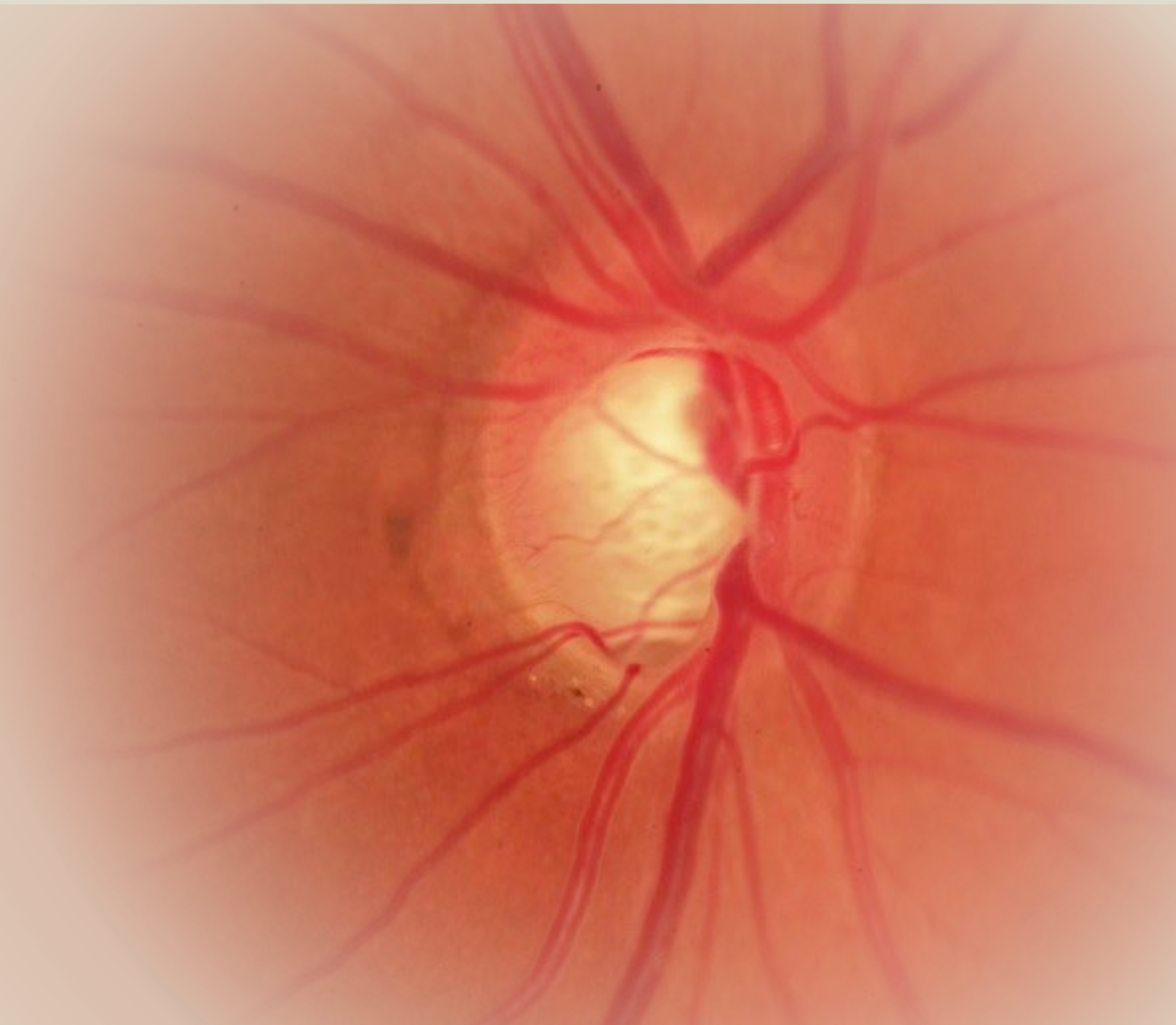
INTERNATIONAL COUNCIL of OPHTHALMOLOGY

ICO Guidelines for Glaucoma Eye Care



International Council of Ophthalmology Guidelines for Glaucoma Eye Care

The International Council of Ophthalmology (ICO) Guidelines for Glaucoma Eye Care have been developed as a supportive and educational resource for ophthalmologists and eye care providers worldwide. The goal is to improve the quality of eye care for patients and to reduce the risk of vision loss from the most common forms of open and closed angle glaucoma around the world.

Core requirements for the appropriate care of open and closed angle glaucoma have been summarized, and consider low and intermediate to high resource settings.

This is the first edition of the ICO Guidelines for Glaucoma Eye Care (February 2016). They are designed to be a working document to be adapted for local use, and we hope that the Guidelines are easy to read and translate.

2015 Task Force for Glaucoma Eye Care

Neeru Gupta, MD, PhD, MBA, Chairman

Tin Aung, MBBS, PhD

Nathan Congdon, MD

Tanuj Dada, MD

Fabian Lerner, MD

Sola Olawoye, MD

Serge Resnikoff, MD, PhD

Ningli Wang, MD, PhD

Richard Wormald, MD

Acknowledgements

We gratefully acknowledge Dr. Ivo Kocur, Medical Officer, Prevention of Blindness, World Health Organization (WHO), Geneva, Switzerland, for his invaluable input and participation in the discussions of the Task Force.

We sincerely thank Professor Hugh Taylor, ICO President, Melbourne, Australia, for many helpful insights during the development of these Guidelines.

Table of Contents

Introduction	2
Initial Clinical Assessment of Glaucoma	4
Glaucoma Assessment and Equipment Needs	5
Glaucoma Assessment Checklist	6
Approach to Open Angle Glaucoma Care	10
Ongoing Open Angle Glaucoma Care	13
Approach to Closed Angle Glaucoma Care	15
Ongoing Care for Closed Angle Glaucoma	16
Indicators to Assess Glaucoma Care Programs	19
ICO Guidelines for Glaucoma Eye Care	20

Introduction

Glaucoma is the leading cause of world blindness after cataracts. Glaucoma refers to a group of diseases, in which optic nerve damage is the common pathology that leads to vision loss. The most common types of glaucoma are open angle and closed angle forms. Worldwide, open angle and closed angle glaucoma each account for about half of all glaucoma cases. Together, they are the major cause of irreversible vision loss globally. The burden of each of these diseases varies considerably among racial and ethnic groups worldwide. For example, in western countries, vision loss from open angle glaucoma is most common, in contrast to East Asia, where vision loss from closed angle glaucoma is most common. Patients with glaucoma are reported to have poorer quality of life, reduced levels of physical, emotional, and social well-being, and utilize more health care resources.

High intraocular pressure (IOP) is a major risk factor for loss of sight from both open and closed angle glaucoma, and the only one that is modifiable. The risk of blindness depends on the height of the intraocular pressure, severity of disease, age of onset, and other determinants of susceptibility, such as family history of glaucoma. Epidemiological studies and clinical trials have shown that optimal control of IOP reduces the risk of optic nerve damage and slows disease progression. Lowering IOP is the only intervention proven to prevent the loss of sight from glaucoma.

Glaucoma should be ruled out as part of every regular eye examination, since complaints of vision loss may not be present. Differentiating open from closed angle glaucoma is essential from a therapeutic standpoint, because each form of the disease has unique management considerations and interventions. Once the correct diagnosis of open or closed angle glaucoma has been made, appropriate steps can be taken through medications, laser, and microsurgery. This approach can prevent severe vision loss and disability from sight threatening glaucoma.

In low resource settings, managing patients with glaucoma has unique challenges. Inability to pay, treatment rejection, poor compliance, and lack of education and awareness, are all barriers to good glaucoma care. Most patients are unaware of glaucoma disease, and by the time they present, many have lost significant vision. Long distances from healthcare facilities, and insufficient medical professionals and equipment, add to the difficulty in treating glaucoma. A diagnosis of open or closed angle glaucoma requires medical and surgical interventions to prevent vision loss and to preserve quality of life. Preventing glaucoma blindness in underserved regions requires heightened attention to local educational needs, availability of expertise, and basic infrastructure requirements.

There is strong support to integrate glaucoma care within comprehensive eye care programs and to consider rehabilitation aspects of care. Persistent efforts to support effective and accessible care for glaucoma are needed.[1]

1. Universal Eye Health: A Global Action Plan 2014-2019, WHO, 2013 www.who.int/blindness/actionplan/en/.

Open Angle Glaucoma

In open angle glaucoma, there is characteristic optic nerve damage and loss of visual function in the presence of an open angle with no identifying pathology. The disease is chronic and progressive. Although elevated IOP is often associated with the disease, elevated IOP is not necessary to make the diagnosis. Risk factors for the disease include elevated intraocular pressure, increasing age, positive family history, racial background, myopia, thin corneas, hypertension, and diabetes. Patients with elevated IOP or other risk factors should be followed regularly for the development of glaucoma.

- ✓ Open Angle
- ✓ Glaucomatous Optic Nerve Damage
- ± Elevated IOP
- ± Visual Field Damage

Closed Angle Glaucoma

In closed angle glaucoma, optic nerve damage and vision loss may occur in the presence of an anatomical block of the anterior chamber angle by the iris. This may lead to elevated intraocular pressure and optic nerve damage. In acute angle closure glaucoma, the disease may be painful, needing emergency care. More often the disease is chronic, progressive, and without symptoms. Risk factors for the disease include racial background, increasing age, female gender, positive family history, and hyperopia. Patients with these risk factors should be followed regularly for the development of closed angle glaucoma.

- ✓ Closed Angle
- ± Elevated IOP
- ± Glaucomatous Optic Nerve Damage
- ± Visual Field Damage

Most patients with open and closed angle forms of glaucoma are unaware they have sight-threatening disease. Mass population screening is not currently recommended. However, all patients presenting for eye care should be reviewed for glaucoma risk factors and undergo clinical examination to rule out glaucoma. Patients with glaucoma should be told to alert brothers, sisters, parents, sons, and daughters that they have a higher risk of developing disease, and that they also need to be checked regularly for glaucoma. The ability to make an accurate diagnosis of glaucoma, to determine whether it is an open or closed form, and to assess disease severity and stability, are essential to glaucoma care strategies and blindness prevention.

Initial Clinical Assessment of Glaucoma

History

Assessment for glaucoma includes asking about complaints that may relate to glaucoma such as vision loss, pain, redness, and halos around lights. The onset, duration, location, and severity of symptoms should be noted. All patients should be asked about family members with glaucoma, and a detailed history should also be taken.

Table 1 - History Checklist

- ✓ Chief Complaint
- ✓ Age, Race, Occupation
- ✓ Social History
- ✓ Possibility of Pregnancy
- ✓ Family History of Glaucoma
- ✓ Past Eye Disease, Surgery, or Trauma
- ✓ Corticosteroid Use
- ✓ Eye Medications
- ✓ Systemic Medications
- ✓ Drug Allergies
- ✓ Tobacco, Alcohol, Drug Use
- ✓ Diabetes
- ✓ Lung Disease
- ✓ Heart Disease
- ✓ Cerebrovascular Disease
- ✓ Hypertension/Hypotension
- ✓ Renal Stones
- ✓ Migraine
- ✓ Raynaud's Disease
- ✓ Review of Systems

Initial Glaucoma Assessment

Evaluation for glaucoma is recommended as part of a comprehensive eye exam. The ability to diagnose glaucoma in its open or closed angle forms, and to evaluate its severity, are critical to glaucoma care approaches and the prevention of blindness. Core examination and equipment needs to diagnose and monitor glaucoma patients are listed in Table 2.

Table 2 - Glaucoma Assessment and Equipment Needs - International Recommendations

Clinical Assessment	Minimal Equipment (Low Resource Settings)	Optional Equipment (Intermediate / High Resource Settings)
Visual Acuity	Near reading card or distance chart with 5 standard letters or symbols Pinhole	3- or 4-meter visual acuity lane with high contrast visual acuity chart
Refraction	Trial frame and lenses Retinoscope, Jackson cross-cylinder	Phoropter Autorefractor
Pupils	Pen light or torch	
Anterior Segment	Slit lamp biomicroscope Keratometer	Corneal pachymeter
Intraocular Pressure	Goldmann applanation tonometer Portable handheld applanation tonometer Schiotz tonometer	Tonopen Pneumotonometer
Angle Structures	Slit lamp gonioscopy Goldmann, Zeiss/Posner goniolenses	Anterior segment optical coherence tomography Ultrasound biomicroscopy
Optic Nerve (dilated if angle open)	Direct ophthalmoscope Slit lamp biomicroscopy with hand held 78 or 90 diopter lens	Fundus photography Optic nerve image analyzers Confocal scanning laser ophthalmoscopy Optical coherence tomography Scanning laser polarimetry
Fundus	Direct ophthalmoscope Head mounted indirect ophthalmoscope with 20 or 25 diopter lens Slit lamp biomicroscopy with 78 diopter lens	12 and 30 diopter lenses 60 and 90 diopter lenses
Visual Field	Manual perimetry or automated white on white perimetry	Frequency doubling technology Short wave automated perimetry

Glaucoma Assessment Checklist

- ✓ **Visual Acuity**
  Vision should be tested (undilated), unaided, and with best correction at distance and near. Central vision may be affected in advanced glaucoma.

- ✓ **Refractive Error**
  The refractive error will help to understand the risk of open angle glaucoma (myopia) or closed angle glaucoma (hyperopia). Neutralizing the error is important to assessing visual acuity and visual fields.

- ✓ **Pupils**
  Pupils should be tested for reactivity and afferent pupillary defect. An afferent defect may signal asymmetric moderate to advanced glaucoma.

- ✓ **Lids/Sclera/ Conjunctiva**
  Evidence of inflammation, redness, ocular surface disease, or local pathology may point to uncontrolled IOP due to acute or chronic angle closure, or possible glaucoma drug allergy, or other disease.

- ✓ **Cornea**
  The cornea should be examined for edema, which may be seen in acute or chronic high IOP. Note that IOP readings are underestimated in the presence of corneal edema. Corneal precipitates may indicate inflammation.

- ✓ **Corneal Thickness**
  The thickness of the cornea is measured to help interpret IOP readings. Thick corneas tend to overestimate the IOP reading, and thin corneas tend to underestimate the reading.

- ✓ **Intraocular Pressure**
  IOP should be measured in each eye before gonioscopy and before dilation. Recording the time of IOP measurement is recommended to account for diurnal variation.

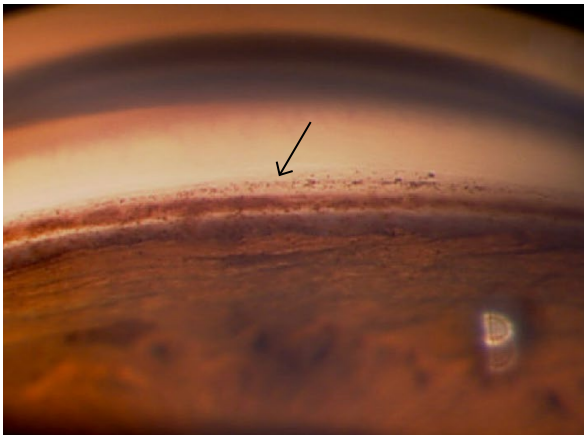
- ✓ **Anterior Segment**
  The anterior segment should be examined in the undilated state and after dilation (if the angle is open). Look for anterior chamber shallowing and peripheral depth, pseudoexfoliation, pigment dispersion, inflammation and neovascularization, or other causes of glaucoma.

Glaucoma Assessment Checklist (cont'd)

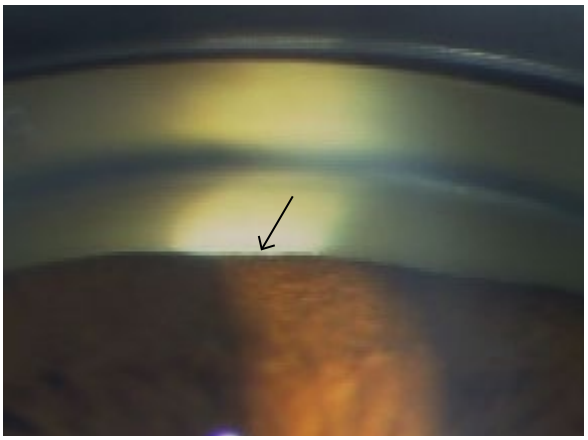
- ✓ **Angle Structures**
  The angle should be examined for the presence of iris contact with the trabecular meshwork in a dark room setting. The location and extent, and whether it is due to appositional or synechial closure, should be determined by indentation gonioscopy. The presence of inflammation, pseudoexfoliation, neovascularization, and other pathology should be noted.

- ✓ **Iris**
  The iris should be examined for mobility and irregularity, the presence of anterior and posterior synechiae, and pseudoexfoliation at the pupil margin. Forward bowing, peripheral angle crowding, and iris insertion should be noted in addition to the presence of inflammation, neovascularization, and other pathology.

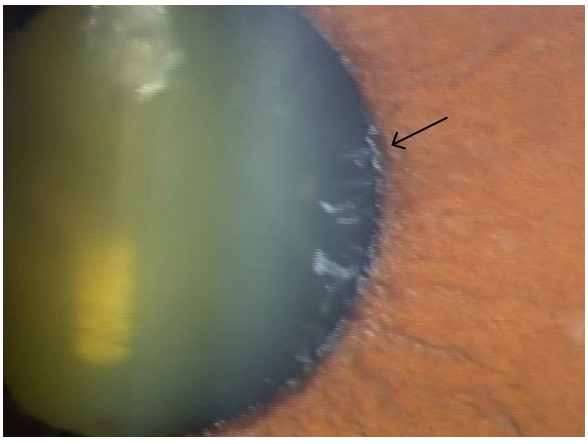
- ✓ **Lens**
  The lens should be examined for cataract, size, position, posterior synechiae, pseudoexfoliation material, and evidence of inflammation.



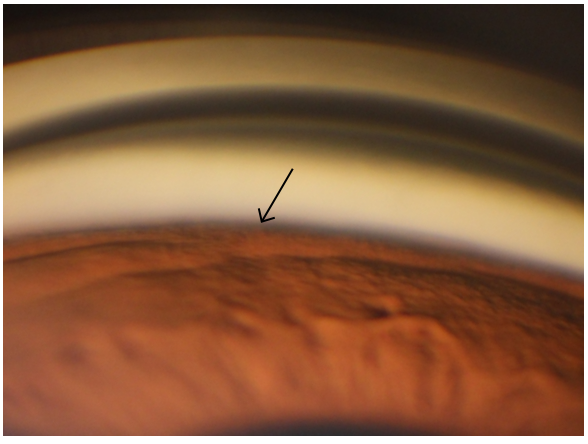
Open angle on gonioscopy



Closed angle on gonioscopy with no structures visible



Pseudoexfoliation deposits at the pupil margin



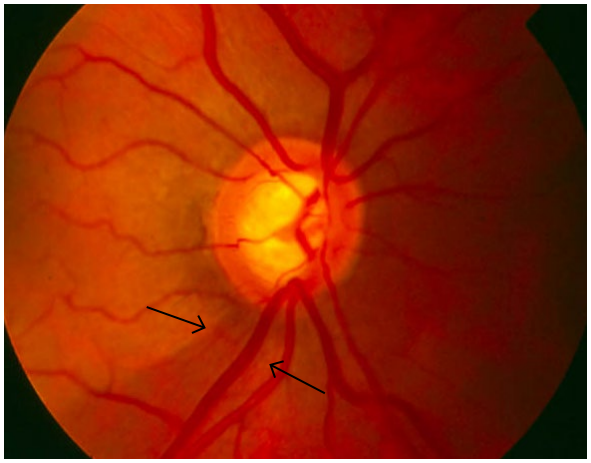
Plateau iris with peripheral iris roll

Glaucoma Assessment Checklist (cont'd)

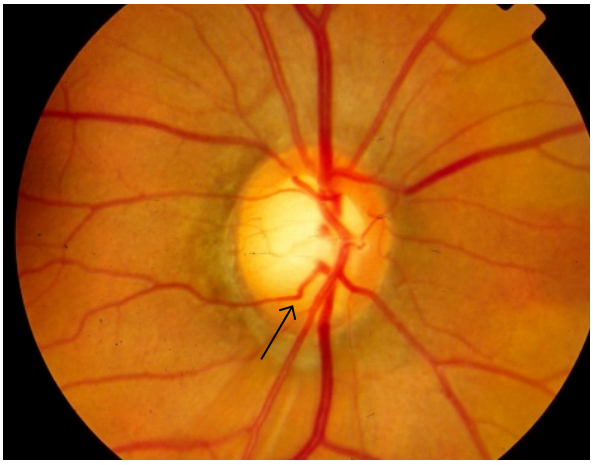
✓ **Optic Nerve**

The optic nerve should be evaluated for characteristic signs of glaucoma. The degree of optic nerve damage helps to guide initial treatment goals.

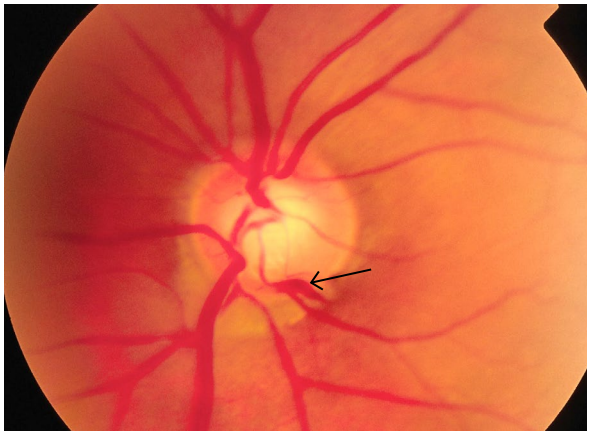
- Early optic nerve damage may include a cup ≥0.5, focal retinal nerve fiber layer defects, focal rim thinning, vertical cupping, cup/disc asymmetry, focal excavation, disc hemorrhage, and departure from the ISNT rule (rim thickest inferiorly, then superiorly, nasally and temporally).
- Moderate to advanced optic nerve damage may include a large cup ≥ 0.7, diffuse retinal nerve fiber defects, diffuse rim thinning, optic nerve excavation, acquired pit of the optic nerve, and disc hemorrhage.



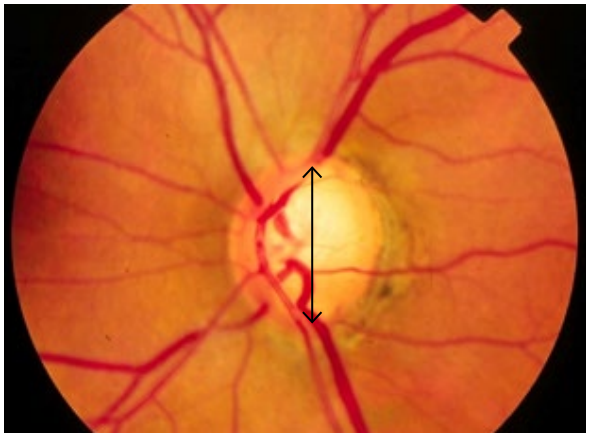
Retinal nerve fiber layer defect



Thinning of the inferior rim



Disc hemorrhage at 5 o'clock

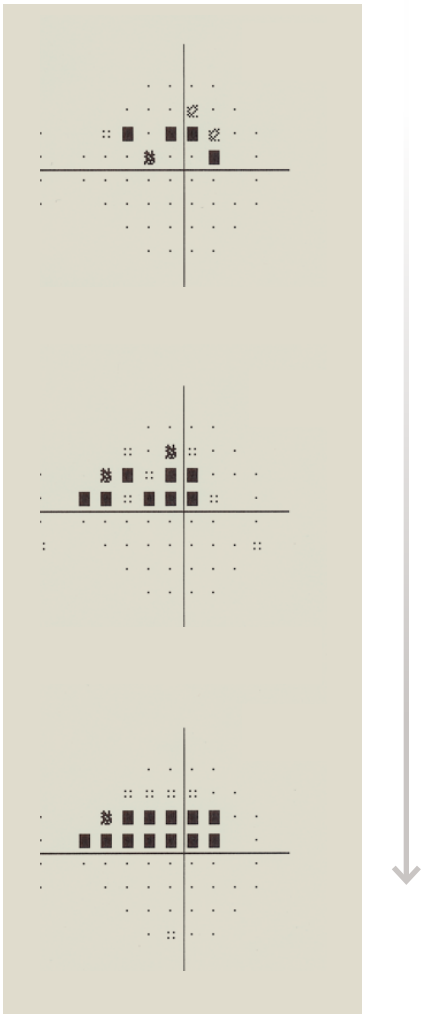


Advanced glaucoma with 0.9 vertical cup

Glaucoma Assessment Checklist (cont'd)

- ✓ **Fundus**
  The posterior pole should be evaluated for the presence of diabetic retinopathy, macular degeneration, and other retinal disorders. See the ICO Guidelines for Diabetic Eye Care at: www.icoph.org/downloads/ICOGuidelinesforDiabeticEyeCare.pdf.

- ✓ **The Visual Field**
  Preserving visual function is the goal of all glaucoma management. The visual field is a measure of visual function that is not captured by the visual acuity test. Visual field testing identifies, locates, and quantifies the extent of field loss. The presence of visual field damage may indicate moderate to advanced disease. Monitoring the visual field is important to determine disease instability as seen below.



Progressive vision loss over time

Approach to Open Angle Glaucoma Care

A diagnosis of open angle glaucoma requires medical and possible surgical intervention to prevent vision loss and to preserve quality of life. Once a diagnosis of open angle glaucoma is made, patient education should begin regarding the nature of the disease, the need to lower IOP, along with discussions of treatment options. Patients should be informed of the need to alert first degree relatives for the need of a glaucoma examination.

The financial, physical, social, emotional, and occupational burdens of glaucoma treatment options should be carefully considered for each patient. Recommendations, risks, options, and consequences of no treatment, should be discussed with all patients in language that is understandable to the patient or caregiver. Classifying glaucoma disease as early, or moderate to advanced, can help to guide IOP treatment goals and approaches. A simplified approach to initiating care in glaucoma patients is summarized below in Table 3.

Table 3 - Initiating Open Angle Glaucoma Care - International Recommendations

Glaucoma Severity	Findings	Suggested IOP Reduction	Treatment Considerations
Early	Optic Nerve Damage ± Visual Field Loss	Lower IOP ≥25%	Medication *or* Laser trabeculoplasty
Moderate/ Advanced	Optic Nerve Damage + Visual Field Loss	Lower IOP ≥25 – 50%	Medication *or* Laser trabeculoplasty *or* Trabeculectomy ± Mitomycin C *or* Tube (± cataract removal and intraocular lens [IOL]) *and/or* Cyclophotocoagulation (*or* cryotherapy)
End-stage (Refractory glaucoma)	Blind Eye ± Pain	Lower IOP ≥25 – 50% (If painful)	Medication *and/or* Cyclophotocoagulation (*or* cryotherapy) *and* Rehabilitation Services

Low resource settings pose unique challenges depending on the region. Particular attention should be given to compliance with treatments and the capacity of the patient to obtain and use medication. If a patient cannot afford the cost of drugs, initial laser trabeculoplasty would be favored wherever equipment and expertise are available. If resources to manage glaucoma are insufficient, referral is indicated.

Table 4 - Medicines for Glaucoma Care: International Recommendations

Eye Drops	**Essential Medicines** (Low Resource Settings)	**Optional Medicines** (Intermediate / High Resource Settings)
Anesthetic	Tetracaine 0.5%	
Diagnostic	Fluorescein 1% Tropicamide 0.5%	
Pupil Constricting	Pilocarpine 2% or 4%	
Pupil Dilating	Atropine 0.1, 0.5, or 1% Homatropine or cyclopentolate	
Anti-Inflammatory	Prednisolone 0.5% or 1%	
Anti-Infectives	Ofloxacin 0.3%, gentamycin 0.3% or azithromycin 1.5%	
Intraocular Pressure Lowering (Topical)	Latanoprost 50µg/mL Timolol 0.25% or 0.5%	Prostaglandin analogs Other beta blockers Carbonic anhydrase inhibitors Alpha agonists Fixed combination drops
Intraocular Pressure Lowering (Systemic)	Oral and IV acetazolamide IV mannitol 10% or 20%	Methazolamide Glycerol

See the 19th WHO Model List of Essential Medicines (April 2015), by going to: www.who.int/medicines/publications/essentialmedicines/en/.

An ethical approach is indispensable to quality clinical care. Download the ICO Code of Ethics at: www.icoph.org/downloads/icoethicalcode.pdf.

Table 5 - Laser Trabeculoplasty for Glaucoma: International Recommendations

Treatment Parameters	Argon Laser Trabeculoplasty (ALT)	Selective Laser Trabeculoplasty (SLT)
Laser Type	Argon green or blue-green / Diode Laser	Frequency doubled Q-Switched Nd: Yag Laser (532 nm)
Spot Size	50 microns (Argon) or 75 microns (diode)	400 microns
Power	300 to 1000 mW	0.5 to 2 mJ
Application Site	TM junction non-pigmented/pigmented	Trabecular meshwork (TM)
Handheld Lens	Goldmann gonioscopy lens or Ritch lens	Goldmann or SLT lens
Treated Circumference	180 – 360 degrees	180 – 360 degrees
Number of Burns	~ 50 spots per 180 degrees	~ 50 spots per 180 degrees
Number of Sittings	1 or 2	1 or 2
Endpoint	Blanching at junction of anterior non-pigmented and pigmented TM	Bubble formation

Table 6 - Cyclophotocoagulation for Glaucoma: International Recommendations

Treatment Parameters	Transscleral Nd: YAG Laser	Transscleral Diode Laser
Laser Type	Nd: YAG Laser	Diode Laser
Power	4 to 7 J	1.0 to 2.5 W
Exposure Time	0.5 to 0.7 seconds	0.5 to 4.0 seconds
Application Site	1.0 to 2.0 mm from limbus	1.0 to 2.0 mm from limbus
Handheld Probe	Transscleral contact	Transscleral contact
Treated Circumference	180 – 360 degrees	180 – 360 degrees
Number of Burns	~ 15 – 20 spots per 180 degrees	~ 12 – 20 spots per 180 degrees
Number of Sittings	1 or 2	1 or 2

Ongoing Open Angle Glaucoma Care

Ongoing management of glaucoma depends on the ability to evaluate response to treatment, and to detect disease progression and instability. Follow-up examinations are similar to the initial assessment and should include history and clinical evaluation.

- ✓ **History:** Ask about changes to general health and medications, visual changes, glaucoma drug compliance, difficulty with drops, and possible side effects.
- ✓ **Clinical Assessment:** Assess for changes in visual acuity or refractive error, IOP, new anterior segment pathology, and changes to the angle anatomy, changes to the optic nerve, and changes to the visual field.

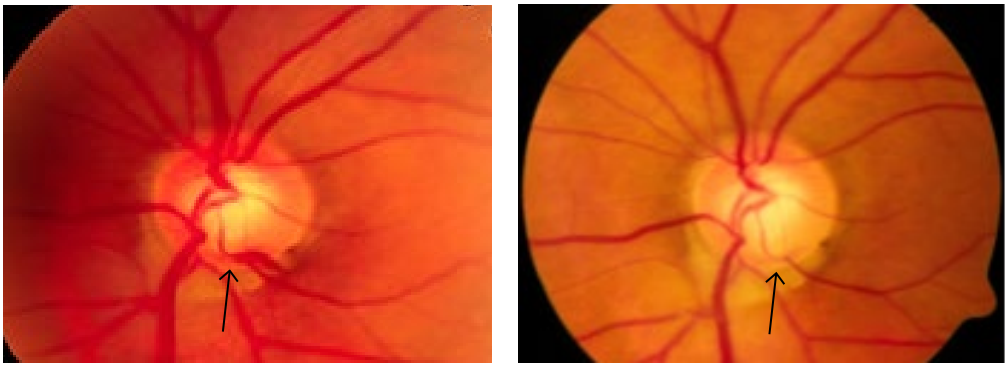
Indicators of Unstable Open Angle Glaucoma

Elevated Intraocular Pressure

- May be due to poor compliance, drug intolerance, or worsening glaucoma.

Progressive Optic Nerve Changes

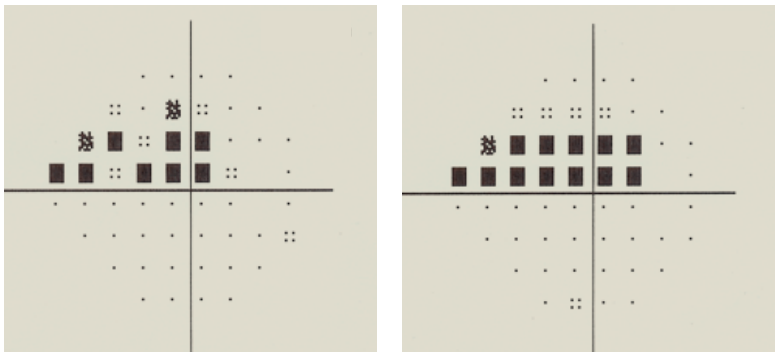
- Expanding nerve fiber layer defect, enlarging cup, new disc hemorrhage, and rim thinning.



Progressive inferior rim loss

Progressive visual field changes

- Expanding visual field defect in size and depth, confirmed by repeat testing.



Progressive superior field loss

Ongoing Open Angle Glaucoma Care

A rise in IOP, progressive optic nerve damage, or progressive visual field loss, signal the need for additional medical or surgical intervention to prevent sight loss. A simplified approach to monitor and follow patients with glaucoma is summarized below.

Table 7 - Ongoing Open Angle Glaucoma Care - International Recommendations

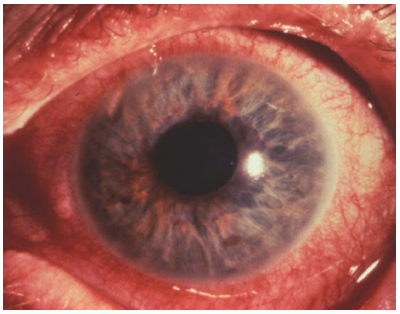
Classification	Exam Findings	Treatment	Follow-up
Stable Glaucoma	**No Change to IOP and Optic Nerve and Visual Field**	Continue	~ 4 months – 1 year
Unstable Glaucoma	**Increased IOP** and/or **Increased Optic Nerve Damage** and/or **Increased Visual Field Damage**	Additional IOP lowering needed by ≥ 25% **(Refer to Table 3)**	1 – 4 months (depending on disease severity, risk factors and resources)

More frequent follow-up is suggested in the presence of advanced disease, multiple risk factors, or progression within a short period. In low resource settings, compliance with treatment and the capacity of the patient to obtain and use medication should be considered. Surgical options may be favored earlier, wherever equipment and expertise are available. If resources to manage glaucoma are insufficient, referral is indicated.

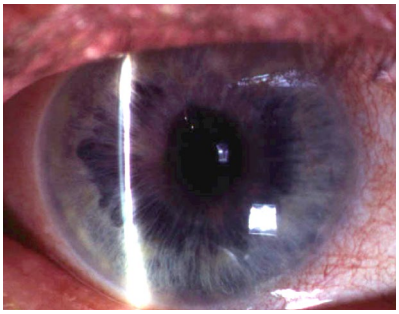
Approach to Closed Angle Glaucoma Care

A diagnosis of closed angle glaucoma requires medical and surgical intervention to prevent vision loss. If expertise and resources to manage glaucoma are insufficient, referral is indicated.

Once a diagnosis of closed angle glaucoma is made, patients should be educated regarding the nature of the disease and required treatment to help prevent vision loss. The cause of angle closure will determine the clinical care pathway, and as pupil block is the most common cause, laser iridotomy is recommended as the first line treatment for all patients. A simplified approach to initiating care in closed angle glaucoma patients is summarized below.



Acute angle closure with red eye and forward iris bowing



Slit lamp beam shows very shallow anterior chamber depth

Table 8 - Initiating Closed Angle Care - International Recommendations

Diagnosis	Clinical Findings	Essential Treatment	Surgical Options
Acute or Chronic Closed Angle (Pupil Block)	Iris-trabecular contact Iris bowing	Constrict pupil and lower IOP Laser iridotomy (desirable) or Surgical iridectomy (laser to fellow eye)	Lens extraction/IOL ± Trabeculectomy ± Mitomycin C
Closed Angle (Plateau Iris)	Iris-trabecular contact Flat Iris	Constrict pupil and lower IOP Laser iridotomy (desirable) or Surgical iridectomy (laser to fellow eye) and Laser iridoplasty	Lens extraction/IOL ± Trabeculectomy ± Mitomycin C

In addition to pupil block, progressive and irreversible angle closure may be due to plateau iris and other causes. The chamber angle should be carefully reviewed after laser iridotomy to look for other mechanisms of a closed angle needing treatment.

Table 9 - Laser Iridotomy and Iridoplasty for Glaucoma: International Recommendations

Treatment Parameters	Laser Iridotomy	Laser Iridoplasty
Laser Type	Q-Switched Nd: Yag	Argon green or blue-green
Spot Size	–	200 – 500 microns
Power	2mJ to 8mJ	200 – 400 mW
Application Site	Peripheral iris	Peripheral iris
Handheld Lens	Laser iridotomy lens	Goldmann gonioscopy lens or Ritch lens
Treated Circumference	–	180 – 360 degrees
Number of Burns	–	20 – 40 spots per 180 degrees
Number of Sittings	1	1 or 2
Endpoint	Full thickness iris opening	Contraction burn

Ongoing Closed Angle Glaucoma Care

Ongoing management of angle closure glaucoma relies on the ability to evaluate response to treatment and to detect disease progression and instability. Follow-up examinations are similar to the initial assessment and should include history and clinical evaluation.

- ✓ **History:** Ask about changes to general health and medications, visual changes, glaucoma drug compliance, difficult with drops, and possible side effects.
- ✓ **Clinical Assessment:** Assess for changes in visual acuity or refractive error, assess IOP, with careful attention to the angle and changes to angle closure status, changes to the optic nerve, and the visual field.

Indicators of Unstable Closed Angle Glaucoma

Persistent Angle Closure

- Synechiae formation, failed iridotomy

Elevated Intraocular Pressure

- Inadequate aqueous drainage

Progressive Optic Nerve Changes

- Expanding nerve fiber layer defect, enlarging cup, new disc hemorrhage, rim thinning

Progressive Visual Field Changes

- Expanding visual field defect in size and depth, confirmed by repeat testing

Ongoing Closed Angle Glaucoma Care

Persistent angle closure with a rise in IOP, progressive optic nerve damage, or progressive visual field loss, all signal the need for additional medical or surgical intervention to prevent sight loss. A simplified approach to monitor and follow patients with glaucoma is summarized below.

Table 10 - Ongoing Closed Angle Glaucoma Care - International Recommendations

Classification	Exam Findings	Treatment	Follow-up
Stable Glaucoma	**No Change to Angle, IOP, Optic Nerve, and Visual Field**	Continue	~ 6 months – 1 year (depending on disease severity, risk factors, and resources)
Unstable Glaucoma	**Persistent Angle Closure** and **Increased IOP** ± **Increased Optic Nerve Damage** ± **Increased Visual Field Damage**	Additional IOP lowering needed by ≥ 25% **(Refer to Table 11)**	1 – 4 months (depending on disease severity, risk factors, and resources)

More frequent follow-up is suggested in the presence of advanced disease, multiple risk factors, or progression within a short period. In low resource settings, compliance with treatment and the capacity of the patient to obtain and use medication should be considered. Surgical options may be favored earlier, wherever equipment and expertise are available. If resources to manage glaucoma are insufficient, referral is indicated.

Unstable Closed Angle Glaucoma

Once closed angle glaucoma is deemed unstable, classifying the disease as early, or moderate to advanced, helps to guide IOP treatment goals and approaches. The treatment options for a closed angle differ from open angle care, and are summarized below.

Table 11 - Unstable Closed Angle Glaucoma - International Recommendations

Glaucoma Severity	Findings	Suggested IOP Reduction	Treatment Considerations
Early	Persistent Angle Closure + Optic Nerve Damage ± Visual Field Loss	Lower IOP ≥25%	Medication Lens extraction/IOL
Moderate / Advanced	Persistent Angle Closure + Optic Nerve Damage + Visual Field Loss	Lower IOP ≥25 – 50%	Medication *and/or* Trabeculectomy or tube (with or without goniosynechiolysis, cataract removal, and IOL) *and/or* Cyclophotocoagulation (*or* cryotherapy) Rehabilitation Services
End-stage (Refractory glaucoma)	Blind Eye ± Pain	Lower IOP ≥25 – 50% (If painful)	Medication *and/or* Cyclophotocoagulation (*or* cryotherapy) Rehabilitation Services

Intraocular pressure goals should be adjusted according to individual risk factors. Financial, physical, and psychosocial burdens of each treatment option should also be considered. In low resource settings, surgical options may be favored. End-stage disease treatment is similar to that of open angle glaucoma. If resources or expertise to manage angle closure glaucoma are insufficient, referral is indicated.

Indicators to Assess Glaucoma Care Programs

a. Prevalence of glaucoma-related blindness and visual impairment.

b. Proportion of blindness and visual impairment due to glaucoma.

c. Last eye examination for glaucoma among known persons with glaucoma (males/females).

- 0 – 12 months ago
- 13 – 24 months ago
- >24 months ago
- Could be simplified as: 0-12 months ago, or >12 months ago

d. Number of patients who were examined for glaucoma during last year.

e. Number of patients who received laser trabeculoplasty, iridotomy, trabeculectomy, or tube surgery during last year.

Define ratios such as:

f. Number of patients who received laser or trabeculectomy per million general population per year (equivalent to cataract surgical rate [CSR]).

g. Number of patients who received laser, trabeculectomy, or tube treatments per number of patients with glaucoma in a given area (hospital catchment area, health district, region, country).

- Numerator: number of laser, trabeculectomy, or tube treatments during the last year
- Denominator: number of patients with glaucoma (population x prevalence of glaucoma)

h. Number of patients who received laser, trabeculectomy, or tube treatments per number of persons with vision-threatening glaucoma in a given area (hospital catchment area, health district, region, country).

- Numerator: number of laser, trabeculectomy, or tube treatments during the last year
- Denominator: number of patients with vision-threatening glaucoma (population x prevalence of glaucoma)

ICO Guidelines for Glaucoma Eye Care

The ICO Guidelines for Glaucoma Eye Care were created as part of a new initiative to reduce worldwide vision loss related to glaucoma. The ICO collected guidelines for glaucoma management from around the world. View the collected guidelines at: www.icoph.org/enhancing_eyecare/glaucoma.html.

In addition to creating a consensus on technical guidelines, this resource will also be used to:

- Stimulate improved training and continuing professional development to meet public needs.
- Develop a framework to evaluate, stimulate, and to monitor relevant public health systems.

Design Credit

The ICO Guidelines for Glaucoma Eye Care were designed in collaboration with Marcelo Silles and Yuri Markarov (photo, page 1), Medical Media, St. Michael's Hospital, Toronto, Canada.
Learn more at: www.stmichaelshospital.com.

Photo Credit

All photos that appear in the ICO Guidelines for Glaucoma Eye Care were provided by Prof. Neeru Gupta, St. Michael's Hospital, Li Ka Shing Knowledge Institute, Ophthalmology & Vision Sciences, University of Toronto, with the exception of the images on page 7, provided by Prof. Ningli Wang, Beijing Institute of Ophthalmology. These may not be used for commercial purposes. If the photos are used, appropriate credit must be given.

About the ICO

The ICO is composed of 140 national and subspecialty Member societies from around the globe. ICO Member Societies are part of an international ophthalmic community working together to preserve and restore vision. Learn more at: www.icoph.org.

The ICO welcomes any feedback, comments, or suggestions. Please email us at info@icoph.org.

ICO Headquarters:

San Francisco, California
United States
Fax: +1 (415) 409-8411
Email: info@icoph.org
Web: www.icoph.org

INTERNATIONAL COUNCIL of OPHTHALMOLOGY

Notes

Notes

INTERNATIONAL COUNCIL
of OPHTHALMOLOGY