



GLAUCOMA ASSESSMENT

Glaucoma assessment

- I. Initial assessment
- II. History
- III. Examination/investigations
- IV. Key points

Initial assessment

- Ask yourself:
 - Is glaucoma present or not?
 - Will glaucoma happen in the future?
 - Assess risk factors
 - Other/differential diagnoses?
 - What is the mechanism of damage?
 - What is the plan for management?
 - Which treatment is most suitable?

Phases of initial assessment

- History
 - Chief visual complaint
 - Ophthalmic history
 - Medical history, including medications
 - Social history
 - Family history
 - Blindness or eye disease in family

Phases of initial assessment

- Examination/investigations
 - Appropriate equipment
 - Sufficient training in examination techniques
 - Accurate and reliable recording of findings

Ophthalmic history

- Visual symptoms of glaucoma
 - Visual blurring and discomfort
 - Coloured rings around lights/glare
 - Needs to be differentiated from migraine/cataracts
 - Poor light/dark adaptation
 - Difficulty in tracking fast-moving objects

Medical history

Points relevant to diagnosis

Cardiovascular system	Vasospastic tendency, previous episodes of profound hypotension or blood loss, ischaemic heart disease, CABG
Central nervous system	Previous cerebrovascular accident, head injury, pituitary lesions, migraine
Endocrine system	Diabetes, thyroid eye disease, pituitary tumours
Musculoskeletal system	Osteoarthritis, rheumatoid arthritis
Ocular trauma	Angle recession, lens dislocation, choroidal or retinal damage, ocular surgery, LASIK, spectacle use

Medical history

Points relevant to treatment

Cardiovascular system

Cardiac arrhythmias, systemic hypertension, ischaemic heart disease

Central nervous system

Early dementia, depression

Respiratory system

Asthma and other chronic obstructive pulmonary disease – no beta-blockers

Urogenital system

Urinary stones, renal disease

Women

Present or possible pregnancy and lactation

Medical history

- Exclude past haemodynamic crises
 - postpartum haemorrhage
 - ruptured abdominal aneurysm
 - severe trauma
 - major surgery (e.g. CABG)
 - prior blood transfusions
- Haemodynamic crises may cause optic disc pallor and cupping that mimics glaucoma but is not progressive

Medication history

- Medications that may lead to glaucoma or glaucoma-like changes
 - Steroids
 - Associated with ocular hypertension, open-angle glaucoma
 - Anticholinergics/tricyclic antidepressants
 - Can cause angle closure
 - Anticonvulsants (vigabatrin)
 - Linked to nasal peripheral field loss without disc changes

Medication history

- Medications that may have an impact on glaucoma treatment
 - Long-term use of glaucoma drops
 - May increase trabeculectomy failure
 - Systemic beta-blockers or calcium channel blockers
 - May interact with topical beta-blockers
 - May mask raised IOP

Other considerations

- Impact of glaucoma on the patient
 - How regularly can the patient attend the clinic?
 - Can the patient afford and comply with treatment?
 - How will having glaucoma affect the patient's life/work/family?
 - Disease
 - Treatment

Other considerations

- Life and lifestyle issues
 - What is the patient's life expectancy?
 - What is the patient's lifestyle?
 - Exercise
 - Water intake
 - Alcohol use

Examination/investigations

- Desirable resources for examination
 - A slit lamp with indirect lens between 60–90D and/or direct ophthalmoscope
 - Automated threshold perimetry
 - A gonioscope that allows indentation gonioscopy
 - A Goldmann applanation tonometer (GAT) or Tono-Pen[®]

Full eye examination

- Every eye deserves a comprehensive examination, including:
 - Slit lamp examination
 - Applanation tonometry
 - Gonioscopy
 - Stereoscopic, dilated optic nerve examination*

*If the angle permits

Slit lamp examination – tonometry

Why?

- IOP is the only modifiable risk factor for glaucoma

What to
use?

- GAT
- Tono-Pen[®] if GAT not available

When?

- Every visit

Tonometry

- How?
- Ensure tonometer is calibrated
 - Prism tip must be disinfected and disinfectant removed
 - Eyelashes must be kept out of the way
 - Cornea must be anaesthetised
 - Tip must touch central cornea gently with observer looking through the slit lamp eyepiece just prior to the tip making contact
 - Adjust gauge until the split tear meniscus just touches on the inside

Tonometry

- Factors affecting measured IOP
 - Time of measurement
 - Circadian cycle
 - Timing of medication
 - Central corneal thickness
 - Blood pressure
 - Age
 - Exercise
 - Lifestyle
 - Posture

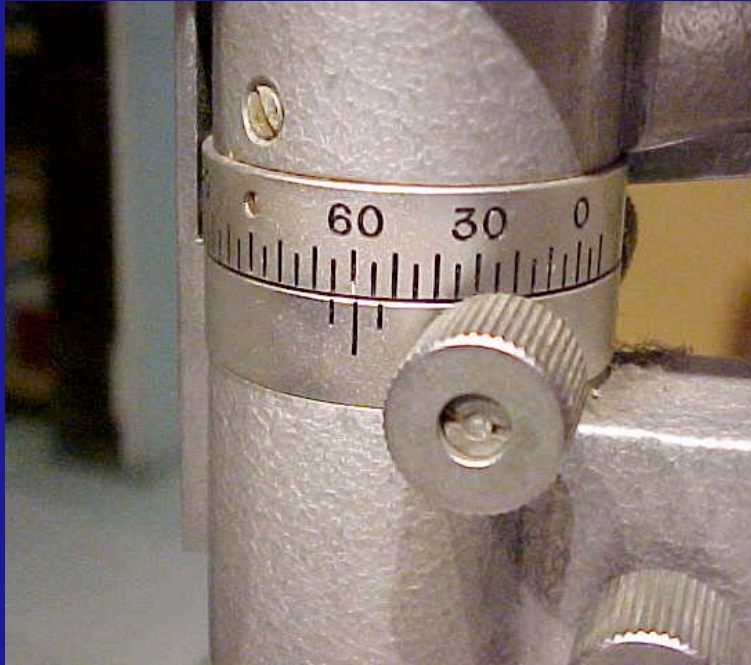
Tonometry

- Testing the calibration of a GAT
 - Threshold tension levels
 - 0 mmHg
 - 20 mmHg
 - 60 mmHg
 - Demonstration

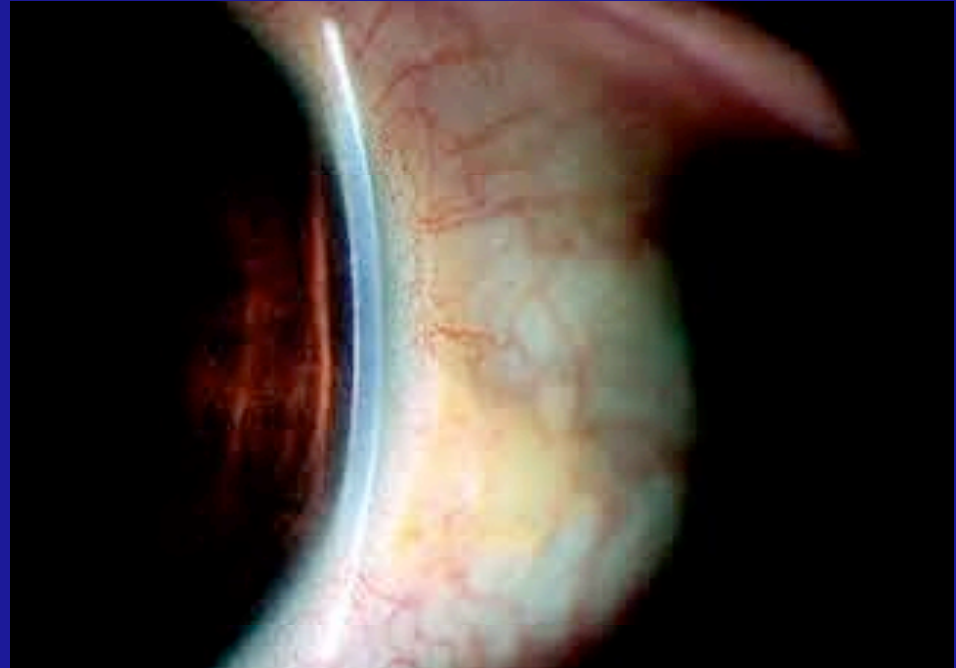


AT-Calibration_applanation tonometer

Van Herick test



Leuenberger EU
Asian Eye Institute



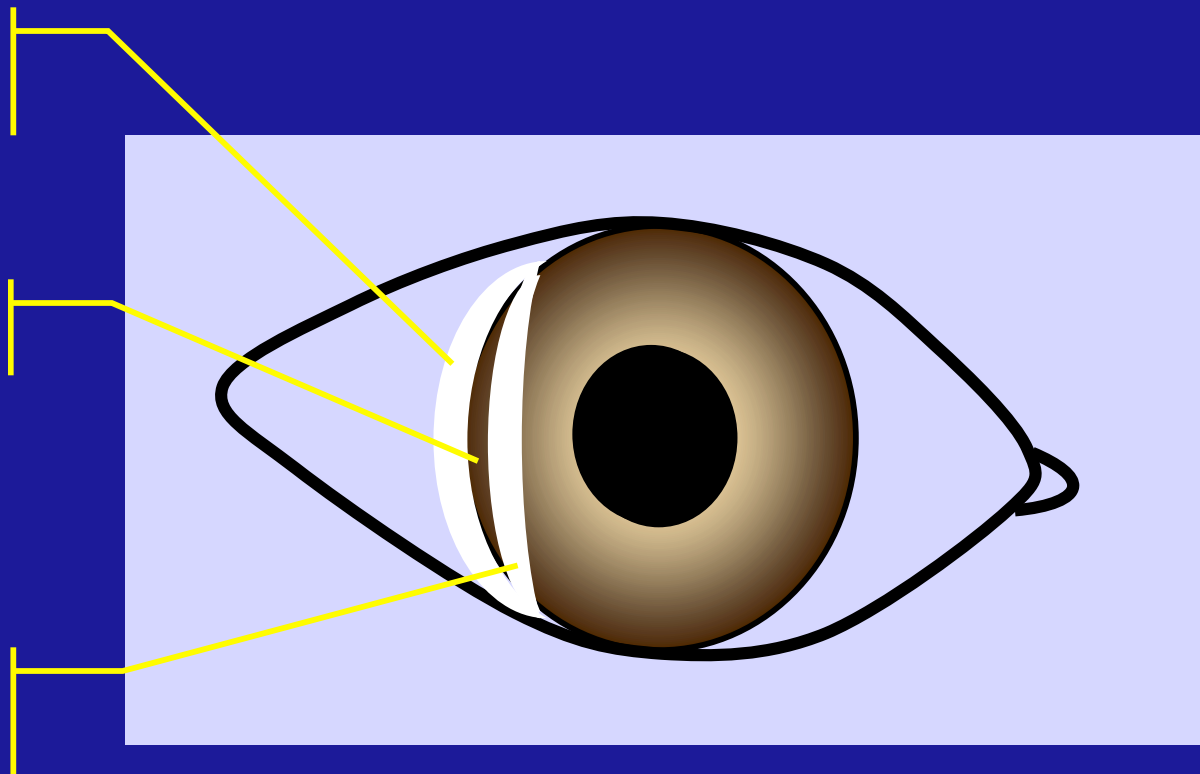
Foster P

Van Herick test

Slit image on
surface of cornea

Width of chamber
angle less than half
the width of the
corneal slit image –
possible angle closure

Slit image on
surface of the iris



Ven Herick video



Simplified van Herick test

Is it $> 50\%$ corneal thickness?

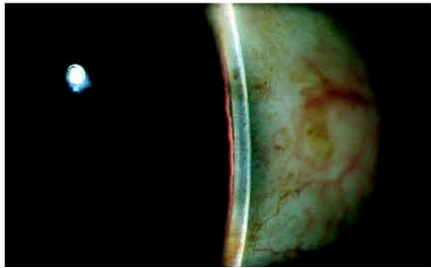
Yes

Angle closure
very unlikely

No

Gonioscopy essential to
determine angle closure risk

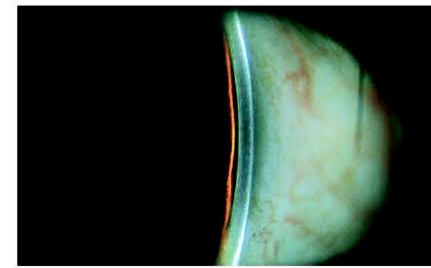
Van Herick test



< 50% grade



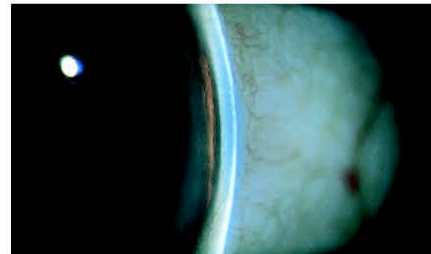
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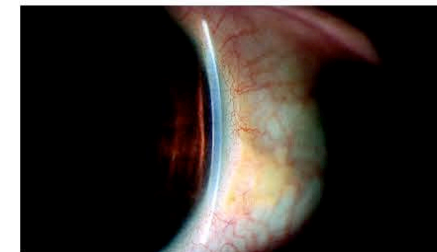
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< 50% grade



> 50% grade



> 50% grade

Van Herick test

- **Not a substitute for gonioscopy**
- Useful when gonioscopic view is hazy
 - e.g. corneal oedema, guttata, scarring
- Only an estimate of angle depth
- Pre-dilation evaluation when lens not available
- Can miss clinically significant signs
 - e.g. angle recession, keratic precipitates, synechiae, abnormal pigments, ghost cells, tumours

Optic nerve head and retinal nerve fibre layer

Why?

- Defines glaucoma

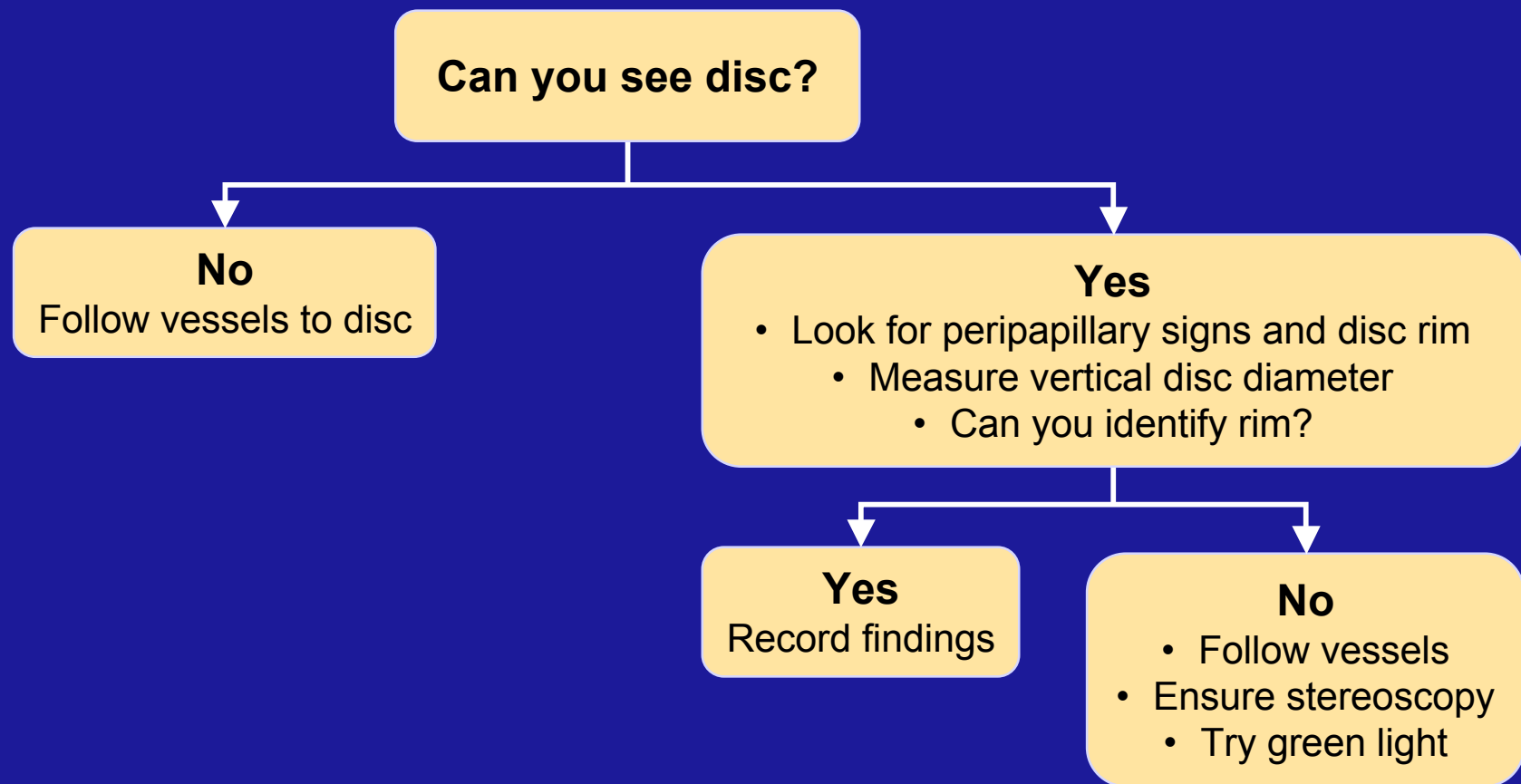
What to look for?

- Disc size
- Neuroretinal rim
- Disc haemorrhage
- Nerve fibre layer defect
- Peripapillary atrophy
- Vascular pattern

When?

- Every visit

Optic nerve head and retinal nerve fibre layer





Optic disc photography and imaging

- Detect glaucomatous optic nerve progression using serial optic nerve head photographs
- Perform stereoscopic fundus photography for all patients at diagnosis
- Disadvantages:
 - Optic disc photography and imaging are expensive
 - Scanning laser technology still under development

Visual field examination

Why?

- Defines state of optic nerve function
- Defines visual impairment

What?

- Automated perimetry

When?

- When glaucoma is suspected on examination

How?

- Users must understand the correct procedure for performing visual field testing, and be familiar with the perimeter manual

Visual field examination

- Choose the most appropriate investigation

- Test pattern

-
- | | |
|--------------------|---|
| 24–2
(or 30–2)* | <ul style="list-style-type: none">• Patients with early/moderate damage• Glaucoma suspects |
|--------------------|---|
-

- | | |
|-------|--|
| 10–2* | <ul style="list-style-type: none">• Patients with advanced damage• Patients with paracentral scotomas |
|-------|--|
-

- Test strategy

- SITA (Humphrey[®] Field Analyzer)* – most patients and suspects

*Or equivalent non-Humphrey[®] test pattern/strategy

Key points

- Detection of glaucoma requires a full eye examination
- Pay attention to patient history, including general medical history
- More than one test is needed to establish a diagnosis of glaucoma
- Dilated examination of the optic nerve head is important