Assessment of the anterior chamber

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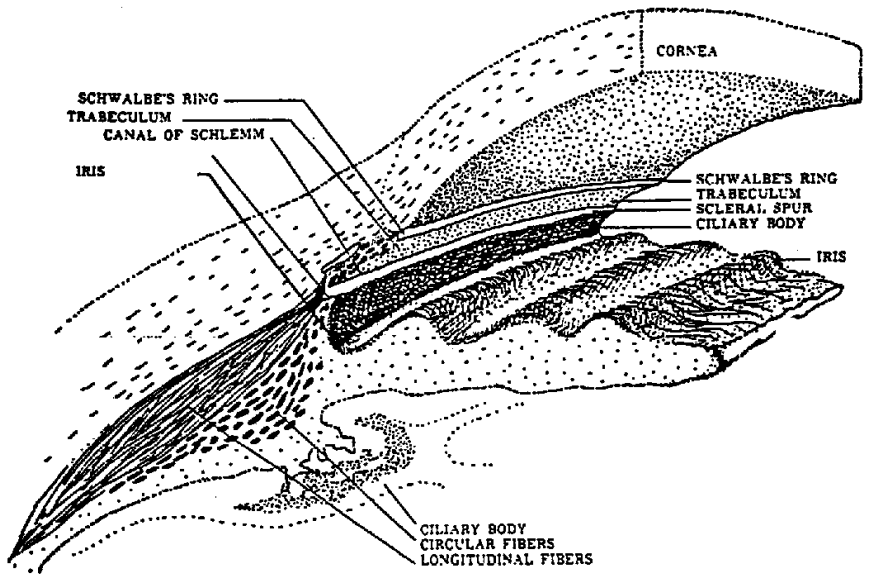
Review of anatomy of the angle

Figure 1. Anatomical section of the angle



Landmarks and some gonioscopic observations

- **Pupil.** Visible with the gonioscope if dilated.
- **Iris.** Colour varies between individuals.
- **Iris root/insertion**. The last roll of the iris may obscure the view of the ciliary body
- **Ciliary body**. Longditudinal muscle. Colur varies between individuals - may be pale brown, grey or dark.
- **Scleral spur**. Protrusion of sclera into anterior chamber. Attached to ciliary body posteriorly and trabecular meshwork anteriorly.
- **Trabecular meshwork.** Multilayered network of fenestrated lamellae and endothelial cells drainis aqueous into **Canal of Schlemm** which may visible when full of blood (e.g. in hypotony or when excess force applied to sclera during gonioscopy. Most of the drainage occurs via the posterior, more

pigmented, portion of the trabecular meshwork. There are variations in colour but usually grey with varying degrees of pigmentation.

- **Schwalbe's line.** Delineates the anterior edge of the trabecular zone and represents the termination of Descemet's membrane. Very fine glossy white line.
- Posterior surface of **Cornea.** Observe limbal loops.

Other normal and and not so rare abnormal structures

- **Iris processes. Normal** variation. Fine bands of iris extending anteriorly to attach to ciliary body or scleral spur.
- **Peripheral anterior synechiae**. **Abnormal.** May be associated with ICE (iridocorneal endothelial syndrome) or post argon laser trabeculoplasty.
- **Neovascularisation of the angle. Abnormal .** (e.g. diabetes, CRV occlusion)

Reasons for anterior chamber examination include:

- to rule anterior segment inflammation (e.g. anterior uveitis)
- to detect eyes at risk from angle closure
- to differentially diagnose open angle, closed angle, primary and secondary glaucomas
- to assess eyes at risk from developing anterior chamber sequelae to other disease e.g. diabetes mellitus, CRV occlusion

Methods of assessing the anterior chamber

Much of the anterior chamber is readily visible with the slit lamp biomicroscope. However the approach to the trabecular region is obscured from view in all eyes except some rare exceptions for two reasons:

- the overlap of the the sclera obscuring the frontal view
- oscuration of a lateral view because of total internal reflection within the cornea (*Figure 2)*

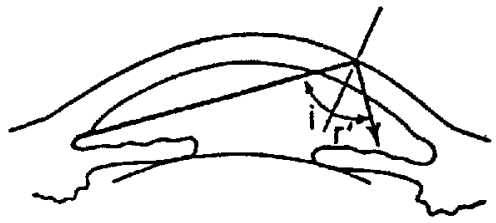


Figure 2. Light returning from the angle is totally internally reflected within the cornea

1) **Slit lamp examination** of the visible anterior segment structures and aqueous for aqueous flare and cells, posterior or anterior synechiae, iris hypoplasia, abnormal iris vessels or pigmentation, Krukenberg's spindle.

2) **Slit lamp** estimation of the **anterior chamber "angle"** (e.g. Van Herrick)

- ***Van Herrick's technique***

  Optical section
  60° between observation and illumination
  Full slit length
  Magnification approximately x 15
  Low to medium illumination

- Place optical section just inside limbus. Assuming the corneal thickness = 1 unit, assess the width of the "aqueous gap" from corneal endothelium to iris.

Table 1 . Van Herrick and Schaffer grades

Grade	*Ratio of aqueous gap/cornea*	*Clinicical interpretation*	*Schaffer angle degrees*
4	> ½ / 1	Closure impossible	45-35
3	½ - ¼ / 1	Closure impossible	35-20
2	¼ / 1	Closure possible	20
1	< ¼ / 1	Closure likely with full dilation	10 or less
0	nil	Closed	0

3) **Slit lamp** estimation of the **anterior chamber depth** (or with **ultrasound**)

- The average adult eye has a chamber depth of 3.15 mm The chamber shallows by 0.01 mm per year. An eye with an anterior chamber depth of less than 2.5 mm is at risk for angle closure.

- ***Slit lamp technique for assessing depth***

- Using the central corneal thickness (approximately 0.5 mm) as a reference, estimate the depth of the chamber.

4) **Gonioscopic** visualisation and grading of the anterior chamber drainage angle structures

- Because of the reasons outlined above, in order to view the trabecular region the effect of the corneal curvature must be neutralised. This can be

produced in two ways.

(a) **Direct gonioscopy** - the anterior curve of the contact lens ***(goniolens)*** is such that the critical angle is not reached and the light rays are refracted at the contact lens/air interface *(Figure 3)*

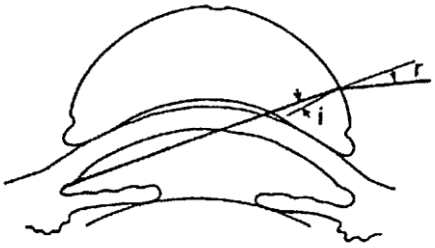


Figure 3 Goniolens

(b) **Indirect gonioscopy** - light rays are reflected by a mirror in the contact lens ***(gonioprism)*** and leave the lens at nearly a right angle to the contact lens-air interface

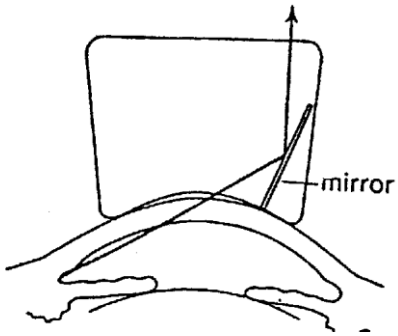


Figure 4 Goniolens

Gonioscopic grading of the angle

- There are a number of grading systems.

- **Schaffer's method**
  Simplistic but useful.
  Estimation of the angle which the iris makes with the ciliary body/trabeculum.
  Corelates well with Van Herrick. **(see Table 1)**
  Does not take into account position of iris insertion or the pupillary block scenario

- **Spaeth's system of grading**
  Assesses and grades the following:
  iris insertion
  angle

contour of most peripheral iris
iris processes
pigmentation of posterior trabeculum

- Contraindications for ***gonioscopy:***
  Hyphaema
  Compromised cornea (e.g corneal ulcer)
  Lacerated or perforated globe