



Tonometry



Tonometry

- Tonometry?
 1. Tonometry is the measurement of tension or pressure .
 2. A tonometer is an instrument for measuring tension or pressure .

In ophthalmology, tonometry is the procedure eye care professionals perform to determine the intraocular pressure (IOP), the fluid pressure inside the eye. It is an important test in the evaluation of patients with glaucoma. Most tonometers are calibrated to measure pressure in mmHg.



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Methods of Ophthalmotometry



- Semicircles seen during Goldman tonometry through slit lamp
- Applanation tonometry measures intraocular pressure either by the force required to flatten a constant area of the cornea (e.g. Goldman tonometry) or by the area flattened by a constant force.
- Goldman tonometry is considered to be the gold standard in tonometry as it is the most widely accepted method of determining intraocular pressure. However Goldman tonometry is also an inherently imprecise measurement.



Methods of Ophthalmotometry



- In **Applanation tonometry**, a special calibrated sterile probe attached to a slit lamp biomicroscope is used to flatten part of the cornea. Because the probe makes contact with the cornea, a topical anesthetic, such as oxybuprocaine, tetracaine, alcaine, proxymetacaine or proparacaine is introduced onto the surface of the eye in the form of one or a few eye drops.
- A yellow fluorescein dye is used in conjunction with a cobalt blue filter to aid the examiner in determining the IOP. Perkins tonometer is a special type of portable applanation tonometer, which allows measurement of IOP in children, patients unable to cooperate for slit lamp exam, and in anesthetised patients.



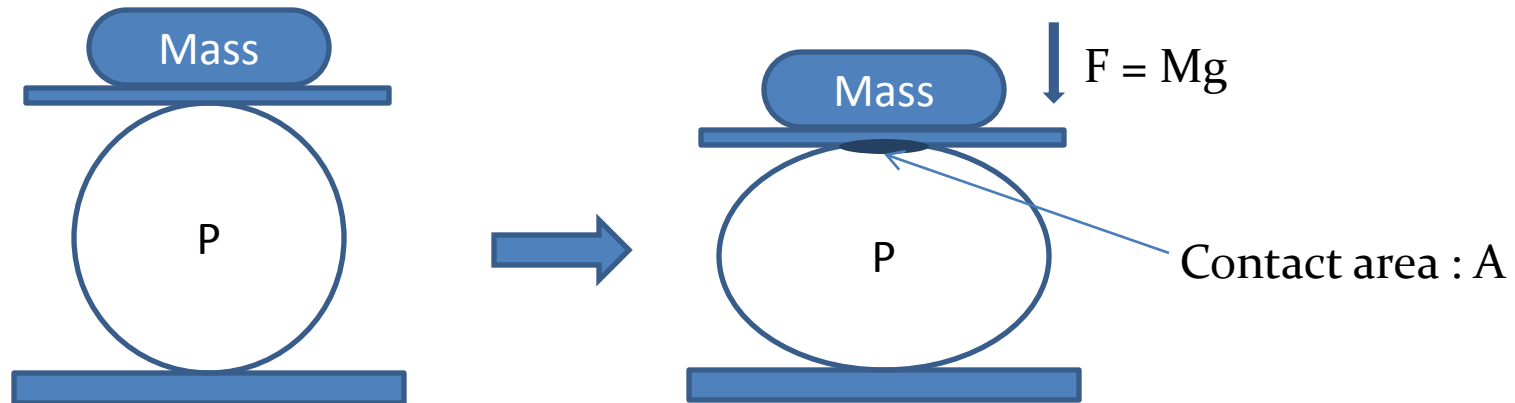
Methods of Ophthalmotometry



- **Pneumotometry**, also known as non-contact tonometry or air-puff tonometry, uses an instrument that senses deflections of the cornea in reaction to a puff of pressurized air. Although not considered to be the most accurate way to measure IOP, it is often used as a simple way to screen for high IOP. It is an easy way to test children. Because non-contact tonometry is accomplished without the instrument contacting the cornea the potential for disease transmission is reduced.



Tonometry

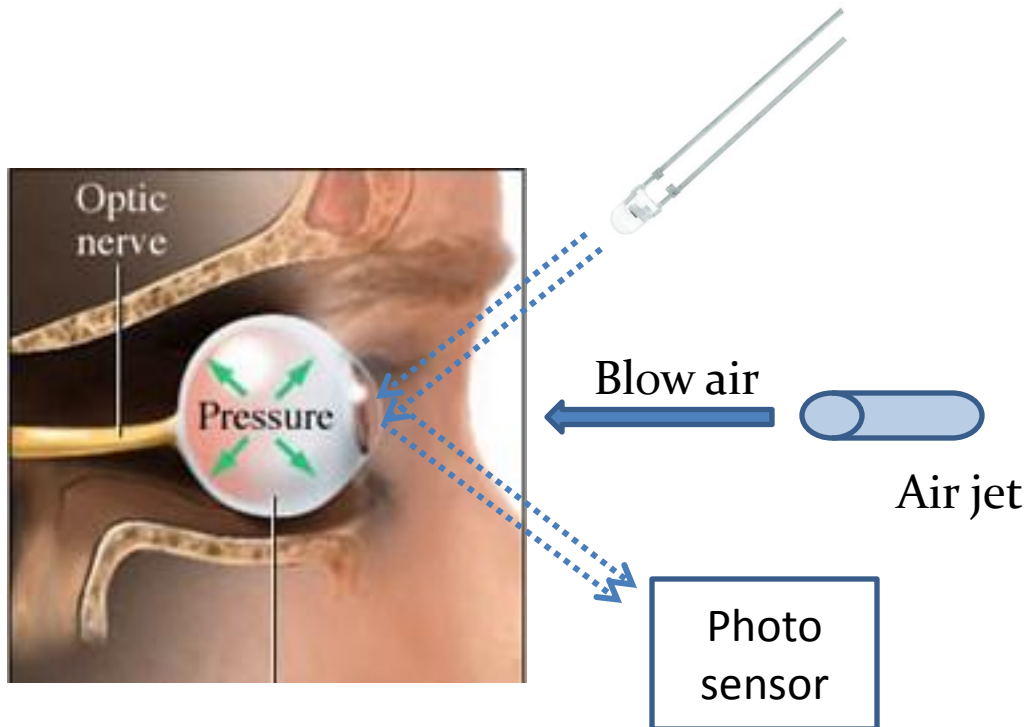


Given by mass of Mass is M (Known), and contact area is A (measurable). Then we can calculate the pressure using this formula.

$$P = \frac{F}{A} = \frac{Mg}{A}$$



Tonometry



When the air jet blow air, part of the cornea is flatten. In the same time, the LED(Light Emitting Diode, Photo diode) emit light. Then the light receiving element(Photo transistor) receive the reflection light by part of the cornea(flat cornea).



Photo sensor

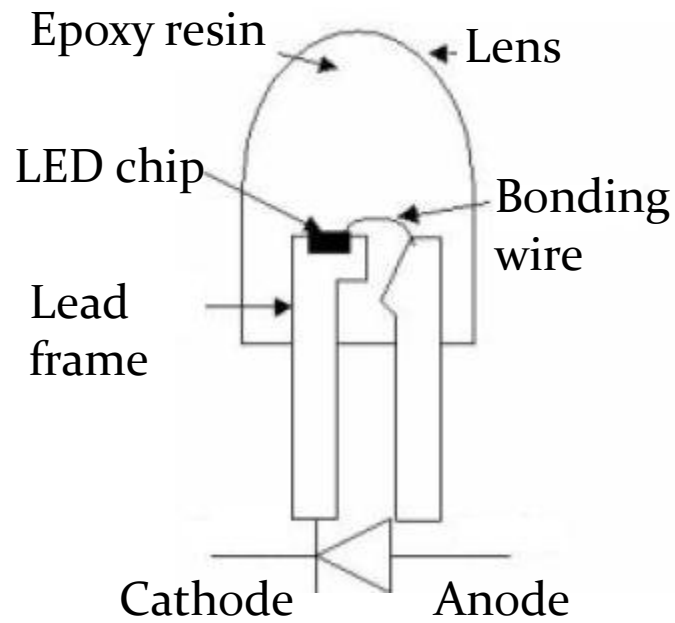


Photo Diode

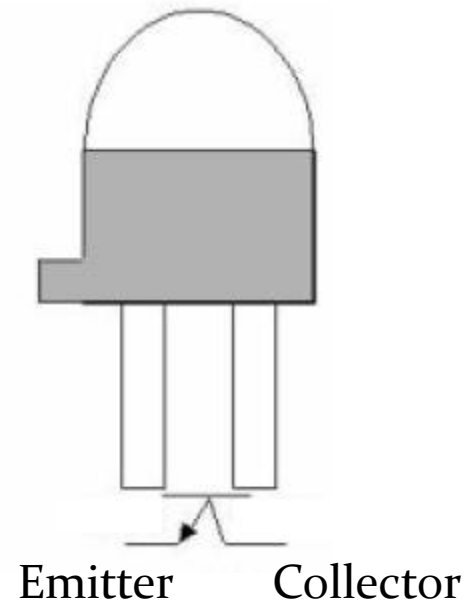


Photo Transistor