

How to measure intraocular pressure: applanation tonometry



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All adults attending an eye unit should have their intraocular pressure (IOP) measured, unless there is a contraindication (e.g. trauma or corneal ulcer). Many people with glaucoma have no symptoms and do not know they have the condition. All children who have had cataract surgery should also have their IOP measured at every follow-up visit, if possible. Finding glaucoma early allows treatment to be given which will preserve sight. Although elevated IOP is not the only sign of glaucoma, measuring it is simple and quick to do. It should therefore be done routinely on all adults attending eye care facilities. Applanation tonometry, described in this article, is the preferred method (the 'gold standard'). Schiötz tonometry, which will be described in a future issue, can also be used to measure intraocular pressure and is a useful screening test.

Equipment

- Tonometer, either Goldmann (used on slit lamps) or Perkins (hand-held)
- Applanation prism
- Local anaesthetic drops
- Fluorescein strips
- Clean cotton wool or gauze swabs.

Preparation

- Ensure the prism has been disinfected with isopropyl alcohol 70% (methylated spirit) or sodium hypochlorite 1%. The prism must be rinsed in sterile water and wiped dry with a clean swab (residue of the disinfectant may cause a caustic burn on the cornea).
- Check that the graduation marked '0' on the measuring prism is aligned with the white marker point on the tonometer head
- Check the calibrated dial of the tonometer is set at 10 mmHg
- Ensure that the patient is sitting comfortably at the slit lamp: at the right height, with their chin on the rest and their forehead against the headband (or in a chair with their head supported, if using the Perkins tonometer)
- Set the magnification of the slit lamp at x10.

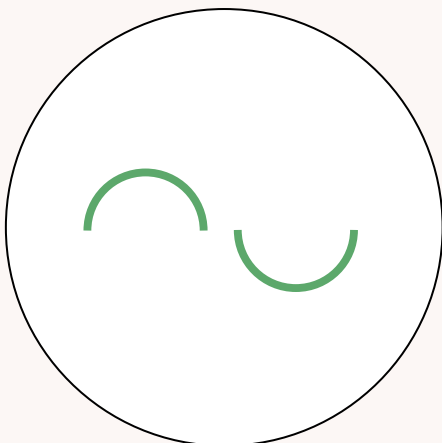
Method

- Instil the local anaesthetic drops and then the fluorescein. Only a very small amount of fluorescein is needed
- For measuring the IOP in the right eye, make sure the slit beam is shining onto the tonometer head from the patient's right side; for the left eye, the beam should come from the patient's left side
- Move the filters so that the blue filter is used to produce a blue beam
- Make sure the beam of light is as wide as possible, and that the light is as bright as possible. This makes visualising the fluorescein rings easier (with the slit diaphragm fully open)
- Ask the patient to look straight ahead, open both eyes wide, fix his or her gaze and keep perfectly still
- With the thumb, gently hold up the patient's top eyelid, taking care not to put

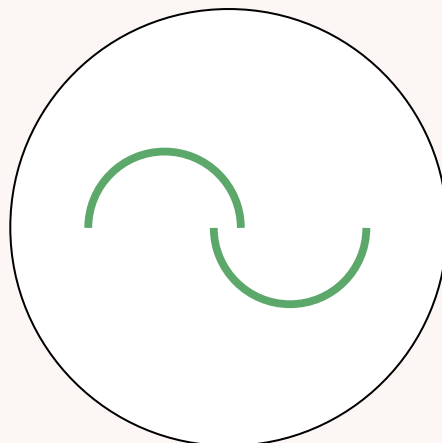


- any pressure on the eye
- Direct the blue light from the slit lamp or the Perkins tonometer onto the prism head
- Make sure that the tonometer head is perpendicular to the eye
- Move the tonometer forward slowly until the prism rests gently on the centre of the patient's cornea
- With the other hand, turn the calibrated dial on the tonometer clockwise until the two fluorescein semi-circles in the prism head are seen to meet and form a horizontal 'S' shape. (Note: the correct end point is when the inner edges of the two fluorescein semi-circle images just touch)
- Note the reading on the dial and record it in the notes
- Withdraw the prism from the corneal surface and wipe its tip
- Repeat the procedure for the other eye
- Wipe the prism with a clean, dry swab and replace it in the receptacle containing the disinfectant.

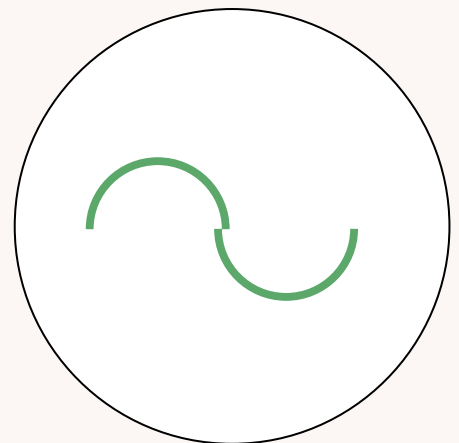
Applanation tonometry rings viewed through the Goldmann prism



High intraocular pressure before the end point is reached will result in this image. Continue to turn the calibrated dial on the tonometer clockwise to reach the correct end point.



Low intraocular pressure will result in this image. Turn the calibrated dial on the tonometer anticlockwise to reach the correct end point.



This is the correct end point – the inner edges of the rings are just touching. This will give a correct reading of intraocular pressure.