services for the provision of presbyopic correction, and make recommendations for improvement.

C: LOW VISION

Cognitive skills

1. Describe the prevalence of low vision in different countries/regions
2. Outline the possible strategies for the provision of low-vision aids in a blindness prevention program.

Technical skills

Evaluate the coverage and impact of low-vision services.

D: CHILDHOOD BLINDNESS

Cognitive skills

1. List the main causes of childhood blindness in different socioeconomic settings
2. Describe the primary, secondary, and tertiary prevention strategies for the control of childhood blindness due to corneal scar, cataract, glaucoma, and retinopathy of prematurity
3. Describe the main barriers for children with visual disabilities to access health, education, and social inclusion

4. Outline the models/strategies for supporting education for children with visual impairments through mainstream schools (e.g., inclusive education) or 'special' schools.

Technical skills

Where appropriate, set up a system for the screening and treatment of retinopathy of prematurity.

E: GLAUCOMA

Cognitive skills

1. Describe the prevalence of glaucoma in different regions and in different ethnic groups
2. Outline the possible strategies for the opportunistic case detection of glaucoma
3. Discuss possible approaches to a programme to prevent blindness from the glaucomas

Technical skills

1. Calculate estimates of numbers of people with glaucoma in different countries and regions
2. For planning purposes, identify and include suitable strategies for including glaucoma as a priority disease in a blindness prevention program.

F: DIABETIC RETINOPATHY

Cognitive skills

1. Outline the possible strategies for the prevention of diabetic retinopathy, including the use of appropriate educational health materials for counseling
2. Outline the possible strategies for screening for diabetic retinopathy
3. Outline the possible strategies for the treatment of diabetic retinopathy
4. Outline the possible strategies for increasing the diabetic retinopathy follow-up rate

Technical skills

1. Calculate estimates of numbers of people at risk of becoming blind from diabetes in different countries and regions
2. For planning purposes, identify and include suitable strategies for including diabetic retinopathy as a priority disease in a blindness prevention program.

HUMAN RESOURCES FOR BLINDNESS PREVENTION PROGRAMS

Cognitive skills

1. Describe the recommended cadres and numbers of human resources required at the community level, primary level, secondary level, and tertiary level for a generic blindness prevention program for a health service unit of one million in the resident's own country or health district
2. Describe the roles of each of the cadres that are recommended for a generic blindness prevention program
3. Describe the available training facilities for a generic blindness prevention program.

Technical skills

1. For planning purposes, identify and include suitable strategies for improving the human resource capacity in a blindness prevention program.

2. Provide training in public health for eye care to different eye care cadres.

INFRASTRUCTURE FOR BLINDNESS PREVENTION PROGRAMS
Cognitive skills

1. From the International Agency for the Prevention of Blindness (IAPB) standard list for VISION 2020, describe the recommended instruments and equipment required at the primary, secondary, and tertiary level for a generic blindness prevention program for a health service unit of one million population
2. Outline the strategies for the maintenance of the recommended instruments and equipment.

Technical skills
For planning purposes, identify and include suitable strategies for improving the infrastructure capacity in a blindness prevention program.

PLANNING OF BLINDNESS PREVENTION PROGRAMS
Cognitive skills
Describe the potential role of a programme coordinator and a Prevention of blindness committee.

Technical skills
Principles of blindness prevention

1. For planning purposes, integrate primary, secondary, and tertiary preventions for leading causes of low vision and blindness into a district blindness prevention program plan adhering to inclusive practices
2. Develop an activities plan for a one-year operational plan for a blindness prevention program for a health district with a population of one million

Module 4: Principles for Prevention of Blindness from Communicable Eye Diseases

Duration: 3 months

At the end of the study of each topic below, trainees are expected to be able to:

OBJECTIVES

1. Conduct situational analysis and rapid assessment of common communicable eye diseases in the community
2. Plan programmes for prevention of blindness from common communicable eye diseases

LEARNING OUTCOMES

A: Trachoma
Cognitive skills
Describe the components of a trachoma prevalence survey.

Technical skills

1. For planning purposes, use available program reports to identify key gaps in and barriers to service delivery.
2. Where appropriate, network and advocate with agencies and communities to implement the F (facial cleanliness) and E (environmental changes) components in the SAFE strategy.

B: Onchocerciasis
Technical skills
For planning purposes, use available program reports to identify key gaps in and barriers to service delivery.

Module 5: Eye Care Policy and Planning

Duration: 6 months

At the end of the study of each topic below, trainees are expected to be able to:

OBJECTIVES

1. Outline the principal public health challenges for eye care in their region/district
2. Complete the following using one common eye condition:
   - A field-based needs assessment
   - A situation/gap analysis based on available resources
   - A report on comprehensive eye care program based on universal eye health care
   - Successful implementation of one aspect of the eye care programme

LEARNING OUTCOMES

Cognitive skills

Describe the key practices and policies that will ensure the principles of prevention of blindness are inclusive relating to gender, disability, and other potential causes of marginalization.

TEACHING AND LEARNING

Knowledge
- Didactic lectures
- Online learning involving self-study

Technical Skills
- Practical work. Learning by carrying out a fieldwork on needs assessment
- Write a good report on comprehensive eye care programme under the supervision of the trainer

ASSESSMENT AND FEEDBACK

Formative assessment
Trainees show that they are working towards the attainment of course learning outcomes through continuous assessment (theory questions, multiple choice questions, viva, drafting examples and sections of the reports and analyses detailed in the learning outcomes above).
The case report book will be evaluated quarterly in the course of the programme

Module 6: Public health advocacy, dissertation, revision and exams

Duration: 6 months

At the end of the study of each topic below the trainees are expected to be able to:

1. Explain the principal challenges regarding public health eye care policies in their region/district

2. Using one example, complete the following:
   - Analyse the policy
   - Identify the gaps
   - Agree on a policy position
   - Determine the aims and objectives on how to make a change
   - Develop strategies for change

3. Using one example, complete the following:
   - Identify the gaps
   - Agree on a position
   - Determine the aims and objectives on how to make a change
   - Develop strategies for change

4. Knowledge, attitude, skills and behaviour of the populations
   - Describe the influence of knowledge, attitude, skills and behaviour of the communities on eye health
   - Using one common example, complete the following:
     - Carry out a qualitative study to assess the knowledge, attitude, skills and behaviour of the communities on eye health
     - Write a report on the problem, the literature review, the gaps, the aims and objectives and the strategies for change

One of the above exercises will, in discussion with the tutors, form the subject of the trainees dissertation. It is expected they will work on their dissertation throughout the training using this final period to refine and produce the completed document. Support in this process will be by one to one meetings with a trainer assigned to them for this purpose. The expectations, structure and marking of the dissertation are outlined in the dissertation module.

LEARNING OUTCOMES

Technical skills

1. Advocate for national policy implementation and community participation to strengthen national blindness prevention programs
2. Engage with public health practitioners to advocate for improvements in eye care services

TEACHING AND LEARNING

Knowledge

Through study and discussion and with support from a mentor, gain insight into the key elements required to evaluate the principal challenges with public health eye care policies, budget and knowledge, attitude, skills and behaviour of the people.
In seminar discussions of learning resources, develop an appreciation of the significance of resources.
Guided practice of the collation of findings and writing the elements of a report through worked examples.

Case report book

It is expected that trainees will complete a minimum of 6 meaningful entries during this module. The report on policy, the trainee's report on budget and his/her qualitative study are valid entries with reflection. These would be under the topic of 'leadership and management'. Other meaningful entries might include leadership and management lessons learnt during the course. For example undertaking a literature review or identifying policies on eye care might have meaningful learning points the trainee can reflect upon.

ASSESSMENT AND FEEDBACK

Formative assessment

- Supervision and feedback at every stage of the report.

Trainees write a report as outlined above based on a worked example.
The report should include a clear analysis of a selected aspect of the ophthalmological public health of a specific population. The elements studied during the course should be detailed: resources, identification of gaps, formulation of a strategy to enhance public eye health, and the outcomes of the implementation of that strategy.

- The case report book will be evaluated quarterly in the course of the programme

Recommended learning tools for the trainee

1. Laptop with internet facility
2. CDs
3. Textbooks

The trainee will still be running regular ophthalmic unit (clinics, admissions, ward rounds, surgeries) using skills acquired during the membership programme.

Portfolio (to be submitted with the exam application form at the end of the training programme)

This must be submitted with the trainee's application for examination.

The contents are as follows:

1. Dissertation
2. Certificates of attendance to relevant courses

3. Results of mock examination
4. Logbook

APPENDIX

Training Centre

The training centre should have WACS accreditation for this subspecialty (see appendix).

MINIMUM REQUIREMENTS FOR ACCREDITATION FOR THE SUBSPECIALTY PUBLIC HEALTH FOR EYE CARE

Personnel (20%)

- At least 1 Public health ophthalmologist with minimum of 3 years' experience
- Ratio of trainer to trainees- 1:3

Infrastructure (20%)

- Seminar room
- Departmental Library with internet facilities, multimedia facilities, relevant journals, CDs and textbooks
- Linkage to existing clinics at primary, secondary and tertiary levels

Clinic days/ward rounds (10%)

Minimum of one general clinic day a week

Eye theatre day

Once a week

Outreach/fieldwork (30%)

A well co-ordinated outreach work

Structured teaching (20%)

- Online lectures
- Frequent discussion with trainer at every stage of report writing
- Dissertation Proposal Presentation Forum
- Dissertation Presentation Forum quarterly (the last, not less than one month before submission of examination application form)
- Mock examination (a month before the fellowship examination)
- One study day

WACS Vitreoretinal Subspecialist Curriculum

Background
Vitreoretinal subspecialty is arguably the most demanding ophthalmic surgical subspecialty to master due to the delicate nature of the retina, the myriad procedures to learn, and the need to adapt to evolving technology. It is for these reasons that primary surgeon experience in vitreoretinal surgery is often lacking at residency programs. The objective of this fellowship is to offer clinical exposure, research experience and produce compassionate practitioners with relevant medical and surgical skills specific to the sub region.

Trainees will work with experts in the subspecialty in general medical and surgical retina. A wide range of pathology and a diverse patient population will be encountered and the trainees will be entrusted with increasing clinical and surgical independence, responsibility and skills to deal with common retinal surgical cases peculiar to the sub region.

Duration: 24 months

Prerequisites
Candidates should have successfully completed the membership training of WACS or its equivalent.

OVERVIEW

First 3 months
Module 1: Research and dissertation module and introduction to vitreoretinal surgery

- Preparation module: 2 months for participants to draw on and consolidate knowledge/abilities through the research and dissertation, finalizing the dissertation at the end of the module
- Orientation into subspecialty module - Medical Retina Course
    - Online MR Course - 2 weeks
    - Hands-on MR Course - 2 weeks

Next 18 months
Module 2: Buckle surgery for simple retinal detachment
Module 3: Vitreoretinal surgery for lens/IOL drop and other complex retinal conditions

- Data collection for dissertation
- Subspecialty based practice and extension from MR online course to the management of other retinal conditions

Next 3 months
Module 4: Dissertation writing, consolidate surgical skills and revision, tidying up and exams.

Logbook
Case based

- Patient evaluation
- Investigations
- Treatment
- Outcomes

Number and range of cases to be specialty based

The aim of the logbook is to supply a clear, accurate record of the participant's clinical practice. These are the characteristics of a satisfactory logbook.

1. The patient profile is supplied (age, sex, general health, including relevant co-morbidities
2. The steps taken to evaluate and investigate the patient's condition are provided
3. Clear details of the treatment including any modifications made with reasons are included
4. Any complications are detailed and actions taken to mitigate these are described
5. Outcomes are detailed with dates
6. Each logbook case is signed off by the clinician who supervised the case

Module 1: Research and dissertation module and introduction to vitreoretinal surgery

Research and dissertation module - 2 months

Orientation into subspecialty module - 1 month

This will involve the trainee undertaking the online diabetic retinopathy course followed by hands-on training in skills for basic management of diabetic retinopathy..

Module 2: Scleral Buckle Surgery

OVERALL OBJECTIVES

The primary aims of the Vitreo retina course MODULE 1 (hands-on components) are to enable participants to:

- Apply knowledge and skills acquired in the Medical Retina Course to the management of other retinal conditions such as age-related macular degeneration, retinal vein occlusion, sickle cell retinopathy and others
- diagnose and assess rhegmatogenous retinal detachment
- evaluate the option for treatment of rhegmatogenous retinal detachment with scleral buckling
- prepare, carry out scleral buckle surgery, follow up, prevent and manage surgical complications

PREREQUISITES/ENTRY REQUIREMENTS

Medical Retina Course or equivalent
Example: Before starting the subspecialist course, participants are expected to be able to:

Knowledge

- Describe the surgical anatomy of the retina, and vitreo-retinal interface
- Explain possible reasons for rhegmatogenous retinal detachment (etiopathogenetic mechanisms)

Clinical skills

- Take a patient history relevant to the development of rhegmatogenous retinal detachment
- Examine the retina using the indirect ophthalmoscope and fundus lens

Technical skills

Draw the retina with colour codes

Training Centre

The training centre should have WACS accreditation for the subspecialty (see appendix).

COURSE TOPICS AND INTENDED LEARNING OUTCOMES
ONLINE/TAUGHT COURSE

1. Participants are expected to:
    - Describe ocular anatomy of relevance to the vitreoretinal surgeon such as the anatomy of Tillaux spiral, the ciliary vasculature and vitreoretinal adhesions
    - Describe the pathology of vitreoretinal disease with special reference to predisposing lesions for retinal detachment
    - State the principles of prophylaxis of retinal detachment
    - State the principles of scleral buckling surgery
    - Describe the different ways of achieving retinopexy – retinal photocoagulation, retinal cryopexy
    - Describe the indications, techniques, and complications of scleral buckling

2. Pre-operative surgery preparation
    - Describe the pre-operative factors that should be assessed prior to scleral buckle surgery
    - Draw pre-operative fundus findings using colour codes.
    -
    - Detail the anaesthetic options for scleral buckle surgery describing the relative merits of each

3. Scleral buckle surgery
    - Detail the indications, pre-operative assessment, and preparation required for scleral buckle surgery
    - Describe the surgical principles behind scleral buckle surgery including choice of buckle
    - Diagnose and manage the common post-operative complications of scleral buckle surgery

4. Post-operative management of scleral buckle surgery
    - Describe the common complications following scleral buckle surgery
    - Explain the role of positioning following scleral buckle surgery
    - Explain the principles for the management of these complications

TEACHING AND LEARNING

How participants develop the knowledge and skills to enable them to achieve subspecialist learning outcomes.

Knowledge
Online learning involving self-study, writing comments and engaging in discussion in the virtual learning environment, watching videos and animations and checking own learning through online quizzes.

Clinical skills
Learning through active observation and emulation, practise, and repeat the observe/emulate/practise cycle until the participant has developed the clinical skill well enough to meet course learning outcomes.

Technical skills
Observe and practise each skill repeatedly until course learning outcomes are met.

ASSESSMENT AND FEEDBACK

Participants show that they are working towards the attainment of course learning outcomes, in the online course through participation in quizzes.
MCQ
IMAGE BASED

Assessment criteria – Formative and ongoing

HANDS-ON COURSE

At the end of the hands-on course, participants are expected to be able to:

Decision making, clinical and communication skills

- Identify indications for scleral buckling surgery and decide when surgery is appropriate
- Identify contraindications for scleral buckling and decide when to refer
- Take account of risk factors for failure and complications such as:
    - Missed breaks
    - co-existing pathology such as PVR
- Counsel patients and take consent for scleral buckle surgery

Surgical skills
Perform:

- Indirect Ophthalmoscopy and Indentation and retina break localisation
- Local anaesthesia (subtenons anaesthesia)
- Conjunctiva periotomy and recti muscle bridling

- Adequate cryotherapy
- Pre-placement of scleral sutures for scleral buckle
- Drainage of subretinal fluid if necessary and where to drain
- Intravitreal air injection when necessary
- Adequate conjunctiva closure
- Immediate post- operative positioning of patients

Teaching and learning activities
Practise the procedures in the wet lab under supervision. Observe, discuss, outline and practise the procedures with guidance in the operating theatre.

Clinical skills
Post-operative management of scleral buckle patients.
By the end of the module, students are expected to be able to:

- Assess patients both in the immediate and late post-operative period
- Carry out retinal examination for adequacy of scleral buckle and intraocular pressure check
- Prescribe appropriate post-operative medications
- Position patients adequately especially when air is injected intravitreally
- Identify early post-operative complications such as raised intra ocular pressures, orbital cellulitis, buckle exposure and infection, re-detachment

Teaching and learning activities

- Lectures, reading and videos for basic knowledge (online course)
- Observe and practise assessing patients in the ward and clinic in the post op period

ASSESSMENT AND FEEDBACK

Feedback on learning and progress is provided throughout the hands-on course.
Summative assessment is through Objective Structured Clinical Examination (OSCE).

The table below details procedures and assessment criteria.

		Novice (score = 2)	**Beginner** (score = 3)	**Advanced Beginner** (score = 4)	**Competent** (score = 5)	**Not applicable. Done by preceptor** (score= 0)
1	**Draping:**	Is unable to prepare or drape the patient using sterile technique without instruction. Unaware of importance of identifying correct eye and procedure prior to draping.	Is able to prepare and drape the patient but sterile technique is inconsistent. Difficulty attaining proper head position.	Is able to consistently prepare and drape patients using sterile technique however steps are performed inefficiently. Attains proper head position.	Is able to consistently and efficiently prepare and drape patients with appropriate head position.	
2.	**Sub tenons anesthesia**	Unable to introduce the subtenons canula	Introduce the subtenons canula with difficulty	Introduce subtenons canula but inject anesthesia sub conjuctivally	Introduce subtenons canula and introduce anesthesia adequately	
3	**Conjunctiva periotomy**	Unable to perform conjunctiva periotomy	Open the conjunctiva with difficulty with undue hemorrhage	Perform conjunctiva periotomy adequately after a long time	Perform conjunctiva periotomy with ease	

4	**Recti muscle bridling**	Unable to isolate and bridle the recti muscle	Isolate recti muscle with difficulty, bridling of part of muscle	Isolate recti muscle inefficiently, after a long time	Isolate muscle and bridling efficiently	
5	**Indirect ophthalmoscopy and localization of breaks**	Unable to adequately localize breaks on sclera	Localize breaks inefficiently, scleral marks not accurate	Localize some breaks while missing some breaks	Efficiently localize breaks on sclera	
6	**Cryotherapy**	Unable to apply cryotherapy	Inefficient localization of breaks with cryoprobe	Localize and apply cryotherapy with difficulty	Efficiently apply cryotherapy accurately	
7	**Scleral buckle suture placement and choice of buckle**	Unable to place scleral suture, and unable to decide on choice of buckle	Inefficient placement and some inadvertent perforations, chose wrong buckle	Apply scleral suture with difficulty, buckle chosen adequate	Able to apply scleral suture and chose adequate buckle.	
8	**Drainage of sub retinal fluid**	Unable to localize where to drain	Inefficient drainage of SRF, minimal fluid drained	Localize drainage site and drain after a few attempts	Drain efficiently	
9	**Tighten scleral sutures to avoid hypotony, Inject air when necessary**	Slow, unable to tighten as fast as required, air injection not adequate	Tightened the sutures with difficulty Air injection with difficulty	Tightened the sutures, with increased IOP, too much air injected	Adequate tightening, adequate IOP, adequate air injection	
10	**Conjunctival closure**	Is unable to close conjunctiva. Unable to differentiate Tenon’s capsule from conjunctiva.	Is able to perform basic conjunctival closure technique but is inefficient and requires significant guidance. Additional sutures are required.	Is able to safely close conjunctiva with good tissue approximation but is inefficient.	Is able to safely and efficiently close conjunctiva with good tissue approximation	Not performed

		Unable to differentiate wing sutures from mattress sutures and running sutures and when appropriate to place.				

Module 3: Vitreoretinal Surgery

The aim is to be able to perform vitreoretinal surgery for lens/IOL drop, macula hole, and complex retinal detachment. Evaluate and treat traumatic injuries to the retina, including complex cases such as intraocular foreign body with rhegmatogenous retinal detachment and traumatic macular holes, and be able to manage complications to the other ocular structures.

1. Participants are expected to:
   - Describe ocular anatomy of relevance to the vitreoretinal surgeon
   - State the principles of pars plana vitrectomy and the vitrectomy machine
   - Describe the indications, techniques, and complications of pars plana vitrectomy
   - Describe the causes, effects and complications of lens nucleus and IOL drop
   - Describe the methods of treatment of lens/IOL drop
   - Describe the pre-operative factors that should be assessed prior to pars plana vitrectomy (such as systemic diseases)
   - Examine in detail the retina and vitreous with binocular indirect ophthalmoscopy
   - Draw pre-operative fundus findings using colour codes
   - Detail the anaesthetic options for pars plana vitrectomy describing the relative merits of each
2. Pars plana vitrectomy + Lens/IOL drop
   i. Detail the indications, pre-operative assessment, and preparation required for pars plana vitrectomy
   ii. Set up the vitrectomy machine and instruments for vitrectomy
   iii. Describe the surgical principles behind pars plana vitrectomy- 20, 23G.
   iv. Describe fluidics in pars plana vitrectomy
   v. Describe the techniques of pars plana vitrectomy for lens/IOL drop
   vi. Diagnose and manage the common post-operative complications of pars plana vitrectomy

3. Attain the following cognitive skills for independent management of complex surgical vitreoretinal conditions.
   a. Knowledge
      i. Evaluate and diagnoseof complex cases of retinal detachment (e.g., acute retinal necrosis, proliferative vitreoretinopathy)
      ii. Diagnose, classify and treat retinopathy of prematurity
      iii. Diagnose and manage (including referral) of complex trauma cases (e.g. chorioretinitis, scleropetaria, intraocular foreign body, shaken baby syndrome)
      iv. Communicate well with the patient and obtain consent for any procedure
      v. Develop surgical proficiency in different surgical techniques for management of retinal detachment, including complex cases (e.g. combined rhegmatogenous/tractional retinal detachments)
      vi. Describe the treatment algorithm for each specific retinal condition, with special emphasis on pros and cons

vii. Compare the current therapeutic retinal treatment strategies and be able to discuss the future improvements of the therapeutic armamentarium

b. Technical/surgical skills for independent management of surgical vitreoretinal diseases.
    i. Diagnose, evaluate, treat (or refer) the most complex forms of retinal vascular diseases and diagnose/manage risk factors (e.g., blood dyscrasia) and systemic complications
    ii. Evaluate and treat traumatic injuries to the retina, including complex cases such as intraocular foreign body with rhegmatogenous retinal detachment and traumatic macular holes, and be able to manage complications to the other ocular structures.
    iii. Diagnose, evaluate, and understand the genetic alterations and the possible applications of gene therapy for hereditary retinal conditions.
    iv. Perform all elements of vitrectomy including:
        a. Setting up of a vitrectomy machine
        b. Sterile Draping for vitrectomy
        c. Local anaesthesia (subtenons anaesthesia)
        d. Setting up a VR operating microscope with BIOM/ Contact lens + inverter system
        e. Sutured and Sutureless Vitrectomy entries
        f. Insertion of infusion and sclerotomies
        g. Anterior, Core and posterior vitrectomy + PVD induction
        h. Detachment of the posterior hyaloid.
        i. Fragmentation for dropped nucleus
        j. Nucleus extraction through anterior chamber
        k. IOL retrieval through the anterior chamber
        l. Adequate cornea/ tunnel closure
        m. Adequate scleral seal after removal of trocar and canula
        n. Adequate sclera/conjunctiva closure if sutured vitrectomy used.
        o. Air-fluid exchange.
        p. Silicone – air exchange.
        q. Indented internal search of retinal breaks
        r. Retinopexy, under both fluid and air.
        s. Exchange of air for non expansile gas.
        t. Prescribe appropriate post- operative medications
        u. Position patients adequately especially when air is injected intravitreally.
        v. Identify early post- operative complications such as raised intra ocular pressures, orbital cellulitis, buckle exposure and infection, re-detachment.
    v. Decision making, clinical and communication skills
        a. Identify indications for pars plana vitrectomy and decide when surgery is appropriate
        b. Identify contraindications for pars plana vitrectomy
        c. Take account of risk factors for failure and complications such as:
            - Corneal edema

- co-existing pathology such as retinal detachment

vi. Counsel patients and take consent for pars plana vitrectomy

v. Post-operative management of Pars plana vitrectomy
   a. Describe the common complications following pars plana vitrectomy
   b. Explain the principles for the management of these complications

Knowledge
Online learning involving self-study, writing comments and engaging in discussion in the virtual learning environment, watching videos and animations and checking own learning through online quizzes.

Clinical skills
Learning through active observation and emulation, practise, and repeat the observe/emulate/practise cycle in the wet lab under supervision until the participant has developed the clinical skill well enough to meet course learning outcomes. Observe, discuss, outline and practise the procedures with guidance in the operating theatre.

Technical skills
Observe and practise each skill repeatedly until course learning outcomes are met.

ASSESSMENT AND FEEDBACK

Participants show that they are working towards the attainment of course learning outcomes, in the online course through participation in quizzes.
MCQ
IMAGE BASED

Assessment criteria – Formative and ongoing

ASSESSMENT AND FEEDBACK

Feedback on learning and progress is provided throughout the hands-on course.
Summative assessment is through Objective Structured Clinical Examination (OSCE).
The table below details procedures and assessment criteria.

		Novice (score = 2)	**Beginner** (score = 3)	**Advanced Beginner** (score = 4)	**Competent** (score = 5)	**Not applicable. Done by preceptor** (score= 0)
1	**Draping:**	Is unable to prepare or drape the patient using sterile technique without instruction. Unaware of importance of identifying correct eye and procedure prior to draping.	Is able to prepare and drape the patient but sterile technique is inconsistent. Difficulty attaining proper head position.	Is able to consistently prepare and drape patients using sterile technique however steps are performed inefficiently. Attains proper head position.	Is able to consistently and efficiently prepare and drape patients with appropriate head position.	
2.	**Sub tenons anesthesia**	Unable to introduce the subtenons canula	Introduce the subtenons canula with difficulty	Introduce subtenons canula but inject anesthesia sub conjuctivally	Introduce subtenons canula and introduce anesthesia adequately	

3	**Conjunctiva periotomy**	Unable to perform conjunctiva periotomy	Open the conjunctiva with difficulty with undue hemorrhage	Perform conjunctiva periotomy adequately after a long time	Perform conjunctiva periotomy with ease	
4	**Recti muscle bridling**	Unable to isolate and bridle the recti muscle	Isolate recti muscle with difficulty, bridling of part of muscle	Isolate recti muscle inefficiently, after a long time	Isolate muscle and bridling efficiently	
5	**Indirect ophthalmoscopy and localization of breaks**	Unable to adequately localise breaks on sclera	Localize breaks inefficiently, scleral marks not accurate	Localise some breaks while missing some breaks	Efficiently localise breaks on sclera	
6	**Cryotherapy**	Unable to apply cryotherapy	Inefficient localisation of breaks with cryoprobe	Localise and apply cryotherapy with difficulty	Efficiently apply cryotherapy accurately	
7	**Scleral buckle suture placement and choice of buckle**	Unable to place scleral suture, and unable to decide on choice of buckle	Inefficient placement and some inadvertent perforations, chose wrong buckle	Apply scleral suture with difficulty, buckle chosen adequate	Able to apply scleral suture and chose adequate buckle.	
8	**Drainage of sub retinal fluid**	Unable to localise where to drain	Inefficient drainage of SRF, minimal fluid drained	Localise drainage site and drain after a few attempts	Drain efficiently	

9	**Tighten scleral sutures to avoid hypotony, Inject air when necessary**	Slow, unable to tighten as fast as required, air injection not adequate	Tightened the sutures with difficulty Air injection with difficulty	Tightened the sutures, with increased IOP, too much air injected	Adequate tightening, adequate IOP, adequate air injection	
10	**Conjunctival closure**	Is unable to close conjunctiva. Unable to differentiate Tenon's capsule from conjunctiva. Unable to differentiate wing sutures from mattress sutures and running sutures and when appropriate to place	Is able to perform basic conjunctival closure technique but is inefficient and requires significant guidance. Additional sutures are required.	Is able to safely close conjunctiva with good tissue approximation but is inefficient.	Is able to safely and efficiently close conjunctiva with good tissue approximation	Not performed

The table below details procedures and assessment criteria.

		Novice (score = 2)	**Beginner** (score = 3)	**Advanced Beginner** (score = 4)	**Competent** (score = 5)	**Not applicable. Done by preceptor** (score= 0)
1	**Setting up of the vitrectomy machine**	Unable to set up the machine	Setting up with difficulty, unable to complete	Setting up after a long time	Setting up with ease	
2	**Setting up of the VR Microscope and BIOM/ Contact lens+ inverter**	Unable to set up the microscope. Unaware of the orientation/arrangement of BIOM/ Inverter	Setting up with difficulty, inconsistent technique	Able to complete the set up of microscope, BIOM and inverter after a long time	Set up of the 3 components adequate and prompt	
1	**Draping:**	Is unable to prepare or drape the patient using sterile technique without instruction. Unaware of importance of identifying correct eye and procedure prior to draping.	Can prepare and drape the patient but sterile technique is inconsistent. Difficulty attaining proper head position.	Can consistently prepare and drape patients using sterile technique however steps are performed inefficiently. Attains proper head position.	Can consistently and efficiently prepare and drape patients with appropriate head position.	
2.	**Sub tenons anesthesia**	Unable to introduce the subtenons canula	Introduce the subtenons canula with difficulty	Introduce subtenons canula but inject anesthesia subconjuctivally	Introduce subtenons canula and introduce anesthesia adequately	

3	**Conjunctiva/sclera opening/entry with trocar/ canula**	Unable to perform entry	Entry with difficulty unable to complete	Perform entry after a long time,	Perform entry with ease	
4	**Core vitrectomy/ +/- PVD**	Unable to initiate vitrectomy	Initiate vitrectomy, poor eye/hand coordination	Initiate vitrectomy, complete vitrectomy with difficulty	Initiate and complete vitrectomy with ease	
5	**Lens fragmentation**	Unable to engage the lens for fragmentation	Engage the lens with difficulty, fragmentation minimal	Fragmentation of the lens after a long time	Efficiently completes fragmentation	
6	**Nucleus extraction through the anterior chamber**	Unable to engage the lens with a bent needle	Engages the lens with difficulty, lens engagement transient, not brought to anterior chamber	Engages the lens and brought into the anterior chamber with difficulty	Lens delivered with ease	
7	**Completes vitrectomy + retinal exam**	Unable to complete vitrectomy.	Inefficient vitreous base shaving, iatrogenic breaks	Completes vitrectomy with difficulty	Able to complete vitrectomy, efficient retinal exam.	
8	**Scleral entry closure**	Unable to close ports	Inefficient closure, leaking ports, HYPOTONY	Closes ports, additional sutures needed	Able to close ports with ease, no leak	

10	**Corneal/ tunnel/conjunctiva closure if nucleus extracted from anterior chamber**	Is unable to close cornea/conjunctiva/ tunnel satisfactorily.	Is able to perform basic corneal/tunnel closure technique but is inefficient and requires significant guidance. Additional sutures are required.	Is able to safely close cornea/tunnel with good tissue approximation but is inefficient.	Is able to safely and efficiently close tunnel /cornea/conjunctiva with good tissue approximation	Not performed

Module 4: Dissertation writing, consolidate surgical skills and revision, tidying up and exams

Using the skills gained from module 1 the trainee will discuss a topic for their dissertation with their mentors. It is expected they will work on their dissertation throughout the training using this final period to refine and produce the completed document. Support in this process will be by one to one meetings with a trainer assigned to them for this purpose. The expectations, structure and marking of the dissertation are outlined in the dissertation module.

APPENDIX

GUIDELINES FOR ACCREDITATION VISITS (MINIMUM REQUIREMENTS)
VITREO-RETINAL (VR) SUBSPECIALTY
The VR Subspecialty Training Centre should meet the following additional requirements:

PERSONNEL (20%)

a. At least 1 vitreoretinal subspecialist who has undergone a full vitreoretinal hands-on fellowship and has practiced as a vitreoretinal subspecialist actively for at least 3 continuous years post training.
b. At least one fully trained Medical Retina subspecialist who has practiced as such for at least 3 continuous years
c. 1a and 1b may be the same person
d. Intake of trainee VR subspecialist should not exceed 1 per VR subspecialist specified in 1a above per year

INFRASTRUCTURE (30%)

a. A minimum of one VR and Medical Retina dedicated Consulting Room each with
    i. Visual acuity chart
    ii. One Indirect Ophthalmoscope with scleral indenter
    iii. One 3-Mirror Contact lens
    iv. One non-contact retinal examination lenses e.g. +90D, +78D
    v. Examination couch/chair
b. Eye Theatre customized for VR surgery with variable room illumination system
c. Vitreoretinal Hardware
    i. A minimum of one operating microscope with
    ii. A minimum of one indirect viewing system and lenses
    iii. A minimum of one vitreoretinal machine with endoillumination
    iv. A minimum of 1 fragmatone hand pieces
    v. A minimum of one cryotherapy machine with and minimum of 1 cryo probes
    vi. A minimum of one laser machine either the 532 or 810 wavelength or both with
    vii. A minimum of 2 endolaser probes
    viii. A minimum of one indirect laser delivery headset
    ix. A minimum of one diathermy machine
    x. A minimum of one indirect ophthalmoscope
    xi. A minimum of one phaco machine each with a
    xii. A minimum of 2 phaco handpieces
d. Uninterrupted Power Supply with voltage stabilization
e. A minimum of 2 operating instrument sets each containing
    i. An appropriate size sterilization tray
    ii. 2 Moorfield forceps

iii. 1 St. Martins forceps
iv. 1 Fine tooth forceps (Pierce Hoskins or Colibri)
v. 1 Fine block forceps (Mcphersons)
vi. 4 Straight artery forceps
vii. 2 Curved artery forceps
viii. 1 Drape scissors
ix. 1 Speculum
x. 2 Graffe squint hooks
xi. 1 Scalpel handle #11
xii. 1 Suture scissors (straight springs)
xiii. 1 Tenotomy scissors (Westcots)
xiv. 1 Vannas spring scissors
xv. 2 Tying forceps
xvi. 1 Fine needle holders (Troutman or Barraquer)
xvii. 2 Castrojevos needle holder
xviii. 1 Plug forceps
xix. 1 Scleral indentor
xx. 1 Caliper and rule
xxi. 1 Schepens indentor
xxii. 4 Bull dog clips
xxiii. 1 Scleral marker
xxiv. 1 set 20G scleral plugs
xxv. 1 set 18G scleral plugs
xxvi. 1 Backflush or flute handpiece
xxvii. 1 bipolar diathermy lead
xxviii. 1 Fisons retractor
xxix. 1 Endodiathermy cable
xxx. 1 Endodiathermy handle
xxxi. 1 Endgripping micro forceps
xxxii. 1 Serrated micro forceps
xxxiii. 1 micro scissors
xxxiv. 1 Foreign body forceps
xxxv. 1 intra-ocular magnet

f. Lenses
i. One 28D
ii. One 20D
iii. 1 High mag macula contact lens (Double D)

g. iv. Consumables
i. Vitrectomy pack
ii. Phaco pack
iii. Silicone oil packs
iv. Intraocular gases
v. Silicon oil
vi. Retinal dye
vii. Vitreous stainer e.g. Triamcinolone
viii. Perfluorocarbon liquid

ix. BSS/Hartmans/Ringers solution
x. MVR blades
xi. Explants
xii. Endolaser probes
xiii. AC maintainer
xiv. Iris hooks
xv. Active aspiration needle
xvi. Double barrelled cannula
xvii. Grizzard brush
xviii. Silicone tipped cannula
xix. Backflush canula
xx. Three way taps
xxi. 50 ml syringe

h. Investigations section
   i. One Fundus Camera with Angiography capability
   ii. One Optical Coherent Tomography machine

i. Laser Room
   i. One 532/810 Laser Machine

1. CLINIC DAYS, THEATRE DAYS, WARDROUNDS (10%)

A minimum of:

- Retina clinics per week.
- 1 VR theatre days per week
- 1 teaching rounds per week

2. SURGICAL VOLUME (20%).

VR surgeries:

- Minimum of 50 per annum per VR Surgeon in past two years
- Lasers
- Minimum of 100 Medical Retina Lasers per annum per VR surgeon in the past 2 years
- Intra-vitreal Injections
- Minimum of 100 intra-vitreal injections per annum per VR Surgeon in the past 2 years

3. RESEARCH AND PUBLICATION (5%)

Evidence of retinal related research activity and publications by the trainer (s)

4. LIBRARY (5%)

The library should have a stock of retina related works and journals such as Retina either in print or electronic form.

5. STRUCTURED TEACHING (5%)

Evidence of routine retina related presentations e.g. fluorescein angiography discussion sessions (FAN club), case presentations, OCT sessions, Journals club, Tutorials etc.

6. VISITING FACULTY AND SHARING OF KNOWLEDGE (5%)

Evidence of visiting Vitreo-retinal Subspecialist with active participation in knowledge sharing activity by way of lectures, conferences, workshops, clinical or surgical activities.

7. GENERAL COMMENTS AND OBSERVATIONS

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1. OVERALL SCORE (%) RECOMMENDED STATUS
   - > 70 Full accreditation

2. Guidelines for recommendation to the faculty board:

Only Full Accreditation should be allowed. Where this cannot be possible in one institution, a group of institutions can be evaluated and given the full accreditation if they together meet the requirement for full accreditation.