Purpose

The Clinical Curriculum Performance Standards describe the knowledge, skills and behaviours that are necessary for the practice of contemporary general ophthalmology.

These curriculum standards describe clinical practice in the following areas:

1. Cataract
2. Clinical refraction
3. Cornea and external eye disease
4. Glaucoma
5. Neuro-ophthalmology
6. Ocular inflammation
7. Ocular motility
8. Oculoplastics and orbit
9. Ophthalmic ultrasound
10. Paediatric ophthalmology
11. Refractive surgery
12. Vitreoretinal

Each element of the curriculum standards is described in terms of:

- learning outcomes (the skill to be mastered);
- level of mastery (the extent of autonomous practice expected of the trainee); and
- performance criteria (how the level of mastery is defined, and will be assessed).

The Clinical Curriculum Performance Standards are founded on the knowledge, skills and behaviours mastered by the trainee, and described in the:

- Ophthalmic sciences (Anatomy; Clinical Ophthalmology and Emergency Medicine; Optics; Physiology; Ocular Pathology; Clinical Genetics and Microbiology; and Evidence-based Ophthalmic Practice);
- Ophthalmic Basic Competencies and Knowledge (OBCK);
- Basics of Ophthalmic Surgery (BOS); and
- Social and Professional Curriculum standards.

The trainee is expected to have attained all of the competencies defined by the Clinical Curriculum Performance standards by the end of the training program.
Level of Mastery

For each learning outcome, the level of mastery to be attained by the trainee at the end of training is defined as follows:

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>***</td>
<td>Core knowledge of which trainees must be able to demonstrate understanding Skills and procedures that trainees must be able to perform autonomously</td>
</tr>
<tr>
<td>**</td>
<td>Knowledge of which trainees must have a good practical understanding Skills and procedures with which trainees should have assisted, and of which have good practical knowledge</td>
</tr>
<tr>
<td>*</td>
<td>Knowledge, skills and procedures of which trainees must have some understanding</td>
</tr>
</tbody>
</table>

Teaching and Learning

The College provides teaching and learning opportunities to assist the trainee in achieving the learning outcomes described in the Clinical Curriculum Performance Standards. The trainee is expected to:

- engage with the teaching and learning opportunities provided by didactic, clinical and surgical sessions in the training network;
- read widely, including of reputable web-based resources, and document learning;
- access the expertise of consultants, and the resources and equipment available in the training post;
- address each curriculum element and meet the performance criteria for each learning outcome;
- use the College website and Moodle learning management system to access learning materials including journals, curriculum documents, RANZCO Congress presentations, guidelines, work-based assessment forms, past papers and examination reports; and
- maintain a case diary (recommended), and RANZCO surgical logbook (mandatory).

Assessment Methods

Mastery of the knowledge, skills and behaviours described in these curriculum standards is assessed in various ways in the workplace, and in the RANZCO Advanced Clinical (RACE) exams.

Work-based assessment
The following forms are used to record and assess the performance of the trainee in the workplace:

- Intentions for the term – Form 2
- Theatre performance assessment – Form 3
- Mid-term formative assessment – Form 4
- End-of-term supervisor assessment – Form 5
Work-based assessment forms are available for download from the College website.

**Examination**
The purpose of the RACE is to test the knowledge and competencies required for contemporary ophthalmic practice. The Clinical Performance Curriculum Standards are intended to be read as the core learning areas for candidates for this examination.

All RANZCO examinations are ‘blueprinted’ against curriculum standards. This means that examination committees use the standards as a guide to structure the examinations. The committee ensures that each examination assesses a breadth of knowledge by testing across all elements of the relevant standards.

Examiners refer to the learning outcomes, levels of mastery and performance criteria when writing examination questions, to ensure that all questions asked in the examinations are at an appropriate depth.

Contemporary ophthalmic practice is dynamic and it is important to be aware that newer areas of current practice may not be explicitly included in these standards but are still examinable. In particular, newer technologies and the key outcomes of recently published research, including the results of Randomised Controlled Trials relevant to clinical practice are examinable.

It is also important to note that the list of conditions and treatment approaches in the Context section of each standard is not exhaustive, and is included as a guide only.

**Best Practice Standards**
The trainee should refer to the current RANZCO clinical guidelines, published on its website, as well as to any standards referred to in each of the clinical areas in these standards.

**References**
The following readings are considered core for all clinical areas in these standards.


**Changes to the curriculum standards**
The trainee will be notified via email, and details published on the College website when new or revised curriculum standards become available. The trainee is encouraged to check the College website and Moodle to ensure that he or she is working from the latest set of curriculum standards.
Acknowledgements

Curriculum Committee
Paul Mitchell (Chair), Jonathan Farrah, Adam Gajdatsy, Glen Gole, Justin Mora, Mark Walland

Review Groups

Cataract, Clinical Refraction Refractive Surgery
Gerard Sutton (Chair), Peter Beckingsale, Dean Corbett, Tom Cunneen, Michael Goggin, Paul McCartney, Gordon Sanderson, Angus Turner

Cornea and External Eye
Michael Loughnan (Chair), Andrea Ang, Paul Giles, Sue Ormonde, Gerard Sutton, Mark Whiting

Glaucoma
Mark Walland (Chair), Stuart Graham, Nicholas Karunaratne, Maria Moon, Jonathon Ng, Tony Wells

Neuro-Ophthalmology
Helen Danesh-Meier (Chair), Celia Chen, Xavier Fagan, Andrew Field, Brent Gaskin, Justin O’Day, Anthony Pane, Sophia Zagora

Ocular Inflammation
Mei-Ling Tay-Kearney (Chair), Maged Attella, Sam Lerts, Rachael Niederer, Jo Sims, Russell Townsend, Ehud Zamir

Ocular Motility, Paediatrics
Glen Gole (Chair), Joanna Black, Stuart Carroll, Susan Carden, Jayne Camuglia, John Dickson, Craig Donaldson, Richard Gardner, Graeme Kelly, Wendy Marshman

Oculoplastics and orbit
Adam Gajdatsy (Chair), Richard Hart, Peter Martin, Zelda Pick, Neil Sinclair, Tim Sullivan, Geoff Wilcsek

Ophthalmic Ultrasound
Brendan Vote (Chair), Alex Hunyor Jnr., Nathan Kerr, Toh Tze’Yo

Vitreoretinal
Paul Mitchell (Chair), Fred Chen, Alex Harper, Alex Hunyor Jnr., Jenny Ip, Tony Kwan, Mark Saunders, David Worsley

The College also acknowledges the individuals listed (in alphabetical order) below for contributing to the drafting of these curriculum standards.

Fellows and Trainees
Diana Conrad, Shuan Dai, Catherine Green, Trent Sandercoe, Christine Younan

College Education and Training Staff
Neridah Baker, Manager, Curriculum and Course Development
Penny Gormly, General Manager, Education and Training
Cataract Curriculum Standard

2014
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Purpose

The Cataract Clinical Performance Standard covers the knowledge, processes, skills and competencies required for the diagnosis and treatment of cataract: the leading cause of avoidable blindness worldwide.

References

In addition to the core texts, the following references are recommended:

Core Cataract Reading

In addition to the core texts, the following references are recommended:

- Reading should be supplemented with appropriate articles and video resources from:
  - relevant ophthalmic journal articles;
  - American Academy of Ophthalmology *Focal Points*;
  - American Academy of Ophthalmology *One Network* (<http://www.aao.org/education/prod_access.cfm>); and

Additional Reading


It is recommended that reading be supplemented with appropriate articles from current and relevant peer-reviewed journals.

Level of Mastery

For each learning outcome, the level of mastery to be attained by the trainee at the end of training is indicated as follows:

<table>
<thead>
<tr>
<th>Level</th>
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<tbody>
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<td>*</td>
<td>Knowledge, skills and procedures of which trainees must have some understanding</td>
</tr>
</tbody>
</table>
## Learning outcomes and performance criteria

### CT1 GENERAL MEDICAL AND OCULAR HISTORY RELEVANT TO CATARACT

This element covers the processes for observing, promoting and recording a general medical and ocular history in preparation for diagnosis and treatment of cataract.

The trainee is expected to have obtained and recorded a general medical and ocular history (including family history) as outlined in the Ophthalmic Basic Competency and Knowledge (OBCK) standard.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Obtain details of ocular history</td>
<td>***</td>
<td>1.1.1 Identify risk factors that may have relevance for primary and secondary cataract</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.1.2 Identify history of conditions that could increase risk of cataract surgical complications</td>
</tr>
<tr>
<td>1.2 Obtain an ocular family history</td>
<td>***</td>
<td>1.2.1 Identify risk factors that may have relevance for primary and secondary cataract</td>
</tr>
<tr>
<td>1.3 Identify general illnesses and medications that may have an impact on ocular disease or its treatment</td>
<td>***</td>
<td>1.3.1 Discuss the impact of any given medication or general illnesses on cataract formation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.3.2 Identify cataract risk factors arising from general history</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.3.3 Identify factors predictive of life expectancy of patient in considering course of management</td>
</tr>
</tbody>
</table>
CT2 PERFORM EYE EXAMINATIONS APPROPRIATE FOR CATARACT

This element covers the performance and interpretation of a range of eye examinations relating to cataract. It also covers the demonstration of judgement in selecting the appropriate examinations for particular patients.

The practitioner is expected to have performed eye examinations as outlined in the Ophthalmic Basic Competency and Knowledge (OBCK) standard.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
</tr>
</thead>
</table>
| 2.1 Undertake an external ocular examination | *** | 2.1.1 From the inspection of the general appearance of the eye and adnexa, interpret the relevance of any signs that may be found  
2.1.2 Identify features or signs that indicate an increased risk of cataract surgical complications |
| 2.2 Measure visual acuity | *** | 2.2.1 Accurately perform, record and interpret the results of the following examinations:  
• visual acuity including refraction and pin hole acuity  
• refraction of the fellow eye  
• assessment of the likely outcome for visual acuity following cataract surgery  
• discussion of likely outcomes with patient |
| 2.3 Undertake ocular examinations appropriate to the diagnosis or external eye and corneal diseases | *** | 2.3.1 Accurately perform, record and interpret the results of these examinations and identify their relevance to the diagnosis of external eye and corneal disease:  
• pupillary reactions  
• colour vision testing and contrast sensitivity |
| 2.4 Perform a slit lamp examination of the anterior segment and adnexa | *** | 2.4.1 Correctly perform, record and interpret the results of anterior segment and adnexa examinations, as applied to cataract |
| 2.5 Obtain intra-ocular pressure (IOP) readings | 2.5.1 Obtain an accurate IOP reading, understand the limitation of the technique used and identify its relevance to diagnosing a cataract and its treatment  
2.5.2 Correctly use tonometers based on indentation and applanation principles (including Goldmann, Tonopen and iCare tonometers) |
|---|---|
| 2.6 Perform gonioscopy to detect angle abnormalities and zonular abnormalities | 2.6.1 Assess characteristics of the anterior chamber angle and related structures  
2.6.2 Assess the anterior chamber angle for risk of closure  
2.6.3 Assess the safety of pupil dilatation for the purposes of preoperative assessment of the eye |
| 2.7 Undertake a posterior segment examination of the vitreous, optic nerve head, macula, retina including its periphery through a dilated pupil unless dilatation is contraindicated | 2.7.1 Accurately report the characteristics and clinical significance of posterior segment findings, particularly those of the optic nerve head, macula and retinal periphery |
| 2.8 Undertake a posterior segment examination of the vitreous, optic nerve head, macula, retina including its periphery | 2.8.1 Given a variety of general presentations (e.g. diabetes, hypertension) identify the relevance, if any, to cataract and potential management |
| 2.9 Test visual fields | 2.9.1 Examine visual fields using confrontation  
2.9.2 Perform and interpret a static perimetry test  
2.9.3 Interpret data for automated fields  
2.9.4 Identify typical field defects in glaucoma as well as diseases mimicking it and recognise any progression over time |
### 2.10 Perform ancillary tests to further assist in the diagnosis or documentation of cataract where appropriate

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>2.10.1</strong></td>
<td>Perform accurate ocular biometry to assess corneal curvature (keratometry) anterior chamber depth, lens thickness and axial length</td>
</tr>
<tr>
<td><strong>2.10.2</strong></td>
<td>Select and apply appropriate IOL power calculation formula individualised to the patient’s biometry and intraocular lens to determine predicted outcomes for cataract surgery</td>
</tr>
<tr>
<td><strong>2.10.3</strong></td>
<td>Modify formulae individualised to the eye and intraocular lens for patients who have had refractive surgery.</td>
</tr>
<tr>
<td><strong>2.10.4</strong></td>
<td>Modify formulae individualised to the eye and intraocular lens for patients who may benefit from toric intraocular lenses</td>
</tr>
<tr>
<td><strong>2.10.5</strong></td>
<td>Modify formulae individualised to the eye and intraocular lens for patients who may benefit from multifocal or accommodating intraocular lenses</td>
</tr>
<tr>
<td><strong>2.10.6</strong></td>
<td>Ensure an understanding on the part of the patient of the effect of anisometropia if monovision is considered</td>
</tr>
<tr>
<td><strong>2.10.7</strong></td>
<td>Interpret corneal topography</td>
</tr>
<tr>
<td><strong>2.10.8</strong></td>
<td>Perform and interpret B scan ultrasonography</td>
</tr>
</tbody>
</table>
| 2.11 Select and perform, or refer, for relevant investigations that pertain to visual loss and are indicated by history and examination | 2.11.1 Perform and interpret fluorescein angiography  
2.11.2 Interpret electro-physiological examinations  
2.11.3 Interpret MRI scans  
2.11.4 Interpret blood analysis including:  
- blood glucose / HbA1c  
- INR  
2.11.5 Cataract associated with other ocular disease:  
- glaucoma  
- corneal pathology  
- uveitis  
- post vitrectomy  
- post refractive surgery |

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## CT3 CHARACTERISE CATARACT

This element covers the classification of types of cataract. The trainee must perform this work with total autonomy and responsibility for accuracy and completeness.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>3.1 Characterise risk factors for cataract</strong></td>
<td>***</td>
<td>3.1.1 Be aware of risk factors for cataract, and assess whether advice on modifying risk factors will be of utility to the patient</td>
</tr>
</tbody>
</table>
| **3.2 Characterise cataract according to their morphology** | *** | 3.2.1 Describe the morphology and assess the severity of cataract  
3.2.2 Be familiar with and able to use cataract classification systems such as LOCS III, that assess nuclear, cortical and posterior subcapsular cataract separately |
| **3.3 Characterise cataract and lens abnormalities according to their aetiology** | *** | 3.3.1 Identify age-related cataract  
3.3.2 Identify cataract originating from genetic, metabolic and systemic disorders  
3.3.3 Identify and diagnose cataract arising from pre-natal maternal infection  
3.3.4 Identify cataract originating from developmental ocular abnormalities  
3.3.5 Identify trauma induced cataract  
3.3.6 Identify cataract arising secondary to posterior segment surgery  
3.3.7 Identify drug-induced cataract  
3.3.8 Identify cataract that are idiopathic |
### 3.4 Characterise lens-related abnormalities and other ocular conditions having impact on the management of cataract

<table>
<thead>
<tr>
<th>3.4.1 Identify lens-related conditions:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• pseudoexfoliation</td>
</tr>
<tr>
<td>• lens-induced inflammation</td>
</tr>
<tr>
<td>• phacodonesis</td>
</tr>
<tr>
<td>• posterior polar cataract</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3.4.2 Identify other ocular conditions:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• corneal opacity, endothelial pathology</td>
</tr>
<tr>
<td>• shallow anterior chamber, elevated IOP</td>
</tr>
<tr>
<td>• previous vitrectomy, retinal detachment</td>
</tr>
<tr>
<td>• refractive state with particular regard to ocular dimensions - high myopia and high hypermetropia, nanophthalmos and astigmatism</td>
</tr>
</tbody>
</table>

### 3.5 Consider differential diagnoses

<table>
<thead>
<tr>
<th>3.5.1 Differentiate cataract from:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• anterior segment pathology</td>
</tr>
<tr>
<td>• vitreous pathology</td>
</tr>
<tr>
<td>• retinal pathology</td>
</tr>
<tr>
<td>• understand the differential diagnosis of leukocoria</td>
</tr>
</tbody>
</table>
CT4 DEVELOP AND IMPLEMENT A CATARACT MANAGEMENT PLAN

This element covers the management of cataract using observation, medical therapies and surgery including postoperative care.

The trainee must adhere to the standards of practice, in particular those regarding informed consent and clinical record-keeping, described in the Ophthalmic Basic Competencies and Knowledge (OBCK) standard.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
</tr>
</thead>
</table>
| 4.1 Determine and document in medical records a management plan for each patient | *** | 4.1.1 Integrate information from the history and examination to determine likely prognosis and possible management options  
4.1.2 Maintain legible records in accepted format of the proposed management plan and the briefing of the patient |
| 4.2 Educate the patient about the condition and obtain agreement on a management plan | *** | 4.2.1 Explain the nature of the patient’s cataract  
4.2.2 Explain clearly the options including observation, refractive correction in early cataract and cataract surgery, and the potential consequences. Include discussion of lifestyle factors including visual criteria for driving, in the decision as to whether to proceed to surgery. If cataract directly threatens vision, such as lens induced inflammation, advise patient  
4.2.3 Discuss the limitations of current IOLs and limited predictability of IOL selection. Be aware of the effect of previous refractive surgery on IOL selection. Discuss with patient proposed surgical technique, IOL style and power  
4.2.4 Determine the impact of co-existing diseases (including but not limited to macular degeneration, glaucoma and diabetic retinopathy) the potential outcomes and explain to the patient. Discuss expected outcome with patient to enable them to make an informed decision  
4.2.5 Understand the concept of informed consent |
| 4.2.6 Obtain the patient's informed consent to the management regimen, having documented discussion in sufficient detail the expected benefits, outcomes, the process involved and the risks both systemic and ocular |
| 4.2.7 Be familiar with standard cataract surgical consent forms [http://www.institute.nhs.uk/quality_and_value/high_volume_care/cataract.html] |

### 4.3 Consider the impact on the cataract of systemic conditions and their treatments

- **3** Identify medical therapies that may exacerbate the cataract or have an impact on the management thereof.
- **3.2** Understand intraoperative floppy iris syndrome (IFIS) and its management.
- **3.3** Identify factors of systemic disease management that may exacerbate the cataract

### 4.4 Consider intraoperative management of the complex cataract

- **2** Dilate or constrict the pupil to manage cataract
- **2** Monitor the efficacy of the medical therapy, identify complications of the therapy and make necessary adjustments to the management regimen
- **3.3** Undertake management of risk from existing ocular conditions that may impact on cataract surgery

### 4.5 Design surgical plan

- **3** Discuss and select the surgical technique relevant to the capacity of the theatre:
  - **3.1** phacoemulsification
  - **2.2** extra-capsular cataract extraction (ECCE)
  - **1.3** intra-capsular cataract extraction (ICCE)
<table>
<thead>
<tr>
<th>Cataract Curriculum Standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.6 Provide advice to patients on contemporary surgical treatment options</td>
</tr>
<tr>
<td>4.6.1 Be aware of and able to discuss with patients contemporary techniques for cataract surgery</td>
</tr>
<tr>
<td>4.7 Perform investigations preparatory to surgery</td>
</tr>
<tr>
<td>4.7.1 Select investigations relevant to the history, the type of anaesthetic and hospital protocols in preparation for surgery</td>
</tr>
<tr>
<td>4.8 Undertake preoperative preparation of the patient</td>
</tr>
<tr>
<td>4.8.1 Immediately prior to surgery utilise a surgical safety checklist, ideally one specifically for cataract surgery. Specifically, identify patient and correct eye and correct IOL for procedure</td>
</tr>
<tr>
<td>4.8.2 Dilate pupil</td>
</tr>
<tr>
<td>4.8.3 Select and administer appropriate antibiotic</td>
</tr>
<tr>
<td>4.8.4 Plan anterior chamber maintenance</td>
</tr>
<tr>
<td>4.8.5 Assess and manage pupil size</td>
</tr>
<tr>
<td>4.8.6 Reassess cataract type and density</td>
</tr>
<tr>
<td>4.8.7 Assess need for capsular staining techniques</td>
</tr>
<tr>
<td>4.9 Administer regional anaesthetic</td>
</tr>
</tbody>
</table>
| 4.9.1 Perform regional anaesthesia  
• peribulbar / sub-Tenon block  
• topical anaesthesia |  
| 4.9.2 Retro-bulbar block |  
| 4.9.3 Perform facial nerve blocks |  

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<table>
<thead>
<tr>
<th>4.10 Perform cataract surgery</th>
<th>4.10.1 Design wound placement and creation taking into account pre-existing astigmatism</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4.10.2 Select viscoelastic device suitable for surgical need</td>
</tr>
<tr>
<td></td>
<td>4.10.3 Maintain anterior chamber with use of viscoelastic device</td>
</tr>
<tr>
<td></td>
<td>4.10.4 Perform anterior capsulotomy with regard to the intraocular lens to be implanted, pupil size, cataract type and method of nuclear removal</td>
</tr>
<tr>
<td></td>
<td>4.10.5 Perform adequate hydro-dissection and hydro-delineation to ensure adequate lens mobility within the capsule, when required</td>
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<tr>
<td></td>
<td>4.10.6 Perform lens disassembly and removal by desired technique</td>
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<td></td>
<td>4.10.7 Perform cortical removal and clean up with irrigator-aspirator</td>
</tr>
<tr>
<td></td>
<td>4.10.8 Modify wound to appropriate lens size and insert lens with and without the use of a viscoelastic device</td>
</tr>
<tr>
<td></td>
<td>4.10.9 Appropriately rotate toric IOLs to the planned meridian having identified this meridian prior to surgery</td>
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<tr>
<td></td>
<td>4.10.10 Remove viscoelastic agent</td>
</tr>
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<td></td>
<td>4.10.11 Check wound integrity</td>
</tr>
<tr>
<td></td>
<td>4.10.12 Suture wound if indicated</td>
</tr>
<tr>
<td></td>
<td>4.10.13 Perform further incisional surgery to correct pre-existing astigmatism</td>
</tr>
<tr>
<td></td>
<td>4.10.14 Administer antibiotic and/or anti-inflammatory prophylactic treatment</td>
</tr>
<tr>
<td>4.11 Manage intraoperative complications</td>
<td>4.11.1 Recognise and manage complications due to anaesthesia</td>
</tr>
<tr>
<td>--------------------------------</td>
<td>--------------------------------------------------------------------------------------------</td>
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<tr>
<td></td>
<td>4.11.2 Recognise and manage intraoperative complications</td>
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</tbody>
</table>
### 4.12 Implement postoperative care

<table>
<thead>
<tr>
<th>4.12.1 Manage corneal exposure</th>
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<tbody>
<tr>
<td>• eye pad</td>
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<tr>
<td>• bandage contact lens</td>
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<tr>
<td>• shields</td>
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<tr>
<td>• sunglasses</td>
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</table>

<table>
<thead>
<tr>
<th>4.12.2 Prescribe postoperative therapies as applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td>• antibiotics</td>
</tr>
<tr>
<td>• anti inflammatories</td>
</tr>
<tr>
<td>• ocular hypotensives</td>
</tr>
</tbody>
</table>

| 4.12.3 Arrange adequate supervision of patient including safe transport arrangements and after hours contact with day patients |

### 4.13 Provide follow up and continuing care

| 4.13.1 Develop follow up and continuing care plan with the patient |

<table>
<thead>
<tr>
<th>4.13.2 Examine patient in the postoperative period and determine:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• patient comfort</td>
</tr>
<tr>
<td>• wound</td>
</tr>
<tr>
<td>• visual acuity</td>
</tr>
<tr>
<td>• corneal clarity</td>
</tr>
<tr>
<td>• a.c. activity and depth</td>
</tr>
<tr>
<td>• lens position</td>
</tr>
<tr>
<td>• pupil size and shape</td>
</tr>
<tr>
<td>• IOP</td>
</tr>
<tr>
<td>• fundus health</td>
</tr>
<tr>
<td>• refractive error</td>
</tr>
<tr>
<td>• patient satisfaction with outcome</td>
</tr>
</tbody>
</table>

### 4.14 Manage postoperative complications

| 4.14.1 Recognise and manage complications of cataract surgery in the postoperative period. Be aware of the need for urgent intervention and appropriate referral where necessary |

| 4.14.2 Assess for posterior capsular opacification and perform YAG laser capsulotomy where indicated after discussion with patient and obtaining informed consent |

| 4.14.3 Be familiar with options available for managing unexpected refractive outcomes post IOL implantation |
| 4.14.4 | Be able to manage the dissatisfied patient post cataract surgery, including and awareness of conditions that may limit effectiveness of IOLs designed to ameliorate presbyopic symptoms. |
| 4.14.5 | Alter frequency of assessments, medical and surgical intervention to optimise visual outcome following complications of surgery |

| **4.15 Audit cataract surgery outcomes** | 4.15.1 Understand the importance of surgical audit, especially in frequently performed procedures such as cataract surgery |
|  | 4.15.2 Understand accepted cataract outcomes, both in developing world and developed world surgery |
|  | [http://www.cehjournal.org/resources/monitoring-cataract-surgical-outcomes/] |
|  | [http://www.rcophth.ac.uk/page.asp?section=583&sectionTitle=Cataract+National+Data+Set+for+Adults] |
|  | 4.15.3 Undertake a continuing personal audit as part of the Surgical Logbook, including but not limited to intraoperative complications, post op. complications including endophthalmitis, refractive outcomes and patient satisfaction ratings. |
|  | 4.15.4 Calculate a personalized A constant and SIA on own patients |
Context

In order to fulfil the clinical performance standards, the trainee must apply the knowledge and skills described in the:

- Ophthalmic Sciences (Anatomy, Clinical Ophthalmic and Emergency Medicine, Optics, Physiology, Clinical Genetics and Microbiology, and Evidence-based Ophthalmic Practice);
- Ophthalmic Basic Competencies and Knowledge (OBCK); and,
- Basics of Ophthalmic Surgery (BOS) curriculum standards.

Clinical practice

The following list is provided to identify the conditions, their causes and sequelae, and the treatment approaches that may be encountered by the trainee in clinical practice. The list is not exhaustive; it is intended as a guide for the use of the trainee when planning his or her learning.

Cataract Topic List

- Ocular medications and their local and systemic side effects
- Eye injuries and accidents and their long term effects
- Ophthalmic procedures and their long term effects
- General diseases with ocular manifestations or that affect the diagnosis and management of cataract
- Medications with ocular effects that affect the diagnosis and management of cataract
- Principles of brief general examination
- Signs of systemic disease
- Ophthalmic instruments specified in the Basics of Ophthalmic Surgery curriculum standard
- Performance of and interpretation of findings of external ocular examination
  - orbit
  - eyelids
  - eye movements
- Use of slit lamp and interpretation of findings of examination of:
  - eyelids
  - conjunctiva (bulbar, tarsal and fornical) including cicatrisation
  - cornea: epithelium, stroma, endothelium
  - anterior chamber: depth, presence of cells/flare
  - iris
  - lens
  - angle structures and grading width
- Performance and interpretation of pupil examination
  - size, colour, shape, reactions
• Performance and interpretation of intra-ocular pressure (IOP) measurements

• Performance and interpretation of posterior segment examination
  - optic disc characteristics: colour; cupping; contour; circulation; size; peripapillary atrophy and haemorrhages
  - retina: central (including macula); and peripheral

• Interpretation of visual field examination
  - visual field examination methods, visual field defects, global indices and indices of reliability and serial analyses

• Morphology of cataract
  - nuclear, cortical, capsular, subcapsular, polar, mature, hypermature

• Genetic, metabolic and systemic diseases causing cataract
  - diabetes mellitus
  - Down syndrome
  - hypoparathyroidism
  - Marfan syndrome
  - Weill-Marchesani syndrome
  - Homocystinuria

• Pre-natal maternal infection resulting in cataract
  - rubella
  - cytomegalovirus
  - varicella
  - syphilis
  - toxoplasmosis
  - herpes simplex

• Developmental ocular abnormalities associated with cataract
  - aniridia
  - anterior segment dysgenesis
  - microphthalmia
  - PHPV
  - posterior lenticonus

• Trauma induced cataract
  - contusion
  - electro-magnetic radiation
  - electrocution
  - lightning strike
  - intraocular copper and iron

• Cataract secondary to posterior segment surgery

• Drug-induced cataract including corticosteroids and phenothiazines

• Conditions mimicking cataract including causes of leukocoria

• Investigations in preoperative assessment of patients
• Pharmacology
  - indications, contraindications, side effects, drug interactions, mechanism of action, absorption, duration of effect, metabolism and compliance issues of the following (and appropriate combinations):
    • beta antagonists
    • parasympathomimetics
    • prostaglandin analogues
    • alpha 2 agonists
    • carbonic anhydrase inhibitors
    • adrenergic agonists
    • hyperosmotic agents
    • antibiotics
    • anti-inflammatories: steroidal and non-steroidal
    • local anaesthetics

• Lasers
  - clinical physics or lasers laser safety
  - laser setting
  - indications, contraindications, techniques and complications of the following procedures: YAG capsulotomy
    - YAG iridotomy
    - YAG vitreolysis
    - YAG laser of lens deposits argon laser iridotomy
  - familiarity with excimer laser refractive surgery (basic knowledge)

• Surgical
  - administration of regional anaesthesia including peribulbar block, retrobulbar block, local nerve blocks and topical anaesthesia
  - management of complications of regional anaesthesia
  - maintenance of airway and basic cardiopulmonary resuscitation (CPR)

  - pathology of wound healing

  - indications, contraindications and techniques of the following procedures:
    • phacoemulsification
    • extra-capsular cataract extraction(ECCE)
    • intra-capsular cataract extraction (ICCE)
    • combined cataract glaucoma surgery
    • secondary IOL implantation
    • peripheral iridectomy

  - intra-ocular lens implant (IOL) types:
    • materials, styles, mono and multi focality, accommodating
    • intraoperative complication management including:
      - allergic reactions to drugs
      - perforated globe
      - retro-bulbar haemorrhage
      - sub-conjunctival haemorrhage corneal abrasions
      - brain/stem anaesthesia hyphaema
      - eyelash contamination ocular laceration adnexal laceration
      - wound location and construction small pupil management
- instrumentation including:
  - microscope
  - blades, scissors
  - forceps
  - phacoemulsifiers
  - sutures
  - needles
  - IOL injection devices

- capsulotomy including capsulorhexis
- excessive or inadequate hydro-dissection
- sudden rise in IOP
- sudden change in depth of anterior chamber
- wound burn
- posterior segment perforation dropped fragments
- zonular dehiscence vitreous prolapse
- haemorrhage including suprachoroidal (expulsive) and hyphaema
- IOL misplacement viscoelastic device retention Descemet's membrane detachment

- Postoperative complication management including:
  - raised IOP
  - intra-ocular haemorrhage
  - peri-ocular/orbital haemorrhage
  - wound leak including prolapse, shallow or flat a.c.
  - corneal integrity
  - lens position
  - posterior segment complications
  - excessive inflammation including endophthalmitis
  - retained nuclear fragments
  - cystoid macular oedema
  - exacerbation of diabetic retinopathy
  - exacerbation of ARMD
  - retinal detachment
  - intractable corneal oedema
  - posterior capsular opacification
  - capsular contraction
  - IOL decentralization
  - Uveitis-glaucoma- hyphaema (UGH) syndrome
  - refractive shift
  - epithelial ingrowth
  - wound infection
  - sterile hypopyon
  - late-onset endophthalmitis
  - wound dehiscence
  - upper lid ptosis
  - dry eye
  - excessive glare and entoptic phenomena
  - IOL imperfections
  - inappropriate IOL selection
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Purpose

"Indeed, of all aspects of medicine this practice [refraction] gives people more comfort and increased efficiency than any other medical technique"

Sir Stewart Duke-Elder, 1970

Refraction is a core skill in ophthalmology; it is not just a method of optimising the visual acuity but is also a diagnostic and therapeutic tool. All ophthalmologists need to be able to refract – some need to have first-class skills with objective refraction in particular.

References

Clinical Refraction Reading
In addition to the core texts, the following references are recommended:


Additional Reading


Other Resources

The RANZCO Optics curriculum provides guidance on learning underpinning this standard. There may be some online resources that are of value, but discretion should be exercised regarding their accuracy. It is recommended that reading be supplemented with appropriate articles from current and relevant peer-reviewed journals.

Best Practice Standards

Refraction is a fundamental diagnostic and therapeutic tool. Trainees must be able to demonstrate, in practice and on assessment, that they meet the following standards:

1. Demonstrate an understanding of the principles of retinoscopy.

2. Demonstrate an ability to perform retinoscopy to within +/- 0.50 DS and +/- 0.50 DC; and axis to within 15 degrees.

   Trainees must be able to record the results in the following forms:
   - optic (power) cross, with working distance allowance included
   - in sphero/cylindrical form, with the working distance allowance removed.

3. Demonstrate an understanding of the principles of subjective refraction including:
   - refinement of the spherical component
   - refinement of the cylindrical component
   - subjective determination of spherical and cylindrical refraction

4. Perform binocular balancing
5. Prescribe prisms in spectacle form.

**Level of Mastery**

For each learning outcome, the level of mastery to be attained by the trainee at the end of training is indicated as follows:

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>***</td>
<td>Core knowledge of which trainees must be able to demonstrate understanding Skills and procedures that trainees must be able to perform autonomously</td>
</tr>
<tr>
<td>**</td>
<td>Knowledge of which trainees must have a good practical understanding Skills and procedures with which trainees should have assisted, and of which have good practical knowledge</td>
</tr>
<tr>
<td>*</td>
<td>Knowledge, skills and procedures of which trainees must have some understanding</td>
</tr>
</tbody>
</table>
## Learning outcomes and performance criteria

### CR1 ADULT REFRACTION

This element covers the performance of refraction on an adult patient, and the prescription of spectacles. The trainee is expected to have obtained and recorded a general medical and ocular history (including family history) as outlined in the Ophthalmic Basic Competency and Knowledge (OBCK) standard.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
</tr>
</thead>
</table>
| 1.1 Determine and record previous spectacle and contact lens wear | *** | 1.1.1 Use questioning to elicit information about previous refractive corrections including:  
- multifocal spectacles  
- bifocal spectacles  
- soft and hard contact lenses  
- prism incorporated into spectacles  
- history of previous refractive surgery |
| 1.2 Use manual or automatic lensometers to examine existing lenses and provide additional information to assist in the initial estimation of refractive error | *** | 1.2.1 Set up equipment as per manufacturer’s specifications  
1.2.2 Test lens correctly positioned on instrument  
1.2.3 Establish lens centration  
1.2.4 Correctly identify power of unknown lenses and prisms |
| 1.3 Prepare and position patient for each test procedure | *** | 1.3.1 Explain test procedure to patient  
1.3.2 Instruct patient what to do during the test  
1.3.3 Adjust equipment to ensure test reliability, and patient and operator comfort |
| 1.4 Use keratometry and/or corneal topography to assist in refraction as appropriate | ** | 1.4.1 Use a keratometer to quantify corneal astigmatism  
1.4.2 Use a keratometer or topographer to exclude any signs of irregular astigmatism |
| 1.5 Obtain objective measurement of refractive error | 1.5.1 Adjust retinoscope for plane or concave mirror effect |
| 1.5.2 Perform and interpret the results of retinoscopy allowing for working distance and noting any ocular disease |
| 1.5.3 Record refraction accurately |
| 1.5.4 Transpose results of retinoscopy to a provisional spectacle prescription |
| 1.5.5 Be familiar with the use of autorefractors and aberrometers in estimating refractive error |
| 1.5.6 Use cycloplegic refraction, where indicated |

| 1.6 Perform subjective refraction | 1.6.1 Accurately refine sphere and cylinder component of refractive error using: |
| 1.6.2 Determine and individualize near vision requirement if indicated |
| 1.6.3 Be familiar with phoropter heads |

| 1.7 Prescribe spectacles | 1.7.1 Consider factors influencing final prescription: |
| 1.7.2 interpupillary distance (IPD) |
| 1.7.3 BVD |
| 1.7.4 anisometropia |
| 1.7.5 amblyopia |
| 1.7.6 prismatic requirement |
## Clinical Refraction Curriculum Standard

| 1.8 Advise on lens type, filters and coatings to suit individual needs | 1.8.1 Discuss spectacle options with the patient to enable them to make an informed decision:  
- tints  
- high index lenses  
- anti-reflective coatings  
1.8.2 Discuss lens shape and materials, and frame types and materials, with patient to enable them to make an informed decision |
<table>
<thead>
<tr>
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<tbody>
<tr>
<td>1.9 Have a knowledge of prescription of contact lenses</td>
<td>1.9.1 Be familiar with different types of contact lenses and basic principles of fittings and prescribing contact lenses</td>
</tr>
</tbody>
</table>
**CR2 PAEDIATRIC REFRACTION**

*This element covers the performance of refraction on paediatric patients and the prescription of spectacles.*

*The practitioner is expected to have obtained and recorded a general medical and ocular history (including family history) as outlined in the Ophthalmic Basic Competency and Knowledge (OBCK) standard.*

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
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</tr>
</thead>
<tbody>
<tr>
<td>2.1 Determine and record previous spectacle and contact lens wear</td>
<td>***</td>
<td>2.1.1 Elicit information about previous use and/or use appropriate equipment to measure existing correction</td>
</tr>
</tbody>
</table>
| 2.2 Prepare and position patient for each test procedure | *** | 2.2.1 Explain test procedure to patient and/or carer(s)  
2.2.2 Instruct patient/carer what to do during the test  
2.2.3 Adjust equipment to ensure test reliability, and patient and operator comfort |
| 2.3 Perform cycloplegic refraction | *** | 2.3.1 Demonstrate understanding of the effects, duration, side effects and relevance of cycloplegic agents  
2.3.2 Demonstrate understanding of the use and role of cycloplegic agents in the refraction of children |
| 2.3.3 Demonstrate understanding of: | ** | 2.3.3.1 the indications for conscious sedation or general anaesthesia, to enable cycloplegic refraction or related procedures  
2.3.3.2 the effects of different forms of anaesthesia on the refractive state |
| 2.4 Obtain objective measurement of refractive error | 2.4.1 Adjust retinoscope for plane or concave mirror effect  
2.4.2 Record refraction accurately  
2.4.3 Record refraction to within 0.50 dioptre sphere and cylinders and axes to within 15°  
2.4.4 Translate results of retinoscopy to a provisional spectacle prescription  
2.4.5 Use an autorefractor and be familiar with aberrometer in estimating refractive error |
|---|---|
| 2.5 Perform subjective refraction | 2.5.1 Attempt to refine sphere and cylinder component of refractive error if appropriate using:  
• trial frame  
• trial lens set  
• Jackson cross cylinder  
• tests, including duochrome test, to avoid over-correcting myopes or under-correcting hypermetropes  
2.5.2 Be familiar with phoropter heads |
| 2.6 Prescribe spectacles | 2.6.1 Demonstrate a knowledge of the development of normal refractive error in childhood  
2.6.2 Demonstrate a knowledge of abnormal refractive error and timing of spectacle correction  
2.6.3 Demonstrate an understanding of the effect of spectacle correction on disease states  
2.6.4 Consider factors influencing final prescription:  
• BVD  
• anisometropia  
• amblyopia |
| 2.7 Have a knowledge of the prescription of contact lenses | 2.7.1 Be familiar with different types of contact lenses and basic principles of fitting and prescribing contact lenses |
| 2.8 Have knowledge of research on slowing the rate of myopic progression in a young person | *** |
| 2.8.1 Be able to explain to a parent or carer the options for slowing the rate of myopic progression |
Context

In order to fulfil the clinical performance standards, the trainee must apply the knowledge and skills described in the:

- Ophthalmic Sciences (Anatomy, Clinical Ophthalmic and Emergency Medicine, Optics, Physiology, Clinical Genetics and Microbiology, and Evidence-based Ophthalmic Practice);
- Ophthalmic Basic Competencies and Knowledge (OBCK); and,
- Basics of Ophthalmic Surgery (BOS) curriculum standards.

Clinical practice

The following list is provided to identify the conditions, their causes and sequelae, and the treatment approaches that may be encountered by the trainee in clinical practice. The list is not exhaustive; it is intended as a guide for the use of the trainee when planning his or her learning.

Conditions deserving special emphasis

These conditions are of particular importance because of their prevalence and impact on society. It is expected that trainees will have a very detailed knowledge of these conditions.

1. Refractive errors
2. Keratoconus or any other form of irregular astigmatism
3. Amblyopia
4. Cataract or other opacities of the transparent media

Clinical Refraction Topic List

- Changes of refraction with age: acquired myopia, myopia due to nuclear sclerosis, hypermetropia and presbyopia
- Far and near point of the eye
- Emmetropia
- Ametropia
- Hypermetropia and its subdivisions: latent manifest, facultative, absolute, total
- Myopia
- Astigmatism: compound, simple, mixed, regular and irregular
- Correction of ametropia: ocular and spectacle refraction
- Anisometropia and aniseikonia
- Refractive state and genetic inheritance
• Accommodation: range and amplitude, age related values, presbyopia

• Duochrome test

• Jackson cross cylinder, Astigmatic fan and stenopaeic slit

• Presbyopia correction: back vertex distance and power

• Forms of lenses: bifocals, trifocal and multifocals (manufacturing techniques not required)

• Spectacle magnification and relative spectacle magnification (simple formulae only)

• The trial case and frames

• Writing spectacle prescriptions

• Transposition

• Aphakia and its correction: spectacles, contact lenses and intra-ocular lenses

• Theory of multifocal and accommodating intra-ocular lenses (basic understanding only)

• Sun glasses

• Spectacle lens materials

• Contact lenses: trial fitting, types, over refraction and prescription
Cornea and External Eye Curriculum Standard

2014
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CE2 PERFORM EYE EXAMINATIONS FOR EXTERNAL EYE AND CORNEAL CONDITIONS ................................................................................................................................. 3
CE3 CHARACTERISE EXTERNAL EYE AND CORNEAL CONDITIONS ....................................................... 6
CE4 DEVELOP AND IMPLEMENT A MANAGEMENT PLAN FOR EXTERNAL EYE AND CORNEAL CONDITIONS .................................................................................................................. 11
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Purpose

The Cornea and External Eye Clinical Performance Standard covers the specific knowledge, processes, skills and competencies required for the diagnosis and treatment of corneal and external eye conditions.

The maintenance of a healthy ocular surface is essential for good vision and comfortable eyes. Disorders of the ocular surface are some of the most common causes of patients presenting to an ophthalmologist. A thorough knowledge of the diagnosis, examination, investigation and treatment of ocular surface disorders is an essential skill for ophthalmic trainees to acquire.

References

Cornea and External Eye Reading
In addition to the core texts, the following references are recommended:


Additional Reading


It is recommended that reading be supplemented with appropriate articles from current and relevant peer-reviewed journals.

Level of Mastery

For each learning outcome, the level of mastery to be attained by the trainee at the end of training is indicated as follows:

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</tbody>
</table>
## Learning outcomes and performance criteria

**CE1  GENERAL MEDICAL AND OCULAR HISTORY RELEVANT TO CORNEAL AND EXTERNAL EYE CONDITIONS**

This element covers the processes for observing, promoting and recording a general medical and ocular history in preparation for diagnosis and treatment of external eye and corneal conditions. The trainee is expected to have obtained and recorded a general medical and ocular history (including family history) as outlined in the Ophthalmic Basic Competencies and Knowledge (OBCK) standard.

<table>
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<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
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</thead>
<tbody>
<tr>
<td>1.1 Obtain details of current and past ocular history</td>
<td>***</td>
<td>1.1.1 Identify risk factors that may have relevance for corneal and external eye disease</td>
</tr>
<tr>
<td>1.2 Obtain an ocular family history</td>
<td>***</td>
<td>1.2.1 Identify risk factors that may have relevance for corneal and external eye disease</td>
</tr>
<tr>
<td>1.3 Identify general illnesses, drug allergies, medications, and injuries that may have an impact on ocular disease or its treatment</td>
<td>***</td>
<td>1.3.1 Identify risk factors from general history for corneal and external eye diseases</td>
</tr>
</tbody>
</table>
**CE2 PERFORM EYE EXAMINATIONS FOR EXTERNAL EYE AND CORNEAL CONDITIONS**

This element covers the performance and interpretation of a range of eye examinations associated with external eye and corneal conditions. It also covers the demonstration of judgement in selecting the appropriate examinations for particular patients.

The trainee is expected to have performed preliminary eye examinations as outlined in the Ophthalmic Basic Competencies and Knowledge (OBCK) standard.

<table>
<thead>
<tr>
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<th>PERFORMANCE CRITERIA</th>
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<tbody>
<tr>
<td>2.1 Identify and describe the general appearance of</td>
<td>***</td>
<td>2.1.1 From an external ocular inspection, interpret the relevance of any signs that</td>
</tr>
<tr>
<td>the anterior eye, lids and adnexa (including lacrimal</td>
<td></td>
<td>may be found</td>
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<td>gland), through an ocular inspection</td>
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<tr>
<td>2.2 Undertake appropriate examination of the eye</td>
<td>***</td>
<td>2.2.1 Perform examinations including:</td>
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<tr>
<td></td>
<td></td>
<td>• visual acuity</td>
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<tr>
<td></td>
<td></td>
<td>• pinhole acuity</td>
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<td></td>
<td></td>
<td>• refraction</td>
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<td>• pupillary responses</td>
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<td></td>
<td></td>
<td>• corneal sensation</td>
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<td></td>
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<td>• measurement of intra-ocular pressure</td>
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<td>2.2.2 Accurately perform, record and interpret the results of these examinations and</td>
</tr>
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<td>note the relevance to the diagnosis of external eye and corneal diseases</td>
</tr>
<tr>
<td>2.3 Perform a slit lamp examination of the anterior segment and adnexa</td>
<td>2.3.1 Plan the order of examinations</td>
<td></td>
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<tr>
<td>2.3.2 Perform and interpret the results of anterior segment, eye and adnexal examinations, that do not require stains, as applied to external eye and corneal diseases</td>
<td></td>
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<tr>
<td>2.3.3 Examine and identify pathology in the different layers of the cornea: epithelium, Bowman layer, stroma, Descemet membrane and endothelium</td>
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<tr>
<td>2.3.4 Evert the upper eyelid</td>
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<tr>
<td>2.3.5 Select appropriate stain and prepare patient for examinations requiring stains</td>
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</tr>
<tr>
<td>2.3.5 Perform and interpret the results of anterior segment and adnexal examinations, which require stains, as applied to external eye and corneal conditions</td>
<td></td>
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<tr>
<td>2.3.6 Document the above findings with appropriate diagrams, including a cross-section of the cornea</td>
<td></td>
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</tr>
</tbody>
</table>

| 2.4 Examine the anterior chamber | 2.4.1 Perform qualitative assessment of anterior chamber including gonioscopy, assessment of inflammatory activity and state of endothelium |
| 2.4.1 | 2.4.1 |

| 2.5 Undertake posterior segment examination, including examination of the optic nerve head and fundus | 2.5.1 Correlate any findings with the corneal or external eye disease demonstrated |
| 2.5.1 | 2.5.1 |

<p>| 2.6 Perform a brief general medical examination relevant to ophthalmology if appropriate | 2.6.1 Given a variety of general presentations (e.g. diabetes, hypertension) identify the relevance, if any, to corneal and external eye diseases |
| 2.6.1 | 2.6.1 |</p>
<table>
<thead>
<tr>
<th>2.7 Perform ancillary tests to further assist in the diagnosis or documentation of external eye and corneal disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.7.1 Perform corneal scraping and culture</td>
</tr>
<tr>
<td>2.7.2 Perform ocular biometry to assess corneal pachymetry, anterior chamber depth, lens thickness and axial length</td>
</tr>
<tr>
<td>2.7.3 Perform lacrimal syringing and irrigation</td>
</tr>
<tr>
<td>2.7.4 Interpret specular microscopic assessment</td>
</tr>
<tr>
<td>2.7.5 Interpret results of conjunctival biopsy, corneal scraping, impression cytology, microbiological swabs</td>
</tr>
<tr>
<td>2.7.6 Interpret corneal tomography and topography maps, including the principles of Placido-based and Scheimpflug imaging</td>
</tr>
<tr>
<td>2.7.7 Perform exophthalmometry</td>
</tr>
<tr>
<td>2.7.8 Describe the principles of anterior segment optical coherence tomography and confocal microscopy in diagnosing corneal disorders</td>
</tr>
<tr>
<td>2.7.9 Perform and interpret keratometry</td>
</tr>
<tr>
<td>2.7.10 Interpret orbital and neuro-radiological imaging</td>
</tr>
</tbody>
</table>
## CE3 CHARACTERISE EXTERNAL EYE AND CORNEAL CONDITIONS

This element covers the classification of types of external eye and corneal conditions and making a working and differential diagnosis.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 Characterise anatomical abnormalities of the eyelid affecting the function of the ocular surface</td>
<td>***</td>
<td>3.1.1 Identify and differentiate anatomical abnormalities of the eyelids</td>
</tr>
<tr>
<td>3.2 Characterise the causes of inflammation and infection of the eyelid</td>
<td>***</td>
<td>3.2.1 Identify blepharitis including meibomian gland dysfunction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.2.2 Identify bacterial, viral, parasitic and fungal eyelid infections</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.2.3 Identify allergic, autoimmune, and dermatological conditions</td>
</tr>
<tr>
<td>3.3 Characterise disorders of the tear film, tear production and drainage</td>
<td>***</td>
<td>3.3.1 Identify features and causes of dry eye</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.3.2 Identify tear film abnormalities</td>
</tr>
<tr>
<td>3.4 Characterise disorders of the lacrimal system</td>
<td>***</td>
<td>3.4.1 Identify dacryoadenitis, dacryocystitis canaliculitis and nasolacrimal duct obstruction</td>
</tr>
<tr>
<td>3.5 Characterise ocular surface tumours</td>
<td>***</td>
<td>3.5.1 Identify dysplastic and malignant lesions of the cornea, limbus and conjunctiva</td>
</tr>
<tr>
<td>3.6 Characterise infectious/microbial conjunctivitis</td>
<td>***</td>
<td>3.6.1 Identify bacterial (including chlamydial) and viral conjunctivitis</td>
</tr>
<tr>
<td>3.7 Characterise ocular allergy syndromes</td>
<td>***</td>
<td>3.7.1 Identify seasonal and perennial conjunctivitis, vernal keratoconjunctivitis and atopic keratoconjunctivitis</td>
</tr>
<tr>
<td>3.8 Characterise cicatrizing conjunctivitis</td>
<td>Identify each of the following:</td>
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<tr>
<td>-------------------------------------------</td>
<td>--------------------------------</td>
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<tr>
<td></td>
<td>3.8.1 Ocular cicatricial pemphigoid and pseudo-cicatricial pemphigoid</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.8.2 Erythema multiforme / Stevens-Johnson syndrome / toxic epidermal necrolysis</td>
<td></td>
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<tr>
<td></td>
<td>3.8.3 Systemic disorders that cause conjunctival cicatrizing (e.g. lymphoma)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.8.4 Other forms of cicatrizing conjunctivitis</td>
<td></td>
</tr>
<tr>
<td>3.9 Characterise other forms of conjunctivitis</td>
<td>3.9.1 Identify each of the following:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.9.2 Superior limbic keratoconjunctivitis</td>
<td></td>
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<tr>
<td></td>
<td>3.9.3 Toxic conjunctivitis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.9.4 Ligneous conjunctivitis</td>
<td></td>
</tr>
<tr>
<td>3.10 Identify developmental abnormalities of cornea</td>
<td>3.10.1 Identify abnormality of size, shape, structure, innervation and clarity</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.10.2 Identify abnormal corneal sensation</td>
<td></td>
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<tr>
<td></td>
<td>3.10.3 Identify anterior chamber cleavage syndromes</td>
<td></td>
</tr>
<tr>
<td>3.11 Characterise corneal manifestations of systemic disease</td>
<td>3.11.1 Identify each of the following:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• skeletal and connective tissue disease</td>
<td></td>
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<tr>
<td></td>
<td>• disease associated with systemic inflammation</td>
<td></td>
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<tr>
<td></td>
<td>• haematologic disease</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• endocrine disease</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• other systemic diseases</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.11.2 Identify each of the following:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• metabolic disease, including:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>– Fabry disease</td>
<td></td>
</tr>
<tr>
<td></td>
<td>– mucopolysaccaridoses</td>
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<tr>
<td></td>
<td>– xerophthalmia</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• nutritional disorders</td>
<td></td>
</tr>
<tr>
<td>3.12 Characterise corneal and conjunctival manifestations of local and systemic therapies</td>
<td>**</td>
<td></td>
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<tr>
<td>3.12.1 Identify manifestations of, including but not limited to:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- conjunctival and corneal deposits</td>
<td></td>
<td></td>
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<tr>
<td>- punctuate keratopathy</td>
<td></td>
<td></td>
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<tr>
<td>- chemical toxicity</td>
<td></td>
<td></td>
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<tr>
<td>- drug induced dry eye syndrome</td>
<td></td>
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<tr>
<td>- limbal stem cell deficiency</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>3.13 Characterise corneal and conjunctival dystrophies, degenerations and ectasia</th>
<th>***</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.13.1 Identify each of the following:</td>
<td></td>
</tr>
<tr>
<td>- pterygium and pseudopterygium</td>
<td></td>
</tr>
<tr>
<td>- dystrophies of epithelium and basement membrane</td>
<td></td>
</tr>
<tr>
<td>- endothelial dystrophies</td>
<td></td>
</tr>
<tr>
<td>- corneal and conjunctival degeneration (including concretions and conjunctival chalasis)</td>
<td></td>
</tr>
</tbody>
</table>

| 3.13.2 Identify each of the following: |
| - stromal dystrophies |
| - peripheral degenerations (e.g. Terriens) |
| - non-inflammatory ectatic dystrophies |
| - iridocorneal endothelial syndromes |
| - limbal stem cell deficiency |

<table>
<thead>
<tr>
<th>3.14 Characterise microbial keratitis</th>
<th>***</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.14.1 Identify each of the following:</td>
<td></td>
</tr>
<tr>
<td>- bacterial keratitis</td>
<td></td>
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<tr>
<td>- viral keratitis (including herpes simplex keratitis, herpes zoster ophthalmicus and adenoviral keratoconjunctivitis)</td>
<td></td>
</tr>
<tr>
<td>- fungal keratitis</td>
<td></td>
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<tr>
<td>- acanthamoeba and other parasitic keratitis</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3.15 Characterise interstitial keratitis</th>
<th>**</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.15.1 Identify the causes of interstitial keratitis</td>
<td></td>
</tr>
</tbody>
</table>
### 3.16 Characterise miscellaneous keratopathies

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>***</td>
<td>3.16.1 Identify each of the following:</td>
<td>recurrent corneal erosion syndromes, neurotrophic keratitis</td>
</tr>
<tr>
<td>**</td>
<td>3.16.2 Identify each of the following:</td>
<td>Thygesons SPK, nummular keratitis, filamentary keratitis, factitious keratoconjunctivitis</td>
</tr>
</tbody>
</table>

### 3.17 Characterise immunological disorders of the cornea and conjunctiva

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>***</td>
<td>3.17.1 Identify each of the following:</td>
<td>corneal disease in rheumatoid and non-rheumatoid collagen vascular disease, phlyctenular keratoconjunctivitis, staph antigen sensitivity, marginal keratitis, Moorens ulcer</td>
</tr>
</tbody>
</table>

### 3.18 Characterise chemical, thermal and mechanical injury of the cornea

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>***</td>
<td>3.18.1 Identify each of the following injuries to the cornea:</td>
<td>mechanical injury, acid injury, alkali injury, non-specific chemical toxicity, thermal injury to the cornea</td>
</tr>
</tbody>
</table>

### 3.19 Characterise disorders of the sclera

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>***</td>
<td>3.19.1 Recognise and differentiate infectious from inflammatory causes of:</td>
<td>episcleritis, scleritis</td>
</tr>
</tbody>
</table>

### 3.20 Characterise ocular conditions resulting from contact lens use

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>***</td>
<td>3.20.1 Identify conjunctival and corneal effects of contact lens wear</td>
<td></td>
</tr>
</tbody>
</table>
### 3.21 Characterise corneal, conjunctival and other external conditions resulting from previous surgery

<table>
<thead>
<tr>
<th>3.21.1 Identify effects on the cornea and surrounding tissues of:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• cataract surgery</td>
</tr>
<tr>
<td>• corneal transplantation, including penetrating keratoplasty (PKP), Descemet stripping automated endothelial keratoplasty (DSAEK / DSEK), and deep anterior lamellar keratoplasty (DALK)</td>
</tr>
<tr>
<td>• pterygium surgery including a conjunctival autograft</td>
</tr>
<tr>
<td>• refractive surgery</td>
</tr>
<tr>
<td>• glaucoma filtering surgery</td>
</tr>
<tr>
<td>• application of antimetabolites and radiation (including the effects of previous radiotherapy following pterygium surgery)</td>
</tr>
<tr>
<td>• conjunctival surgery</td>
</tr>
<tr>
<td>• vitreoretinal surgery</td>
</tr>
</tbody>
</table>

### 3.21.2 Identify effects on the cornea and surrounding tissues of:

- corneal collagen cross-linking

### 3.22 Recognise evidence of previous refractive surgery

<table>
<thead>
<tr>
<th>3.22.1 Identify each of the following:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• previous laser photo refractive keratectomy (PRK)</td>
</tr>
<tr>
<td>• previous laser-assisted in situ keratomileusis (LASIK)</td>
</tr>
<tr>
<td>• previous incisional refractive surgery, including arcuate/astigmatic keratotomy (AK) and radial keratotomy (RK)</td>
</tr>
<tr>
<td>• corneal stromal implants</td>
</tr>
</tbody>
</table>
CE4 DEVELOP AND IMPLEMENT A MANAGEMENT PLAN FOR EXTERNAL EYE AND CORNEAL CONDITIONS

This element covers the management of external eye and corneal conditions using observation, medical therapies and surgery including postoperative care.
The trainee must adhere to the standards of practice, in particular those regarding informed consent and clinical record-keeping, described in the Ophthalmic Basic Competencies and Knowledge (OBCK) standard.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
</tr>
</thead>
</table>
| 4.1 Determine and document in medical records a management plan for each patient | *** | 4.1.1 Integrate information from the history and examination to determine likely prognosis  
4.1.2 Choose appropriate management strategies  
4.1.3 Establish initial management targets |
| 4.2 Educate the patient | *** | 4.2.1 Explain the nature of the patients' corneal and/or external eye condition  
4.2.2 Explain clearly the proposed management regimen and the potential consequences thereof, including genetic counselling  
4.2.3 Obtain and record the patient's informed consent to the management regimen where appropriate |
| 4.3 Understand the role of observation as part of management plan | *** | 4.3.1 Establish and record appropriate baseline parameters  
4.3.2 Maintain documentation including imaging that charts the progress of the observations |
| 4.4 Manage corneal and external eye disease with medical treatment | *** | 4.4.1 Undertake first aid and emergency management procedures for ocular trauma  
4.4.2 Monitor the efficacy of the medical therapy, identify complications of the therapy and make necessary adjustments to the management regimen |
<table>
<thead>
<tr>
<th>4.4.3</th>
<th>Be familiar with the use of rigid gas permeable contact lenses and scleral contact lenses in the treatment of irregular astigmatism and ectatic disease</th>
</tr>
</thead>
</table>
| **4.5** Perform surgery to manage external eye and corneal conditions | **4.5.1** Counsel patient on the surgical procedure, and obtain consent  
**4.5.2** Perform tarsorrhaphy  
**4.5.3** Perform electrolysis for the treatment of trichiasis  
**4.5.4** Perform techniques for repair of entropion and ectropion  
**4.5.5** Perform excision of pterygium and pinguecula including conjunctival autograft  
**4.5.6** Suture corneal lacerations  
**4.5.7** Glue corneal perforation and apply corneal bandage lens  
**4.5.8** Use epithelial debridement or bandage contact lens to aid in epithelial healing  
**4.5.9** Recognise and provide appropriate medical and surgical management of corneal and conjunctival tumours and neoplastic disease  
**4.5.10** Inject botulinum toxin to induce ptosis  
**4.5.11** Describe the indications and techniques of lamellar (including DSAEK, DSEK, and DALK) and penetrating keratoplasty  
**4.5.12** Be familiar with the technique of corneal collagen cross-linking for progressive keratoconus  
**4.5.13** Be familiar with the procurement, processing, storage and selection of donor corneal material |
| 4.5 | Be familiar with techniques of limbal stem cell transplantation  
| 4.5.14 | Perform stromal micropuncture  
| 4.5.15 | Perform cryotherapy for the treatment of trichiasis  
| 4.5.16 | Be familiar with the use of intracorneal stromal rings to treat keratoconus  
| 4.5.17 | Perform partial conjunctival flaps  
| 4.5.18 | Be familiar with Gunderson conjunctival flaps  
| 4.5.19 | Be familiar with the use of excimer laser phototherapeutic keratectomy (PTK) for disorders of the epithelium and anterior stroma  
| 4.5.20 |

| 4.6 | Undertake postoperative management  
| 4.6.1 | Identify and manage postoperative complications  
| 4.6.2 | Identify and manage corneal graft rejection, vascularization and suture related complications  

| 4.7 | Demonstrate appropriate decision making with regard to referral of patients  
| 4.7.1 | Refer patient in a timely manner, with a comprehensive case history (oral or written) to the appropriate specialist  
| 4.7.2 | Share management with an appropriate specialist (e.g. patients requiring immunosuppression, those with infectious disease or allergies, and paediatric patients)  

Context

In order to fulfil the clinical performance standards, the trainee must apply the knowledge and skills described in the:

- Ophthalmic Sciences (Anatomy, Clinical Ophthalmic and Emergency Medicine, Optics, Physiology, Clinical Genetics and Microbiology, and Evidence-based Ophthalmic Practice);
- Ophthalmic Basic Competencies and Knowledge (OBCK); and,
- Basics of Ophthalmic Surgery (BOS) curriculum standards.

Clinical practice

The following list is provided to identify the conditions, their causes and sequelae, and the treatment approaches that may be encountered by the trainee in clinical practice. The list is not exhaustive; it is intended as a guide for the use of the trainee when planning his or her learning.

Cornea and External Eye Topic List

- Systemic disease with ocular manifestations, or diseases that impact on the diagnosis or external eye or corneal conditions including but not limited to:
  - endocrine and metabolic diseases such as diabetes
  - allergy
  - auto immune diseases
  - neurological disease
  - collagen vascular disorders
  - mucocutaneous disorders
  - oncology and chemotherapy
  - chemical and physical insults
  - infectious diseases including, but not limited to, sexually transmitted diseases
  - nutritional disease and conditions

- Medications with ocular and systemic effects impacting on external eye and corneal diseases including but not limited to:
  - topical medications, their vehicles and preservatives
  - systemic medications including but not limited to:
    - psychotropics
    - rheumatological medications
    - antiarrhythmics
    - chemotherapeutic agents
    - alpha blocking agents

- Environmental conditions that impact on external eye and corneal diseases including but not limited to ultraviolet light, housing and hygiene conditions.

- Ocular medications and their local and systemic side effects

- Eye injuries, including their long term effects

- Ophthalmic procedures, including their long term effects

- Principles of brief general examination
• Signs of systemic disease
• Performance and interpretation of findings of external ocular examination including, but not limited to, the assessment of:
  – Bell phenomenon
  – lagophthalmos
  – corneal sensation
  – tear film break-up time
  – corneal stains (e.g. fluorescein, Rose Bengal and lissamine green)
  – Schirmer test

• Use of slit lamp and interpretation of findings on examination of:
  – eyelids
  – conjunctiva (bulbar, tarsal and fornical) including cicatrisation
  – cornea: epithelium, Bowman layer, stroma, Descemet membrane, endothelium
  – anterior chamber: depth, presence of cells/flare
  – iris
  – lens
  – angle structure and grading

• Knowledge of the diagnosis and management of each of the conditions relevant to the areas listed in element CE3
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### Purpose

The Glaucoma Clinical Performance Standard covers the specific knowledge, processes, skills and competencies required for the diagnosis and treatment of glaucoma.

Neglected glaucoma remains a blinding disease. The ophthalmologist has traditionally been the practitioner best able to diagnose and manage the condition.

Glaucoma is usually said to make up roughly one third of the consultation case load of the general ophthalmologist. Since the current Australian National Health and Medical Research Council (NHMRC) guidelines\(^1\) state that the ophthalmologist shall provide oversight on all glaucoma management decisions, trainee experience in all complexities of the disease and its management are essential.

This standard reflects the trans-Tasman requirements of the College education process, and is intended to enable the newly-qualified ophthalmologist to provide competent, comprehensive glaucoma care, including laser and surgical treatments for glaucoma and the ability to differentiate glaucoma from other optic neuropathies and causes of visual field defects.

### References

In addition to the core texts, the following references are recommended:

**Glaucoma Reading**

- National Health and Medical Research Council, 2010, *NHMRC Guidelines for the screening, prognosis, diagnosis, management and prevention of glaucoma*, Canberra, ACT.

**Additional Reading**

- American Academy of Ophthalmology *Focal Points*
- Appropriate articles from relevant ophthalmic journals, including those reporting on the following:
  - Ocular Hypertension Treatment Study (OHTS)
  - Collaborative Normal Tension Glaucoma Trial (CNTGT)
  - Collaborative Initial Glaucoma Treatment study (CIGTS)
  - Early Manifest Glaucoma Trial (EMGT)
  - Advanced Glaucoma Intervention Study (AGIS)
  - Tube versus Trabeculectomy Study (TVT)

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\(^1\) National Health and Medical Research Council, 2010, *NHMRC Guidelines for the screening, prognosis, diagnosis, management and prevention of glaucoma*, Canberra, ACT.


It is recommended that reading be supplemented with appropriate articles from current and relevant peer-reviewed journals.

**Level of Mastery**

For each learning outcome, the level of mastery to be attained by the trainee by the end of training is indicated as follows:

<table>
<thead>
<tr>
<th>Level of Mastery</th>
<th>Description</th>
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<tbody>
<tr>
<td>***</td>
<td>Core knowledge of which trainees must be able to demonstrate understanding. Skills and procedures that trainees must be able to perform autonomously.</td>
</tr>
<tr>
<td>**</td>
<td>Knowledge of which trainees must have a good practical understanding. Skills and procedures with which trainees should have assisted, and of which have good practical knowledge.</td>
</tr>
<tr>
<td>*</td>
<td>Knowledge, skills and procedures of which trainees must have some understanding.</td>
</tr>
</tbody>
</table>
Learning outcomes and performance criteria

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Obtain details of past ocular history</td>
<td>***</td>
<td>1.1.1 Identify risk factors that may have relevance for primary and secondary glaucoma</td>
</tr>
<tr>
<td>1.2 Obtain an ocular family history</td>
<td>***</td>
<td>1.2.1 Identify risk factors that may have relevance for primary and secondary glaucoma</td>
</tr>
</tbody>
</table>
| 1.3 Identify general illnesses and medications that may have an impact on ocular disease or its treatment | *** | 1.3.1 Discuss the impact of any given medications or general illnesses on glaucoma  
 1.3.2 Identify risk factors arising from general history for glaucoma |
### GL2 PERFORM EYE EXAMINATIONS APPROPRIATE FOR GLAUCOMA

This element covers the performance and interpretation of a range of eye examinations applicable to glaucoma. It also covers the demonstration of judgement in selecting the appropriate examinations for particular patients.

The trainee is expected to have performed preliminary eye examinations as outlined in the Ophthalmic Basic Competency and Knowledge (OBCK) standard.

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<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
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</table>
| 2.1 Undertake ocular examinations appropriate for glaucoma | *** | 2.1.1 Accurately perform and interpret the results of these examinations and identify their relevance to the diagnosis of glaucoma:  
• visual acuity including refraction  
• pupillary reactions  
• colour vision testing  
• light brightness appreciation |
| 2.2 Perform a slit lamp examination of the anterior segment and adnexa | *** | 2.2.1 Correctly perform and interpret the results of anterior segment and adnexa examinations, as applied to glaucoma. This includes:  
• measurement of intraocular pressure  
• gonioscopy |
| 2.3 Perform a slit lamp examination of the posterior segment | *** | 2.3.1 Accurately report the characteristics and clinical significance of posterior segment findings, particularly those of the optic nerve head |
| 2.4 Perform a brief general medical examination relevant to ophthalmology if appropriate | *** | 2.4.1 Given a variety of general presentations (e.g. diabetes, hypertension) identify the relevance, if any, to glaucoma and its potential management |
| 2.5 Test visual fields | 2.5.1 Examine visual fields using confrontation |
| | 2.5.2 Perform and interpret a static perimetry test |
| | 2.5.3 Interpret a kinetic perimetry test |
| | 2.5.4 Interpret data for automated fields |
| | 2.5.5 Identify typical field defects in glaucoma as well as diseases mimicking it |
| | 2.5.6 Detect progression of field loss and understand significance of rates of progression |
| 2.6 Perform ancillary tests to further assist in the diagnosis or documentation of glaucoma where appropriate | 2.6.1 Maintain a record of fundus photos including stereo-views of the optic disc |
| | 2.6.2 Measure corneal thickness |
| | 2.6.3 Interpret nerve fibre analysis/disc topography |
| | 2.6.4 Perform ocular biometry to assess anterior chamber depth, lens thickness and axial length |
| | 2.6.5 Interpret anterior segment imaging |
| | 2.6.6 Interpret radiological imaging of the brain, optic nerve and adjacent structures |
| | 2.6.7 Interpret results of carotid artery investigations |
### GL3 CHARACTERISE GLAUCOMA

This element covers the classification of types of glaucoma and making a working and differential diagnosis.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
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</thead>
<tbody>
<tr>
<td>3.1 Characterise risk factors for glaucoma</td>
<td>***</td>
<td>3.1.1 Identify and prioritise risk factors including ocular hypertension and distinguish these from glaucoma</td>
</tr>
<tr>
<td>3.2 Characterise primary glaucoma</td>
<td>***</td>
<td>3.2.1 Identify primary open and closed angle glaucomas</td>
</tr>
<tr>
<td>3.3 Characterise secondary glaucoma</td>
<td>***</td>
<td>3.3.1 Identify the causes and types of secondary glaucoma</td>
</tr>
<tr>
<td>3.4 Characterise congenital and developmental glaucoma</td>
<td>***</td>
<td>3.4.1 Identify congenital glaucoma</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.4.2 Identify glaucoma associated with developmental disorders</td>
</tr>
<tr>
<td>3.5 Develop a differential diagnosis</td>
<td>***</td>
<td>3.5.1 Differentiate between glaucoma and other conditions causing visual field loss or optic nerve abnormalities, including congenital abnormalities</td>
</tr>
</tbody>
</table>
### GL4 DEVELOP AND IMPLEMENT A GLAUCOMA MANAGEMENT PLAN

This element covers the management of glaucoma using observation, medical therapies, laser and surgery, including postoperative care.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
</tr>
</thead>
</table>
| 4.1 Determine and document in medical records a management plan for each patient | *** | 4.1.1 Integrate information from the history and examination to determine likely prognosis  
4.1.2 Choose appropriate management strategies  
4.1.3 Establish initial management targets |
| 4.2 Educate the patient on the proposed management regimen | *** | 4.2.1 Explain the nature of the patient’s glaucoma  
4.2.2 Explain clearly the proposed management regimen and its potential consequences  
4.2.3 Obtain and record the patient’s informed consent to the management regimen where necessary |
| 4.3 Understand the impact on glaucoma of systemic conditions and their treatments | *** | 4.3.1 Identify medical therapies that may exacerbate glaucoma or have an impact on the management thereof  
4.3.2 Identify aspects of systemic disease management that may exacerbate glaucoma |
| 4.4 Understand the impact on glaucoma of other ocular diseases and their treatments | *** | 4.4.1 Consider other ocular diseases and ocular therapies that may have an impact on glaucoma  
4.4.2 Formulate variations in the management plan to appropriately treat secondary forms of glaucoma (e.g. uveitic, phakolytic, steroid-related) |
| 4.5 | Understand the role of observation, and incorporate its use into the development of a management plan | 4.5.1 Establish and record appropriate baseline parameters  
4.5.2 Maintain documentation that charts the progress of the observations |
| 4.6 | Undertake medical management of glaucoma | 4.6.1 Apply knowledge of the physiology governing aqueous humour production and outflow to the selection of medical therapy  
4.6.2 Formulate a target intraocular pressure (IOP) range for a given patient  
4.6.3 Monitor the efficacy of the medical therapy, identify local complications of the therapy and make necessary adjustments to the management regimen  
4.6.4 Identify the impact of treatment on systemic conditions, identify systemic complications of therapy, and modify the treatment appropriately |
| 4.7 | Determine the expected outcome of medical and surgical therapy given the impact of coexisting conditions and explain to the patient | 4.7.1 Discuss expected outcome with patient to enable them to make an informed decision  
4.7.2 Describe how glaucoma management might differ for a pregnant or lactating woman or for someone who is trying to become pregnant |
| 4.8 | Perform laser therapy for the management of glaucoma | 4.8.1 Perform laser trabeculoplasty  
4.8.2 Perform peripheral iridotomy using YAG and/or argon lasers  
4.8.3 Perform panretinal photocoagulation using a laser  
4.8.4 Describe the various laser methods of cycloablation and the risks and consequences of these procedures  
4.8.5 Describe argon laser iridoplasty and the risks and consequences of the procedure |
### 4.9 Perform surgery to lower intra-ocular pressure

| 4.9 | 4.9.1 Counsel patient on the surgical procedure |
|  | 4.9.2 Perform trabeculectomy including the use of antimetabolites and releasable sutures |
|  | 4.9.3 Perform lens / cataract surgery as treatment for angle closure (glaucoma) |
|  | 4.9.4 Perform combined glaucoma and cataract surgery |
|  | 4.9.5 Perform a peripheral iridectomy |
|  | 4.9.6 Describe cyclophotocoagulation and cyclocryotherapy |
|  | 4.9.7 Identify and manage intraoperative complications |
|  | 4.9.8 Describe glaucoma drainage (tube) device insertion and the consequences of the procedure |
|  | 4.9.9 Describe gonioto microscopy and trabeculotomy and the consequences of the procedures |
|  | 4.9.10 Describe the technique and frequency of EUA for follow-up of infantile glaucoma |
|  | 4.9.11 Be aware of newly-described alternatives to trabeculectomy surgery and be familiar with the strengths and weaknesses of these |

### 4.10 Undertake postoperative management

<p>| 4.10 | 4.10.1 Identify and manage postoperative complications |
|  | 4.10.2 Perform sub-conjunctival injection of 5-fluorouracil or steroids |
|  | 4.10.3 Perform suturelysis |
|  | 4.10.4 Place a large contact lens effectively |
|  | 4.10.5 Inject visco-elastic into the anterior chamber |
|  | 4.10.6 Teach patient to perform bleb massage |</p>
<table>
<thead>
<tr>
<th>4.11 Modify postoperative management plan with consideration of incurred complications</th>
<th>4.11.1 Alter frequency of assessments, medical and surgical intervention to optimise visual outcome following complications of surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.12 Demonstrate appropriate decision making on referral of patients</td>
<td>4.12.1 Patients are referred in a timely manner with a comprehensive case history (oral or written) to the appropriate specialist or a support group</td>
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<tr>
<td>4.12.2 Share the management with an appropriate specialist for a patient with shunt surgery or paediatric glaucoma patients</td>
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<tr>
<td>4.13 Plan and undertake follow-up and continuing care</td>
<td>4.13.1 Develop an appropriate frequency for assessment of treatment</td>
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<tr>
<td>4.13.2 Ascertain health of the bleb, early (leakage, non-functioning) and late problems infection and cystic bleb</td>
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<tr>
<td>4.13.3 Manage these problems</td>
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<tr>
<td>4.13.4 Identify evidence of progression or deterioration in a glaucoma patient and revise management plan accordingly</td>
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</tbody>
</table>
Glaucoma Curriculum Standard

Context

In order to fulfil the clinical performance standards, the trainee must apply the knowledge and skills described in the:

- Ophthalmic Sciences (Anatomy, Clinical Ophthalmic and Emergency Medicine, Optics, Physiology, Clinical Genetics and Microbiology, and Evidence-based Ophthalmic Practice);
- Ophthalmic Basic Competencies and Knowledge (OBCK); and,
- Basics of Ophthalmic Surgery (BOS) curriculum standards.

Clinical practice

The following list is provided to identify the conditions, their causes and sequelae, and the treatment approaches that may be encountered by the trainee in clinical practice. The list is not exhaustive; it is intended as a guide for the use of the trainee when planning his or her learning.

Glaucoma Topic List

- Ocular medications and their local and systemic side effects
- Eye injuries and accidents and their long term effects
- Ophthalmic procedures and their long term effects
- General diseases with ocular manifestations or impact on diagnosis and management of glaucoma, including:
  - atopic diseases
  - respiratory diseases
  - diabetes
  - hypertension / hypotension
  - vascular disease, e.g. carotid stenosis, vascular insufficiency, embolic disease
  - neurological diseases
  - phakomatoses
- Medications with ocular effects that have an impact on glaucoma, such as:
  - corticosteroids: systemic, topical
  - sedatives
  - antidepressants
  - anticholinergics
  - antipsychotics
- Signs of systemic disease
  - performance of and interpretation of findings of external ocular examination:
    - orbit
    - eyelids
    - eye movements
- Use of slit lamp and interpretation of findings on examination of:
  - eyelids
  - conjunctiva (bulbar, tarsal and fornical) including cicatrisation
  - cornea: epithelium, stroma, endothelium
  - anterior chamber: depth, presence of cells / flare
Glaucoma Curriculum Standard

- iris
- lens
- angle structures and grading width

• Performance and interpretation of pupil examination
  - size, colour, shape, reactions

• Performance and interpretation of intra-ocular pressure (IOP) measurements

• Performance and interpretation of posterior segment examination
  - optic disc characteristics: colour, cupping, contour, circulation, size, peripapillary atrophy and haemorrhages
  - retina: central (including macula) and peripheral

• Interpretation of visual field examination
  - visual field examination methods, visual field defects, global indices and indices of reliability and serial analyses

• Ancillary tests
  - interpretation of various methods of nerve fibre analysis
  - neuroimaging including computed tomography (CT) and magnetic resonance imaging (MRI) scans, carotid Doppler studies

• Pathology, aetiology, genetics, epidemiology, clinical manifestations, systemic manifestations, diagnostic criteria and natural history of:
  - primary open angle glaucoma
  - primary closed angle glaucoma with and without pupil block
  - combined mechanism glaucoma
  - normal pressure glaucoma
  - ocular hypertension
  - pseudoexfoliation
  - pigment dispersion
  - neovascular glaucoma
  - uveitic / inflammatory glaucoma
  - lens induced glaucoma
  - trauma induced glaucoma
  - drug induced glaucoma
  - ciliary block glaucoma
  - secondary angle closure glaucoma with ad without pupil block
  - combined mechanism secondary glaucoma
  - tumour induced glaucoma
  - iridocorneal endothelial (ICE) syndrome glaucoma
  - glaucoma because of raised episcleral pressure
  - ghost cell glaucoma
  - congenital glaucoma
  - glaucoma associated with developmental disorders

• Differential diagnosis including:
  - congenital anomalies
  - ischaemic optic neuropathy
  - neurological disease
  - retinal disorders
  - compressive optic nerve lesions
  - past transient elevated IOP
• Pharmacology
  – indications, contraindications, side effects, drug interactions, mechanism of action, absorption, duration of effect, metabolism and compliance issues of the following (and appropriate combinations)
    • beta antagonists
    • parasympathomimetics
    • prostaglandin analogues
    • alpha 2 agonists
    • carbonic anhydrase inhibitors
    • adrenergic agonists
    • hyperosmotic agents
    • antibiotics
    • anti-inflammatories: steroidal and non-steroidal
    • local anaesthetics

• Laser
  – clinical physics of lasers
  – laser safety
  – laser settings
  – indications, contraindications, techniques and complications of the following procedures:
    • laser trabeculoplasty
    • laser peripheral iridotomy
    • laser panretinal photocoagulation
    • laser iridoplasty
    • cyclophotocoagulation

• Surgical
  – administration of regional anaesthesia including peribulbar block, retrobulbar block, local nerve blocks and topical anaesthesia
  – management of complications of regional anaesthesia
  – maintenance of airway and basic cardiopulmonary resuscitation (CPR)
  – Indications, contraindications and techniques of the following procedures:
    • trabeculectomy, including use of anti-metabolites and resealable/adjustable sutures
    • lens extraction as a treatment for angle closure and angle closure glaucoma
    • combined glaucoma cataract surgery
    • peripheral iridectomy
    • reformation of a shallow or flat anterior chamber
    • glaucoma drainage (tube) device insertion
    • goniotoomy

• Intraoperative complication management including:
  – conjunctival buttonhole
  – scleral flap disinsertion
  – vitreous loss
  – hyphaema
  – suprachoroidal haemorrhage
  – expulsive haemorrhage
  – Descemet membrane detachment
  – retrobulbar haemorrhage
Postoperative complication management including:
- leaking bleb
- over filtration
- choroidal detachment
- pupil block
- ciliary block/aqueous misdirection/malignant glaucoma
- bleb failure
- suprachoroidal haemorrhage
- flat anterior chamber
- postoperative infection and inflammation
- distinguish infectious blebitis and endophthalmitis
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Purpose

The Neuro-ophthalmology Clinical Performance Standard covers the knowledge, process, skills and competencies required for the diagnosis and management of neuro-ophthalmic conditions.

Neuro-ophthalmology involves visual problems that are related to the nervous system. Neuro-ophthalmic disorders may be life threatening or sight threatening and require careful recognition and prompt management. A thorough knowledge of the diagnosis, examination, investigation and management of neuro-ophthalmic disorders is an essential skill for the ophthalmic trainee to acquire.

References

Neuro-ophthalmology Reading
In addition to the core texts, the following references are recommended:


Key Neuro-ophthalmology Randomised Clinical Trials

Additional Reading


It is recommended that reading be supplemented with appropriate articles from current and relevant peer-reviewed journals.

Level of Mastery

For each learning outcome, the level of mastery to be attained by the trainee at the end of training is indicated as follows:

| *** | Core knowledge of which trainees must be able to demonstrate understanding Skills and procedures that trainees must be able to perform autonomously |
| **  | Knowledge of which trainees must have a good practical understanding Skills and procedures with which trainees should have assisted, and of which have good practical knowledge |
| *   | Knowledge, skills and procedures of which trainees must have some understanding |
Learning outcomes and performance criteria

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
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<tbody>
<tr>
<td>NO1 GENERAL MEDICAL AND OCULAR HISTORY RELEVANT TO NEURO-OPHTHALMIC CONDITIONS</td>
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<tr>
<td>This element covers the processes for observing, prompting and recording a general medical and ocular history in preparation for diagnosis and treatment of neuro-ophthalmic conditions. The trainee is expected to have obtained and recorded a general medical and ocular history (including family history) as outlined in the Ophthalmic Basic Competencies and Knowledge (OBCK) standard.</td>
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<tr>
<td>1.1 Take a thorough history of presenting symptoms, past medical history, ocular history and family history from a patient presenting with a neuro-ophthalmic condition</td>
<td>***</td>
<td>Identify and record features that have relevance to neuro-ophthalmic conditions in a patient who may present with the following symptoms:</td>
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<tr>
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<td>1.1.1 Visual loss</td>
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<td>1.1.2 Disorders of higher visual function including visual hallucinations</td>
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<tr>
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<td>1.1.3 Unexplained loss of vision</td>
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<td>1.1.4 Diplopia</td>
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<td></td>
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<td>1.1.5 Proptosis or enophthalmos</td>
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<td>1.1.6 Ptosis</td>
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<td></td>
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<td>1.1.7 Transient visual loss</td>
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<td>1.1.8 Ansicoria</td>
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<td>1.1.9 Facial weakness or spasm</td>
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<td>1.1.10 Orbital pain or headache</td>
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<td>1.1.11 Nystagmus</td>
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</table>
**NO2 PERFORM EYE EXAMINATIONS FOR NEURO-OPHTHALMIC CONDITIONS**

This element covers the performance and interpretation of a range of eye examinations associated with neuro-ophthalmic conditions, as well as the demonstration of judgement in selecting the appropriate examinations for particular patients.

The trainee is expected to have performed preliminary eye examinations as outlined in the Ophthalmic Basic Competencies and Knowledge (OBCK) standard. The trainee is also expected to have obtained and recorded a neuro-ophthalmic medical history.

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</table>
| 2.1 Undertake relevant neuro-ophthalmic examination based on presenting complaint | *** | 2.1.1 Perform, measure, record and interpret the results of the following examinations and note the relevance to the diagnosis of neuro-ophthalmic disease:  
- visual acuity (best corrected)  
- colour vision testing using Ishihara colour plates, HRR, or other office based techniques.  
- lid examination (identification, if present, of ptosis, retraction)  
- pupil examination – including pupil size in light and dark, shape, reaction, relative afferent pupillary defect and near response  
- ocular movements quantified with prisms  
- ascertain where there is deviation, whether it is comitant or incomitant  
- tests of muscle restriction, fatigability, saccadic, pursuit and nystagmoid movement including optokinetic nystagmus (OKN)  
- contrast sensitivity testing  
- photostress test  
- ocular motility with respect to specific nerve palsies – including patterns of lid abnormality  
- detect and quantify exophthalmos or enophthalmos  
- ascertain horizontal and vertical fusion range |
<table>
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<tr>
<th>2.2 Perform slit lamp examination</th>
<th>***</th>
<th>2.2.1 Examine pupil, cornea, iris and lens and record and interpret observation of any disorders relevant to neuro-ophthalmic diagnosis</th>
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<tbody>
<tr>
<td>2.3 Perform fundus examination</td>
<td>***</td>
<td>2.3.1 Examine fundus, record and interpret relevant retinal, choroidal, optic nerve and vitreal changes to aid neuro-ophthalmic diagnosis</td>
</tr>
<tr>
<td>2.4 Perform visual field test to confrontation</td>
<td>***</td>
<td>2.4.1 Where relevant, perform and interpret results of confrontation visual field defect and be able to identify lesions that obey the vertical meridian</td>
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<tr>
<td>2.5 Perform a neurological examination as relevant</td>
<td>***</td>
<td>2.5.1 Perform and interpret cranial nerve assessment</td>
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<td>2.5.2 Perform and interpret tests for tendon reflexes</td>
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<td>2.5.3 Perform and interpret basic office-based tests of vestibular and cerebellar function</td>
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<tr>
<td>2.6 Undertake basic tests of higher cortical function</td>
<td>***</td>
<td>2.6.1 Where relevant, perform tests to identify alexia, agraphia, neglect</td>
</tr>
<tr>
<td>2.7 Undertake appropriate examinations and tests to investigate functional visual loss</td>
<td>***</td>
<td>2.7.1 Where relevant, perform tests to identify functional visual loss</td>
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</tbody>
</table>
**NO3 SPECIAL NEURO-OPHTHALMIC TESTING**

This element covers the performance and interpretation of a range of special neuro-ophthalmic tests associated with neuro-ophthalmic conditions. The trainee is required to demonstrate judgement in selecting the appropriate tests for particular patients.

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</table>
| 3.1 Perform a range of specific tests to confirm diagnosis | 3.1.1 | Perform, record and/or interpret the results of the following examinations and note the relevance to the diagnosis of neuro-ophthalmic disease:  
- automated threshold perimetry  
- Goldmann perimetry  
- Hess Screens testing  
- Ice and Rest tests  
- ocular ultra-sonography  
- optic disc morphology and nerve fibre layer abnormalities using contemporary investigative techniques, e.g. optical coherence tomography (OCT)  

3.1.2 Understand the performance and interpretation of the Tensilon test and:  
- recognise the parameters that are relevant to the diagnosis  
- identify the indications and contraindications for the test  
- be aware that necessary resuscitation equipment needs to be within easy reach  

3.1.3 Perform and interpret pharmacological pupil tests:  
- determine which pharmacological tests may be appropriate for investigation of anisocoria to identify the underlying cause  

3.1.4 Identify the indications for a fluorescein angiogram and interpret results  

3.1.5 Identify the indications for a temporal artery biopsy, perform surgery, use techniques that avoid possible complications and interpret results  

3.1.6 Identify optic nerve head drusen using ultrasound and/or autofluorescence | 3.1.2 | Understand the performance and interpretation of the Tensilon test and:  
- recognise the parameters that are relevant to the diagnosis  
- identify the indications and contraindications for the test  
- be aware that necessary resuscitation equipment needs to be within easy reach  

3.1.3 Perform and interpret pharmacological pupil tests:  
- determine which pharmacological tests may be appropriate for investigation of anisocoria to identify the underlying cause  

3.1.4 Identify the indications for a fluorescein angiogram and interpret results  

3.1.5 Identify the indications for a temporal artery biopsy, perform surgery, use techniques that avoid possible complications and interpret results  

3.1.6 Identify optic nerve head drusen using ultrasound and/or autofluorescence | 3.1.6 | Identify optic nerve head drusen using ultrasound and/or autofluorescence |
3.2 Use blood testing to confirm diagnosis

**

3.2.1 Identify the indications for and interpret results from the following types of tests:
- haematology
- biochemistry
- microbiology
- immunology

3.3 Use genetic testing to confirm diagnosis

***

3.3.1 Identify the indications for and interpret results from genetic testing

3.3.2 Seek appropriate informed consent from the patient for testing

3.3.3 Provide or arrange genetic counselling

3.4 Use radiologic testing to confirm diagnosis

**

3.4.1 Identify the indications for and interpret results of:
- x-rays
- computed tomography (CT) scans
- magnetic resonance imaging (MRI) scans
- magnetic resonance arteriography (MRA)
- magnetic resonance venography (MRV)
- digital subtraction angiography

3.4.2 Understand which is the most relevant imaging modality for diagnosis or exclusion of a condition

3.5 Use ultrasonography testing of carotid and vertebral vasculature to confirm diagnosis

**

3.5.1 Identify the indications for and interpretation of results of Doppler studies

3.6 Use the results of lumbar puncture testing to confirm diagnosis

**

3.6.1 Identify the indications for, the principles of conducting and interpretation of results from a lumbar puncture
| 3.7 Understand the rationale behind and results of electrophysiological testing | 3.7.1 Identify the indications for conducting the following testing of retinal and visual pathways and interpret the results thereof:  
- electro-oculogram (EOG)  
- electro-retinogram (ERG)  
- electro-myogram (EMG)  
- multifocal ERG  
- pattern ERG  
- visual evoked potential (VEP) |
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<tr>
<td>3.8 Use muscle biopsy testing to confirm diagnosis</td>
<td>3.8.1 Identify the indications for and interpretation of fibre patterns of muscle biopsies for neuro-ophthalmology</td>
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<td>3.9 Use auto-immune testing to confirm diagnosis</td>
<td>3.9.1 Identify the indications for skin and buccal mucous membrane biopsies, the patterns of staining and significance</td>
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</table>
NO4 IMPLEMENT A NEURO-OPHTHALMIC MANAGEMENT PLAN

This element covers the management of neuro-ophthalmic conditions using observation, medical therapies and surgery, including postoperative care.

The trainee must adhere to the standards of practice, in particular those regarding informed consent and clinical record-keeping, described in the Ophthalmic Basic Competencies and Knowledge (OBCK) standard.

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<thead>
<tr>
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</table>
| 4.1 Determine and document in medical records a management plan for each individual patient | *** | 4.1.1 Integrate information from the history and examination to determine likely prognosis  
4.1.2 Maintain legible records in accepted format on the proposed management plan and the briefing of the patient  
4.1.3 Choose appropriate management strategies  
4.1.4 Establish initial management targets |
| 4.2 Educate the patient on the proposed management plan | *** | 4.2.1 Explain the nature of the patient’s neuro-ophthalmic condition  
4.2.2 Explain clearly the proposed management regimen and its potential consequences  
4.2.3 Obtain and record the patient’s informed consent, where necessary, to the management plan. |
| 4.3 Manage neuro-ophthalmic conditions using medical therapies | *** | 4.3.1 Identify the indications and contraindications for pharmacological therapies  
4.3.2 Monitor the efficacy of the therapy, identify complications of the therapy and make necessary adjustments to the management regimen  
4.3.3 Consult with relevant medical specialties on management plan |
| 4.4 Understand the indications for the use of systemic steroids | 4.4.1 Clearly outline:  
- indications, dosage and management regimen of the use of systemic steroids in neuro-ophthalmic conditions  
- potential complications  
- appropriate management strategies to address complications (for example, bone-sparing treatments, treatment for potential gastric ulceration etc.) |
|---|---|
| 4.5 Manage neuro-ophthalmic conditions using surgery | 4.5.1 Perform temporal artery biopsy:  
- counsel the patient on surgery, potential outcomes and potential complications  
- understand the details of the surgical procedure and management of intraoperative complications  
- provide follow-up and continuing care |
| 4.6 Describe the rationale behind the management of neuro-ophthalmic conditions using radiotherapy | 4.6.1 Identify methods of delivery of radiation therapy for eye, neck and visual pathways  
4.6.2 Be familiar with the selected technique including effects and complications |
| 4.7 Provide psychological support for patient | 4.7.1 Counsel patient on condition, likely prognosis and progression  
4.7.2 Provide genetic counselling  
4.7.3 Provide emotional support  
4.7.4 Refer patient to relevant support services |
Context

In order to fulfil the clinical performance standards, the trainee must apply the knowledge and skills described in the:

- Ophthalmic Sciences (Anatomy, Clinical Ophthalmic and Emergency Medicine, Optics, Physiology, Clinical Genetics and Microbiology, and Evidence-based Ophthalmic Practice);
- Ophthalmic Basic Competencies and Knowledge (OBCK); and,
- Basics of Ophthalmic Surgery (BOS) curriculum standards.

Clinical practice

The following list is provided to identify the conditions, their causes and sequelae, and the treatment approaches that may be encountered by the trainee in clinical practice. The list is not exhaustive; it is intended as a guide for the use of the trainee when planning his or her learning.

Conditions deserving special emphasis

These conditions are of particular importance because of their prevalence and impact on society. It is expected that the trainee will have a very detailed knowledge of these conditions.

- Temporal arteritis
- Optic neuritis and demyelinating disease and its differentiation from atypical optic neuritis
- Myasthenia Gravis
- III Cranial Nerve Palsy

Neuro-ophthalmology Topic List

- Visual loss
  - retinal disorders
    - big blind spot syndrome
    - acute macular neuro-retinopathy
    - multiple evanescent white dot syndrome (MEWDS)
    - birdshot choroidopathy
    - acute zonal occult outer retinopathy (AZOOR)
    - melanoma associated retinopathy (MAR)
    - cancer associated retinopathy (CAR)
    - occult maculopathy
    - cone dystrophy
    - vitamin A deficiency
    - retinitis pigmentosa
  - optic nerve conditions
    - retrobulbar optic neuritis
  - retrochiasmal conditions
  - cortical conditions
    - cortical blindness
- Conditions which present with sudden loss of vision
- Conditions which present with progressive loss of vision
- Unilateral swollen optic nerve
- Bilateral optic nerve swelling
- Pseudodisc swelling
- Non-metastatic manifestations of cancer
  - carcinoma associated
  - melanoma associated
  - optic neuropathy
- Phakomatoses
  - neurofibromatosis Type I and II
  - racemose haemangioma
  - tuberous sclerosis
  - Von-Hippel-Lindau
  - Kippel-Trelauny-Weber
- Retinal vascular
  - retinal vein and artery occlusion – branch, hemi and central
  - haematological disorders: hypertension, anaemia, subacute bacterial endocarditis (SBE)
  - Vogt-Koyanagi-Harada disease
  - migraine
  - neurological disease with retinovascular manifestations e.g. Susac syndrome
  - retinal vasculitides
- Sclera
  - anterior scleritis
  - posterior scleritis
- Pupil
  - anatomy
  - normal – testing
  - abnormal – testing
  - describe clinical setting and relevance of:
    - Horner syndrome
    - light-near dissociation
    - aberrant regeneration
    - Adie pupil
    - afferent pupil defect
    - mid-brain / Parinaud pupil
    - pharmacological blockade / tests
    - Raede paratrigeminal neuralgia
    - episodic dysfunction
    - traumatic pupillary abnormalities
- Orbit (orbital disease relevant to neuro- ophthalmology)
  - thyroid eye disease
    - discuss the pathogenesis and clinical manifestation
• describe the investigations and diagnosis (differential radiological findings)
• explain the immune function and its clinical relevance
• understand the principles of management:
  – systemic — explain the basis of treatment of thyrotoxicosis (medical, surgical and radiological treatments) and its effects on the eye
  – ophthalmic — describe the principles, order and timing of treatment

• Tumours
  – describe the modes of clinical presentation, treatments and complications of:
    • meningiomas
      – optic nerve sheath
      – spheroidal wing
      – optic disc swelling associated with meningiomas and optico-ciliary shunt vessels, differential diagnosis of shunt vessels
      – olfactory nerve
    – understand treatment options including modality of radiotherapy, dosage and complications of radiotherapy
    • lymphoma – relevant systemic and ophthalmic investigations from a suspected diagnosis of lymphoma
    • secondary tumours of the orbit – relevant systemic and ophthalmic investigations from a suspected diagnosis of a secondary tumour
      – vascular fistulas – clinical manifestations, the carotico-cavernous fistula, dural fistula
      – inflammation
        • non-infective: idiopathic orbital inflammation syndrome (Tolosa-Hunt)
        • infective: viral, bacterial and fungal infection or orbit and adnexal (including mucormycosis, sinusitis, orbital cellulitis and adnexal infection)

• Optic nerve
  – congenital abnormalities
  – true swelling versus pseudo-swelling – understand conditions mimicking optic disc swelling: optic nerve head drusen, hypermetropic discs
  – swollen disc:
    • hereditary
    • infiltrative
    • papilloedema (elevated intra-cranial pressure, idiopathic intra-cranial hypertension)
    • optic papillitis
    • granulomas on optic nerve – e.g. sarcoid, toxoplasmosis
    • infective – cat scratch
    • anterior ischaemic optic neuropathy: non-arteritic and arteritic
  – optic neuropathies
    • toxic
    • infiltrative
    • hereditary
    • radiation
    • ischaemic
    • compressive
    • traumatic
    • inflammatory
  – conditions mimicking optic disc swelling: optic nerve head drusen
• Ocular myasthenia
  – discuss the aetiology, clinical presentation and association with general myasthenia
  – describe clinical findings and specific clinical tests including ice test, Tensilon test, fatiguing, Cogan lid twitch, single muscle fibre electromyography (EMG)
  – discuss relevant systemic investigations and their significance
  – understand the principles of management of myasthenia gravis with appropriate referral to a neurologist for systemic disease management

• Mitochondrial diseases
  – describe acute and chronic presentations and their investigations, epidemiology, characteristic fundus findings
  – Leber hereditary optic neuropathy (LHON) common mutation
  – chronic progressive external ophthalmoplegia

• Myotonic dystrophy

• Eye movement disorders
  – III nerve
    • clinical presentation including signs of aberrant regeneration
    • develop appropriate differentials of the cause of the III nerve palsy based on clinical presentation and age e.g. aneurysm, microvascular, other causes
    • perform appropriate investigation(s)
  – IV nerve
    • recognise clinical presentation of IV nerve palsy.
    • determine the differentials (e.g. congenital versus acquired) based on the clinical findings
    • perform appropriate investigation and discuss appropriate management options.
  – V nerve
    • recognise clinical presentations of V nerve dysfunction, e.g. trigeminal neuralgia, orbital apex syndromes, cavernous sinus lesions
    • manage clinical complications of V nerve dysfunction, e.g. neusotropic keratitis
  – VI nerve
    • recognise clinical presentations of VI nerve palsy.
    • able to generate appropriate differential e.g. trauma, tumour, microvascular
    • aware of conditions that may present with VI nerve palsy as a false localising sign
  – VII nerve
    • upper motor neuron versus lower motor neuron
    • blepharospasm
    • hemifacial spasm
    • botulinum toxin treatment including pharmacology and treatment effect
    • meiges syndrome
    – combined cranial neuropathies
      • recognise the clinical features of combined cranial neuropathies
      • localization of pathology and discuss differentials of the cause

• Abnormal vertical dissociation and deviation

• Supranuclear gaze disorders
  – progressive supranuclear palsy: Steele-Richardson syndrome
  – Parkinsonism
– traumatic head injury
– dorsal midbrain lesions

• Nystagmus – methods for diagnosing, clinical types and localising types
  – upbeat
  – downbeat
  – horizontal
  – rotary
  – convergence / retraction
  – opsoclonus
  – periodic alternating
  – latent
  – congenital
  – pendular
  – monocular
  – seesaw

• Optic chiasm
  – pituitary tumour
    • describe the generalised clinical manifestation (e.g. acromegaly, Cushing, Addison)
    • explain the spectrum of visual field and central visual loss
    • recognise urgency and presentation of pituitary apoplexy
    • impact of modality of treatment on visual function
    • understand indications of neuro-surgery and endocrine treatments
  – craniopharyngiomas (particularly in children)
  – meningiomas (including those occurring more posteriorly impinging on visual pathways and eye movement)

• Optic tract and radiation
  – describe the visual field defects – congruous vs. non-congruous, macula sparing vs. macular involving
  – anatomical characterisation and localization on the visual pathway

• Lateral geniculate nucleus related visual field defects

• Higher disorders of visual function
  – visual hallucination (pathological, non-pathological) – differential diagnosis of formed and unformed visual hallucinations and their clinical significance
  – ocular manifestations of dementia

• Transient visual loss
  – embolic
  – amaurosis fugax: clinical manifestations and association with vascular disease; appropriate investigations and treatment
  – ocular ischaemic syndrome
  – hypoperfusion
  – transient obscuration associated with disc swelling
  – migraine
  – ocular surface disorders
  – in association with optic nerve tumour
  – in association with glaucoma

• Functional visual loss
– paediatric – including strategies for detection
– adult

• Headaches
  – sinus
  – neck disease
  – migraine
    • ophthalmoplegic migraine
    • retinal migraine
    • common migraine
    • classic migraine
    • variants – cluster headache
    • acephalgic migraine
  – occipital stroke
  – carotid artery and vertebral artery dissection
  – tumours
  – tension
  – cluster
  – aesthenopic

• Idiopathic intra-cranial hypertension / pseudotumour cerebri
  – discuss the clinical manifestations
  – outline the investigations and differential diagnosis (including venous sinus thrombosis)
  – discuss management options

• Other systemic disease with neuro-ophthalmic manifestations
  – infective – include human immunodeficiency virus (HIV), tuberculosis (TB), syphilis, Lyme disease
  – non-infective – include Behçet disease
  – functional visual loss

• Combined cranial neuropathies
  – recognise the clinical features of combined cranial neuropathies
  – localisation of pathology and discuss differentials of the cause
  – superior orbital fissure syndromes
  – cavernous sinus disease

• Orbit (orbital disease relevant to neuro-ophthalmology)
  – thyroid eye disease
  – discuss the pathogenesis and clinical manifestation
  – describe the investigations and diagnosis (differential radiological findings)
  – explain the immune function and its clinical relevance
  – understand the principles of management
  – systemic - explain the basis of treatment of thyrotoxicosis (medical, surgical and radiological treatments) and its effects on the eye
  – ophthalmic - describe the principles, order and timing of treatment

• Orbital apex syndromes
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**Purpose**

The Ocular Inflammation Clinical Performance Standard covers the specific knowledge, processes, skills and competencies required for the diagnosis and treatment of a patient with ocular inflammatory symptoms and signs.

As ocular inflammation is a potentially blinding condition, generally affecting a younger age group, it is important to be able to recognise ocular inflammation, its causes and associated systemic diseases, some of which can be life-threatening.

**References**

**Ocular Inflammation Reading**

In addition to the core texts, the following references are recommended:


**Additional Reading**

- *Current Opinion in Ophthalmology*: ocular manifestations of systemic disease. (access to full text articles 1990-present available via RANZCO website)


It is recommended that reading be supplemented with appropriate articles from current and relevant peer-reviewed journals.

**Level of Mastery**

For each learning outcome, the level of mastery to be attained by the trainee at the end of training is indicated as follows:

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# Learning outcomes and performance criteria

## UV1 GENERAL MEDICAL AND OCULAR HISTORY RELEVANT TO OCULAR INFLAMMATORY CONDITIONS

This element covers the processes for observing, prompting, and recording a general medical and ocular history in preparation for diagnosis and treatment of ocular inflammatory conditions. The trainee is expected to have obtained and recorded a general medical and ocular history (including family history) as outlined in the Ophthalmic Basic Competencies and Knowledge (OBCK) standard.

<table>
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<tr>
<th>LEARNING OUTCOMES</th>
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<th>PERFORMANCE CRITERIA</th>
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<tbody>
<tr>
<td>1.1 Obtain and interpret correctly the significance of the ocular and systemic symptoms</td>
<td>***</td>
<td>1.1.1 Identify risk factors which are potentially sight and life threatening</td>
</tr>
<tr>
<td>1.2 Obtain details of ocular history including previous surgery, trauma, allergies and amblyopia</td>
<td>***</td>
<td>1.2.1 Identify risk factors that may have relevance to the cause of ocular inflammation</td>
</tr>
<tr>
<td>1.3 Determine and record any past and current topical, local and systemic therapies used to treat the eyes</td>
<td>***</td>
<td>1.3.1 Identify risk factors that may have relevance for ocular inflammatory conditions</td>
</tr>
<tr>
<td>1.4 Obtain an ocular and medical family history</td>
<td>***</td>
<td>1.4.1 Identify risk factors that may have relevance for ocular inflammation and systemic disorders with ocular manifestations</td>
</tr>
<tr>
<td>1.5 Identify general illnesses and medications that may have an impact on ocular disease or its treatment</td>
<td>***</td>
<td>1.5.1 Discuss the impact of any given medications or general illnesses on ocular inflammation</td>
</tr>
<tr>
<td>1.6 Obtain travel history and where relevant sexual and vaccination history; and recreational drug use</td>
<td>***</td>
<td>1.6.1 Identify risk factors that may have relevance to the cause of ocular inflammation</td>
</tr>
</tbody>
</table>
UV2 PERFORM EYE EXAMINATIONS FOR OCULAR INFLAMMATORY CONDITIONS

This element covers the performance and interpretation of a range of eye examinations associated with the anterior and posterior segments and the adnexa applicable to ocular inflammation. It also covers the demonstration of judgement in selecting the appropriate examinations for particular patients.

The trainee is expected to have performed preliminary eye examinations as outlined in the Ophthalmic Basic Competencies and Knowledge (OBCK) standard.

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<td>2.1 Identify and describe the general appearance of the eye and adnexa through an external ocular inspection</td>
<td>***</td>
<td>2.1.1 Interpret the relevance of any signs that may be found on external ocular inspection</td>
</tr>
</tbody>
</table>
| 2.2 Undertake ocular examinations appropriate for ocular inflammatory conditions | ***              | 2.2.1 Accurately perform and interpret the results of these examinations and identify their relevance to the diagnosis of ocular inflammatory conditions:
                                                                                     |                  | • visual acuity including refraction                                                                                                                 |
                                                                                     |                  | • pinhole acuity                                                                                                                                     |
                                                                                     |                  | • pupillary reactions                                                                                                                                  |
| 2.3 Perform a slit lamp examination of the anterior segment and adnexa          | ***              | 2.3.1 Correctly perform and interpret the results of anterior segment and adnexa examinations, as applied to ocular inflammation – with special attention to the conjunctiva, cornea and sclera |
                                                                                     |                  | 2.3.2 Identify and grade signs of anterior chamber inflammation and flare according to SUN (Standardisation of Uveitis Nomenclature) criteria  |
                                                                                     |                  | 2.3.3 Be able to identify iris abnormalities relevant to ocular inflammation                                                                       |
| 2.4 Undertake a comprehensive posterior segment examination                      | ***              | 2.4.1 Accurately report the characteristics and clinical significance of posterior segment findings, particularly those of the vitreous (noting signs of inflammation and debris), optic nerve head, macula, retinal vasculature, retina and retinal pigment epithelium, choroid and pars plana |

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| 2.5 Perform a brief general medical examination relevant to ophthalmology, if appropriate | 2.5.1 Recognising the variability of presentations of systemic conditions like connective tissue diseases and infections, identify their relevance, if any, to ocular inflammation and its potential management

Examination should pay special attention to skin, hands, joints, mouth and posture |

| 2.6 Identify cause of visual loss in an eye | 2.6.1 Distinguish between various causes of visual impairment in the eye with inflammation – such as cataract, cystoid macular oedema, epiretinal membrane, macular pigmented changes – and their respective treatments |
UV3 OCULAR INFLAMMATION DIAGNOSIS AND INVESTIGATION

This element covers the performance and interpretation of a range of specific uveitides and the relevant tests. Following examination, the provisional diagnosis and/or differential diagnosis is established. Further investigation may be required to establish the diagnosis. The trainee is required to demonstrate judgement in selecting the appropriate tests for particular patients.

<table>
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</table>
| 3.1 Undertake investigations using fundus imaging | *** | 3.1.1 Identify the indications for, perform and interpret the results of:  
  - fluorescein angiography  
  - ultrasound (B-scan)  
  - fundus and optic disc photos  
  - ocular coherence tomography (OCT) |
|                   | *** | 3.1.2 Identify the indications for, and interpret the results of indocyanine green angiography |
| 3.2 Undertake investigations using appropriate nerve imaging and visual field testing | *** | 3.2.1 Identify indications where optic nerve imaging and visual field tests are required  
  3.2.2 Undertake pupil testing; request and interpret appropriately other investigations of optic nerve function, including visual field testing, visually evoked potential (VEP), ultrasonography, computed tomography (CT), magnetic resonance imaging (MRI) or fluorescein angiography (FA), as indicated |
| 3.3 Use laboratory testing to confirm diagnosis | *** | 3.3.1 Identify the indications for and interpret results from laboratory investigations, including:  
  - haematology  
  - immunology  
  - biochemistry  
  - microbiology  
  - genetics |
| 3.4 Use radiological testing to establish diagnosis | 3.4.1 Identify the indications for, and interpret the significance of the report results of:  
- X-rays  
- computed tomography (CT) scans  
- magnetic resonance imaging (MRI)  
- carotid duplex studies |
|---------------------------------------------------|----------------------------------------------------------------------------------|
| 3.5 Use electrophysiological testing to establish diagnosis | 3.5.1 Identify the indications for, and interpret the results of retina and visual pathways tests using:  
- electro-oculogram (EOG)  
- electro-retinogram (ERG)  
- multifocal and full field  
- visual evoked response (VER) |
| 3.6 Use biopsy testing to establish diagnosis | 3.6.1 Identify the indications and contra-indications for, and interpret ocular tissue biopsies, including, but not limited to:  
- aqueous biopsy  
- vitreous biopsy  
- conjunctival biopsy  
- scleral biopsy  
3.6.2 Interpret results of ocular tissue biopsies including (but not limited to):  
- infective IPCR, culture, stains)  
- autoimmune  
- masquerade (flow cytometry, immune cell composition) |
UV4 IMPLEMENT A MANAGEMENT PLAN FOR OCULAR INFLAMMATORY DISORDERS

This element covers the management of uveitic and intra-ocular inflammatory conditions using observation, medical therapies and surgery, including postoperative care.

The trainee must adhere to the standards of practice, in particular those regarding informed consent and clinical record-keeping, described in the Ophthalmic Basic Competencies and Knowledge (OBCK) standard.

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| 4.1 Develop an informed, practical, probability-based differential diagnosis | *** | 4.1.1 Identify diagnostic clinical triggers for suspecting infections and masquerade syndromes (such as age, increased IOP, retinal arteritis, rapid progression etc.)

4.1.2 Differentiate infective, autoimmune and masquerade causes of ocular inflammation |
| 4.2 Determine and document in medical records an individualised management plan | *** | 4.2.1 While waiting for results of clinical tests, develop a plan to initiate the most appropriate empirical therapy based on the worst case scenario, and the likely aetiology

4.2.2 Review and revise treatment plan, if necessary, following interpretation of the results of diagnostic tests |
| 4.3 Discuss with patient the proposed management regimen | *** | 4.3.1 Explain clearly the natural history, proposed management regimen, alternatives and the potential outcome with and without the management regimen proposed

4.3.2 Obtain and document the patient’s informed consent, where necessary, to the management regimen |
| 4.4 Obtain advice from other relevant medical specialties | *** | 4.4.1 Consult with relevant medical specialties on the management plan |
| 4.5 Manage ocular inflammatory conditions using medical therapies | 4.5.1 Identify the indications and contraindications for pharmacological therapies  
4.5.2 Administer corticosteroids using the following routes:  
- topical  
- subconjunctival  
- periocular  
- intravitreal  
- oral  
- intravenous  
4.5.3 Monitor the efficacy of the therapy, identify complications of the therapy and make necessary adjustments to the management plan  
4.5.4 Be aware of how steroid-sparing drugs are used  
4.5.5 Be aware of how different biologics are used |
| --- | --- |
| 4.6 Manage ocular inflammatory conditions using laser therapies | 4.6.1 Use photocoagulation to manage ocular inflammatory conditions  
4.6.2 Demonstrate and understand the principles and safe use of laser techniques in management of ocular inflammation |
### 4.7 Manage ocular inflammation using surgical techniques

- **4.7.1** Administer therapies for ocular inflammation using intravitreal injection
- **4.7.2** Be able to execute changes in pre-, intra-, and postoperative procedures and care when undertaking cataract surgery in patients with ocular inflammation
- **4.7.3** Be aware of modifications required when managing a patient with uveitic glaucoma
- **4.7.4** Know the indications for a vitrectomy in patients with ocular inflammation
- **4.7.5** Identify and describe common intraoperative complications
- **4.7.8** Implement postoperative care and manage postoperative complications
- **4.7.9** Be aware of the different drug implants available to treat ocular inflammation

### 4.8 Provide psychological support for patient

- **4.8.1** Counsel patient on condition, likely prognosis and progression
- **4.8.2** Refer patient to relevant support services, genetic counselling when relevant
Context

In order to fulfil the clinical performance standards, the trainee must apply the knowledge and skills described in the:

- Ophthalmic Sciences (Anatomy, Clinical Ophthalmic and Emergency Medicine, Optics, Physiology, Clinical Genetics and Microbiology, and Evidence-based Ophthalmic Practice);
- Ophthalmic Basic Competencies and Knowledge (OBCK); and,
- Basics of Ophthalmic Surgery (BOS) curriculum standards.

Clinical practice

The following list is provided to identify the conditions, their causes and sequelae, and the treatment approaches that may be encountered by the trainee in clinical practice. The list is not exhaustive; it is intended as a guide for the use of the trainee when planning his or her learning.

Ocular Inflammation Topic List

Explain the pathology, aetiology, genetics, epidemiology, clinical manifestations, systemic features, diagnostic criteria and natural history of the following ocular inflammatory conditions, as well as the various classifications of uveitis and their applications in clinical assessment (e.g. anatomical, temporal, aetiological)

- Cicatrising Conjunctivitis
- Keratitis
  - peripheral ulcerative keratitis
  - corneal melting
  - interstitial keratitis
  - corneal infiltrates
  - band keratopathy
- Scleritis / Episcleritis
  - anterior
  - posterior
  - necrotising and non-necrotising
  - diffuse and nodular
  - infective scleritis
- Associated systemic conditions
  - rheumatoid arthritis
  - juvenile idiopathic arthritis (JIA)
  - inflammatory bowel disease
  - spondyloarthropathies
  - systemic lupus erythematosus
  - polyangiitis with granulomatosis (Wegener granulomatosis)
  - polyarteritis nodosa
  - relapsing polychondritis
  - infection (syphilis, TB, herpes, fungal)
- Associated local causes
  - trauma
surgery
conjunctival disease
lid disease

• Anterior uveitis:
  (i) Infectious
  – syphilis
  – tuberculosis
  – leprosy
  – Lyme disease
  – toxoplasmosis
  – herpes zoster ophthalmicus
  – herpes simplex
  – cytomegalovirus
  – rubella
  
  (ii) Non infectious
  – HLA B−27 and related conditions including:
    • ankylosing spondylitis
    • Reiter syndrome
    • psoriatic arthropathy
  – juvenile idiopathic arthritis (JIA)
  – inflammatory bowel disease
  – phacolytic and phacoantigenic uveitis
  – sarcoidosis
  – Behçet disease
  – Fuchs heterochromic cyclitis
  – Posner-Schlossman syndrome
  – nephritis (TINU)
  – multiple sclerosis
  – masquerade

• Intermediate uveitis:
  – pars planitis
  – multiple sclerosis

• Panuveitis / posterior uveitis:
  (i) Infectious
  – toxoplasmosis
  – toxocara canis
  – viruses, e.g. herpes viruses (HSV, VZV, CMV, EBV), rubella
  – human immunodeficiency virus (HIV)
  – mycobacterial diseases
  – POHS
  – bartonella henselae
  – spirochetal diseases including syphilis, Lyme, cat scratch, leptospirosis
  – opportunistic infections, e.g. pneumocystis carinii, cryptococcus neoformans
  – candida, scedosporium and other fungal diseases
  – onchocerciasis and other parasitic diseases
  
  (ii) Non-infectious
  – sarcoidosis
  – Behçets disease
  – multifocal choroiditis
– sympathetic ophthalmia
– Vogt-Koyanagi-Harada syndrome
– retinal vasculitis
– retained lens matter
– birdshot choroidopathy
– multiple evanescent white dot syndrome
– punctuate inner choroidopathy
– serpiginous choroidopathy
– acute posterior multifocal placoid pigment epitheliopathy
– acute zonal occult outer retinopathy
– subretinal fibrosis and uveitis syndrome

• Optic neuritis
  – infections
  – autoimmune
  – masquerade (paraneoplastic)

• Endophthalmitis
  – endogenous
  – exogenous
  – outline the epidemiology and clinical presentations (both ocular and non-ocular)
  – describe the organism in detail, including method(s) of transmission
  – describe the pathology and immunology of the disease including natural history
  – describe diagnostic tests
  – provide detailed descriptions of treatment modalities, including their rationale, relevant clinical trials and possible complications

• Uveitis diagnosis and management in special case scenarios
  – paediatrics
  – pregnancy
  – breast-feeding women
  – immunocompromised
  – elderly

• Explain the prognosis to the patient

• Masquerade syndromes:
  – neoplastic and paraneoplastic conditions (CAR, MAR)
  – ocular ischaemia
  – intraocular foreign body
  – chronic retinal detachment
  – aqueous / vitreous haemorrhage
  – juvenile xanthogranuloma
  – amyloidosis
  – retinitis pigmentosa
  – pigment dispersion syndrome
  – UGH syndrome

• Drug induced
  – topical agents
  – systemic agents
• Principles of therapy
  – explain the philosophy, goals, approaches and potential complications of treatment of infectious causes and immunosuppression

• Complications and their management
  – list potential complications of ocular inflammatory processes and explain their management
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<td>OM3 CHARACTERISE OCULAR MOTILITY CONDITIONS</td>
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<td>OM4 DEVELOP AND IMPLEMENT A MANAGEMENT PLAN FOR OCULAR MOTILITY CONDITIONS</td>
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Purpose

The Ocular Motility Clinical Performance Standard indicates the learning outcomes, performance criteria and competencies required of a trainee in this sub-specialty area. It provides a framework for distilling guided study and clinical exposure into a knowledge and skill base necessary to correctly diagnose and manage ocular motility and related disorders for best patient outcome.

Disorders of ocular motility make up a substantial proportion of paediatric practice and the correct diagnosis and management of these disorders is vital to ensuring life-long optimal binocular function. In addition, disorders of ocular alignment occurring in adult life can cause significant morbidity.

References

Ocular Motility Reading
In addition to the core texts, the following references are recommended:


Additional Reading

It is recommended that reading also be supplemented with appropriate articles from current and relevant peer-reviewed journals. This may include the use of online resources made available by RANZCO and recommended third parties, such as http://telemedicine.orbis.org (in particular, a source of e-resources including e-books, and strabismus surgery videos).

**Best Practice Standards**

Guidelines produced by The Royal College of Ophthalmologists (RCOphth) have been placed on the RANZCO learning management system. RANZCO expresses its gratitude to RCOphth for its permission to do so.

One Network Guidelines: Preferred practice pattern – esotropia and exotropia
Accessed 21 November 2013

**Level of Mastery**

For each learning outcome, the level of mastery to be attained by the trainees at the end of training is indicated as follows:

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## Learning outcomes and performance criteria

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<tr>
<td>1.1 Determine and record any past and current topical, local and systemic therapies used to treat the eyes, including herbal and alternative medicines</td>
<td>***</td>
<td>1.1.1 Identify risk factors that may have relevance for primary and secondary ocular motility disorders</td>
</tr>
<tr>
<td>1.2 Obtain details of ocular history especially duration of misalignment, diplopia, previous strabismus surgery and/or amblyopia management, ocular or orbital trauma</td>
<td>***</td>
<td>1.2.1 Identify risk factors that may have relevance for primary and secondary ocular motility disorders</td>
</tr>
<tr>
<td>1.3 Obtain an ocular family history</td>
<td>***</td>
<td>1.3.1 Ascertain family history of strabismus in particular</td>
</tr>
</tbody>
</table>
| 1.4 Accurately record patient’s past and current illness, operations, injuries and medication | *** | 1.4.1 Ascertain current and past history of illnesses, diseases and medications, surgery and anaesthetic reactions, and their outcomes, that may be relevant to ocular motility disorders and their management. Consider especially:  
  - neurological disease  
  - thyroid disease  
  - myasthenia gravis |
**OM2 PERFORM EYE EXAMINATIONS AND TESTS APPROPRIATE FOR OCULAR MOTILITY CONDITIONS**

This element covers the performance and interpretation of a range of eye examinations and tests associated with ocular motility. It also covers the demonstration of judgement in selecting the appropriate examinations and tests for particular patients.

The trainee is expected to have performed eye examinations as outlined in the Ophthalmic Basic Competencies and Knowledge (OBCK) standard.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
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</thead>
</table>
| **2.1 Identify and describe the general appearance of the patient, the eye and adnexa through an external inspection** |  | 2.1.1 From an external ocular inspection and facial appearance, interpret the relevance of any signs that may be found  
2.1.2 Including abnormal head posture and markers of potentially associated general conditions e.g. craniofacial disorders  
2.1.3 Lid position for ptosis and Marcus Gunn jaw wink  
2.1.4 Look for scarring to indicate past strabismus surgery  
2.1.5 Assess the nature and power of any spectacle correction, including any incorporated or temporary prism, and understand the effect these may have on the motility examination |

|  |  | 2.2.1 Perform, record and interpret the results of these examinations accurately, and note their relevance to the diagnosis of ocular motility disorders  
2.2.2 Perform tests to characterise binocular function including the determination of the presence of sensory fusion, level of stereopsis, and nature of normal/abnormal retinal correspondence  
2.2.3 Perform tests to determine the risk of diplopia following any planned surgery  
2.2.4 Quantify muscle under/over action using standard notation e.g. +4 to -4 |

2.2 Undertake the following examinations:  
- visual acuity  
- subjective and cycloplegic refraction  
- pupillary reactions  
- sensory evaluation  
- motor evaluation  
- neurological assessment  
- nystagmus assessment  

(more detail on sensory testing modalities can be found in the context section of the standard)
| 2.3 Perform a slit lamp examination of the anterior segment and adnexa | 3.1 Perform, and interpret the results of, anterior segment and adnexa examinations correctly, as applied to ocular motility disorders. |
| 2.4 Perform and interpret intraocular pressure (IOP) measurements | 3.1 Obtain accurate IOP readings, demonstrating an appreciation of the relationship between IOP and restrictive and inflammatory ocular myopathies. |
| 2.5 Undertake a posterior segment examination of the vitreous, optic nerve head, macula and retina (including periphery) | 3.1 Report accurately the characteristics and clinical significance of posterior segment findings relevant to binocular function and ocular alignment. 3.2 Assess fundus torsion. |
| 2.6 Perform a general medical examination relevant to ophthalmology, if appropriate | 3.1 Given a variety of general presentations, identify the relevance, if any, to ocular motility disorders and their potential management. |
| 2.7 Understand the relevance of various in-office tests to the management of strabismus | 3.1 Demonstrate appreciation of how the results of tests such as binocular visual fields measurement can affect the management of strabismus. 3.2 Understand the role of the orthoptist in diagnosis and management of strabismus. |
| 2.8 Instigate relevant ancillary investigations that may assist in the diagnosis and management of ocular motility disorders | 2.8.1 Appropriately order investigations including:  
- blood tests for associated conditions such as thyroid disease, myasthenia gravis, temporal arteritis and atherosclerotic disease  
- imaging including ultrasound, CT, MRI/MRA |
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<tbody>
<tr>
<td>**</td>
<td>2.8.2 Appropriately order EMG studies</td>
</tr>
</tbody>
</table>
OM3 CHARACTERISE OCULAR MOTILITY CONDITIONS

This element covers the classification of types of ocular motility conditions and the use of differential diagnosis.

The following groups are not necessarily independent or mutually exclusive but give a framework for reference. To characterise ocular motility conditions, it is important to first exclude local ocular causes and systemic causes. Characterisation should concentrate on the gross ocular motility condition rather than minor deviations.

Understanding of the role of the orthoptist and the interpretation of orthoptic reports in characterising ocular motility conditions is included in this element.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
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</thead>
<tbody>
<tr>
<td>3.1 Characterise comitant eso-deviations</td>
<td>***</td>
<td>3.1.1 Identify and characterize esotropia, including:</td>
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<tr>
<td></td>
<td></td>
<td>• infantile (congenital) esotropia</td>
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<tr>
<td></td>
<td></td>
<td>• accommodative esotropia – refractive /non-refractive, fully and partial</td>
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<td></td>
<td></td>
<td>• non-accommodative esotropia – acquired esotropia and secondary to other pathology</td>
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<td></td>
<td></td>
<td>• consecutive esotropia</td>
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<tr>
<td></td>
<td></td>
<td>• pseudo-esotropia</td>
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<tr>
<td></td>
<td></td>
<td>• esophoria</td>
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<tr>
<td></td>
<td></td>
<td>• cyclical esotropia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• microtropia</td>
</tr>
<tr>
<td>3.2 Characterise comitant exo-deviations</td>
<td>***</td>
<td>3.2.1 Identify and characterise exotropia, including:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• intermittent exotropia</td>
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<tr>
<td></td>
<td></td>
<td>• constant acquired exotropia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• convergence insufficiency</td>
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<tr>
<td></td>
<td></td>
<td>• constant acquired secondary to other pathology</td>
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<td>• consecutive exotropia</td>
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<td></td>
<td></td>
<td>• infantile (congenital) exotropia</td>
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<td></td>
<td>• pseudo-exotropia</td>
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<tr>
<td></td>
<td></td>
<td>• exophoria</td>
</tr>
</tbody>
</table>
### 3.3 Characterise vertical deviations

<table>
<thead>
<tr>
<th>3.3.1 Identify and characterise ocular motility conditions causing vertical strabismus, including:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• hypertropia</td>
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<tr>
<td>• hypotropia</td>
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<tr>
<td>• elevation in adduction and inferior oblique muscle overaction</td>
</tr>
<tr>
<td>• depression in adduction and superior oblique muscle overaction</td>
</tr>
<tr>
<td>• dissociated vertical deviation</td>
</tr>
<tr>
<td>• A and V patterns</td>
</tr>
<tr>
<td>• vertical muscle malfunction associated with other strabismus entities</td>
</tr>
<tr>
<td>• monocular elevation deficiency (double elevator palsy)</td>
</tr>
</tbody>
</table>

### 3.4 Characterise neurological disorders resulting in disturbances in ocular motility

<table>
<thead>
<tr>
<th>3.4.1 Identify and characterise ocular motility conditions caused by neurological disorders, including:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• cranial nerve pareses: III, IV and VI nerve palsy</td>
</tr>
<tr>
<td>• myasthenia gravis</td>
</tr>
<tr>
<td>• progressive external ophthalmoplegia</td>
</tr>
<tr>
<td>• internuclear ophthalmoplegia</td>
</tr>
<tr>
<td>• congenital ocular motor apraxia</td>
</tr>
<tr>
<td>• brain stem associated ocular motility disorders</td>
</tr>
<tr>
<td>• sensory and cortical deprivation</td>
</tr>
<tr>
<td>• Parinaud syndrome</td>
</tr>
<tr>
<td>• convergence spasm</td>
</tr>
</tbody>
</table>

### 3.5 Characterise restrictive ocular motility disorders

<table>
<thead>
<tr>
<th>3.5.1 Identify and characterise ocular motility conditions due to restriction, including:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• thyroid eye disease</td>
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<tr>
<td>• trauma</td>
</tr>
<tr>
<td>• fat adherence syndrome</td>
</tr>
<tr>
<td>3.6 Characterise other specific strabismus syndromes and entities</td>
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<tr>
<td>3.6.2 Brown syndrome</td>
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</tbody>
</table>

| 3.7 Characterise nystagmus                                                            | 3.7.1 Identify nystagmus that may be associated with strabismus, including: |
|                                                                                        | • infantile nystagmus syndrome                   |
|                                                                                        | (includes congenital idiopathic nystagmus, sensory deprivation nystagmus) |
|                                                                                        | • fusion maldevelopment nystagmus                |
|                                                                                        | (formerly latent nystagmus)                     |
|                                                                                        | • nystagmus blockage syndrome                    |
|                                                                                        | • spasmus nutans                                 |
|                                                                                        | • visual deprivation (e.g. cataract)             |
OM4 DEVELOP AND IMPLEMENT A MANAGEMENT PLAN FOR OCULAR MOTILITY CONDITIONS

This element covers the management of ocular motility conditions using observation, medical therapies and surgery, including postoperative care.

Timing for intervention and implementing management plans can be critical depending on clinical diagnosis and the age of the patient.

Understanding of the role of the orthoptist and the interpretation of orthoptic reports in developing an overall diagnostic and management plan is included in this element.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
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</thead>
</table>
| 4.1 Determine and document in medical records a management plan for each individual patient with an indication of estimated time frame | *** | 4.1.1 Integrate information from the history and examination to determine likely prognosis  
4.1.2 Maintain legible records of examination in accepted format. Document proposed management plan and the briefing of the patient  
4.1.3 Establish initial management targets  
4.1.4 Choose appropriate management strategies |
| 4.2 Educate the patient on the proposed management plan | *** | 4.2.1 Explain the nature of the patient’s ocular motility condition  
4.2.2 Explain clearly the proposed management plan and its potential consequences  
4.2.3 Discuss alternative management plans including the consequences of no treatment  
4.2.4 Obtain and record the patient’s informed consent to the management plan |
| 4.3 Achieve best possible visual acuity status for the patient | *** | 4.3.1 Refract patient and prescribe corrective spectacles (critical)  
4.3.2 Treat and monitor amblyopia including standard occlusion, penalisation and pharmacological occlusion |
<table>
<thead>
<tr>
<th>4.4 Use observation and non-operative therapies in management</th>
<th>4.4.1 Measure misalignment at baseline and record using standard format</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>4.4.2 Maintain records that document the progress of the misalignment</td>
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<tr>
<td></td>
<td>4.4.3 Refer patient for orthoptic treatment as appropriate</td>
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<tr>
<td></td>
<td>4.4.4 Evaluate and monitor progress of refractive treatment of strabismus i.e. either single-vision or bifocal glasses</td>
</tr>
<tr>
<td></td>
<td>4.4.5 Establish and monitor progress of amblyopia treatment at appropriate time intervals</td>
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<td></td>
<td>4.4.6 Evaluate the suitability of prisms as a treatment for a particular condition</td>
</tr>
</tbody>
</table>

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<thead>
<tr>
<th>4.5 Apply pharmacological therapies to the management of ocular motility conditions</th>
<th>4.5.1 Understand the mechanism of action of botulinum toxin</th>
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<tbody>
<tr>
<td></td>
<td>4.5.2 Evaluate the patient for and, if indicated:</td>
</tr>
<tr>
<td></td>
<td>• explain risks and obtain informed consent</td>
</tr>
<tr>
<td></td>
<td>• instigate chemodenervation treatment using botulinum toxin</td>
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</table>

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<thead>
<tr>
<th>4.6 Apply surgery to the treatment strabismus</th>
<th>4.6.1 Obtain informed consent, counsel patient on the surgical procedure and postoperative care</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4.6.2 Assess if suitable for adjustable sutures</td>
</tr>
<tr>
<td></td>
<td>4.6.3 Assess risk of anterior segment ischaemia</td>
</tr>
<tr>
<td></td>
<td>4.6.4 Perform surgery for ‘weakening’ muscles, including:</td>
</tr>
<tr>
<td></td>
<td>• recession</td>
</tr>
<tr>
<td></td>
<td>• inferior oblique myectomy</td>
</tr>
<tr>
<td></td>
<td>• tenotomy *</td>
</tr>
<tr>
<td></td>
<td>• marginal myotomy *</td>
</tr>
<tr>
<td></td>
<td>• tendon spacers for SO surgery*</td>
</tr>
</tbody>
</table>

procedures may fall into category ** or * as indicated
| 4.6.5 | Perform surgery for ‘strengthening’ muscles, including: *  
|       | • resection  
|       | • advancement  
|       | • tucking *

| 4.6.6 | Use adjustable sutures to correct strabismus where appropriate

| 4.6.7 | Undertake transposition techniques to correct strabismus

| 4.6.8 | Understand vertical rectus muscle techniques for hypotropia and hypertropia

| 4.6.9 | Understand Anderson-Kestenbaum techniques to correct head posture in nystagmus

| 4.6.10 | Be aware of procedures to increase foveation time

| 4.7 | Undertake intraoperative management of complications

| 4.7.1 | Identify and manage intraoperative complications, including:  
|       | • perforation of the globe  
|       | • slipped or lost muscle  
|       | • right operation on wrong muscle  
|       | • wrong operation on right muscle  
|       | • haemorrhage  
|       | • oculocardiac reflex  
|       | • corneal abrasion  
|       | • perforation of fat pad with herniation of contents

| 4.8 | Undertake postoperative management

| 4.8.1 | Identify and manage postoperative complications, including:  
|       | • vomiting  
|       | • infection  
|       | • haemorrhage  
|       | • granuloma  
|       | • Tenons prolapse  
|       | • conjunctival cyst / scarring  
|       | • anterior segment ischemia  
|       | • altered eyelid position  
|       | • diplopia
<table>
<thead>
<tr>
<th><strong>4.9 Demonstrate correct follow-up management</strong></th>
<th></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>4.9.1 Manage under-correction or over-correction after surgery – both functional and cosmetic aspects</td>
</tr>
<tr>
<td></td>
<td>4.9.2 Implement a follow-up plan, including:</td>
</tr>
<tr>
<td></td>
<td>• amblyopia management</td>
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<tr>
<td></td>
<td>• refraction</td>
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<td></td>
<td>• postoperative drops</td>
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<thead>
<tr>
<th><strong>4.10 Demonstrate periodic review and monitoring of management plan</strong></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>4.10.1 Implement appropriate changes to management plan</td>
</tr>
<tr>
<td></td>
<td>4.10.2 If necessary, patients are referred in a timely manner with a comprehensive case history (oral or written) to other appropriate specialists</td>
</tr>
</tbody>
</table>
Context

In order to fulfil the clinical performance standards, the trainee must apply the knowledge and skills described in the:

- Ophthalmic Science (Anatomy, Clinical Ophthalmic and Emergency Medicine, Optics, Physiology, Clinical Genetics and Microbiology, and Evidence-based Ophthalmic Practice);
- Ophthalmic Basic Competencies and Knowledge (OBCK); and,
- Basics of Ophthalmic Surgery (BOS) curriculum standards.

Clinical practice

The following list is provided to identify the conditions, their causes and sequelae, and the treatment approaches that may be encountered by the trainee in clinical practice. The list is not exhaustive; it is intended as a guide for the use of the trainee when planning his or her learning.

Conditions deserving special emphasis

These conditions are of particular importance because of their prevalence and impact on society. It is expected that trainees will have a very detailed knowledge of these conditions.

1. Infantile esotropia
2. Refractive strabismus
3. Acute III nerve palsy in adults
4. Intermittent exotropia

Ocular Motility Topic List

- Anatomy, physiology and biochemistry associated with management of ocular motility conditions
  - describe and identify the origin, course, insertion, innervation and action of the extra-ocular muscles including horizontal recti, vertical recti, obliques, levator palpebrae superioris and insertion relationships and trochlear function
  - describe and identify blood supply of the extra-ocular muscles
  - describe and identify the fine structure of extra-ocular muscles including fibre type and proprioceptor apparatus
  - describe and identify Tenon capsule, muscle cone and capsule, inter-muscular septum, 'check ligaments', Lockwood ligament and adipose tissue
  - describe and explain the importance of the extra-ocular muscle pulley system.
  - explain and identify primary, secondary and tertiary action of the extra-ocular muscles, fields of muscle action and changing action with different gaze positions
  - explain the physiology of muscle contraction
  - identify primary position of gaze, arc of contact
  - describe and identify monocular eye movements: ductions
  - describe and identify binocular eye movements: versions and vergences
  - describe supranuclear control systems for eye movements
  - explain the physiology of normal binocular vision: monocular deprivation, abnormalities of binocular vision, diplopia (both physiological and pathological), confusion, suppression, anomalous retinal correspondence and monofixation syndrome
• Describe the characteristics of general diseases with ocular manifestations, or that impact on the diagnosis of ocular motility conditions, such as:
  – metabolic diseases, including thyroid dysfunction and diabetes
  – neurological disorders, including myasthenia gravis, multiple sclerosis and mitochondrial diseases
  – cerebro-vascular diseases, especially aneurysm

• Identify ocular and systemic medications that impact on ocular motility and their local and systemic side effects

• Identify particular eye injuries and accidents that may impact on ocular motility and their long term effects

• Identify ‘white eye’ blow out fractures and their association with inferior rectus muscle ischaemia

• Identify ophthalmic procedures and their long term effects on ocular motility, for example:
  – peri- and retrobulbar anaesthetics
  – cataract surgery
  – orbital decompression for thyroid ophthalmopathy
  – vitreoretinal surgery
  – refractive surgery
  – glaucoma surgery
  – previous strabismus surgery
  – sinus/endoscopic surgery
  – repair of orbital fracture

• Describe and identify orbital and facial relationships

**Sensory evaluation tests**

• Perform and/or interpret sensory evaluation tests, including:
  – visual acuity
    • a knowledge of appropriate tests at various levels of development including forced choice preferential looking (e.g. Teller, Keeler and Cardiff Cards) and distance testing (e.g. Kays, Lea, Sheridan-Gardiner, HOTV Snellen, EDTRS)
    • an understanding of the crowding phenomenon and its relevance to:
      – testing and fixation ability
      – fixation preference assessment (e.g. using cover test / prisms)
      – fixation quality (central, steady, maintained)

• Stereopsis
  – understand and be able to perform age-appropriate testing
    • including the use of Lang, Titmus (including Worth Fly), TNO, Randot tests, Frisby, A/O vectograph slides
  – synoptophore
  – distance stereotests

• Tests for fusion
  – Worth four dot test
  – fusional amplitudes with prism in free space
  – cover tests (also used for motor evaluation)
  – fixation targets
Tests for deviation
- cover-uncover test for manifest deviation
- alternate cover test for latent deviation
- simultaneous prism cover test

Major amblyoscope: synoptophore, troposcope (also used for motor evaluation)
- measure deviation
- angle kappa measurement
- assessing fusion
- assessing stereopsis
- assessing retinal correspondence

Bruckner test (also used for motor evaluation)

Test for retinal correspondence/suppression
- afterimage test (Bielschowsky)
- Bagolini striated glasses
- four dioptre prism test

Near point convergence

Near point accommodation

Special tests:
- visually evoked potential
- electroretinogram
- photoscreening

Motor evaluation

Hirschberg test (corneal reflections)

Krimsky test (prism reflex / prism reflection)

Prism and cover test

Maddox rod / Maddox wing

Assessment of ocular movement
- duction tests:
  - prisms
  - light reflex displacement
  - dolls eye manoeuvre
  - OKN testing with drum or spinning
  - field of binocular vision using a perimeter
  - forced duction test
- versions

Active force generation test

Fields of fixation
- binocular single vision
Ocular Motility Curriculum Standard

- field of diplopia
- tests for paresis
  - Park 3-step test
  - tangent screens
  - Hess screen
  - Lancaster red/green test
  - saccadic velocities

- Abnormal head posture: identification and causes, including non-neurological ones

Binocular Vision Abnormalities

- Describe the causes and types of amblyopia, including:
  - deviated eye (strabismic)
  - defocused eye (refractive)
  - deprived eye (deprivational)

- Outline the investigation process for amblyopia, including:
  - assessment of visual acuity
  - managing uncooperative patients

- Explain the prognosis of various types of amblyopia

- Define and describe the general characteristics of esophoria and exophoria

- Define and describe the general characteristics of convergence insufficiency

- Describe the natural history of untreated essential infantile esotropia

- Define and describe the general features of essential infantile esotropia, including:
  - apparent reduced abduction
  - cross-fixation
  - pursuit asymmetry
  - dissociated vertical deviation
  - elevation in adduction / inferior oblique overaction
  - convergence blocked nystagmus

- Outline conditions that may be misdiagnosed as essential infantile esotropia, including:
  - broad epicanthal folds (pseudostrabismus)
  - VI nerve palsy
  - early onset accommodative esotropia
  - Duane retraction syndrome
  - nystagmus blockage syndrome
  - Moebius syndrome
  - congenital fibrosis syndrome

- Describe how fusion occurs and how patients without fusion function

- Define and describe the general characteristics of acquired esotropia

- Explain the prognosis for acquired esotropia
• Describe the general features of congenital (infantile) exotropia and its association with neurological problems and syndromes

• Describe the history and aetiology of intermittent exotropia

• Describe consecutive constant exotropia following an esotropia

• Describe the classical features of a superior oblique palsy

• Describe the bilateral oblique palsies and impact on central fusion disruption

• Describe vertical strabismus not arising from superior oblique palsy, including:
  – incomitant vertical strabismus
  – skew deviation
  – Brown syndrome
  – inferior oblique palsy
  – mechanical restriction
  – DVD strabismus
  – Heimann Bielschowksy phenomenon

• Describe the general features of paralytic or paretic strabismus, including:
  – III nerve palsy
  – IV nerve palsy – unilateral and bilateral
  – VI nerve palsy
  – congenital paralysis of ocular muscles
  – acquired traumatic paralysis of ocular muscles
  – understand significance of multiple cranial nerve palsies and discuss possible aetiologies

• Describe and identify the general characteristics of mechanical restrictions, including:
  – Duane syndrome – Huber classification
  – Brown syndrome
  – inferior oblique palsy
  – blowout fractures
  – thyroid ophthalmopathy
  – general fibrosis syndrome
  – Mobius syndrome
  – superior oblique myokymia
  – myasthenia gravis

• Identify and describe the classification of infantile nystagmus syndrome (idiopathic (aka congenital motor nystagmus) and secondary causes (e.g. retinal dystrophies etc.)

• Discuss the importance of the diagnostic null zone

• Discuss the clinical associations and general features of idiopathic infantile nystagmus syndrome (aka motor nystagmus)

• Identify and describe chronic progressive external ophthalmoplegia

Management of Ocular Motility Conditions

• Describe the treatment of exophoria and esophoria
• Describe the treatment for convergence insufficiency

• Describe the treatment of amblyopia using occlusion, including:
  – occlusion programs
  – when and how to stop occlusion
  – penalisation with atropine
  – risks of atropine
  – risk of reversal of amblyopia with excessive patching

• Describe the goals for treatment of infantile esotropia

• Discuss the treatment for essential infantile esotropia, including:
  – glasses
  – occlusion
  – surgery
  – botox chemodenervation

• Discuss the management of patients with cerebral palsy and other neurological problems and strabismus

• Discuss the treatment of:
  – fully accommodative esotropia
  – partially accommodative esotropia
  – monofixation syndrome
  – non-accommodative esotropia
  – high accommodative convergence to accommodation (AC/A) ratio
  – cyclic esotropia
  – occlusion esotropia

• Discuss prism adaptation, bifocals and miotics in treatment of esotropia

• Explain the management, options and goals of treatment in intermittent exotropia, including:
  – observation
  – optical treatment
  – orthoptic treatment
  – surgery

• Describe the treatment goals of intermittent esotropia

• Discuss when it is appropriate to treat pattern strabismus

• Discuss surgical procedures for pattern strabismus

• Discuss surgical correction of vertical strabismus

• Discuss surgical treatment options for and urgency of treatment for paralytic strabismus

• Discuss the goals of treatment and treatment procedures for 3rd and 4th nerve palsy

• Discuss the principles of treatment for:
  – Duane syndrome
  – Brown syndrome
Ocular Motility Curriculum Standard

- inferior oblique palsy
- thyroid ophthalmopathy

- Discuss management of acute cases of trauma involving the eye muscles
- Outline and discuss the surgical plan for strabismus surgery
- Describe and discuss the selection of materials and methods for extra-ocular muscular surgery, including:
  - sutures
  - needles
- Discuss and describe indications and contraindications of use of adjustable suture in strabismus surgery (including allergy)
- Describe posterior fixation suture (Faden Operation) and Pulley sutures
- Discuss the management of complications arising from strabismus surgery, including:
  - ocular alignment problems
  - diplopia
  - conjunctival complications
  - mechanical restriction
  - lost/slipped muscle
  - postoperative infection
  - granuloma
  - change in eyelid position
  - perforation of the globe
  - anterior segment ischemia
- Discuss the indications for surgery in patients with nystagmus
- Discuss the treatment options for infantile nystagmus syndrome
- Explain surgery to move the null zone nearer to the primary position (Kestenbaum-Anderson procedure)
- Describe chemodenervation treatment of strabismus using botulinum toxin and risks
- Impact of strabismus (esp. diplopia) on patient’s occupation and driving
Oculoplastics and Orbit Curriculum Standard

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Purpose

The Oculoplastic and Orbit Clinical Performance Standard covers the specific knowledge, processes, skills and competencies required for the diagnosis and treatment of oculoplastic and orbital conditions.

The learning outcomes and performance criteria serve as a guide to help the trainee attain the knowledge and skills to formulate treatment plans that balance outcomes for vision, function and appearance in cases of trauma or disease.

References

Oculoplastic and Orbit Reading
In addition to the core texts, the following references are recommended:


Additional Reading

It is recommended that reading be supplemented with appropriate articles from current and relevant peer-reviewed journals.

**Best Practice Standards**


**Level of Mastery**

For each learning outcome, the level of mastery to be attained by the trainee at the end of training is indicated as follows:

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>***</td>
<td>Core knowledge of which trainees must be able to demonstrate understanding Skills and procedures that trainees must be able to perform autonomously</td>
</tr>
<tr>
<td>**</td>
<td>Knowledge of which trainees must have a good practical understanding Skills and procedures with which trainees should have assisted, and of which have good practical knowledge</td>
</tr>
<tr>
<td>*</td>
<td>Knowledge, skills and procedures of which trainees must have some understanding</td>
</tr>
</tbody>
</table>
Learning outcomes and performance criteria

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1.1 Identify general medical conditions (including congenital/hereditary and acquired conditions) that may be associated with oculofacial, orbital and lacrimal conditions</strong></td>
<td>***</td>
<td>1.1.1 Ascertain relevant current and past history of illnesses, surgical history, family history, diseases, allergies and medications/substances that may contribute to oculofacial, orbital and lacrimal conditions</td>
</tr>
<tr>
<td><strong>1.2 Identify surgical history that may affect oculofacial, orbital and lacrimal conditions</strong></td>
<td>***</td>
<td>1.2.1 Ascertain previous surgical history and outcomes</td>
</tr>
</tbody>
</table>
| **1.3 Identify oculofacial, orbital and lacrimal conditions arising from trauma** | *** | 1.3.1 Ascertain history of trauma including:  
- nature of injury  
- blunt  
- penetrating  
- presence of intraocular foreign body  
- features that might contribute to high risk of infection  
- trauma to non-ocular tissue |
## OP2 PERFORM EYE EXAMINATIONS FOR OCULOFACIAL, ORBITAL AND LACRIMAL CONDITIONS

This element covers the performance and interpretation of a range of eye examinations associated with oculofacial, orbital and lacrimal conditions. It also covers the demonstration of judgment in selecting the appropriate examinations for particular patients.

The trainee is expected to have performed eye examinations as outlined in the Ophthalmic Basic Competency and Knowledge (OBCK) standard.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 Undertake examinations of oculofacial, orbital, and lacrimal features</td>
<td>***</td>
<td>Accurately perform, record and interpret the results of the following examinations and note their relevance to the diagnosis of oculofacial, orbital and lacrimal conditions</td>
</tr>
</tbody>
</table>
| 2.1.1 Eyelid | ** | • skin appearance  
• eyelid position  
• palpebral fissure  
• eyelid movement  
• Bell phenomenon  
• associated features: anisocoria, strabismus, nystagmus, abnormal head posture, sympathetic nervous system |
| 2.1.2 Lacrimal | ** | • tear film assessment  
• dye disappearance  
• Schirmer test  
• Jones test  
• probe and syringe test  
• lacrimal gland  
• lacrimal sac examination  
• inspection of nasal passage |
| 2.1.3 Orbital | ** | • globe position and displacement  
• exophthalmometry  
• external eye movements  
• palpation of bony margin and orbital quadrants  
• retropulsion  
• cranial nerves I to VII  
• intra-ocular pressure (IOP) readings  
• Valsalva manoeuvre  
• auscultation |
2.1.4 Facial
- motor
- sensory
- bony structure
- skin quality
- regional lymph nodes
- neck structures

2.2 Perform and refer for ancillary tests to further assist in the diagnosis or documentation of oculofacial, orbital and lacrimal conditions

| 2.2 | 2.2.1 Interpret: orbital, lacrimal and neurological imaging, ultrasonography, visual fields, OCT and automated perimetry, electrophysiology and VER reports
| *** |
| 2.2.2 Perform and interpret ice tests
| 2.2.3 Interpret the results of biopsies including histopathological reports |

2.3 Provide appropriate referral to specialist or ophthalmic sub-specialist for further tests

| 2.3 | 2.3.1 Provide detailed history, examination and investigation reports to appropriate specialist or ophthalmic sub-specialist for interpretation
| ** |
### OP3 CHARACTERISE OCULOFAcial, ORBITAL AND LACRIMAL CONDITIONS

This element covers the classification of types of oculofacial, orbital and lacrimal conditions, and making a working differential diagnosis.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 Characterise eyelid malpositions</td>
<td>***</td>
<td>3.1.1 Identify:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• ectropion</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• entropion</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• blepharoptosis</td>
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<tr>
<td></td>
<td></td>
<td>• trichiasis and distichiasis</td>
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<tr>
<td></td>
<td></td>
<td>• eyelid retraction</td>
</tr>
<tr>
<td>3.2 Characterise involutional periorbital changes</td>
<td>***</td>
<td>3.2.1 Identify:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• dermatochalasis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• blepharochalasis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• brow ptosis</td>
</tr>
<tr>
<td>3.3 Characterise facial dystonias</td>
<td>***</td>
<td>3.3.1 Identify:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• benign essential blepharospasm (BEB)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Identify hemifacial spasm</td>
</tr>
<tr>
<td>3.4 Characterise mid face descent</td>
<td>**</td>
<td>3.4.1 Identify the causes of mid face descent impacting on the appearance or function of the lower eyelids</td>
</tr>
<tr>
<td>3.5 Characterise eyelid tumours</td>
<td>***</td>
<td>3.5.1 Identify:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• benign tumours</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• malignant tumours</td>
</tr>
<tr>
<td>3.6 Characterise eyelid trauma</td>
<td>3.6.1 Identify • blunt trauma • penetrating trauma</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.6.2 Identify: • tarsal plate/posterior lid margin laceration with intact skin • eyelid laceration involving lacrimal canaliculus</td>
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<tr>
<td></td>
<td>3.6.3 Consider and exclude foreign body</td>
<td></td>
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<tr>
<td></td>
<td>3.6.4 Identify: • chemical trauma • thermal trauma</td>
<td></td>
</tr>
<tr>
<td>3.7 Characterise eyelid inflammation</td>
<td>3.7.1 Identify: • chalazion/blepharitis • hordeolum • allergy • cellulitis • floppy eyelid syndrome</td>
<td></td>
</tr>
<tr>
<td>3.8 Characterise eyelid anomalies</td>
<td>3.8.1 Identify anomalies impacting on the appearance or function of the eyelids</td>
<td></td>
</tr>
<tr>
<td>3.9 Characterise lacrimal conditions</td>
<td>3.9.1 Identify congenital lacrimal conditions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.9.2 Identify acquired lacrimal conditions</td>
<td></td>
</tr>
<tr>
<td>3.10 Characterise congenital orbital anomalies</td>
<td>3.10.1 Identify: • anophthalmos • microphthalmos • tumours and choristomas • craniofacial clefting • craniosynostoses including Crouzon syndrome</td>
<td></td>
</tr>
<tr>
<td>3.11 Characterise inflammatory disorders of the orbit</td>
<td>3.11.1 Identify: • Graves ophthalmopathy • idiopathic orbital inflammation (pseudotumour) • vasculitis • sarcoidosis</td>
<td></td>
</tr>
</tbody>
</table>
### 3.12 Characterise infectious disorders of the orbit

3.12.1 Identify:
- preseptal cellulitis
- orbital cellulitis
- fulminating streptococcal infection
- necrotising fasciitis
- mucormycosis
- aspergillosis
- parasitic diseases
- echinococcosis
- trichinosis
- cysticerosis

### 3.13 Characterise orbital neoplasms

3.13.1 Identify common presentation and imaging findings of:
- rhabdomyosarcoma
- identify congenital orbital tumours
- vascular tumours
- neural tumours
- mesenchymal tumours
- lacrimal gland tumours
- direct and metastatic spread of tumours
- lymphoproliferative disorders

### 3.14 Characterise orbital vascular lesions

3.14.1 Identify common presentation and imaging findings of:
- arteriovenous malformation
- choroidal haemangioma
- capillary haemangioma
- cavernous haemangioma
- venolymphatic malformation
- orbital venous varix
- sclerosing haemangioma
- haemangiopericytoma
- haemangioendothelioma (angiosarcoma)
- arterial aneurysms
| 3.15 Characterise orbital trauma | 3.15.1 Identify orbital fractures:  
|                                 | • zygomatic fractures  
|                                 | • orbital apex fractures  
|                                 | • orbital roof fractures  
|                                 | • medial wall fractures  
|                                 | • orbital floor fractures  
|                                 | **  
|                                 | 3.15.2 Identify type and location of foreign bodies  
|                                 | 3.15.3 Identify traumatic optic neuropathy  
|                                 | 3.15.4 Identify associated ocular injury  
|                                 | 3.15.5 Identify subcutaneous emphysema  
|                                 | 3.15.6 Identify associated head, neck and facial injuries  
| 3.16 Characterise orbital apex syndrome | 3.16.1 Identify common presentation and imaging findings  

# OP4 DEVELOP AND IMPLEMENT A MANAGEMENT PLAN FOR OCULOFACIAL, ORBITAL AND LACRIMAL CONDITIONS

This element covers the management of oculofacial, orbital and lacrimal conditions using observation, medical therapies and surgery including postoperative care.

The trainee must adhere to the standards of practice, in particular those regarding informed consent and clinical record-keeping, described in the Ophthalmic Basic Competencies and Knowledge (OBCK) standard.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1 Determine and document in medical records a management plan for each individual patient</td>
<td>***</td>
<td>4.1.1 Manage legible record in an accepted format of the proposed management plan and the briefing of the patient</td>
</tr>
<tr>
<td>4.2 Educate the patient on the proposed management regimen</td>
<td>**</td>
<td>4.2.1 Clearly explain the natural history, proposed management regimen, alternatives, and the potential outcome with and without the management regimen proposed</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.2.2 Obtain the patient’s informed consent, where necessary, to the management regimen</td>
</tr>
<tr>
<td>4.3 Use observation in the management plan</td>
<td>***</td>
<td>4.3.1 Establish and record appropriate baseline data</td>
</tr>
<tr>
<td>4.4 Manage oculofacial, orbital and lacrimal conditions using medical therapies</td>
<td>***</td>
<td>4.4.1 Undertake first aid and emergency management procedures for ocular and adnexal trauma</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.4.2 Select and use medication to medically manage oculofacial, orbital and lacrimal conditions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>4.4.3 Monitor the efficacy of the medical therapy, identify complications of the therapy and make necessary adjustments to the management regime</td>
</tr>
<tr>
<td>4.5 Determine the expected outcome of surgery, given the impact of coexisting diseases, and explain to the patient</td>
<td>***</td>
<td>4.5.1 Discuss expected outcome with patient to enable them to make an informed decision</td>
</tr>
<tr>
<td>4.6 Design surgical plan</td>
<td>4.6.1 Identify impact of systemic disease on surgical planning</td>
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<tr>
<td></td>
<td>4.6.2 Understand the relevant lid and orbital anatomy for surgical planning</td>
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<td></td>
<td>4.6.3 Assess impact of systemic medications on surgical planning</td>
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<tr>
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<td>4.6.4 Modify medical therapies in the perioperative period</td>
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<td>4.6.5 Select forms of anaesthesia that meet the surgical need and liaise with anaesthetist</td>
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<td></td>
<td>4.6.6 Discuss and select the surgical technique relevant to the capacity of the theatre and staff</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4.7 Apply surgical skills for further investigation or treatment of oculofacial, orbital and lacrimal conditions</th>
<th>4.7.1 Counsel patient on the surgical procedure having previously obtained informed consent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4.7.2 Perform emergency canthotomy / cantholysis</td>
</tr>
<tr>
<td></td>
<td>4.7.3 Perform techniques to correct ectropion</td>
</tr>
<tr>
<td></td>
<td>4.7.4 Perform techniques to correct involutional type entropion</td>
</tr>
<tr>
<td></td>
<td>4.7.5 Perform techniques to correct involutional ptosis</td>
</tr>
<tr>
<td></td>
<td>4.7.6 Perform simple eyelid and periorbital reconstruction including wedge resection, lateral canthal advancement, flaps and free grafts</td>
</tr>
<tr>
<td></td>
<td>4.7.7 Perform lateral tarsorrhaphy</td>
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<td></td>
<td>4.7.8 Perform nasolacrimal probing and syringing</td>
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<td>4.7.9 Perform punctal snip</td>
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<td></td>
<td>4.7.10 Perform punctal occlusion</td>
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<td></td>
<td>4.7.11 Perform tarsoconjunctival cautery</td>
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<tr>
<td>4.7.12</td>
<td>Perform simple evisceration and enucleation</td>
</tr>
<tr>
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<td>-------------------------------------------</td>
</tr>
<tr>
<td>4.7.13</td>
<td>Incise and curette tarsal cysts</td>
</tr>
<tr>
<td>4.7.14</td>
<td>Perform techniques to correct trichiasis including cryotherapy, electrolysis, and radiofrequency follicle ablation</td>
</tr>
<tr>
<td>4.7.15</td>
<td>Perform eyelid biopsies</td>
</tr>
<tr>
<td>4.7.16</td>
<td>Perform bulbar conjunctival biopsy</td>
</tr>
</tbody>
</table>

**

<table>
<thead>
<tr>
<th>4.7.17</th>
<th>Perform techniques to correct cicatricial ectropion with full thickness skin graft</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.7.18</td>
<td>Repair lid lacerations including monocanalicular stenting</td>
</tr>
<tr>
<td>4.7.19</td>
<td>Perform functional upper lid reduction</td>
</tr>
<tr>
<td>4.7.20</td>
<td>Perform medial and lateral canthoplasty techniques</td>
</tr>
<tr>
<td>4.7.21</td>
<td>Perform direct eyebrow lift</td>
</tr>
<tr>
<td>4.7.22</td>
<td>Perform external DCR</td>
</tr>
</tbody>
</table>

***

**

<table>
<thead>
<tr>
<th>4.8.1</th>
<th>enucleation with integrated orbital implant</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.8.2</td>
<td>cicatricial entropion</td>
</tr>
<tr>
<td>4.8.3</td>
<td>congenital ptosis</td>
</tr>
<tr>
<td>4.8.4</td>
<td>neurogenic ptosis</td>
</tr>
<tr>
<td>4.8.5</td>
<td>myopathic ptosis</td>
</tr>
<tr>
<td>4.8.6</td>
<td>posterior lamellar reconstruction with mucous membrane grafting</td>
</tr>
<tr>
<td>4.8.7</td>
<td>orbital surgery</td>
</tr>
<tr>
<td>4.8.8</td>
<td>eyelid recession</td>
</tr>
</tbody>
</table>

4.8 Recognise condition, understand principles of surgery, be able to discuss surgical problem and refer for the management of the following complex oculofacial, orbital and lacrimal conditions. Be familiar with techniques/management of:
| 4.8.9 | intubation of nasolacrimal system |
| 4.8.10 | anophthalmic socket re-construction |
| 4.8.11 | ocular prosthesis |
| 4.8.12 | lacrimal gland surgery |
| 4.8.13 | accurately assess the weight of gold required for an upper eyelid weight |
| 4.8.14 | insert eyelid weight for facial palsy |
| 4.8.15 | endonasal DCR |
| 4.8.16 | revision DCR |
| 4.8.17 | repair of lid lacerations including bi-canalicular stenting |
| 4.8.18 | cosmetic upper and lower lid reduction |
| 4.8.19 | mid-face lift |
| 4.8.20 | alternative techniques for eyebrow lift |
| 4.8.21 | repair of orbital floor fractures following facial trauma |
| 4.8.22 | complex orbital fractures |
| 4.8.23 | skin resurfacing |

**4.9** Modify postoperative management plan with consideration of incurred complications

- **4.9.1** Alter frequency of assessments, medical and surgical intervention to optimise visual outcome following complications of surgery

**4.10** Demonstrate appropriate decision making on referral of patients

- **4.10.1** Patients are referred in a timely manner with a comprehensive case history (oral or written) to the appropriate specialist and/or support group
- **4.10.2** Share the management of patients with other specialists
Context

In order to fulfil the clinical performance standards, the trainee must apply the knowledge and skills described in the:

- Ophthalmic Sciences (Anatomy, Clinical Ophthalmic and Emergency Medicine, Optics, Physiology, Clinical Genetics and Microbiology, and Evidence-based Ophthalmic Practice) curriculum standards;
- Ophthalmic Basic Competencies and Knowledge (OBCK); and,
- Basics of Ophthalmic Surgery (BOS) curriculum standards.

Clinical practice

The following list is provided to identify the conditions, their causes and sequelae, and the treatment approaches that may be encountered by the trainee in clinical practice. The list is not exhaustive; it is intended as a guide for the use of the trainee when planning his or her learning.

Conditions deserving special emphasis

The following are conditions which are of particular importance because of their prevalence and impact on society. It is expected that the trainee will have a very detailed knowledge of these conditions.

1. Retrobulbar haemorrhage
2. Orbital cellulitis
3. Orbital apex syndrome

Oculoplastics, Orbital and Lacrimal Topic List

- Systemic disease with ocular manifestations, or diseases that impact on the diagnosis of oculofacial, orbital and lacrimal conditions including but not limited to:
  - endocrine and metabolic diseases including thyroid disease
  - allergy
  - autoimmune disease
  - neurological disease
  - mucocutaneous disorders
  - oncology and chemotherapy
  - chemical and physical insults
  - infectious diseases
  - sinonasal disease
  - intracranial diseases

- Medications with ocular and systemic effects impacting on external oculofacial, orbital and lacrimal conditions including but not limited to:
  - topical medications, their vehicles and preservatives
  - systemic medications
  - chemotherapeutic agents
  - radiotherapy
• Environmental conditions that impact on oculofacial, orbital and lacrimal conditions including but not limited to ultra violet light, housing and hygiene conditions

• Ocular medications and their local and systemic side effects

• Eye injuries and their long term effects

• Ophthalmic procedures and their long term effects

• General physical examination

• Ophthalmic instruments

• Knowledge of the diagnosis and management of each of the conditions listed in OP3

  Identify ectropion
  – congenital
  – involutional
  – paralytic ectropion
  – cicatricial ectropion
  – mechanical ectropion

  Identify entropion
  – congenital
  – acute spastic
  – involutional
  – cicatricial

  Identify blepharoptosis
  – congenital ptosis
  – involutional ptosis
  – myogenic ptosis
  – neurogenic ptosis
  – pseudo ptosis
  – mechanical ptosis

  Identify trichiasis
  – trichiasis
  – distichiasis

  Identify dermatochalasis

  Identify blepharochalasis

  Identify brow ptosis
  – paralytic
  – involutional
  – cicatricial

  Eyelid anomalies
  – blepharophimosis syndrome
– euryblepharon
– ankyloblepharon
– epicanthus
– epiblepharon
– congenital distichiasis
– congenital coloboma
– congenital eyelid lesions

**Congenital and acquired lacrimal conditions**
– obstruction
– functional
– tumours
– infection
– traumatic
– iatrogenic
– medical
– radiological
– surgical
– topical
– systemic

• Trauma survey of the whole patient

• Knowledge of the risks, benefits, complications and alternatives of each of the treatments for conditions listed in OP3.

• Knowledge of eye safety equipment and eye safety systems for recreational and occupational health and safety

• Recognition of the following types of oculofacial injuries:
  – penetrating
  – non-penetrating injury
  – mechanical
  – chemical
  – thermal
  – electromagnetic
  – ultraviolet

• Primary, secondary and tertiary care of injuries

• Medications for the treatment of tumours

• Long term visual rehabilitation

• Indications, contra-indications, side effects, drug interactions and toxicity of:
  – lubricants
  – antimicrobials
  – antinflammatories

• Surgical safety systems including but not limited to:
- sterilization procedures
- theatre management
- workplace health and safety
- knowledge of suture and needle types and their properties

- Knowledge of regional road traffic authority's guidelines/legislation for vision requirements for all categories of motor vehicle licences
Ophthalmic Ultrasound Curriculum Standard

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OU2 ULTRASOUND ANATOMY ................................................................................................................. 5

OU3 ULTRASOUND INSTRUMENT APPLICATION & SKILL ACQUISITION ............................................. 7

OU4 CLINICAL APPLICATIONS OF OPHTHALMIC ULTRASOUND ....................................................... 9
Purpose

The Ophthalmic Ultrasound Clinical Performance Standard covers the specific knowledge, processes, skills and competencies required for the diagnostic use of ultrasound for eye conditions.

Ophthalmic ultrasound is an essential diagnostic imaging modality. It allows for an assessment in appropriate contexts of ocular and periocular tissues, providing information leading to accurate diagnosis and more comprehensive management plans than would be possible from clinical examination alone. In particular, it serves a critical role in the diagnosis and management of many vitreoretinal (vitreous haemorrhage, retinal detachment), ocular oncology (especially melanoma) and trauma-related conditions, as well as in the exclusion of diseases where the view of the posterior segment is limited (e.g. white cataract, corneal scarring). Ultrasound is used to measure the length of the eye for calculating the power of an intra-ocular lens. Ultrasound is essential for this purpose in cases in which partial coherence interferometry cannot be used.

An understanding of relational anatomy of ocular tissues is critical for the interpretation of ocular imaging modalities. Ophthalmic ultrasound in particular integrates the ophthalmologist’s unique expert knowledge of ocular anatomy with patient examination in a clinical setting to elucidate disease. Adequate topographic evaluation depends on the ophthalmologist’s ability to think three-dimensionally while examining the globe with instruments that have only one- or two-dimensional display.

References

Ultrasound Reading
In addition to the core texts, the following references are recommended:

- or

Additional Reading

The RANZCO Optics curriculum provides guidance on learning underpinning this standard. It is recommended that reading be supplemented with appropriate articles from current and relevant peer-reviewed journals.

**Level of Mastery**

For each learning outcome, the level of mastery to be attained by the trainee at the end of training is indicated as follows:

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
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<tbody>
<tr>
<td>***</td>
<td>Core knowledge of which trainees must be able to demonstrate understanding Skills and procedures that trainees must be able to perform autonomously</td>
</tr>
<tr>
<td>**</td>
<td>Knowledge of which trainees must have a good practical understanding Skills and procedures with which trainees should have assisted, and of which have good practical knowledge</td>
</tr>
<tr>
<td>*</td>
<td>Knowledge, skills and procedures of which trainees must have some understanding</td>
</tr>
</tbody>
</table>
# Learning outcomes and performance criteria

## OU1 ULTRASOUND PRINCIPLES

This element covers the requisite knowledge and application of the principles of ophthalmic ultrasound.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
</tr>
</thead>
</table>
| 1.1 Demonstrate knowledge of the physics of ultrasound generation, and the characteristic echoes produced at acoustic interfaces of different ocular media | *** | 1.1.1 Describe:  
- principles of sound waves  
- sound wave absorption and reflection  
- transduction  
- standard probes (8–10mHz)  
- ultrasound biomicroscopy (20–50mHz) |
| 1.2 Demonstrate knowledge of the different methods of signal processing and their application in ophthalmology | *** | 1.2.1 Describe the processes and applications for:  
- A-scan (uni-dimensional) \(\rightarrow\) quantitative information  
- B-scan (two-dimensional) \(\rightarrow\) topographic information  
- time-based (kinetic) \(\rightarrow\) dynamic information |
| 1.3 Demonstrate knowledge of sources of variation in normal echography, especially instrumentation limitation and artefacts | * | 1.3.1 Describe the influences of the following sources of variation on ophthalmic ultrasound:  
- insufficient fluid coupling  
- Baum’s bumps  
- gas or air bubbles  
- reverberations  
- scleral buckle  
- silicone oil  
- glaucoma shunt devices |
| 1.4 Demonstrate knowledge of how echoes may be affected by various factors | * | 1.4.1 Describe how ultrasound echoes may be affected by:  
- size and shapes of interfaces  
- angle of incidence  
- probe positioning  
- absorption  
- scattering  
- refraction |
| 1.5 Demonstrate knowledge of the applications of and information obtained from the three primary B-scan probe positions | 1.5.1 Describe the applications of and information obtained from the following B-scan probe positions:
- transverse
- longitudinal
- axial |
| 1.6 Synthesize your knowledge through performance and documentation of the purpose of standardised echography | 1.6.1 Describe the purpose of standardised echography
1.6.2 Perform ultrasound procedures
1.6.3 Document and interpret ultrasound findings in a standardised fashion
1.6.4 Maintain ultrasound diary:
- record your experience of ophthalmic ultrasound in vitreoretinal/opaque media/trauma conditions
- record your experience of ophthalmic ultrasound in ocular oncology conditions |
### OU2 ULTRASOUND ANATOMY

This element covers the requisite knowledge of ultrasound anatomy.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
</tr>
</thead>
</table>
| 2.1 Demonstrate knowledge of relational anatomy of ocular tissues | *** | 1.1.1 Describe and identify:  
- cornea  
- sclera  
- anterior chamber  
- trabecular meshwork  
- uveal tract  
- lens and zonules  
- vitreous  
- retina  
- choroid  
- optic nerve  
- orbit and optic canal  
- extra-ocular muscles  
- axial length |
| 2.2 Apply ocular anatomy knowledge to ocular imaging modalities – in particular ultrasound | *** | 2.2.1 Describe the indications and procedures for:  
- A-scan  
- B-scan |
| | ** | 2.2.2 Describe the indications and procedures for:  
- Doppler  
- ultrasound biomicroscopy (UBM) |
| 2.3 Demonstrate knowledge of normal developmental parameters of the globe and its structures, and common developmental variations | * | 2.3.1 Describe the following ocular parameters, including its typical values and common developmental variations:  
- axial length  
- corneal curvature  
- anterior chamber depth  
- lens thickness  
- vitreous chamber depth |
| 2.4 Demonstrate knowledge of normal functional changes in globe anatomy with age | * |
| 2.4.1 Describe the changes that occur as part of the normal ageing process in: | |
| • corneal curvature | |
| • anterior chamber depth | |
| • lens thickness | |
| • axial length | |
| • amplitude of accommodation | |
| • refraction | |
### OU3 ULTRASOUND INSTRUMENT APPLICATION AND SKILL ACQUISITION

This element covers the requisite knowledge of and skill using ultrasound techniques.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 Understand how to define sonographic parameters of instrument and the purpose of each</td>
<td>*</td>
<td>3.1.1 Define and describe the purpose of:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- screening below tissue sensitivity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- screening at tissue sensitivity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- screening above tissue sensitivity</td>
</tr>
<tr>
<td>3.2 Utilise different examination techniques to obtain sonographic information</td>
<td>**</td>
<td>3.2.1 Demonstrate the following ocular sonographic techniques:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- contact (esp. posterior segment) – on globe vs. through lids</td>
</tr>
<tr>
<td></td>
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<td>- immersion (esp. anterior segment)</td>
</tr>
<tr>
<td>3.3 Utilise B-scan ultrasound to determine the topographic nature of structures in the eye</td>
<td>***</td>
<td>3.3.1 Determine and describe the location, extension and shape of ocular structures identified through ophthalmic ultrasonography</td>
</tr>
<tr>
<td>3.4 Utilise A-scan mode to determine the quantitative nature of structures in the eye</td>
<td>**</td>
<td>3.4.1 Utilising A-scan mode, describe:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- reflectivity estimate (spike height)</td>
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<td></td>
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<td>- structure (internal architecture) – mass-like structures</td>
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<tr>
<td></td>
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<td>- sound attenuation (absorption)</td>
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<tr>
<td></td>
<td></td>
<td>- reflectivity measurement (dB comparison) – membrane-like structures (e.g. posterior vitreous detachment vs. retinal detachment)</td>
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<tr>
<td></td>
<td></td>
<td>- axial length measurement</td>
</tr>
<tr>
<td>3.5 Utilise kinetic echography techniques</td>
<td>**</td>
<td>3.5.1 Determine the mobility (after movement) and vascularity (blood flow) of tissues</td>
</tr>
<tr>
<td>3.6 Utilise the three primary B-scan probe orientations to perform and report standardised examinations of the globe</td>
<td>**</td>
<td>3.6.1 Demonstrate and describe the indications for using the following B-scan probe orientations:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- transverse</td>
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<tr>
<td></td>
<td></td>
<td>- longitudinal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- axial</td>
</tr>
<tr>
<td>3.7 Utilise UBM techniques in assessment of anterior segment structures</td>
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<tr>
<td>---------------------------------------------------------------</td>
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<tr>
<td>3.7.1 Demonstrate the use of UBM to assess:</td>
<td></td>
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<tr>
<td>- cornea</td>
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<td>- iris</td>
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<td>- sclera</td>
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<td>- ciliary body</td>
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<td>- zonules</td>
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<tr>
<td>- pathophysiologic changes in anterior segment architecture</td>
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</tbody>
</table>
### OU4 CLINICAL APPLICATIONS OF OPHTHALMIC ULTRASOUND

This element covers the clinical applications of ophthalmic ultrasound.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
</tr>
</thead>
</table>
| 4.1 Have a detailed understanding of the indications for ophthalmic ultrasound | *** | 4.1.1 Describe the indications for ophthalmic ultrasound in:  
- opaque ocular media  
- clear ocular media  
- biometry – independent of cataract work-up (e.g. monitoring paediatric glaucoma)  
- biometry when optical partial coherence interferometry fails to adequately assess axial length |
| 4.2 Have detailed knowledge of and obtain clinical experience in performing ophthalmic ultrasound on patients with vitreo-retinal disease | *** | 4.2.1 Perform ophthalmic ultrasound in cases of vitreous haemorrhage or other media opacity  
4.2.2 Perform ophthalmic ultrasound to exclude the presence of posterior segment masses, as well as to distinguish retinal detachment from mimicking condition  
4.2.3 Distinguish between different types of retinal detachment based on their sonographic features:  
- rhegmatogenous  
- tractional (e.g. diabetic)  
- exudative (e.g. choroidal effusions, inflammations)  
4.2.4 Describe the sonographic features used to distinguish posterior vitreous detachment from retinal detachment |
| 4.3 Have detailed knowledge of and obtain clinical experience in performing ophthalmic ultrasound on patients with ocular oncologic disease | 4.3.1 Utilise topographic, quantitative and kinetic examination techniques to provide echographic data; integrate these with your detailed knowledge of ocular pathology to optimise the management of ocular oncology patients  
4.3.2 Utilise standardised ophthalmic ultrasound examination techniques so that serial measurements can be reliably undertaken in the monitoring of ocular oncology patients and their response to treatment, as well as the detection of progression/recurrence |
|---|---|
| 4.4 Understand the sonographic characteristics of common ocular oncologic disease in adult patients | 4.4.1 Describe the sonographic characteristics of common ocular oncologic diseases in adult patients, in particular ocular melanoma (esp. choroidal and ciliary body)  
4.4.2 Describe the pathology and sonographic characteristics of differential diagnosis of choroidal melanoma:  
- choroidal haemangioma  
- metastatic carcinoma  
- disciform lesions  
- choroidal haemorrhages  
- choroidal osteoma  
- melanocytoma |
| 4.5 Understand the sonographic characteristics of common ocular oncologic disease in paediatric patients | 4.5.1 Describe the sonographic characteristics of common ocular oncologic diseases in paediatric patients, in particular retinoblastoma  
4.5.2 Describe the disorders and sonographic characteristics of differential diagnosis of retinoblastoma:  
- retinopathy of prematurity (ROP)  
- persistent foetal vasculature  
- Coats disease  
- endophthalmitis  
- toxocariasis  
- cysticercosis |
| 4.6 Understand the role of ophthalmic ultrasound in trauma | 4.6.1 Utilise ophthalmic ultrasound to diagnosis and localise intraocular foreign bodies  
4.6.2 Utilise ophthalmic ultrasound to provide evidence of lens and anterior segment disorders  
4.6.3 Utilise ophthalmic ultrasound to provide evidence of posterior segment disorders, including retinal detachment and posterior globe rupture  
4.6.4 Utilise ophthalmic ultrasound to assess and diagnose surgical trauma and complications, including:  
- infection/endophthalmitis  
- hypotony and choroidal effusions  
- retained lens material  
- haemorrhage – including suprachoroidal haemorrhage/expulsive haemorrhage  
4.6.5 Utilise ophthalmic ultrasound to provide evidence of anaesthetic (needle) trauma |
| 4.7 Understand the role of ophthalmic ultrasound in uveitis/ocular inflammation | 4.7.1 Utilise ophthalmic ultrasound in diagnosis or exclusion of posterior scleritis  
4.7.2 Utilise ophthalmic ultrasound in assessing choroidal thickening |
| 4.8 Understand the role of ophthalmic ultrasound in assessing optic nerve disorders | 4.8.1 Utilise ophthalmic ultrasound in diagnosing optic disc drusen and other optic nerve disorders |
# Paediatric Ophthalmology Curriculum Standard

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- **Learning outcomes and performance criteria** ....................................................................................................................................... 5
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Purpose

The Paediatric Ophthalmology Clinical Performance Standard covers the specific knowledge, processes, skills and competencies required for the diagnosis and treatment of corneal and external eye conditions.

Paediatric Ophthalmology is a very exciting area of the specialty which will challenge and reward you. In the teaching hospital, you will often see children with eye disorders that are part of a systemic illness or syndrome. This provides intellectually stimulating practice and the opportunity to interact with other specialist practitioners as you try to improve your patients’ lives.

Expect culture shock: it takes time to become comfortable dealing with children who are often uncooperative. With practice, you should become very proficient at examining children and enjoy the experience (and the fun of interacting with them). You will need to learn to deal effectively not only with the patient, but with the extended family. This is real doctoring work. The challenges are great but the rewards are very satisfying because you can make a difference in a child’s life where the benefits will long outlast you. You will get out what you put in, so try and examine as many children as possible so you become proficient and then move on to mastery in this subject area.

References

In addition to the core texts, the following references are recommended:

Paediatric Ophthalmology Reading

- Wilson, M.E., Saunders, R.A. & Trivedi, R.H. (eds) 2009, Pediatric ophthalmology: current thought and practical guide, Springer-Verlag, Berlin. (this book can be read in a term - also available as an ebook)
- Hoyt, C.S. & Taylor, D. 2013, Pediatric ophthalmology and strabismus, 4th edn, Elsevier Saunders. (this is a good book to browse, in order to reinforce your learning)

Additional Reading

the electrophysiological responses and tables summarizing the characteristic changes seen in a wide variety of clinical conditions.)


- webvision.med.utah.edu – this website has very comprehensive coverage of the technical aspects of electrophysiological testing of the visual system, with some details of the changes seen in clinical practice.


**Journal Articles**


**Advanced Reading**


It is recommended that reading also be supplemented with appropriate articles from current and relevant peer-reviewed journals. This may include the use of online resources made available by The College and recommended third parties, such as telemedicine.orbis.org (in particular, a source of e-resources including e-books and videos).

**Best Practice Standards**

Guidelines produced by The Royal College of Ophthalmologists (RCOphth) have been placed on the RANZCO learning management system. RANZCO expresses its gratitude to RCOphth for its permission to do so.
**Level of Mastery**

For each learning outcome, the level of mastery to be attained by the trainee at the end of training is indicated as follows:

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<th>Description</th>
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<td>Knowledge of which trainees must have a good practical understanding Skills and procedures with which trainees should have assisted, and of which have good practical knowledge</td>
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<tr>
<td>*</td>
<td>Knowledge, skills and procedures of which trainees must have some understanding</td>
</tr>
</tbody>
</table>
# Learning outcomes and performance criteria

**PO1 PAEDIATRIC EYE EXAMINATION**

This element covers the processes for observing, prompting and recording a general medical and ocular and history, as well as performing and interpreting a range of eye examinations, in preparation for diagnosis and treatment of paediatric eye conditions.

The trainee is expected to have obtained and recorded a general medical and ocular history (including family history) as outlined in the Ophthalmic Basic Competencies and Knowledge (OBCK) standard.

<table>
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<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
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</tr>
</thead>
<tbody>
<tr>
<td>1.1 Obtain a general and ocular history from parents</td>
<td>***</td>
<td>1.1.1 Demonstrate capacity to build rapport with parents / carers and the child</td>
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<td>***</td>
<td>1.1.2 During history taking, provide prompts or questioning to elicit the following:</td>
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<td></td>
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<td>• what problem promoted the referral?</td>
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<td>• do the parents feel there is a problem with the child’s vision?</td>
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<td></td>
<td>• is the child otherwise healthy?</td>
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<td></td>
<td></td>
<td>• were there pre- or peri-natal problems?</td>
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<td></td>
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<td>• what has the child’s general developmental history been?</td>
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<tr>
<td></td>
<td></td>
<td>• have the various visual development milestones been achieved?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• family history and genetic pedigree</td>
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<tr>
<td></td>
<td></td>
<td>• draw a pedigree, if required</td>
</tr>
<tr>
<td>1.2 Assess visual acuity</td>
<td>***</td>
<td>1.2.1 Undertake tests appropriate for the child’s age and condition</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1.2.2 Infants / pre-verbal children:</td>
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<tr>
<td></td>
<td></td>
<td>• nystagmus</td>
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<tr>
<td></td>
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<td>• quality of fixation with large and small objects</td>
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<tr>
<td></td>
<td></td>
<td>• preferential looking</td>
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<td></td>
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<td>• smiling</td>
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<td></td>
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<td>• involuntary movements</td>
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<td>• vestibulo-ocular reflex</td>
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<td>1.2.3 Toddlers:</td>
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<td>• 100s and 1000s and Smarties</td>
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<td>• Lea symbols</td>
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<td></td>
<td></td>
<td>• fixation</td>
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<td></td>
<td></td>
<td>• 10 prism dioptre base down test or 20 prism dioptre base out</td>
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<tr>
<td>Section</td>
<td>Details</td>
<td></td>
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<td>--------------------------</td>
<td>-------------------------------------------------------------------------</td>
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</tbody>
</table>
| 1.2.4 Pre-school         | - Sheridan-Gardner test  
                          - stereopsis (limitations of testing)  
                          - Kay pictures                        |
| 1.2.5 Primary school     | - STYCAR letters  
                          - Snellen visual acuity chart          |
| 1.3 Assess visual fields | 1.3.1 Undertake confrontational testing for visual fields using behavioural techniques  
                          1.3.2 Identify field defects and infer anatomical location of defect |
| 1.4 Assess colour vision | 1.4.1 Colour vision testing appropriate for age:  
                          - Ishihara pseudo-isochromatic plates (winding lines or numbers) |
| 1.5 Assess ocular motility | 1.5.1 Observe motility and detect abnormal responses using tests suitable for the age of the child:  
                          - cover tests: including cover-uncover, alternate, prism-alternate, simultaneous prism  
                          - Krimsky test  
                          - supranuclear reflexes (doll’s head)  
                          - Bruckner reflex test  
                          - Hirschberg test  
                          - 4 dioptre prism base out test  
                          - ductions and versions in the nine standard positions of gaze  
                          - eye alignment in right and left forced head tilt  
                          - record findings using standard notation |
| 1.6 Assess binocular function | 1.6.1 Test binocular function by undertaking tests appropriate for the child’s age and condition:  
                          - Worth 4 dot  
                          - Lang and Frisby (< 5 years)  
                          - Titmus fly, Randot stereopsis (5 to 8 years) |
<table>
<thead>
<tr>
<th>1.7 Undertake ocular examination</th>
<th>1.7.1 Examine the ocular adnexa to detect:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• pseudo-strabismus</td>
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<tr>
<td></td>
<td>• ptosis</td>
</tr>
<tr>
<td></td>
<td>• pseudoptosis</td>
</tr>
<tr>
<td></td>
<td>• lid, orbit and globe developmental abnormalities</td>
</tr>
<tr>
<td></td>
<td>• evidence of facial asymmetry or craniosynostosis</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1.8 Undertake pupil examination</th>
<th>1.8.1 Detect abnormalities on pupil examination, including:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• pupil shape</td>
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<tr>
<td></td>
<td>• iris colour</td>
</tr>
<tr>
<td></td>
<td>• direct and consensual light reflexes</td>
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<td></td>
<td>• paradoxical pupil reaction</td>
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<td></td>
<td>• anisocoria</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>1.9 Assess intraocular pressure (IOP)</th>
<th>1.9.1 Use suitable testing techniques (including examination under anaesthesia) to measure IOP and determine whether normal or abnormal:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• iCare Tonometer (any age)</td>
</tr>
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<td></td>
<td>• Tonopen</td>
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<tr>
<td></td>
<td>• Perkins tonometer (&lt; 12 months)</td>
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<td></td>
<td>• Goldmann tonometer</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>1.10 Examine the eye</th>
<th>1.10.1 Perform slit lamp examination (including portable slit lamp) to detect:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• anterior segment abnormalities</td>
</tr>
<tr>
<td></td>
<td>• iris transillumination</td>
</tr>
<tr>
<td></td>
<td>• cataract type / size / position</td>
</tr>
</tbody>
</table>

|  | 1.10.2 Use indirect ophthalmoscope to detect abnormalities in the retina or optic nerve (e.g. hypoplasia) |
|  | 1.10.3 Perform cycloplegic refraction |
|  | 1.10.4 Perform dynamic retinoscopy |
PO2 AMBLYOPIA
This element covers the processes for identifying and managing amblyopia using refractive, non-surgical and surgical treatments.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1 Assess the aetiology of amblyopia</td>
<td>***</td>
<td>2.1.1 Identify unilateral and bilateral amblyopia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.1.2 Apply knowledge of anatomy of visual cortex and retina</td>
</tr>
<tr>
<td>2.2 Diagnose amblyopia</td>
<td>***</td>
<td>2.2.1 Test visual acuity and interpret result</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.2.2 Conduct and interpret binocular fixation test (infants)</td>
</tr>
<tr>
<td>2.3 Manage amblyopia</td>
<td>***</td>
<td>2.3.1 Follow hospital/practice protocols to obtain informed consent from the parent / guardian</td>
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<tr>
<td></td>
<td></td>
<td>2.3.2 Select appropriate treatment, with reference to evidence-based standards, that may include:</td>
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<tr>
<td></td>
<td></td>
<td>• implementation of an occlusion program appropriate to the causative condition and circumstances of patient</td>
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<tr>
<td></td>
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<td>• correction of refractive errors</td>
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<td></td>
<td></td>
<td>• use of atropine, and management of associated risk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• patching protocols</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• removal of obstacles to vision, e.g. cataracts</td>
</tr>
<tr>
<td></td>
<td>*</td>
<td>2.3.3 Assessment and review of emerging treatments such as modulators of neurotransmitter release</td>
</tr>
</tbody>
</table>
# PO3 RETINOBLASTOMA (Rb)

This element covers the processes for recognising, treating and counselling paediatric patients with retinoblastoma.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1 Recognise potential cases of retinoblastoma</td>
<td></td>
<td>3.1.1 Identify common presentations of retinoblastoma, including the significance of leukocoria</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.1.2 Differentiate retinoblastoma from the following:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.1.2.1 tumours other than retinoblastoma</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.1.2.2 Coats disease</td>
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<tr>
<td></td>
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<td>3.1.2.3 persistent fetal vasculature</td>
</tr>
<tr>
<td></td>
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<td>3.1.2.4 cataract</td>
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<tr>
<td></td>
<td></td>
<td>3.1.2.5 retinopathy of prematurity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.1.2.6 toxocariasis</td>
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<tr>
<td></td>
<td></td>
<td>3.1.2.7 retinochoroidal coloboma</td>
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<tr>
<td></td>
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<td>3.1.2.8 uveitis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.1.2.9 vitreous haemorrhage</td>
</tr>
<tr>
<td></td>
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<td>3.1.2.10 retinal dysplasia</td>
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<tr>
<td></td>
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<td>3.1.2.11 retinal detachment</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.1.2.12 myelinated nerve fibres</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.1.2.13 pseudoleukocoria, resulting from off-axis photos</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.1.3 Demonstrate ability to identify retinoblastoma, and the differential diagnoses, and choose the appropriate management techniques</td>
</tr>
<tr>
<td>3.2 Undertake investigation of potential retinoblastoma</td>
<td></td>
<td>3.2.1 Order examinations including:</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.2.1.1 magnetic resonance imaging (MRI)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.2.1.2 lumbar puncture</td>
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<tr>
<td></td>
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<td>3.2.1.3 bone marrow aspiration</td>
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<tr>
<td></td>
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<td>3.2.1.4 B-scan ultrasound</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.2.2 Examine other family members</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.2.3 Understand the basic genetics of retinoblastoma (e.g. Knudson two-hit hypothesis) and its implications</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.2.4 Understand role of mutation testing for retinoblastoma</td>
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<tr>
<td></td>
<td></td>
<td>3.2.5 Recognise histopathological features of retinoblastoma</td>
</tr>
<tr>
<td></td>
<td>3.2.6 Understand staging / classification:</td>
<td></td>
</tr>
<tr>
<td>---</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>• international classification for intraocular retinoblastoma ABCDE</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• TNM</td>
<td></td>
</tr>
<tr>
<td>3.3 Apply appropriate treatment</td>
<td>3.3.1 Follow hospital/practice protocols to obtain informed consent from the parent / guardian</td>
<td></td>
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<tr>
<td></td>
<td>3.3.2 Evaluate and select appropriate treatment, including:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• chemoreduction and chemotherapy (systemic and local)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• laser treatment</td>
<td></td>
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<tr>
<td></td>
<td>• cryotherapy</td>
<td></td>
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<tr>
<td></td>
<td>• radiation</td>
<td></td>
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<tr>
<td></td>
<td>– plaques</td>
<td></td>
</tr>
<tr>
<td></td>
<td>– external beam</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• consider potential risks associated with chemotherapy and radiotherapy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• awareness and discussion of intravitreal and intra-arterial chemotherapy (melphalan)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• understanding of current management by team including oncologist, geneticist</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.3.3 Enucleation:</td>
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</tr>
<tr>
<td></td>
<td>• understand effect of enucleation on the growth of the immature orbit</td>
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</tr>
<tr>
<td></td>
<td>• understand moulding of a socket and ocular prosthesis basics</td>
<td></td>
</tr>
<tr>
<td>3.4 Counsel parents/carers and child</td>
<td>3.4.1 Provide prognosis, including:</td>
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</tr>
<tr>
<td></td>
<td>• risk of mortality</td>
<td></td>
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<tr>
<td></td>
<td>• secondary tumour potential</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• morbidity due to treatment</td>
<td></td>
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<tr>
<td></td>
<td>3.4.2 Provide preliminary genetic counselling to family</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3.4.3 Refer family to clinical geneticist</td>
<td></td>
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<td></td>
<td>3.4.4 Follow up for patient and other family members</td>
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</tbody>
</table>
## PO4 UVEITIS

This element covers the processes for identifying and managing uveitis of the anterior, intermediate and posterior segments.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
</tr>
</thead>
</table>
| 4.1 Assess factors associated with onset of anterior uveitis | ***              | 4.1.1 Identify risk factors from patient history:  
  - juvenile idiopathic arthritis  
  - juvenile rheumatoid arthritis  
  - family history  
  - gender  
  - age at onset of arthritis  
  - positive antinuclear antibodies (ANA) test (esp. in females)  
  - negative rheumatoid factor  
  - trauma  
  - sarcoidosis  
  - herpes  
  - Kawasaki disease  
  - systemic disease  
  - extra-ocular manifestations of immune disease          |
| 4.2 Identify clinical signs / complications of anterior uveitis | ***              | 4.2.1 Diagnose signs of uveitis:  
  - anterior chamber cells and flare  
  - keratic precipitates  
  - posterior synechiae  
  - band keratopathy  
  - cataract  
  - hypotony  
  - glaucoma  
  - cystoid macular oedema                                  |
| 4.3 Monitor at risk children                            | ***              | 4.3.1 Know recommended follow up intervals  
  4.3.2 Identify evidence of improvement or deterioration in the patient and revise management plan accordingly  
  4.3.3 Understand the use of OCT in management            |
<table>
<thead>
<tr>
<th>4.4 Assess factors associated with presentation of intermediate uveitis</th>
<th>4.4.1 Identify risk factors from patient history:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• family history</td>
</tr>
<tr>
<td></td>
<td>• multiple sclerosis</td>
</tr>
<tr>
<td></td>
<td>• sarcoidosis</td>
</tr>
<tr>
<td></td>
<td>• inflammatory bowel disease</td>
</tr>
<tr>
<td></td>
<td>• Lyme disease</td>
</tr>
<tr>
<td></td>
<td>• toxocariasis</td>
</tr>
<tr>
<td></td>
<td>• amyloidosis</td>
</tr>
<tr>
<td></td>
<td>• systemic viral infections</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>4.5 Identify clinical signs of intermediate uveitis</th>
<th>4.5.1 Identify indicators of intermediate uveitis:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• cells in vitreous</td>
</tr>
<tr>
<td></td>
<td>• snowballs</td>
</tr>
<tr>
<td></td>
<td>• snowbanking</td>
</tr>
<tr>
<td></td>
<td>• cystoid macular oedema</td>
</tr>
<tr>
<td></td>
<td>• posterior sub-capsular cataract</td>
</tr>
<tr>
<td></td>
<td>• glaucoma</td>
</tr>
<tr>
<td></td>
<td>• optic nerve swelling</td>
</tr>
<tr>
<td></td>
<td>• retinal vasculitis</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4.6 Assess factors associated with presentation of posterior uveitis</th>
<th>4.6.1 Identify source of posterior uveitis:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• toxoplasmosis</td>
</tr>
<tr>
<td></td>
<td>• toxocariasis</td>
</tr>
<tr>
<td></td>
<td>• posterior pole granuloma</td>
</tr>
<tr>
<td></td>
<td>• other parasitic infections, e.g. presumed ocular histoplasmosis syndrome (POHS)</td>
</tr>
<tr>
<td></td>
<td>• Vogt Koyanagi-Harada syndrome (VKH)</td>
</tr>
<tr>
<td></td>
<td>• differentiate pars planitis from other entities</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4.7 Identify clinical signs of posterior uveitis</th>
<th>4.7.1 Identify chorioretinitis / vitritis / vasculitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.7.2 Make differential diagnosis of causes of macular star</td>
<td></td>
</tr>
<tr>
<td>4.7.3 Identify optic neuritis:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• macular oedema</td>
</tr>
<tr>
<td></td>
<td>• vitreous opacities</td>
</tr>
<tr>
<td>4.7.4 Differentiate:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• toxoplasmosis</td>
</tr>
<tr>
<td></td>
<td>• toxocariasis</td>
</tr>
<tr>
<td></td>
<td>• VKH / sympathetic</td>
</tr>
<tr>
<td></td>
<td>• endogenous endophthalmitis</td>
</tr>
</tbody>
</table>
### 4.8 Undertake relevant investigations for uveitis

4.8.1 Select, initiate and assess the results from the appropriate investigations for uveitis:
- full blood count
- urea/electrolytes/LFTs
- ESR/C-reactive protein
- anti-nuclear factor
- rheumatoid factor
- angiotensin-converting enzyme (ACE)
- human leukocyte antigen (HLA) status
- toxocara antibodies
- toxoplasmosis antibodies
- syphilis screening
- Mantoux test / Quantiferon Gold
- HIV serology
- aqueous and vitreous sampling
- diagnostic imaging (CXR)

### 4.9 Implement appropriate management

4.9.1 Follow hospital/practice protocols to obtain informed consent from the parent / guardian

4.9.2 Evaluate and select appropriate treatment, including:
- topical steroids
- systemic or peri-ocular steroids
- mydriatics
- treatment for band keratopathy
- treatment for cataracts
- non-steroidal anti-inflammatory drugs
- referral to rheumatologist/immunologist

4.9.3 Monitor patient for side effects of treatment, including:
- glaucoma
- side-effects of systemic treatment

4.9.4 Evaluate and select appropriate systemic treatment including:
- steroids
- immunosuppressants
- cryotherapy
- biological agents
<table>
<thead>
<tr>
<th>4.10 Counsel carers and child</th>
<th>***</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.10.1 Provide prognosis for vision</td>
<td></td>
</tr>
<tr>
<td>4.10.2 Provide or recommend follow up for patient and other family members, where appropriate</td>
<td></td>
</tr>
</tbody>
</table>
PO5 PAEDIATRIC GLAUCOMA

This element covers the processes for identifying, diagnosing and managing paediatric glaucoma using either surgical or non-surgical treatment.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
</tr>
</thead>
</table>
| 5.1 Identify clinical signs of paediatric glaucoma | | 5.1.1 Classification of childhood glaucoma as per CGRN (WGA Consensus meeting; see reading list):  
- primary congenital glaucoma  
- juvenile open angle glaucoma  
- glaucoma associated with non-acquired ocular conditions  
- glaucoma associated with non-acquired systemic conditions  
- glaucoma associated with acquired conditions  
- glaucoma associated with cataract surgery  
| | 5.1.2 Diagnose signs of congenital glaucoma in infants:  
- buphthalmos  
- enlargement / clouding / opacity / oedema of the cornea  
- photophobia  
- epiphora  
- blepharospasm  
- elevated IOP and optic disc cupping  
- syndromes  
  - Sturge Weber syndrome  
  - aniridia  
  - neurofibromatosis  
  - Lowe syndrome  
  - Peters anomaly  
  - juvenile xanthogranuloma  
| | 5.1.3 Recognize other secondary glaucomas. e.g. uveitic, steroid response  
| | 5.1.4 Diagnose indicators of juvenile glaucoma in older children:  
- visual failure  
- trauma  
- syndromes  
  - Sturge Weber syndrome  
  - aniridia  
  - neurofibromatosis  
  - anterior segment dysgenesis |
5.1.5 Make differential diagnoses of the following conditions:

**Epiphora**
- congenital nasolacrimal duct obstruction
- corneal epithelial defect / abrasion
- ocular inflammation (uveitis, trauma)

**Cloudy Cornea**
- corneal dystrophy, esp. congenital hereditary endothelial dystrophy
- birth trauma with Descemet’s tears
- storage disease (mucopolysaccharidosis)
- cystinosis
- congenital abnormalities
- sclerocornea
- Peter’s anomaly
- congenital rubella syndrome
- herpetic keratitis

**Large eye / Buphthalmos**
- axial myopia
- megalocornea

**Optic nerve abnormalities**
- optic nerve coloboma
- optic atrophy
- optic nerve hypoplasia
- physiologic optic nerve cupping

5.2 Undertake relevant investigations for glaucoma

5.2.1 Perform eye examinations, interpret the results and identify their relevance to the diagnosis of glaucoma

5.2.2 Recognise when examination under anaesthesia is required

5.2.3 Understand the effect of different anaesthetics on IOP measurements

5.2.4 Obtain and interpret results of IOP, corneal diameter, gonioscopy and axial length measurements taken under anaesthetic

5.2.5 Perform OCT, disc photography if feasible
### 5.3 Develop and implement a management plan

#### 5.3.1 Identify the indications and contraindications of various treatment options:

*Medical*
- beta blockers
- carbonic anhydrase inhibitors
- prostaglandin analogues
- alpha 2 receptor agonists

*Surgical*
- goniotomy
- trabeculotomy
- trabeculectomy
- implant surgery
- cycloablation

#### 5.3.2 Consult as appropriate with other paediatric specialists and geneticist

#### 5.3.3 Determine a management plan appropriate for the age and condition of the patient

#### 5.3.4 Explain proposed management plan to patient / parent / guardian / carer

#### 5.3.5 Follow hospital/practice protocols to obtain informed consent from the parent / guardian

#### 5.3.6 Implement plan observing the following:

*Non-surgical*
- monitor patient to identify changes in condition or detect side effects of medications and adjust plan as appropriate

*Surgical*
- choose appropriate procedures
- observe the correct steps throughout the operation
- anticipate and deal with peri-operative problems
- conduct operation to successful conclusion

#### 5.3.7 Undertake post-operative care and check for the potential of short-term or long-term complications

#### 5.3.8 Manage visual rehabilitation
<table>
<thead>
<tr>
<th>5.3.9</th>
<th>Provide counselling for parents / carers</th>
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</thead>
<tbody>
<tr>
<td>5.3.10</td>
<td>Provide ongoing follow-up</td>
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</tbody>
</table>
PO6 LENS ABNORMALITIES – CATARACTS AND SUBLUXATION OF THE LENS

This element covers the processes for identifying, diagnosing and managing childhood cataracts and subluxation of the lens using surgical and non-surgical treatments.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
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</thead>
</table>
| 6.1 Assess aetiology of cataract | 6.1.2 Identify possible aetiology of paediatric cataracts from patient history, ocular examination findings and laboratory studies | 6.1.3 Understand the aetiology of bilateral cataracts:  
- idiopathic  
- hereditary without systemic disease  
- autosomal dominant  
- autosomal recessive  
- X-linked  
- genetic, metabolic and systemic disease and syndromes  
  - Down syndrome  
  - Hallermann-Streiff syndrome  
  - Lowe oculocerebrorenal syndrome  
  - Smith-Lemli-Opitz syndrome  
  - galactosaemia  
  - hypoglycaemia  
  - Edward syndrome  
  - Patau syndrome  
  - Alport syndrome  
  - myotonic dystrophy  
  - Fabry disease  
  - hypoparathyroidism  
  - pseudo hypoparathyroidism  
  - Conradi syndrome  
  - diabetes mellitus  
  - peroxisomal disorders  
  - Wilson disease  
- maternal infection  
  - rubella  
  - cytomegalovirus  
  - varicella  
  - toxoplasmosis  
  - herpes simplex |

***

continued over…
### Paediatric Ophthalmology Curriculum Standard

- **Ocular abnormalities**
  - aniridia
  - anterior segment dysgenesis
  - microphthalmia
  - persistent foetal vasculature (formerly persistent hyperplastic primary vitreous - PHPV)
  - posterior lenticonus

### 6.1.3 Understand the aetiology of unilateral cataracts:
- idiopathic
- ocular abnormalities
  - posterior lenticonus
  - persistent foetal vasculature
  - anterior segment dysgenesis
  - posterior pole tumours
- traumatic
- intrauterine infection (rubella)

### 6.2 Classify and describe paediatric cataracts

#### 6.2.1 Document the location and morphologic characteristics of cataracts correctly, to establish a specific diagnosis and identify types of cataracts that:

**a)** are unlikely to progress
- nuclear
- anterior polar
- blue dot

**b)** may progress, including
- posterior lenticonus
- persistent foetal vasculature
- lamellar
- anterior and posterior subcapsular
- oil droplet

---

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| 6.3 Undertake relevant systemic investigations for paediatric cataracts | 6.3.1 Be aware of the indications for, select, initiate and assess the results from the appropriate investigations:  
- ocular physical examination  
- paediatric physical examination  
- pathology tests (if indicated)  
  - TORCH titre  
  - syphilis serology  
  - urine (reducing substances and amino acids)  
  - red cell galactokinase and G1P uridyl transferase  
  - calcium and phosphorus  
  - transferrin isoforms (for congenital disorders of glycosylation) |
|---|---|
| 6.4 Implement appropriate management of paediatric cataract | 6.4.1 Follow hospital/practice protocols to obtain informed consent from the parent / guardian, including informing of the need for long-term surveillance and possible treatment for glaucoma  
6.4.2 Assess the risk of amblyopia associated with delaying surgery and risk of glaucoma from early surgery  
6.4.3 Consult as appropriate with other paediatric specialists and geneticist  
6.4.4 Evaluate and select treatment appropriate for the type and degree of cataract and the visual and general health status of the child and be aware of any precautions associated with the selected treatment  
6.4.5 Be aware of age in relation to implantation of intra-ocular lenses (IOLs) into children (reference: IATS)  
6.4.6 Prescribe and conduct non-surgical treatments  
  - patching  
  - pupil dilation |
6.4.7 Prescribe and conduct surgical treatment:
- lensectomy
- vitrectomy
- intra-ocular lens implantation
- choose appropriate procedures
  - observe the correct steps throughout the operation
  - anticipate and deal with peri-operative problems
  - conduct operation to successful conclusion
  - undertake post-operative care and check for the potential for short-term or long-term complications

6.4.8 Manage visual rehabilitation including contact lens fitting and management of contact lens related problems

6.4.9 Monitor refractive changes after surgery

6.4.10 Provide counselling for parents/carers

6.4.11 Understand the need for life-long surveillance for glaucoma after infantile cataract surgery

### 6.5 Assess aetiology of lens subluxation

<table>
<thead>
<tr>
<th>6.5.1 Identify aetiology of subluxation from patient history, ocular examination findings and laboratory studies:</th>
</tr>
</thead>
</table>

- **Ocular causes**
  - autosomal dominant
  - trauma
  - aniridia
  - ectopia lentis et pupillae
  - idiopathic
  - coloboma

- **Systemic syndromes**
  - Marfan syndrome
  - homocystinuria
  - Weill-Marchesani syndrome
  - sulfite oxidase deficiency *
  - hyperlysinemia *
### 6.6 Undertake relevant systemic investigations for lens subluxation

- Be aware of the indications for, select, initiate and assess the results, including evaluation of significance of subluxation from the appropriate investigations:

#### Ocular physical examination
- visual acuity
- keratometry
- retinoscopy / refraction
- external ocular examination
- anterior segment including measurement of anterior chamber depth and iridocorneal angle
- ultrasound
- posterior segment

#### Paediatric physical examination
- assess for possibility of Marfan syndrome

#### Pathology tests
- urine (amino acids)
<table>
<thead>
<tr>
<th>6.7 Implement appropriate management of lens subluxation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>6.7.1</strong> Follow hospital/practice protocols to obtain informed consent from the parent/guardian</td>
</tr>
<tr>
<td><strong>6.7.2</strong> Assess the risk of amblyopia associated with delaying surgery</td>
</tr>
<tr>
<td><strong>6.7.3</strong> Consult as appropriate other paediatric specialists including geneticist and/or cardiologist</td>
</tr>
<tr>
<td><strong>6.7.4</strong> Evaluate and select appropriate treatment and precautions, including:</td>
</tr>
<tr>
<td><em>Non-surgical treatments</em></td>
</tr>
<tr>
<td>• phakic correction</td>
</tr>
<tr>
<td>• contact lenses</td>
</tr>
<tr>
<td><em>Surgery</em></td>
</tr>
<tr>
<td>• lensectomy/vitrectomy</td>
</tr>
<tr>
<td>• intra-ocular lens implantation</td>
</tr>
<tr>
<td><em>Choose appropriate procedures</em></td>
</tr>
<tr>
<td>• observe the correct steps throughout the operation</td>
</tr>
<tr>
<td>• anticipate and deal with peri-operative problems</td>
</tr>
<tr>
<td>• conduct operation to successful conclusion</td>
</tr>
<tr>
<td>• undertake postoperative care and check for the potential of short-term or long-term complications</td>
</tr>
<tr>
<td><strong>6.7.5</strong> Manage visual rehabilitation</td>
</tr>
<tr>
<td><strong>6.7.6</strong> Provide counselling for parents/carers, including understanding contact lens fitting and management of contact lens related problems</td>
</tr>
<tr>
<td><strong>6.7.7</strong> Provide long-term follow-up</td>
</tr>
</tbody>
</table>
# PO7 PAEDIATRIC RETINAL DISEASES

This element covers the processes for identifying and managing retinal diseases using non-surgical treatments, laser and surgery.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
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</thead>
</table>
| 7.1 Assess aetiology of paediatric retinal disease | *** | 7.1.1 Identify aetiology from patient history, ocular examination findings and laboratory studies:  
- retinopathy of prematurity  
- Coats disease  
- Non-accidental injury (know differential diagnosis of retinal haemorrhages)  
- Stargardt disease  
- Best disease  
- retinitis pigmentosa  
- Leber congenital amaurosis  
- choroideremia  
- gyrate atrophy  
- cone disorders (including rod monochromatism)  
- congenital stationary night blindness  
- vitreoretinal dystrophies |
| 7.2 Undertake relevant investigations for retinal diseases | ** | 7.2.1 Be aware of the indications for, select, initiate and assess the results from the appropriate investigations:  
- fundus examination  
- electroretinogram (ERG)  
- electro-oculogram (EOG)  
- OCT  
- fluorescein angiogram  
- genetic testing  
- testing for metabolic disease |
| 7.3 Implement appropriate management | ** | 7.3.1 Review recent advances in treatment of particular diseases (esp. ROP, Rb) before initiating management  
7.3.2 Follow hospital/practice protocols to obtain informed consent from the parent / guardian  
7.3.3 Apply appropriate follow-up and screening protocols for ROP, Rb |
<p>| | |</p>
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<tbody>
<tr>
<td>7.3.4</td>
<td>Consult as appropriate with other paediatric specialists, including geneticist</td>
</tr>
</tbody>
</table>
| 7.3.5 | Evaluate and select appropriate treatment and precautions, including:  
- non-surgical treatments  
- laser treatment  
- cryotherapy  
- retina / vitreous surgery |
| 7.3.6 | Follow visual development |
| 7.3.7 | Counselling and support services  
- provide counselling for parents/carers  
- understand need for support of parents/carers and child by low vision support agencies |
PO8 RETINOPATHY OF PREMATURITY (ROP)

This element covers the processes for identifying and managing ROP. Indirect ophthalmoscopy in infants is best learnt on nursery rounds as part of ROP screening.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
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<tbody>
<tr>
<td><strong>8.1 Understand the pathogenesis and aetiology of ROP</strong></td>
<td>***</td>
<td>8.1.1 Understand the normal development of retinal vasculature</td>
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<tr>
<td></td>
<td></td>
<td>8.1.2 Understand the effect of premature birth and risk factors for ROP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8.1.3 Understand the natural history of ROP</td>
</tr>
<tr>
<td><strong>8.2 Undertake relevant investigations for ROP</strong></td>
<td>***</td>
<td>8.2.1 Be familiar with the revised version International Classification of ROP (ICROP)</td>
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<tr>
<td></td>
<td></td>
<td>8.2.2 Be familiar with recommended screening protocols for ROP</td>
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<tr>
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<td></td>
<td>8.2.3 Be able to examine premature infant’s retina with indirect ophthalmoscope and grade findings</td>
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<tr>
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<td></td>
<td>8.2.4 Be able to grade images of premature infant’s fundus with signs of ROP using ICROP</td>
</tr>
<tr>
<td></td>
<td>**</td>
<td>8.2.5 Be able to perform digital imaging of premature infant’s fundus (e.g. using Retcam)</td>
</tr>
<tr>
<td><strong>8.3 Implement appropriate management of ROP</strong></td>
<td>***</td>
<td>8.3.1 Understand importance of timely screening for ROP and timing of follow-up screenings</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8.3.2 Understand treatment protocols for ROP e.g. laser and anti-VEGF treatment</td>
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</table>
### PO9 PAEDIATRIC NEURO-OPHTHALMOLOGY

This element covers the processes for identifying and managing optic neuropathies and nystagmus. This list is not exhaustive.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
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<tbody>
<tr>
<td>9.1 Assess aetiology of neuro-ophthalmic disease</td>
<td>***</td>
<td>9.1.1 Identify optic nerve disease from patient history, ocular examination findings and laboratory studies</td>
</tr>
</tbody>
</table>

**Optic nerve abnormalities**
- optic nerve hypoplasia
- morning glory disc anomaly
- optic disc coloboma
- optic pit
- Aicardi syndrome
- hereditary optic neuropathies, including Behr optic atrophy and Leber hereditary optic neuropathy (LHON)
- optic neuritis
- optic atrophy (including list of causes: unilateral, bilateral, congenital and acquired)
- papilloedema and pseudopapilloedema

**Nystagmus**
- infantile nystagmus syndrome (includes congenital idiopathic nystagmus, sensory deprivation nystagmus)
- fusion maldevelopment nystagmus (formerly latent nystagmus)
- spasmus mutans
- retinal dystrophies
- vertical
- upbeat
- downbeat
- ocular dysmetria
- ocular flutter
- seesaw nystagmus
- others
### 9.2 Undertake relevant systemic investigations for neuro-ophthalmic disorders

**9.2.1** Be aware of the indications for, select, initiate and assess the results including diagnosis and evaluation of significance of disorders from the appropriate investigations:
- ocular physical examination
- paediatric physical examination
- genetic testing
- neuro-imaging
- ERG
- visual evoked response (VER)
- OCT, retinal photography
- B scan ultrasound of optic discs
- fundus autofluorescence

### 9.3 Implement appropriate management

**9.3.1** Follow hospital/practice protocols to obtain informed consent from the parent / guardian

**9.3.2** Consult as appropriate with other paediatric specialists, including geneticist

**9.3.3** Evaluate and select appropriate treatment and precautions

**9.3.4** Manage visual rehabilitation or low vision support

**9.3.5** In event of genetic causation, provide counselling for parents

**9.3.6** Provide follow-up for patient and other family members where appropriate
### PO10 PAEDIATRIC SYSTEMIC DISEASES WITH OCULAR INVOLVEMENT

This element covers the processes for identifying ocular and non-ocular manifestations of systemic diseases with ocular involvement.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
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</thead>
</table>
| **10.1 Identify the ocular and non-ocular manifestations of the phakomatoses**    | ***              | 10.1.1 Ability to diagnose:  
• neurofibromatosis I and II  
• Sturge-Weber syndrome  
• Tuberous sclerosis  
• Von Hippel-Lindau disease  
• ataxia telangiectasia  
• racemose haemangioma                                                            |
| **10.2 Identify the ocular and non-ocular manifestations of neuro-metabolic disorders** | *                | 10.2.1 Ability to suspect diagnosis:  
• mucopolysaccharidoses  
• GM 2 Type 1 gangliosidosis  
• Fabry disease  
• Wilson disease  
• cystinosis                                                                 |
| **10.3 Identify the ocular and non-ocular manifestations of chromosomal anomalies** | ***              | 10.3.1 Apply diagnostic criteria for:  
• trisomy 21                                                                  |
| **10.4 Identify the ocular and non-ocular manifestations of connective tissue disorders** | ***              | 10.4.1 Ability to diagnose:  
• Marfan syndrome  
• pseudoxanthoma elasticum  
• juvenile xanthogranuloma                                                       |
| **10.5 Identify the ocular and non-ocular manifestations of albinism**             | ***              | 10.5.1 Ability to diagnose and distinguish between:  
• oculocutaneous albinism  
• ocular albinism                                                                 |
| **10.6 Identify the ocular and non-ocular manifestations of leukaemia**            | **               | 10.6.1 Ability to identify the various ocular manifestations of leukaemia                                                                      |
| 10.7 Identify the ocular and non-ocular manifestations of congenital infections | ** | 10.7.1 Ability to identify disease pattern of congenital:  
- syphilis  
- toxoplasmosis  
- cytomegalovirus (CMV)  
- herpes simplex |
|---|---|---|
| 10.8 Identify the ocular and non-ocular manifestations of foetal alcohol spectrum disorder | ** | 10.8.1 Ability to identify manifestations of foetal alcohol spectrum disorder:  
- optic nerve hypoplasia  
- ptosis  
- telecanthus  
- narrow palpebral fissures  
- epicanthus  
- strabismus  
- high refractive errors  
- poor acuity  
- flat philtrum  
- thin upper lip |
**PO11 THE APPARENTLY BLIND INFANT**

This element covers the processes for evaluating and managing the apparently blind infant.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
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</thead>
</table>
| **11.1 Evaluation of the apparently blind child** |   | 11.1.1 Obtain details of:  
- perinatal history  
- maternal history  
- family history  
11.1.2 Identify visual behaviours suggestive of cerebral vision impairment  
11.1.3 Conduct examinations for:  
- fixation behaviour and nystagmus  
- cerebral vision impairment  
- delayed visual maturation |
| **11.2 Undertake relevant investigations for the causes of poor vision in children** |   | 11.2.1 Conduct relevant examinations, including:  
- characterise nystagmus  
- paradoxical pupil reaction  
- iris transillumination  
- cataract  
- refractive error  
- fundus examination (esp. look for optic nerve hypoplasia, peripheral pigmentary retinopathy, albinotic fundus, macular abnormality)  
- visual electrophysiology  
- select appropriate neuro imaging  
- genetic testing  
- biochemical testing |
| **11.3 Implement appropriate management** |   | 11.3.1 Provide or arrange parents/carers counselling and support  
11.3.2 Prescribe appropriate glasses - distance or bifocal, with tinted lenses if necessary  
11.3.3 Refer to paediatrician if necessary for examination to exclude cerebral palsy, developmental delay, autism  
11.3.4 Refer to appropriate support agencies e.g. low vision clinics, Vision Australia |
### PO12 ACCIDENTAL AND NON-ACCIDENTAL EYE INJURY

This element covers the processes for assessment and investigations of eye injuries. The standard includes the record requirements and reporting of non-accidental injuries (NAI).

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
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<tbody>
<tr>
<td><strong>12.1 Assessment of eye injuries</strong></td>
<td></td>
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<tr>
<td>12.1.1</td>
<td>12.1.1 Conduct examination under anaesthetic and removal of foreign bodies</td>
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<tr>
<td>12.1.2</td>
<td>12.1.2 Understand the natural history of birth-related retinal haemorrhages</td>
<td></td>
</tr>
</tbody>
</table>
| 12.1.3 | 12.1.3 Review examination results with reference to the index of suspicion of non-accidental injuries:  
  - direct impact – bruising, haemorrhage and laceration, retinal detachment, subluxated lenses  
  - indirect impact – shaking, retinal haemorrhage, optic atrophy |
| 12.1.4 | 12.1.4 Understand diagnostic significance of traumatic retinoschisis |
| 12.1.5 | 12.1.5 Understand eye injuries as manifestation of 'Munchausen syndrome by proxy' |
| 12.1.6 | 12.1.6 Understand urgency of clearing blood from visual pathway in infants before deprivation amblyopia develops |

| **12.2 Investigation of eye injuries** | | |
| 12.2.1 | 12.2.1 Understand differential diagnosis of retinal haemorrhages in infants:  
  - birth trauma  
  - non-accidental injury  
  - significance of retinoschisis  
  - systemic diseases including leukaemia and bleeding disorders  
  - Terson syndrome |
| 12.2.2 | 12.2.2 Order and interpret results of the following assessments, in collaboration with other medical specialists:  
  - physical assessments, including neuroradiology, skeletal scans  
  - neurological assessment  
  - electrophysiology |
| 12.2.3 Collect documentation – photographs, diagnosis and classification |
| 12.2.4 Record negative findings as well as positive findings |

<table>
<thead>
<tr>
<th>12.3 Management of eye injuries – accidental</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.3.1 Treatment plan to preserve and restore vision</td>
</tr>
<tr>
<td>12.3.2 Undertake counselling of patient and parents/carers under supervision, including:</td>
</tr>
</tbody>
</table>
  - providing core knowledge of injury |
  - precise diagnosis |
  - providing realistic expectations, based on extent of injury |
| 12.3.3 Give parents/carers direction to ancillary services: |
  - education |
  - support groups |
  - self-help groups |
| 12.3.4 Discuss with parents/carers steps in grieving – reactions |
| 12.3.5 Use appropriate language: |
  - age-appropriate, with patients |
  - avoid jargon |
| 12.3.6 Discuss personal coping strategies for child and family, including their interactions with: |
  - other health professionals |
  - peers |
  - families |

<table>
<thead>
<tr>
<th>12.4 Management of eye injuries – non-accidental</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.4.1 Know appropriate regional/national laws relating to reporting of child abuse</td>
</tr>
<tr>
<td>12.4.2 Consult with appropriate local paediatric child abuse unit</td>
</tr>
<tr>
<td>12.4.3 Plan follow up appointments and devise visual prognosis</td>
</tr>
<tr>
<td>12.4.4 Plan and commence management of any permanent ocular damage</td>
</tr>
<tr>
<td>12.4.5 Manage visual rehabilitation</td>
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</table>
## PO13 LEARNING DISABILITIES

This element covers the processes for identifying and managing learning disabilities in children.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
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</thead>
</table>
| 13.1 Aetiology of learning disabilities (in absence of neurologic disorder) | *** | 13.1.1 Identify factors that may be associated with learning disabilities:  
- environment  
- culture  
- physical disabilities  
- intelligence quotient (IQ)  
- attention deficit disorder  
13.1.2 Recognise evidence (or lack of evidence) of ocular disease causing learning disabilities |
| 13.2 Management of learning disabilities | *** | 13.2.1 Perform complete eye examination to exclude eye disorders as cause of learning problems – including testing static and dynamic accommodation, convergence, eye movements, refractive errors  
13.2.2 Counsel parents/carers on issues  
13.2.3 Refer to appropriate assessment agencies/support groups  
13.2.4 Discuss lack of proven association of minor ocular abnormalities/vision therapies with learning disabilities |
**PO14 VISUAL ELECTROPHYSIOLOGY**

*This element covers the processes for identifying the application of visual electro-physiology in diagnosis and interpreting the output of electro-physiological tests.*

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<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
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</thead>
</table>
| **14.1 Understand the anatomy and physiology of electrophysiological testing of the visual system** | *                | 14.1.1 Outline the electrical origin of ERG:   *
|                                                                                 |                  | • a and b waves, oscillatory potentials  
|                                                                                 |                  | • photopic and scotopic ERG and the separation of rod and cone responses  
|                                                                                 |                  | • pattern ERG  
|                                                                                 |                  | • multifocal ERG  
|                                                                                 |                  | 14.1.2 Outline the electrical origin of EOG  
|                                                                                 |                  | 14.1.3 Outline the electrical origin of VEPs and characteristics of VEP waveforms (amplitude, latency)  
| **14.2 Understand recording techniques and their limitations**                  | *                | 14.2.1 Demonstrate an awareness of the applicability and limitations of, or with:  
|                                                                                 |                  | • ERG (flash, pattern and multifocal), EOG and VEP (flash, pattern, visual acuity estimation, visual field analysis)  
|                                                                                 |                  | • VEP maturational changes  
|                                                                                 |                  | • the young or unco-operative patient  
|                                                                                 |                  | • the malingering patient  
|                                                                                 |                  | • the patient with very poor vision  
|                                                                                 |                  | • refractive error, media opacity and amblyopia  

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### 14.3 Understand the indications for investigation and typical findings

<table>
<thead>
<tr>
<th>14.3.1 Demonstrate a clear understanding of the applicability of electrophysiological testing in the following clinical scenarios:</th>
</tr>
</thead>
<tbody>
<tr>
<td>• the infant with nystagmus and/or poor visual behaviour</td>
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<tr>
<td>• suspected albinism</td>
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<tr>
<td>• suspected retinal dystrophy or disease e.g. CAR, MAR</td>
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<tr>
<td>• monitoring for retinal toxicities, vitamin A deficiency</td>
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<tr>
<td>• macular dystrophies and other macular disease</td>
</tr>
<tr>
<td>• optic nerve disease</td>
</tr>
<tr>
<td>• cerebral vision loss</td>
</tr>
<tr>
<td>• unexplained reduced vision</td>
</tr>
<tr>
<td>• suspected functional visual loss</td>
</tr>
<tr>
<td>• visual acuity estimation</td>
</tr>
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<td>• visual field loss</td>
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</table>
# PO15 FUNCTIONAL VISION IMPAIRMENT

This element covers the processes for evaluating and managing functional vision impairment.

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<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
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<tbody>
<tr>
<td>15.1 Functional Vision Impairment (Loss) in childhood (syn. visual conversion disorder, non-organic vision loss)</td>
<td>***</td>
<td>15.1.1 Understand common presentations of functional vision impairment (FVI) such as unocular or binocular vision loss, constricted visual fields etc.</td>
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<tr>
<td></td>
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<td>15.1.2 Understand difference between FVI (conversion reaction) and malingering</td>
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<tr>
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<td>15.1.3 Know tests to distinguish FVI from organic disease especially when testing visual acuity, visual fields, colour vision, pupils and ocular motility</td>
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<td>15.1.4 Understand common causative factors e.g. bullying, family stress, various forms of abuse</td>
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<td>15.1.5 Consider organic diseases which are often initially misdiagnosed as FVI such as Stargardt disease, Batten disease, cone dystrophy</td>
</tr>
<tr>
<td></td>
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<td>15.1.6 Understand necessity of excluding organic disease and positively confirming diagnosis of FVI</td>
</tr>
<tr>
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<td></td>
<td>15.1.7 Understand the necessity for follow up to avoid missing organic disease</td>
</tr>
<tr>
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<td></td>
<td>15.1.8 Explain FVI to parents / carers and distinguish from malingering; ask about common causative factors</td>
</tr>
<tr>
<td></td>
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<td>15.1.9 Reassure child and parents / carers about good prognosis</td>
</tr>
</tbody>
</table>
Context

In order to fulfil the clinical performance standards, the trainee must apply the knowledge and skills described in the:

- Ophthalmic Sciences (Anatomy, Clinical Ophthalmic and Emergency Medicine, Optics, Physiology, Clinical Genetics and Microbiology, and Evidence-based Ophthalmic Practice) curriculum standards;
- Ophthalmic Basic Competencies and Knowledge (OBCK); and,
- Basics of Ophthalmic Surgery (BOS) curriculum standards.

Clinical practice

The following list is provided to identify the conditions, their causes and sequelae, and the treatment approaches that may be encountered by the trainee in clinical practice. The list is not exhaustive; it is intended as a guide for the use of the trainee when planning his or her learning.

Conditions deserving special emphasis

The following conditions are of particular importance because of their prevalence and impact on society. It is expected that trainees will have a very detailed knowledge of these conditions.

1. ROP
2. Retinoblastoma
3. Paediatric cataract
4. Paediatric glaucoma

Paediatric Ophthalmology Topic List

- Milestones of the embryology of the ocular muscles and visual pathway and their importance to visual acuity:
  - corneal diameters
  - globe size and axial length
  - extra ocular muscles
  - embryology of retina and visual cortex
  - visual development

- Presenting signs, differential diagnosis, treatment procedures and prognosis for retinoblastoma:
  - clinical features and manifestations
  - differential diagnosis
  - inheritance factors
  - pathology and natural history
  - evaluation
  - classification
  - treatment
  - regression patterns
  - prognosis
• Presenting signs, differential diagnosis, treatment procedures and prognosis for childhood uveitis. Clinical feature and diagnosis (and screening protocols where relevant):
  – anterior: Juvenile rheumatoid arthritis (JRA), sarcoidosis, spondyloarthropathies, herpetic iridocyclitis
  – intermediate: clinical features and diagnosis
  – posterior: toxoplasmosis, toxocariasis, VKH syndrome
  – sympathetic ophthalmia: pathology and natural history, evaluation, treatment, prognosis

• Presenting signs, differential diagnosis, treatment procedures and prognosis for paediatric glaucoma:
  – congenital and infantile glaucoma: clinical, investigations, measurement of intraocular pressure, treatment - surgical and non-surgical
  – juvenile glaucoma
  – ocular and systemic conditions associated with glaucoma

• Presenting signs, differential diagnosis, treatment procedures and prognosis for paediatric cataracts and lens subluxation:
  – lens anatomy: morphologic classification, aetiology, evaluation – unilateral and bilateral cataracts
  – management – patching, surgery, aphakia, prognosis

• Presenting signs, differential diagnosis, treatment procedures and prognosis for retinal diseases in children:
  – retinopathy of prematurity: risk factors, pathogenesis, clinical features and grading, screening and examination, treatment
  – Coats disease
  – retinal haemorrhage
  – retinitis pigmentosa
  – cone disorders
  – congenital stationary night blindness
  – vitreoretinal dystrophies

• Presenting signs, differential diagnosis, and prognosis for optic nerve and related disorders in children:
  – optic nerve disorders such as hypoplasia, morning glory disc anomaly, optic disc coloboma, optic pit, Aicardi syndrome, optic neuritis

• Nystagmus: infantile, spasmus mutans, pathology and natural history, evaluation, treatment, prognosis

• Ocular manifestations of systemic disease in children:
  – metabolic disorders, chromosomal anomalies, connective tissue disorders, albinism, leukaemia and congenital infections

• Clinical features and diagnosis of:
  – phakomatoses, congenital toxoplasmosis, congenital syphilis, congenital rubella, congenital CMV and foetal alcohol spectrum disorder
• Presenting signs, differential diagnosis, treatment procedures and prognosis for amblyopia:
  – pathophysiology, common forms of amblyopia, unilateral, form deprivation, strabismic, anisometropic, bilateral, ametropic (including meridional), form deprivation
  – treatment: occlusion techniques including patching, contact lenses and pharmacological, prognosis for treatment
  – outcomes of the various PEDIG studies relating to amblyopia therapy

• Evaluation and management of the apparently blind infant: fixation behaviours, nystagmus, pupil reaction, fundus features

• Application and interpretation of visual electro-physiological tests:
  – electroretinogram (ERG)
  – electrooculogram (EOG)
  – visually evoked cortical potentials, visual evoked response (VEP/VER)

• Presenting signs, differential diagnosis, management and follow-up of functional visual impairment (FVI): common presentations; conversion reaction vs. malingering; distinguishing FVI from organic disease; common causative factors; appropriate follow-up
Refractive Surgery Curriculum Standard 2014
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   RS2 PERFORM EYE EXAMINATIONS RELEVANT TO REFRACTIVE SURGERY ........ 5
   RS3 CHARACTERISE REFRACTIVE SURGERY OPTIONS ............................................ 7
   RS4 DEVELOP AND IMPLEMENT A MANAGEMENT PLAN FOR PATIENTS WHO HAVE HAD REFRACTIVE SURGERY ..................................................... 8
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Purpose

The Refractive Surgery Clinical Performance Standard describes the knowledge, processes, skills and competencies that the trainee should master for the surgical treatment of refractive disorders.

The trainee is expected to become familiar with the techniques of refractive surgery, the preoperative assessment and postoperative course of the routine case, and complications of the procedures. The trainee is not required to achieve the level of expertise required of an independent sub-specialist in this area.

References

Core Refractive Surgery Reading
In addition to the core texts, the following references are recommended:

- American Academy of Ophthalmology, Focal points: clinical modules for ophthalmologists, American Academy of Ophthalmology, San Francisco, CA — issues dedicated to PRK and LASIK, for example:
  - Focal Points 2008 Module: Wavefront-Guided LASIK
    (Product Number: 0202397V, Media Type: eBook, Online)
  - Understanding Lasik and Wavefront Online
    (Product Number: 050130V, Media Type: Video)
  - Focal Points 2007 Module: Refractive Lens Exchange
    (Product Number: 0202390V, Media Type: eBook, Online)
  - Focal Points 2010 Module: Innovations in Advanced Surface Laser Refractive Surgery
    (Product Number: 0202422V, Media Type: eBook, Online)

Additional Reading


It is recommended that reading be supplemented with appropriate articles from current and relevant peer-reviewed journals.

**Level of Mastery**

For each learning outcome, the level of mastery to be attained by the trainee at the end of training is indicated as follows:

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
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<tbody>
<tr>
<td>***</td>
<td>Core knowledge of which trainees must be able to demonstrate understanding Skills and procedures that trainees must be able to perform autonomously</td>
</tr>
<tr>
<td>**</td>
<td>Knowledge of which trainees must have a good practical understanding Skills and procedures with which trainees should have assisted, and of which have good practical knowledge</td>
</tr>
<tr>
<td>*</td>
<td>Knowledge, skills and procedures of which trainees must have some understanding</td>
</tr>
</tbody>
</table>
# Learning outcomes and performance criteria

<table>
<thead>
<tr>
<th>RS1 GENERAL MEDICAL AND OCULAR HISTORY RELEVANT TO REFRACTIVE ERRORS</th>
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<tbody>
<tr>
<td><strong>This element covers the processes for observing, promoting and recording an general medical and ocular history as the preliminary preparation for diagnosing refractive errors and correcting them using refractive surgery.</strong></td>
</tr>
<tr>
<td><strong>The trainee is expected to have obtained and recorded a general medical and ocular history (including family history) as outlined in the Ophthalmic Basic Competency and Knowledge (OBCK) standard.</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.1 Identify general medical conditions (including congenital/hereditary and acquired conditions) that may have relevance for the diagnosis or surgical treatment of refractive error</td>
<td><strong>1.1.1</strong></td>
<td>Ascertain and record relevant current and past history of illnesses, surgical history, family history, diseases, allergies and medications/substances that may have an impact on the diagnosis or surgical treatment of refractive error, or on the outcome of refractive surgery</td>
</tr>
<tr>
<td>1.2 Identify details of ocular history that may affect surgical treatment of refractive error</td>
<td><strong>1.2.1, 1.2.2, 1.2.3</strong></td>
<td>Ascertain and record previous history and outcomes. Identify risk factors that may have relevance for laser refractive surgery. Recognise key features and patterns of symptoms/history that may assist in indicating or contraindicating particular refractive surgery modalities</td>
</tr>
<tr>
<td>1.3 Identify details of specific history in relation to refractive surgery</td>
<td><strong>1.3.1</strong></td>
<td>Use questioning to elicit necessary information concerning: history of contact lens usage, refractive stability, need for presbyopic correction, need for prisms in spectacles, patient’s reasons for wanting refractive surgery, impact of patient’s ocular condition on daily living activities including driving, impact of proposed refractive surgery on patient’s occupation</td>
</tr>
<tr>
<td>1.4 Identify details of family ocular history</td>
<td>1.4.1 Given any hereditary ocular diseases indicate potential impacts for laser refractive surgery</td>
<td></td>
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<tr>
<td>---------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>**</td>
<td>1.4.2 Identify risk factors that may have relevance for corneal disease or glaucoma</td>
<td></td>
</tr>
</tbody>
</table>
### RS2 PERFORM EYE EXAMINATIONS RELEVANT TO REFRACTIVE SURGERY

This element covers the performance and interpretation of a range of eye examinations associated with the ocular surface, the anterior and posterior segments and the adnexa applicable to refractive surgery. It also covers the demonstration of judgement in selecting the appropriate examinations for particular patients.

The practitioner is expected to have performed preliminary eye examinations as outlined in the Ophthalmic Basic Competency and Knowledge (OBCK) standard.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
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</tr>
</thead>
</table>
| 2.1 Undertake an external ocular inspection of the eye and adnexa | *** | 2.1.1 Identify and describe the general appearance of the eye and adnexa  
2.1.2 Interpret the relevance of any signs that may be found |
| 2.2 Undertake the following examinations:  
– visual acuity  
– pupillary reactions  
– corneal sensation  
– cover testing | *** | 2.2.1 Accurately perform, record and interpret the results of these examinations and note the relevance to the diagnosis of external eye and corneal diseases and abnormalities of ocular motility  
2.2.2 Refine subjective refraction  
2.2.3 Perform cycloplegic refraction |
| 2.3 Use an anterior segment slit lamp to examine the eyes and adnexa | *** | 2.3.1 Correctly perform, and interpret the results of, anterior segment and adnexa examination |
| 2.4 Obtain intra-ocular pressure (IOP) readings | *** | 2.4.1 Obtain an accurate IOP reading, understand the limitation of the technique used |
| 2.5 Perform gonioscopy for angle abnormalities and zonular abnormalities if indicated | *** | 2.5.1 Assess characteristics of the anterior chamber angle and related structures  
2.5.2 Assess the anterior chamber angle for risk of closure |
<p>| 2.6 Undertake a posterior segment examination of the vitreous, optic nerve head, macula, retina including its periphery | *** | 2.6.1 Accurately report the characteristics and clinical significance of posterior segment findings, particularly those of the optic nerve head, macula and retinal periphery |</p>
<table>
<thead>
<tr>
<th>2.7 Perform a general medical examination relevant to ophthalmology if appropriate</th>
<th>**</th>
<th>2.7.1 Given a variety of general presentations (e.g. diabetes, hypertension) identify the relevance, if any, to laser refractive surgery procedures</th>
</tr>
</thead>
</table>
| 2.8 Interpret the results of investigations, in preparation for refractive surgery | ** | 2.8.1 Determine the sequence, and perform and interpret the following investigations:  
- cycloplegic refraction  
- pupilometry in photopic and scotopic lighting conditions  
- anterior segment OCT  
2.8.2 Interpret results of corneal tomography and topography in common corneal conditions, and for the screening of potential refractive surgery patients  
2.8.3 Determine the sequence and be familiar with the performance and interpretation of the following investigations:  
- wavefront analysis  
- contrast sensitivity  
- specular or confocal microscopy  
- AC depth measurement  
- colour vision testing |
RS3 CHARACTERISE REFRACTIVE SURGERY OPTIONS

*This element covers the classification of types of refractive surgery.
The trainee is expected to be able to explain to patients both the surgical techniques and the indications and contraindications for the use of these techniques.*

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<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
</tr>
</thead>
</table>
| **3.1 Characterise types of refractive surgery**       | **               | 3.1.1 Explain the following corneal refractive surgery procedures:  
• PRK  
• LASEK  
• LASIK  
• incisional keratotomy  
• corneal inlays

3.1.2 Explain the following intraocular refractive surgery procedures:  
• clear lens extraction  
• cataract extraction  
• phakic IOL implantation

3.1.3 Describe options for management of presbyopia:  
• monovision  
• diffractive and refractive multifocal IOLs  
• accommodating IOLs  
• corneal inlays                                                                                      |
| **3.2 Explain the indications and contraindications for refractive surgery**                         | **               | 3.2.1 Determine suitability of patient for refractive surgery taking into account the following:  
• patient motivation  
• patient expectation  
• refractive error  
• patient age  
• corneal thickness  
• corneal shape  
• anterior chamber depth  
• condition of lens  
• posterior segment health  
• concomitant ocular disease                                                                           |
| **3.3 Outline medico-legal risk management strategies**                                              | **               | 3.3.1 Counsel patient regarding specific risks and complications and document discussion                                                                                                                                       |
RS4 DEVELOP AND IMPLEMENT A MANAGEMENT PLAN FOR PATIENTS WHO HAVE HAD REFRACTIVE SURGERY

This element covers the postoperative management of refractive surgery patients. The trainee is expected to perform preliminary diagnosis and urgent management autonomously, and supplement this with timely referral to a sub-specialist.

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<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
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</thead>
</table>
| 4.1 Determine and document in medical records a management plan for each patient | ** | 4.1.1 Integrate information from the history and examination to determine likely prognosis  
4.1.2 Maintain legible records in accepted format of the proposed management plan and the briefing of the patient  
4.1.3 Choose appropriate management strategies  
4.1.4 Establish initial management targets |
| 4.2 Educate the patient | ** | 4.2.1 Explain the nature of the patients' corneal and/or external eye condition  
4.2.2 Explain clearly the proposed management regimen and the potential consequences thereof  
4.2.3 Obtain and record the patient's informed consent to the management regimen where appropriate |
| 4.3 Use of observation in the management plan | *** | 4.3.1 Establish and record appropriate baseline parameters  
4.3.2 Maintain documentation that charts the progress of the observations |
| 4.4 Recognise normal recovery | ** | 4.4.1 Recognise and treat pain and ocular discomfort  
4.4.2 Be familiar with the normal rate of recovery following common refractive procedures  
4.4.3 Recognise normal ocular appearance following common refractive procedures |
<table>
<thead>
<tr>
<th>4.4.4</th>
<th>Be familiar with appropriate postoperative medications for refractive surgery patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.4.5</td>
<td>Be familiar with limitations on patient activities following refractive surgery</td>
</tr>
<tr>
<td>4.4.6</td>
<td>Manage patient expectations following refractive surgery</td>
</tr>
</tbody>
</table>

### 4.5 Undertake post-operative management

Recognise, manage and where necessary provide referral for the following postoperative complications:

#### 4.5.1 Corneal
- keratectasia
- non-infective keratitis
- infective keratitis
- non healing epithelial defect
- diffuse lamellar keratitis
- dry eye
- stromal haze

#### 4.5.2 Flap complications
- displacement
- folds
- striae
- stromal haze
- recurrent erosion
- irregular astigmatism
- abnormal corneal topography
- epithelial ingrowth/implantation

#### 4.5.3 Functional issues
- loss of best corrected visual acuity
- loss of contrast visual acuity
- night vision symptoms
- glare/halos/visual distortion
- ocular surface discomfort
- under and over correction
- induced astigmatism
- regression of effect
- ghosting/monocular diplopia
<table>
<thead>
<tr>
<th>4.5.4 Intraocular</th>
</tr>
</thead>
<tbody>
<tr>
<td>• endophthalmitis</td>
</tr>
<tr>
<td>• glaucoma</td>
</tr>
<tr>
<td>• cataract</td>
</tr>
<tr>
<td>• intraocular lens displacement</td>
</tr>
<tr>
<td>• uveitis</td>
</tr>
<tr>
<td>• endothelial decompensation</td>
</tr>
<tr>
<td>• retinal complications</td>
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<tr>
<td>• optic nerve complications</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>4.6 Manage other ophthalmic conditions in patients with prior history of refractive surgery</th>
</tr>
</thead>
<tbody>
<tr>
<td>** 4.6.1 Impact on cataract surgery</td>
</tr>
<tr>
<td>4.6.2 Describe techniques of IOL calculation in patients with history of corneal refractive surgery</td>
</tr>
<tr>
<td>4.6.3 Impact on intraocular pressure measurement and management of glaucoma</td>
</tr>
<tr>
<td>4.6.4 Impact on retinal examination and visual effects for patients with retinal disease</td>
</tr>
<tr>
<td>4.6.5 Identification and prevention of dry eye</td>
</tr>
</tbody>
</table>
Context

In order to fulfil the clinical performance standards, the trainee must apply the knowledge and skills described in the:

- Ophthalmic Sciences (Anatomy, Clinical Ophthalmic and Emergency Medicine, Optics, Physiology, Clinical Genetics and Microbiology, and Evidence-based Ophthalmic Practice);
- Ophthalmic Basic Competencies and Knowledge (OBCK); and,
- Basics of Ophthalmic Surgery (BOS) curriculum standards.

Clinical practice

The following list is provided to identify the conditions, their causes and sequelae, and the treatment approaches that may be encountered by the trainee in clinical practice. The list is not exhaustive; it is intended as a guide for the use of the trainee when planning his or her learning.

Conditions deserving special emphasis

The following conditions are of particular importance because of their prevalence and impact on society. It is expected that trainees will have a very detailed knowledge of these conditions.

1. Dry eye syndrome
2. Keratoconus
3. Narrow or occludable angles associated particularly with high hyperopia

Refractive Surgery Topic List

- Systemic diseases with ocular manifestations, or diseases that impact on the diagnosis of external eye or corneal conditions including but not limited to:
  - endocrine and metabolic diseases including but not limited to diabetes
  - allergy
  - autoimmune diseases
  - neurological disease
  - mucocutaneous disorders
  - oncology and chemotherapy
  - chemical and physical insults
  - infectious diseases including, but not limited to, sexually transmitted diseases
  - nutritional diseases and conditions

- Medications with ocular and systemic effects impacting on external eye and corneal diseases including but not limited to:
  - topical medications, their vehicles and preservatives
  - systemic medications including but not limited to psychotropics, rheumatological medications, antiarrhythymics
  - chemotherapeutic agents

- Environmental conditions that impact on external eye and corneal diseases including but not limited to ultra violet light, housing and hygiene conditions
Refractive Surgery Curriculum Standard

- Ocular medications and their local and systemic side effects
- Eye injuries and their long term effects
- Ophthalmic procedures and their long term effects
- Principles of brief general examination
- Signs of systemic disease
  - Performance of and interpretation of findings of external ocular examination including assessment of:
    - Bell phenomenon
    - lagophthalmos
    - corneal sensation
    - tear film break up time
- Cover and alternate cover tests
- Corneal stains
- Schirmer test
  - Use of slit lamp and interpretation of findings on examination of:
    - eyelids
    - conjunctiva (bulbar, tarsal and fornical) including cicatrisation
    - cornea: epithelium, stroma, endothelium
    - anterior chamber: depth, presence of cells/flare iris
    - lens
    - angle structures and grading
- Normal development of refractive errors
- Alternatives to refractive surgery including spectacles, contact lenses, mono vision
- Basic knowledge of PRK, LASEK, LASIK and incision keratotomy
- Comprehension of computerised corneal topography and interpretation of normal and abnormal appearance
- Intra ocular lens designs and locations in the correction of refractive errors: multifocal, toric and phakic IOL
- Techniques of corneal incision surgery including astigmatic keratotomy and limbal relaxing incisions
- Relative indications (including range of refractive error) for treatments:
  - PRK
  - LASIK
  - LASEK
  - phakic intra ocular lenses
  - clear lens extraction
  - corneal inlays
– cataract – refractive techniques
– possible contraindications for treatments

– ocular:
  • HSV
  • ulcerative keratitis
  • keratoconus
  • pellucid marginal degeneration
  • severe dry eye
  • neurotrophia
  • poor lid closure
  • non-infectious blepharitis
  • infectious blepharitis
  • uncontrolled glaucoma
  • optic neuritis
  • diabetic retinopathy
– systemic:
  • collagen vascular diseases
  • drugs: amiodarone, roaccutane
  • keloid scarring
– psychological:
  • severe psychiatric illness
  • unrealistic expectations

• Knowledge of normal postoperative recovery
  – knowledge of common and severe postoperative complications
  – comprehension of patient ocular visual symptoms and possible aetiologies

• Knowledge of regional road traffic authority guidelines/legislation for vision requirements for all categories of motor vehicle licences
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**References** .............................................................. 1
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  - VR2 PERFORM EYE EXAMINATIONS FOR VITREORETINAL CONDITIONS ... 7
  - VR3 VITREORETINAL DIAGNOSIS AND INVESTIGATIONS .......................... 10
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**Context** ........................................................................ 19
Purpose

The Vitreoretinal Clinical Performance Standard covers the specific knowledge, processes, skills and competencies required for the diagnosis and treatment of vitreoretinal disorders.

Retinal disease is the most frequent cause of irreversible blindness in Australia and many countries worldwide. Tremendous advances in new biologics, surgical techniques and imaging technology have enabled ophthalmologists to diagnose and effectively manage a growing number of retinal conditions.

Medical retina makes up a large proportion of the work of a general ophthalmologist. The range of new treatment options becoming available in the management of age-related macular degeneration, diabetic retinopathy and retinal vein occlusion reinforces the need for trainees to be exposed to the subtleties and complexities of retinal diagnostic challenges and their management.

References

In addition to the core texts, the following references are recommended:

Medical Retina Randomised Clinical Trials

1. AMD: ANCHOR, MARINA, PIER, CATT, VIEW, HORIZON/SEVEN-UP
2. DR: DCCT, UKPDS, ETDRS, FIELD, ACCORD,
3. DME: ETDRS, DRCR.net, RESTORE, RISE/RIDE, BOLT, VIVID/VISTA
4. RVO: SCORE, CRUISE, BRAVO, GALILEO, COPERNICUS

Extended Vitreoretinal Reading


• Ryan, S.J. (ed.) 2013, *Retina*, 5th edn, Volume 1 (Retinal imaging and diagnostics; Basic science and translation to therapy); Volume 2 (Medical retina); Volume 3 (Tumors of the retina, choroid and vitreous), Elsevier Saunders, London.


It is recommended that reading be supplemented with appropriate articles from current and relevant peer-reviewed journals.

**Best Practice Standards**

RANZCO Clinical Guidelines for Performing Intravitreal Therapy

RANZCO Fluorescein and Indocyanine Green Angiography Guidelines
Accessed 24 May 2014,
# Level of Mastery

For each learning outcome, the level of mastery to be attained by the trainee at the end of training is indicated as follows:

<table>
<thead>
<tr>
<th>level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>***</td>
<td>Core knowledge of which trainees must be able to demonstrate understanding. Skills and procedures that trainees must be able to perform autonomously.</td>
</tr>
<tr>
<td>**</td>
<td>Knowledge of which trainees must have a good practical understanding. Skills and procedures with which trainees should have assisted, and of which have good practical knowledge.</td>
</tr>
<tr>
<td>*</td>
<td>Knowledge, skills and procedures of which trainees must have some understanding.</td>
</tr>
</tbody>
</table>
# Learning outcomes and performance criteria

## VR1 GENERAL MEDICAL AND OCULAR HISTORY RELEVANT TO VITREORETINAL CONDITIONS

This element covers the processes for observing, promoting and recording a general medical and ocular history in preparation for diagnosis and treatment of vitreoretinal conditions. The trainee is expected to have obtained and recorded a general medical and ocular history (including family history) as outlined in the Ophthalmic Basic Competencies and Knowledge (OBCK) standard.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
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</thead>
</table>
| 1.1 Identify key features of symptoms that may assist in diagnosing vitreoretinal disease | *** | 1.1.1 Identification must include:  
- commencement/duration  
- fluctuation and severity  
- precipitating and exacerbating activities  
- recurrence  
1.1.2 Ascertain symptoms of photopsia, floaters and field defects with respect to:  
- commencement / duration  
- distinguishing symptoms of field defects related to detachment, glaucoma and retina degeneration  
1.1.3 Distinguish between different types of photopsia or scintillations related to vitreoretinal traction, migraine, ocular tumour and inflammatory chorioretinopathy |
1.2 Identify general medical conditions including congenital/hereditary and acquired that may be associated with vitreoretinal disease

<table>
<thead>
<tr>
<th>1.2.1</th>
<th>Ascertain relevant current and past history of illnesses, ocular history, surgical history, family history, diseases, allergies and medications / substances that may contribute to vitreoretinal conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2.2</td>
<td>Recognise principal risk factors for AMD and retinal vascular conditions: family history, hypertension, diabetes, lipid disorders, smoking, dietary factors</td>
</tr>
</tbody>
</table>
| 1.2.3 | Identify and understand the association with vitreoretinal disease of the following:  
  • congenital/hereditary conditions  
  • acquired conditions:  
    − degenerative  
    − infective  
    − tumours/malignancy  
    − autoimmune and inflammatory  
    − iatrogenic |
| 1.2.4 | Identify patterns of family history for retinal detachment, retinoschisis or retinal dystrophy as having dominant, recessive, mitochondrial or X-linked inheritance |
| 1.2.5 | Elicit risk factors for progression to tractional detachment of ischaemic / proliferative retinopathy in diabetes mellitus, following radiation, carotid occlusion, and in retinopathy of prematurity |
| 1.2.6 | Be familiar with the association between optic nerve head anomaly, coloboma and systemic diseases |
| 1.2.7 | Be familiar with systemic associations in inherited vitreoretinopathies |
1.3 **Ascertain relevant vitreoretinal surgical history**

- 1.3.1 Ascertain previous retinal surgical history and outcomes
- 1.3.2 Ascertain relevant history related to previous complications related to anterior segment surgery (cataract, glaucoma etc.)
- 1.3.3 Elicit specific surgical procedure history related to the different types of retinal detachment repair techniques, focusing on postoperative course and complications:
  - scleral buckle
  - pneumatic retinopexy
  - vitrectomy
  - cryo. versus laser retinopexy
  - gas, oil and heavy liquid tamponade

1.4 **Identify vitreoretinal conditions arising from trauma**

- 1.4.1 Ascertain history of trauma including:
  - nature of injury
  - closed or open globe
  - classification of trauma
  - presence of intraocular foreign body
  - trauma to surrounding tissue area
  - non-ocular injury
- 1.4.2 Identify features that may contribute to high risk of infection and morbidity
- 1.4.3 Elicit symptoms of sympathetic ophthalmia from patients with history of trauma and multiple vitreoretinal procedures
- 1.4.4 Systemic review to identify risk factors for Purtcher retinopathy, e.g. thoracic and cranial trauma
## VR2 PERFORM EYE EXAMINATIONS FOR VITREORETINAL CONDITIONS

This element covers the performance and interpretation of a range of eye examinations associated with vitreoretinal conditions. It also covers the demonstration of judgment in selecting the appropriate examinations for particular patients. The trainee is expected to have performed preliminary eye examinations as outlined in the Ophthalmic Basic Competencies and Knowledge (OBCK) standard.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
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<th>PERFORMANCE CRITERIA</th>
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</thead>
</table>
| 2.1 Undertake an anterior segment examination including sclera and conjunctiva | *** | 2.1.1 Perform and interpret the results of these examinations and identify their relevance to the diagnosis of vitreoretinal conditions:  
- visual acuity (best corrected)  
- pupil responses  
- intraocular pressure  
- lens status and media clarity  
- grade anterior chamber cells and flare  
- identify keratic precipitates, rubeosis iridis |
|                    | **                | 2.1.2 Identify the following signs with specific relevance to surgical retina:  
- evidence of previous vitrectomy surgery  
- location and extrusion of scleral explant  
- abnormal lid movement and/or ocular motility due to scleral explant  
- peripheral iridotomy location and type of vitreous tamponade |
|                    | **                | 2.1.3 Assess lens / capsule complex:  
- identify different types of cataract following vitreous surgery (lens touch, gas cataract, posterior subcapsular and nuclear sclerotic cataract)  
- assess location and fixation of intraocular lens implant (in-the-bag, sulcus fixation, sutured, iris fixation, optic captured and anterior chamber lens)  
- assess integrity of capsular support  
- assess stability of crystalline lens |
| 2.1.4 | Identify and distinguish between different types of vitreous tamponade that may migrate into the anterior chamber |
| 2.1.5 | Assess anterior chamber and perform gonioscopy in postoperative ocular hypertension following vitreous surgery to distinguish between anterior chamber oil fill, silicone oil overfill, gas overfill (expansile concentration) and trabeculitis |

**2.2 Undertake a directed posterior segment examination**

<p>| 2.2.1 | Use binocular indirect ophthalmoscopy to identify vitreoretinal structures and conditions |
| 2.2.2 | Assess vitreous status at slit lamp: • distinguish between attached and detached posterior cortical vitreous |
| 2.2.3 | Using suitable condensing lens (e.g. 78D), perform posterior pole examination to assess the optic nerve, macula, peripheral retina, noting abnormalities in the retina, macula, fovea, retinal vessels, pigment epithelium and choroid, and define conditions affecting these structures |
| 2.2.4 | Identify and distinguish between early and late signs of age-related macular degeneration (AMD), including neurosensory and retinal pigment epithelial (RPE) detachment, and presence of neovascular features (haemorrhage, exudate, fibrosis) |
| 2.2.5 | Identify and distinguish variants of AMD including polypoidal choroidal vasculopathy (PCV) and retinal angiomatous proliferation (RAP) |
| 2.2.6 | Identify epiretinal membranes, macular oedema, macular hole, vitreomacular traction, diabetic retinopathy, idiopathic central serous retinopathy, retinal venous occlusive disease, retinal emboli, retinal arteriolar occlusion, choroidal naevi, RPE hyperplasia, ocular ischaemia |</p>
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<tr>
<td>2.2.7 Identify abnormalities of ocular anatomy consistent with trauma</td>
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<td>2.2.8 Assess vitreous opacity:</td>
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<tr>
<td>- grading of vitreous opacity</td>
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<tr>
<td>- identify and distinguish between tobacco dust, vitreous haemorrhage, vitritis and vitreous seeding of tumours</td>
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<tr>
<td>- identify patterns of vitreous abnormalities in vitreoretinopathies</td>
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<tr>
<td>- distinguish between silicone oil, gas, and heavy liquid in vitreous cavity</td>
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<tr>
<td>2.2.9 Perform detailed peripheral retinal examination:</td>
<td></td>
</tr>
<tr>
<td>- using indirect ophthalmoscopy and scleral indentation</td>
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<tr>
<td>- using Goldmann 3 mirror lens</td>
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<tr>
<td>- using wide field contact lens</td>
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<tr>
<td>- visualise retinal breaks: horseshoe tears, atrophic and operculated holes, retinal dialysis, giant tears</td>
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<tr>
<td>- assess adequacy of retinopexy</td>
<td></td>
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<tr>
<td>- assess extent and adequacy of scleral indent following scleral buckling surgery</td>
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<tr>
<td>2.2.10 Recognise degenerative retinoschisis:</td>
<td></td>
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<tr>
<td>- elicit clinical signs that distinguish between detachment and retinal schisis</td>
<td></td>
</tr>
<tr>
<td>- distinguish between inner and outer leaf breaks</td>
<td></td>
</tr>
<tr>
<td>- identify underlying retinal detachment arising from outer leaf break in retinoschisis</td>
<td></td>
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<tr>
<td>2.2.11 Recognise choroidal detachment:</td>
<td></td>
</tr>
<tr>
<td>- distinguish between haemorrhagic and serous choroidal detachment, and simulating lesions</td>
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<tr>
<td>2.2.12 Distinguish between rhegmatogenous, exudative, and tractional retinal detachments</td>
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</table>
**VR3  VITREORETINAL DIAGNOSIS AND INVESTIGATIONS**

This element covers the performance and interpretation of a range of special vitreoretinal investigations associated with vitreoretinal conditions. Following examination, the provisional diagnosis and/or differential diagnosis is established. Further investigation may be required to establish the diagnosis.

The trainee is required to demonstrate judgment in selecting the appropriate tests for particular patients.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
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</thead>
</table>
| 3.1 Undertake specific retinal investigations | ***              | 3.1.1 Identify the indications and contra-indications for, and understand the adverse effects of the following retinal investigations. Perform or order tests, so as to provide the most useful diagnostic information, and interpret the results of:  
  - optical coherence tomography (OCT)  
  - retinal photography  
  - fluorescein angiography (FA)  
  - indocyanine green angiography (ICG)  
  - fundus autofluorescence imaging (FAF)  
  - B-scan ultrasound  |
|                                           | **               | 3.1.2 Use OCT imaging to assess maculae for presence of fluid (intraretinal, subretinal, sub-RPE), subretinal fibrosis, hard exudate, epiretinal membrane, thinning (atrophy), vitreo-macular attachment or traction, macular hole, subretinal lesions, and choroidal signs  |
|                                           |                  | 3.1.4 Use OCT imaging to distinguish between retinal detachment and retinoschisis  |
|                                           |                  | 3.1.5 Use autofluorescence imaging (FAF) to identify geographic atrophy and other FAF signs  |
|                                           |                  | 3.1.6 Use B-scan ultrasound in patients with vitreous haemorrhage to, for example:  
  - detect retinal tears  
  - distinguish between vitreous detachment and retinal detachment  
  - distinguish between serous and haemorrhagic choroidal detachment  |
| 3.1.7 | Understand indication and interpretation of fundus controlled perimetry (microperimetry) |
| 3.1.8 | Perform B-scan ultrasound to assist in differential diagnosis of conditions such as retinal detachment, choroidal osteoma, melanoma, metastasis, uveal lymphoma and uveal effusion |

**3.2 Use radiological testing to establish diagnosis**

| 3.2.1 | Identify the indications for use and interpret the results of: |
|       | - X-rays |
|       | - carotid duplex studies |
|       | - computed tomography (CT) scans |
|       | - magnetic resonance imaging (MRI) |

***3.2.2 | Demonstrate awareness of relevant neuroimaging for diagnosis of intracranial lesions associated with optic nerve head anomalies |

**3.3 Use electrophysiological testing to establish diagnosis**

| 3.3.1 | Identify the indications and limitations, and interpret the results of retinal and visual pathways tests using: |
|       | - electro-oculogram (EOG) |
|       | - electro-retinogram (ERG) – pattern ERG, full field (Ganzfeld) ERG, multi-focal ERG |
|       | - visual evoked response (VER) |

***3.4 Use biopsy testing to establish diagnosis**

<p>| 3.4.1 | Use vitreous biopsy to identify retinal lymphoma |
| 3.4.2 | Use fine needle biopsy to identify melanoma |
| 3.4.3 | Use scleral histology in uveal effusion syndrome to identify excess proteoglycan |
| 3.4.4 | Use aqueous sampling in selected cases to detect photoreceptor segments on electron microscopy |</p>
<table>
<thead>
<tr>
<th>3.5 Use other systemic investigations to identify risk factors and/or establish diagnosis</th>
<th>3.5.1 Identify the indications for systemic investigations or screening to assist in identifying risk factors and co-morbidities for retinal vascular disease and retinal detachment</th>
</tr>
</thead>
<tbody>
<tr>
<td>***</td>
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<tr>
<td>3.5.2 Understand potential for gene testing to identify mutations in inherited vitreo/retinopathies</td>
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<td>*</td>
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</tr>
<tr>
<td>3.5.3 Describe systemic work-up in the process of confirming diagnosis of various inherited vitreo/retinopathies</td>
<td></td>
</tr>
</tbody>
</table>
VR4 IMPLEMENT A VITREORETINAL MANAGEMENT PLAN

This element covers the management of vitreoretinal conditions using observation, medical therapies and surgery including postoperative care. The trainee must adhere to the standards of practice, particularly those regarding informed consent and clinical record-keeping, described in the Ophthalmic Basic Competencies and Knowledge (OBCK) standard.

<table>
<thead>
<tr>
<th>LEARNING OUTCOMES</th>
<th>LEVEL OF MASTERY</th>
<th>PERFORMANCE CRITERIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.1 Determine and document in medical records a management plan for each individual patient</td>
<td></td>
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</tr>
<tr>
<td>4.1.1</td>
<td>Clearly identify and document any specific features, signs, and grading of macular or retinal diseases - e.g. degenerative retinal diseases including AMD (both early and late features, and types of CNV), the severity level for diabetic retinopathy (DR) by using ETDRS or AAO scales, and peripheral retinal pathologies</td>
<td></td>
</tr>
<tr>
<td>4.1.2</td>
<td>Clearly identify and document any specific features and signs of choroidal or RPE related pathologies - e.g. other secondary causes of choroidal neovascularisation including myopic retinal degeneration, angioid streaks, choroidal rupture, multifocal choroidopathy, birdshot choroidopathy, and other inflammatory conditions</td>
<td></td>
</tr>
<tr>
<td>4.1.3</td>
<td>Clearly identify and document any systemic conditions associated with the corresponding macular or retinal diseases - e.g. inflammatory (sarcoidosis), infectious (TB), connective tissue disorders (pseudoxanthoma elasticum), inherited disorders (Usher syndrome)</td>
<td></td>
</tr>
<tr>
<td>4.1.4</td>
<td>Clearly identify and document the features, signs and sizes of any tumour in the posterior segment</td>
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<tr>
<td>4.1.5</td>
<td>Clearly identify and distinguish the differences between retinoschisis and retinal detachment, and document retinal detachment and grade any proliferative vitreoretinopathy on a retinal detachment chart</td>
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</tr>
<tr>
<td><strong>4.1.6</strong></td>
<td>Document the specific risks of primary detachment repair using vitrectomy technique, scleral buckle or pneumatic retinopexy - including postoperative endophthalmitis, failure of retinal reattachment, cataract, and glaucoma. Document the factors associated with poor visual outcome in these conditions.</td>
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<tr>
<td><strong>4.1.7</strong></td>
<td>Formulate treatment plan and follow-up for both early and late-stage AMD, including role for dietary supplements and anti-VEGF therapy. Understand the need for long-term therapy for CNV, and the approach to monitoring using OCT and other investigations.</td>
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</tr>
<tr>
<td><strong>4.1.8</strong></td>
<td>Formulate treatment plan for different severity stages of diabetic retinopathy - e.g. non-proliferative DR versus proliferative DR, and centre- versus non-centre-involving diabetic macular oedema (DME) including indications for medical therapy (e.g. fenofibrate), focal, grid or panretinal laser (PRP) or anti-VEGF therapy.</td>
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<tr>
<td><strong>4.1.9</strong></td>
<td>Formulate treatment plan for other vascular retinopathies including medical therapy, focal or peripheral laser, or anti-VEGF therapy.</td>
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</tr>
<tr>
<td><strong>4.1.10</strong></td>
<td>Formulate a surgical management plan for advanced DR and other proliferative retinopathies. Identify indications for vitrectomy – e.g. subhyaloid haemorrhage, non-clearing haemorrhage, recurrent haemorrhage, tractional detachment encroaching fovea.</td>
<td></td>
</tr>
<tr>
<td>4.1.1 Formulate a surgical management plan for rhegmatogenous retinal detachment including the reasoning behind the choices between scleral buckling, vitrectomy or pneumatic retinopathy</td>
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<tr>
<td>4.1.2 Discuss the rationale of various adjunctive techniques in repairing retinal detachment complicated by proliferative vitreoretinopathy – e.g. scleral buckle versus retinectomy versus using of vitreous substitute</td>
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</tr>
<tr>
<td>4.1.3 Formulate a management plan for choroidal or retinal tumours (e.g. therapy for ocular melanoma, choroidal haemangioma, vasoproliferative tumour)</td>
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</tr>
<tr>
<td>4.1.4 Discuss the indications and controversies in prophylaxis against retinal detachment in patients with high myopia, extensive lattice degeneration, and inherited vitreoretinopathy including those with collagen disorders</td>
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</tr>
</tbody>
</table>

**4.2 Educate the patient on the proposed management regimen**

<table>
<thead>
<tr>
<th>4.2.1 Explain the natural history, proposed management and potential outcomes for therapy of neovascular AMD, atrophic AMD and other degenerative retinal lesions</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.2.2 Explain the need for long-term anti-VEGF management of neovascular AMD, with appropriate monitoring using OCT and other assessments</td>
</tr>
<tr>
<td>4.2.3 Explain the likely natural history, proposed management regimen (laser or intravitreal therapy), alternative therapies and potential outcomes of the therapy for DR (DME and PDR) and other vascular retinopathies</td>
</tr>
<tr>
<td>4.2.4 Explain clearly the natural history, proposed management regimen, alternatives and the potential outcome with and without surgical repair in rhegmatogenous retinal detachment</td>
</tr>
<tr>
<td>4.2.5</td>
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<tr>
<td>4.2.6</td>
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<td>4.2.7</td>
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<td>**</td>
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</tbody>
</table>

**4.3 Manage vitreoretinal surgical conditions using appropriate therapies**

| 4.3.1 | Determine the best treatment option in patients presenting with elevated intraocular pressure following vitreoretinal procedure |
| ** | 4.3.2 Identify sympathetic ophthalmia in patients who have had ocular trauma and/or vitreoretinal procedures, and discuss treatment options |
| * | 4.3.3 Identify surgically induced necrotising scleritis and discuss differential diagnosis and treatment options |
| 4.4 Use laser or intravitreal injection procedures to manage vitreoretinal conditions | 4.4.1 Demonstrate safe use of laser techniques in vitreoretinal management  
4.4.2 Perform laser treatment to manage diabetic retinopathy, including focal and grid laser for threatened or actual DME, and panretinal laser for PDR  
4.4.3 Perform intravitreal injection of different agents (steroids, anti-VEGF therapies) to manage neovascular AMD, DME or other vascular retinopathies  
4.4.4 Recognise symptoms and signs suggesting endophthalmitis following intravitreal therapy, and perform tap and inject procedures to manage suspected endophthalmitis  
4.4.5 Understand the role of vitrectomy surgery in endophthalmitis  
4.4.6 Using contact lens or indirect-laser delivery in performing laser treatment to seal retinal breaks  
4.4.7 Perform or observe use of endolaser treatment during vitreous surgery |
|---|---|
| 4.5 Participate in the surgical management of vitreoretinal conditions | 4.5.1 Counsel patient on potential for endophthalmitis after intravitreal therapy, warning of specific symptoms and need for urgent review  
4.5.2 Counsel patient on procedures, potential outcomes and potential complications of retinal detachment repair  
4.5.3 Participate in vitrectomy and buckling procedures, and identify and describe common intraoperative complications  
4.5.4 Identify postoperative complications following retinal detachment procedures |
<table>
<thead>
<tr>
<th><strong>Vitreoretinal Curriculum Standard</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>4.5.5 Manage cataract following vitrectomy surgery</td>
</tr>
<tr>
<td>4.5.6 Assist with removal of silicone oil from posterior chamber with or without cataract extraction</td>
</tr>
<tr>
<td>4.5.7 List the surgical steps in retinal detachment repair using scleral buckling or pars plana vitrectomy</td>
</tr>
<tr>
<td>4.5.8 Perform cryopexy to seal retinal break/s with or without intravitreal gas injection</td>
</tr>
<tr>
<td>4.5.9 Assist with removal of segmental scleral buckle in buckle extrusion</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>4.6 Provide psychological support for patient</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>4.6.1 Counsel patient on diagnosis and prognosis of retinal detachment</td>
</tr>
<tr>
<td>4.6.2 Provide support for patients with low vision due to retinal diseases through referral to low vision services</td>
</tr>
<tr>
<td>4.6.3 Refer patients to relevant support services, including genetic counselling</td>
</tr>
<tr>
<td>4.6.4 Interpret the results of genetic testing for inherited retinal disease, and advise the patient</td>
</tr>
<tr>
<td>4.6.5 Be aware of and able to discuss experimental treatments such as stem cell therapy or bionic eye with the patient</td>
</tr>
</tbody>
</table>
Context

In order to fulfil the clinical performance standards, the trainee must apply the knowledge and skills described in the:

- Ophthalmic Sciences (Anatomy, Clinical Ophthalmic and Emergency Medicine, Optics, Physiology, Clinical Genetic and Microbiology and Evidence-based Ophthalmic Practice);
- Ophthalmic Basic Competencies and Knowledge (OBCK); and,
- Basics of Ophthalmic Surgery (BOS) curriculum standards.

Clinical practice

The following list is provided to identify the conditions, their causes and sequelae, and the treatment approaches that may be encountered by the trainee in clinical practice. The list is not exhaustive; it is intended as a guide for the use of the trainee when planning his or her learning.

Conditions deserving special emphasis

These conditions are of particular importance because of their prevalence and impact on society. It is expected that the trainee will have a very detailed knowledge of these conditions.

- Medical retinal conditions
  - diabetic retinopathy
  - choroidal neovascularisation
  - other common retinal vascular diseases (branch/ central retinal vein/ artery occlusion)
  - atrophic retinal or macular disease

- Surgical retinal conditions
  - retinal breaks and retinal detachment
  - retained lens fragments and dislocated intraocular lens
  - endophthalmitis
  - posterior segment trauma

The aspects of these conditions that should be covered include:
- epidemiology and public health significance;
- clinical presentation including ocular and non-ocular presentation;
- association with systemic conditions;
- differential diagnosis;
- pathology;
- a detailed account of treatment modalities with reference to applicable clinical trials;
- counselling of patient and family;
- long-term prognosis; and
- long-term management and support.

Vitreoretinal Topic List

Pathology, aetiology, genetics, epidemiology, clinical manifestations, systemic manifestations, diagnostic criteria, and natural history of:
Medical Retinal Disease

(i) Congenital / hereditary
For the following congenital/inherited conditions, recognise clinical manifestations and any systemic associations; identify pattern of inheritance, and management principles

- Rod cone dystrophies
  - retinitis pigmentosa (RP) and variants
  - RP and deafness syndromes (Usher syndrome)
  - RP and systemic syndromes (Refsum, abetalipoproteinaemia, Kearns-Sayre syndromes; mitochondrial encephalomyopathy lactic acidosis and stroke (MELAS); Bardet Biedel syndrome,
  - Leber congenital amaurosis

- Cone and cone rod dystrophy

- Stationary rod or cone dysfunction
  - congenital stationary night blindness
  - achromatopsia

- Macular dystrophies
  - Best disease
  - Stargardt disease / fundus flavimaculatus
  - pattern dystrophy of the RPE
  - adult vitelliform macular dystrophy
  - maternally inherited diabetes and deafness (MIDD)

- Retinal dysplasia
  - Norrie disease

- Vitreoretinopathies
  - congenital x-linked retinoschisis
  - Goldmann Favre / enhanced S-cone syndrome

- Choroidal dystrophies
  - choroideraemia
  - gyrate atrophy

- Developmental
  - ocular coloboma syndromes
  - persistent hyperplastic primary vitreous

- Systemic
  - albinism (oculocutaneous and ocular)
  - phakomatoses
  - pseudoxanthoma elasticum – angioid streaks
  - metabolic/storage diseases

- Combined hamartoma of retina and RPE

- Familial exudative vitreoretinopathy

- Retinopathy associated with TORCH syndromes (toxoplasma gondii, rubella virus, cytomegalovirus, and herpes simplex virus)
(ii) **Acquired**

- **Infections**
  - toxoplasmosis
  - toxocariasis
  - endophthalmitis: postoperative, traumatic, endogenous
  - viral retinitis syphilis
  - ocular histoplasmosis
  - tuberculosis
  - nematode infestation
  - onchocerciasis

- **Inflammation**
  - multifocal choroiditis +/− panuveitis
  - punctate inner choroidopathy (PIC)
  - multiple evanescent white dot syndrome (MEWDS)
  - acute zonal outer occult retinopathy (AZOOR)
  - acute macular neuroretinopathy (AMN)
  - acute posterior multifocal placoid pigment epitheliopathy (APMPPE)
  - pars planitis
  - sympathetic ophthalmia
  - Behçets syndrome
  - Vogt-Koyanagi-Harada syndrome
  - sarcoidosis
  - serpiginous choroidopathy
  - birdshot choroidopathy
  - uveal effusion syndrome
  - cancer associated retinopathies

- **Benign neoplasm**
  - choroidal naevus
  - choroidal haemangioma – diffuse and circumscribed
  - retinal capillary haemangioma
  - retinal cavernous haemangioma
  - retinal vasoproliferative tumour (reactive glioangiosis or pseudoangiomatous retinal giosis)
  - melanocytoma
  - astrocytoma
  - sclerochoroidal calcification
  - choroidal osteoma
  - congenital hypertrophy of the RPE
  - arteriovenous malformation

- **Malignant neoplasm**
  - retinoblastoma/retinocytoma
  - uveal melanoma
  - choroidal metastasis
  - intraocular lymphoma
  - leukaemia

- **Degenerative disease**
  - age-related macular degeneration (AMD), including early and late signs
  - idiopathic polypoidal choroidal vasculopathy
  - retinal angiomaticous proliferation
  - presumed ocular histoplasmosis syndrome (POHS)
− pathologic myopia
− epiretinal membrane (macular pucker)
− choroidal folds
− posterior staphyloma
− maculopathy related to tilted disc syndrome

• Retinal toxicity of systemic and locally administered agents
  − chloroquine and hydroxychloroquine
  − phenothiazines
  − tamoxifen
  − aminoglycosides
  − other

• Retinal vascular disease
  − diabetic retinopathy
  − central retinal vein occlusion
  − branch retinal vein occlusion
  − central retinal artery occlusion
  − branch retinal artery occlusion
  − retinal emboli
  − hypertensive retinopathy and choroidopathy
  − retinal arterial macroaneurysm
  − ocular ischaemic syndrome
  − Coats disease / retinal telangiectasia
  − macular telangiectasia
  − retinopathy of prematurity
  − radiation retinopathy
  − retinal vasculitis
  − Eales disease
  − drug abuse
  − sickle cell retinopathy
  − familial exudative vitreoretinopathy

• Other
  − optic disc pit maculopathy
  − central serous chorioretinopathy
  − idiopathic uveal effusion syndrome
  − angioid streaks (non PXE)
  − cancer associated retinopathies
  − choroidal rupture
  − cystoid macular oedema
  − Valsalva retinopathy
  − Terson syndrome
  − Purtscher retinopathy

Surgical Retinal Disease

• Posterior vitreous detachment

• Vitreous haemorrhage

• Systemic and inherited diseases associated with rhegmatogenous retinal detachment
  − collagen type II, V, XI, XVIII, versican and fibrillin
  − Stickler syndrome
  − Knobloch syndrome
- Marshall syndrome
- Ehlers-Danlos syndrome
- Wagner syndrome
- Marfan syndrome
- snowflake vitreoretinal degeneration (SVD)
- autosomal dominant vitreoretinochoroidopathy (ADVIRC)

- Pre-detachment retinal and disc lesions and vitreoretinal degeneration
  - horse shoe tear
  - giant retinal tear
  - retinal dialysis
  - atrophic round holes
  - myopic macular hole
  - lattice degeneration
  - degenerative retinoschisis (see below)
  - vitrectomy related: entry site breaks trauma related: chorioretinitis sclopetaria
  - optic disc pit
  - morning glory anomaly
  - posterior segment coloboma

- Retinal detachment
  - rhegmatogenous
  - tractional breaks secondary to PVD
  - break without PVD: round hole, dialysis and myopic macular hole
  - related to disc pit, morning glory anomaly and coloboma
  - tractional
    - diabetic tractional detachment
    - sickle cell retinopathy
    - retinopathy of prematurity
  - exudative or serous
    - Coats disease
    - uveal effusion syndrome
    - ocular melanoma

- Degenerative retinoschisis
  - reticular retinoschisis
  - typical retinoschisis
  - inner leaf break
  - outer leaf break
  - schisis-detachment

- Choroidal detachment (serous and haemorrhagic)
  - hypotony induced choroidal effusion
  - uveal effusion syndrome
  - intraoperative choroidal haemorrhage
  - spontaneous choroidal haemorrhage

- Macular disorders
  - full-thickness macular hole
  - epiretinal membrane, pseudohole
  - vitreomacular traction syndrome
  - lamellar hole
  - macular micro hole
  - myopic foveoschisis with or without foveal detachment / macular hole
- submacular haemorrhage

**Endophthalmitis**
- postoperative endophthalmitis
- post-injection endophthalmitis
- endogenous endophthalmitis (fungal, syphilitic and bacterial)
- panophthalmitis

**Trauma**

- Management of different types of trauma
  - closed globe – contusion or lamellar laceration
  - open globe – rupture or laceration including penetrating, perforating, intraocular foreign body
  - principle of primary traumatic repair (to close the globe) and secondary repair (e.g. vitrectomy for vitreous haemorrhage)
  - management of closed globe injury (e.g. hyphema, retinal/choroidal contusion)
  - exploratory surgery (in severe globe rupture) and eye removal in trauma
  - management of traumatic cataract during globe repair
  - basic principles of anterior and pars plana vitrectomy in trauma

- Surgical planning
  - appropriate imaging and interpretation in order to assess the extent of the injury and to plan for surgical repair
  - preoperative management plan for traumatic case (e.g. anaesthetic consideration, antimicrobial/antibiotic cover, tetanus toxoid)
  - options for repair of different corneal and scleral wounds (e.g. stellate, shelved and non-shelved)
  - management of tissue loss (e.g. iris preservation, management of prolapsed choroid and retina)
  - use of tissue glue (e.g. cyanoacrylate)

**Anterior segment related vitreoretinal conditions**

- Retained lens fragment

- Dislocated intraocular lens

- Aqueous misdirection, malignant glaucoma

**Other vitreous conditions or therapy associations**

- Intravitreous drug delivery systems
  - ganciclovir, steroid or other implants

- Complications from gas and air
  - glaucoma
  - IOL dislocation

- Complications from silicone oil, heavy liquid and heavy oil tamponade
  - glaucoma
  - anterior chamber migration
  - subretinal heavy liquid and silicone oil

- Scleral buckles related conditions
- extrusion of scleral explant
- intrusion of scleral explant
- Miragel expansion
- anterior segment ischaemia
- diplopia and muscle trauma from scleral explant
- scleral explant infection
- surgically induced necrotising scleritis