

Basics of slit lamp microscopy

Dr. S S Bhatti

www.bhattieye.com

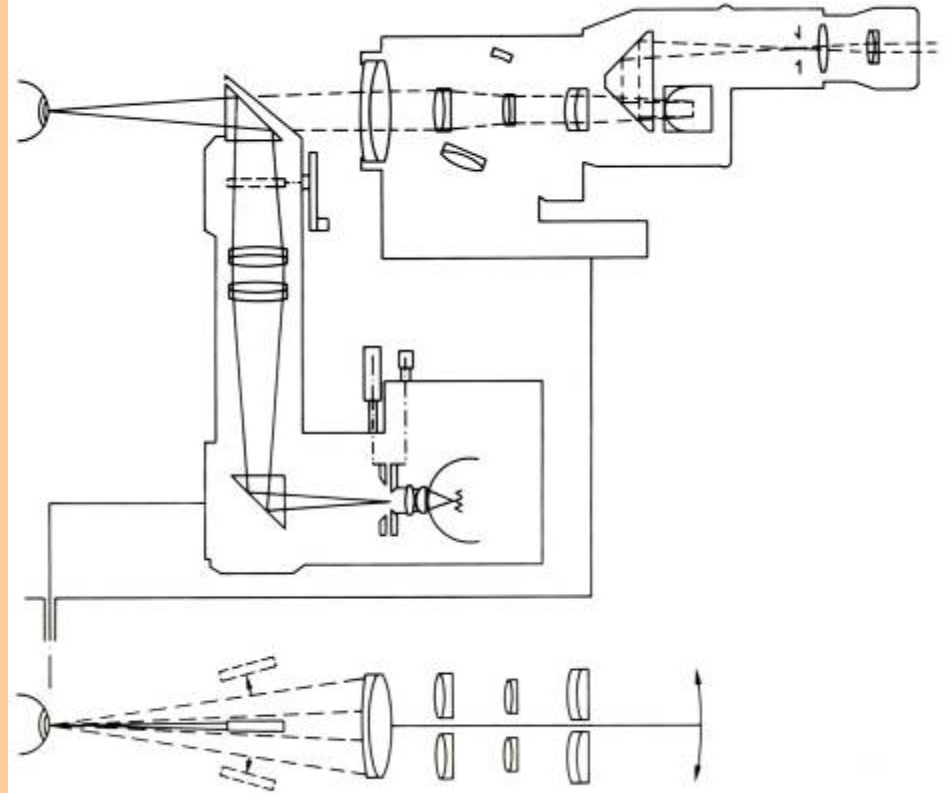
The 2 basic parts of the slit lamp biomicroscope are:

- The slit lamp (illumination system)
- The biomicroscope

The illumination system can be

1. Of the Zeiss type
2. Of the Haag Streit type

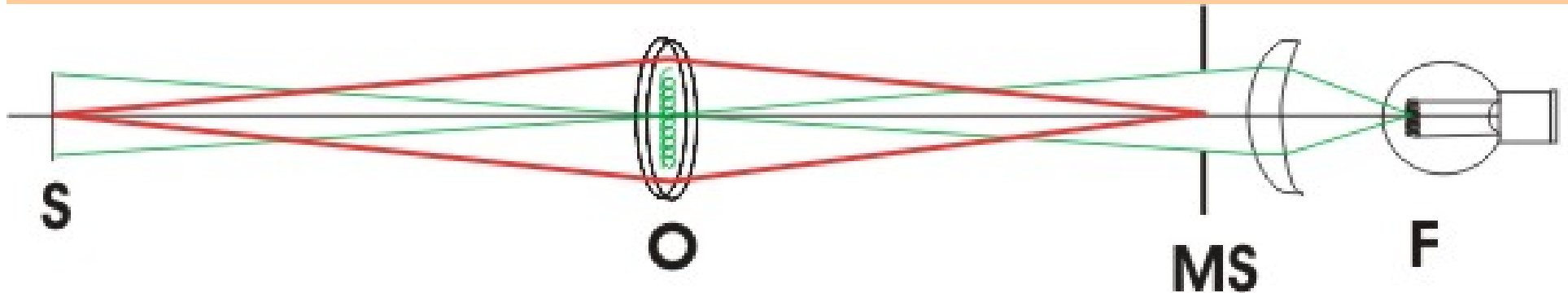
In the Zeiss type the illumination comes from below



In the Haag Streit type the illumination comes from above



In both types of illumination system the Kohler illumination principle is used:



The Interwoven beam path in Kohler illumination

The filament is imaged on to the objective lens but the mechanical slit is imaged on to the patient's eye

The biomicroscope: based on the optics of a compound microscope

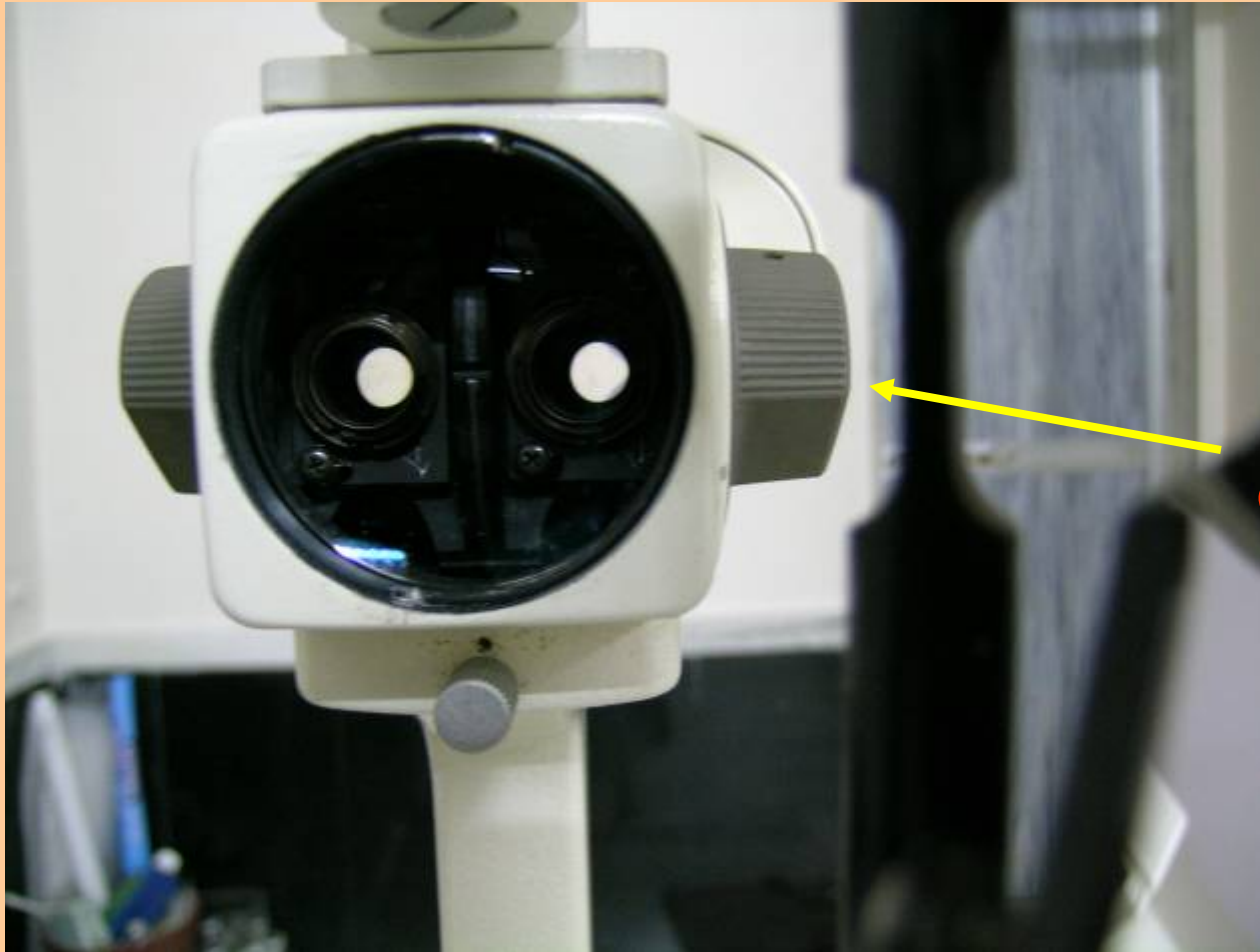
- **Two basic types:**
 - **The Grenough type**
 - **The Galilean changer type**

The Grenough type(Classical Haag Streit)

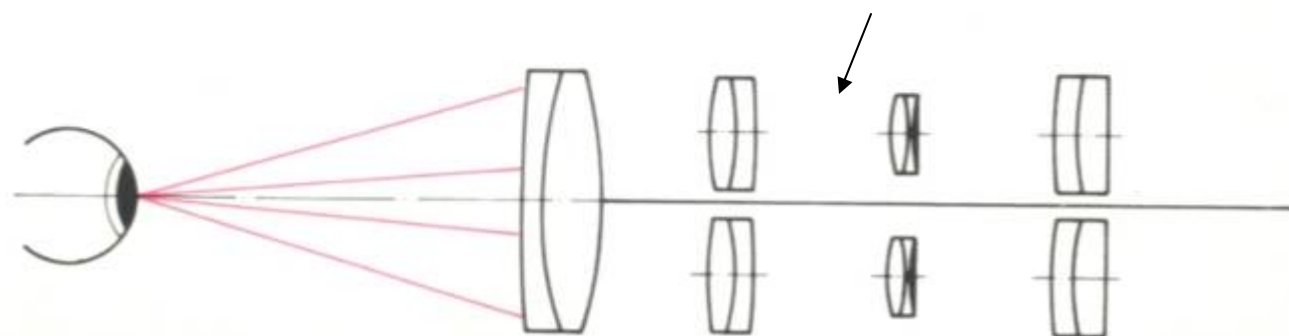
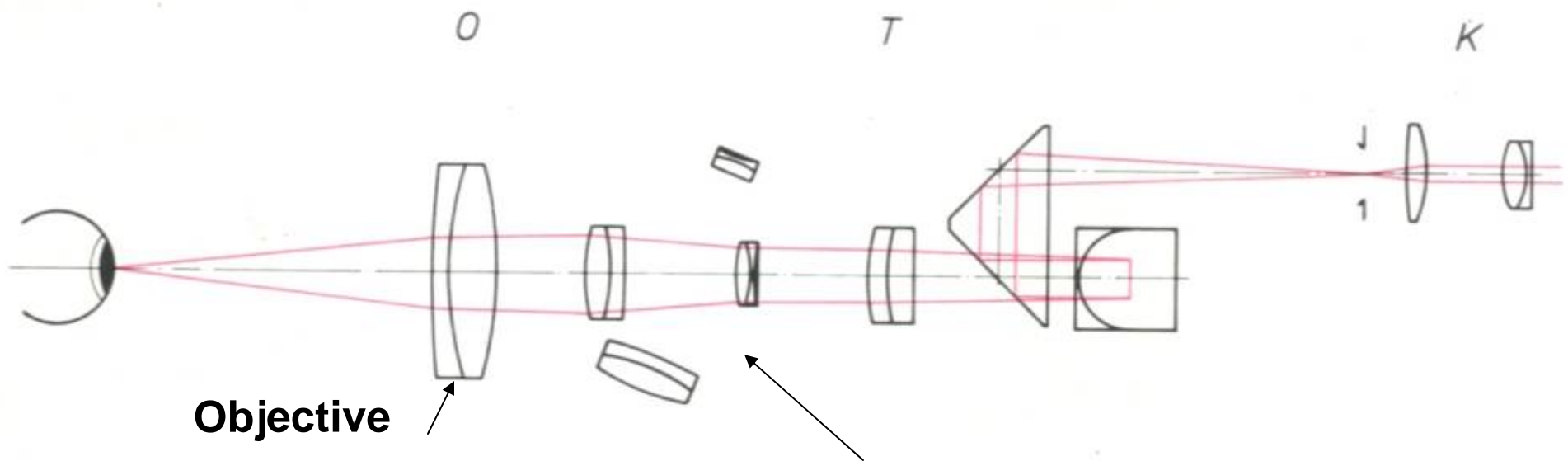


Flip lever to change magnification

The Galilean Magnification changer



**Knob to change
magnification (3
or 5step)**



Magnification can also be changed by changing the eyepiece power



The slit lamp and the biomicroscope are manoeuvred together on a cross slide by means of a joystick

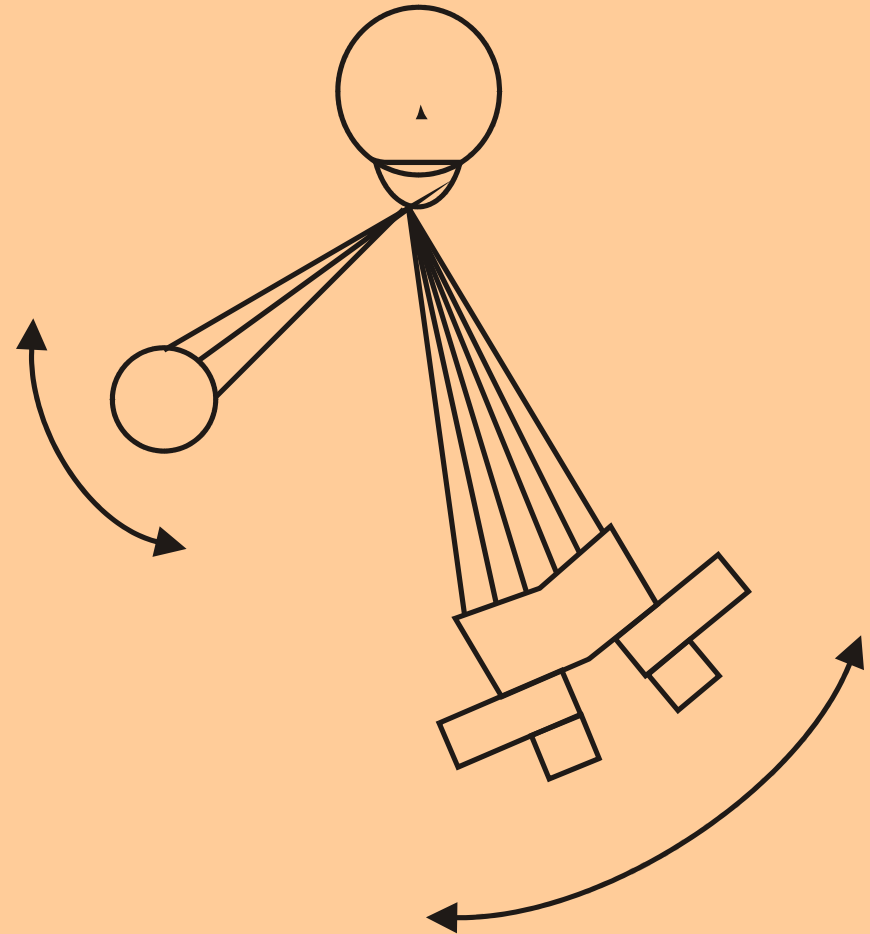


The coupling between the slit lamp and the biomicroscope

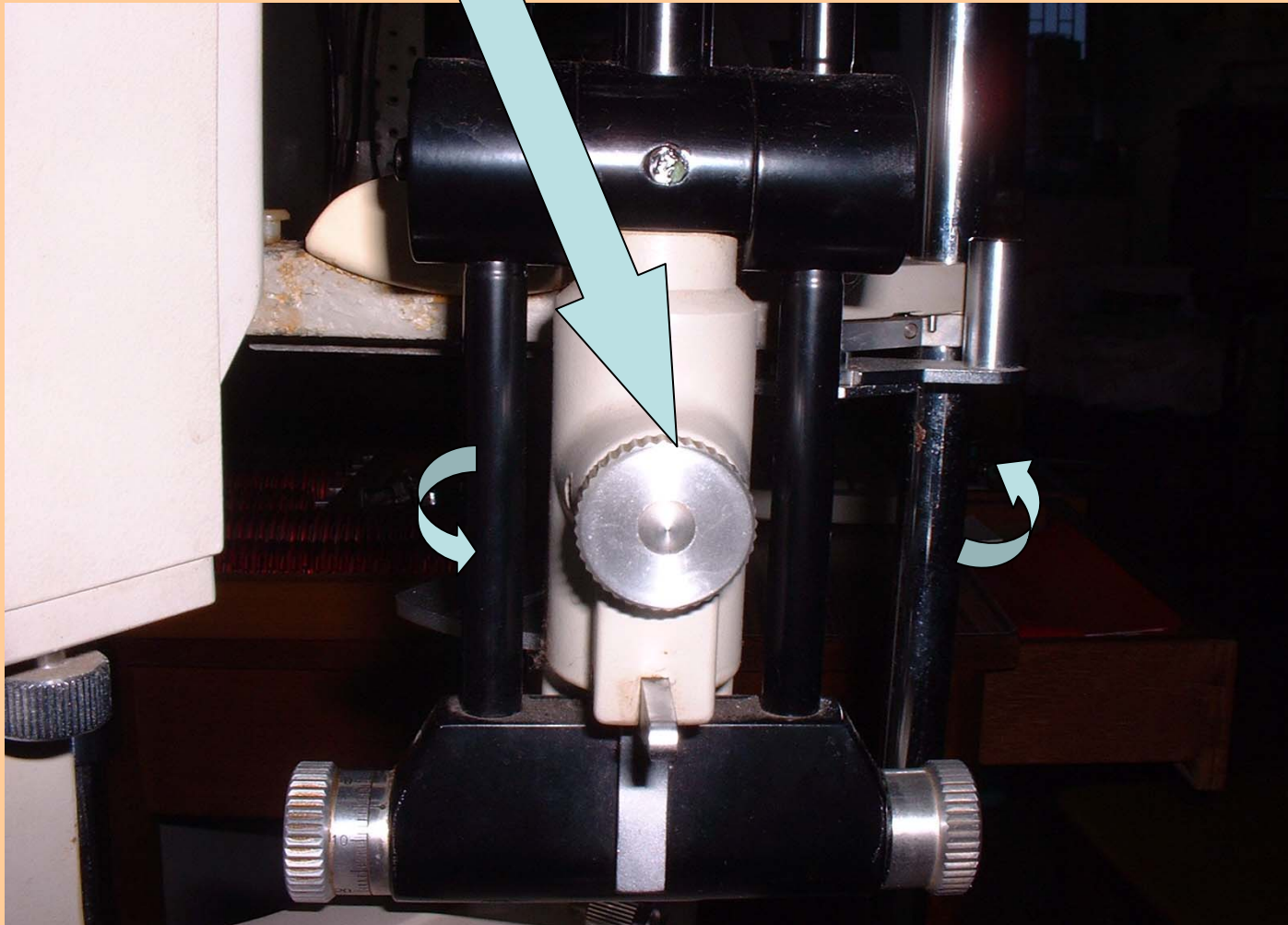
- This is such as to make the system “parfocal”
- i.e the focus of the slit and the focus of the microscope are at the same point.
- This parfocality may occasionally need to be dissociated as for example in the technique of sclerotic scatter

The coupling between the slit lamp and the biomicroscope

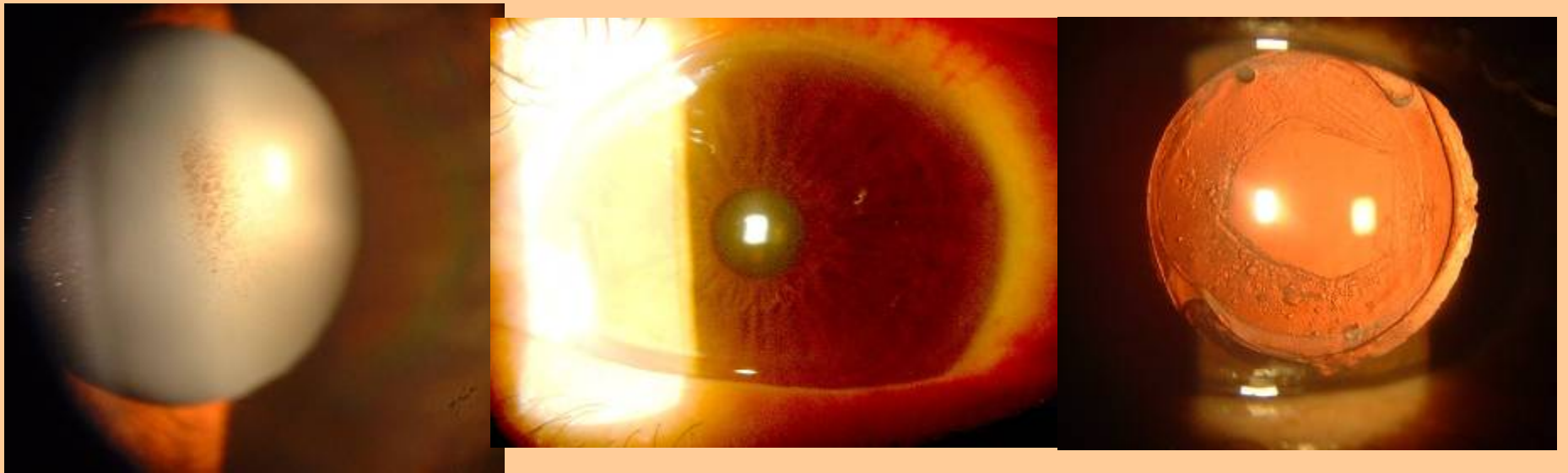
- This allows both the slit and the microscope to rotate about the point of focus (i.e the eye)



Dissociation of parfocality can be done in “Haag Streit” type slit lamps by loosening the sclerotic scatter knob



This dissociation of parfocality is useful for indirect illumination, sclerotic scatter and retroillumination



- The key to successful examination of the anterior segment is knowledge of the various methods of lighting which can be achieved by the slit lamp.

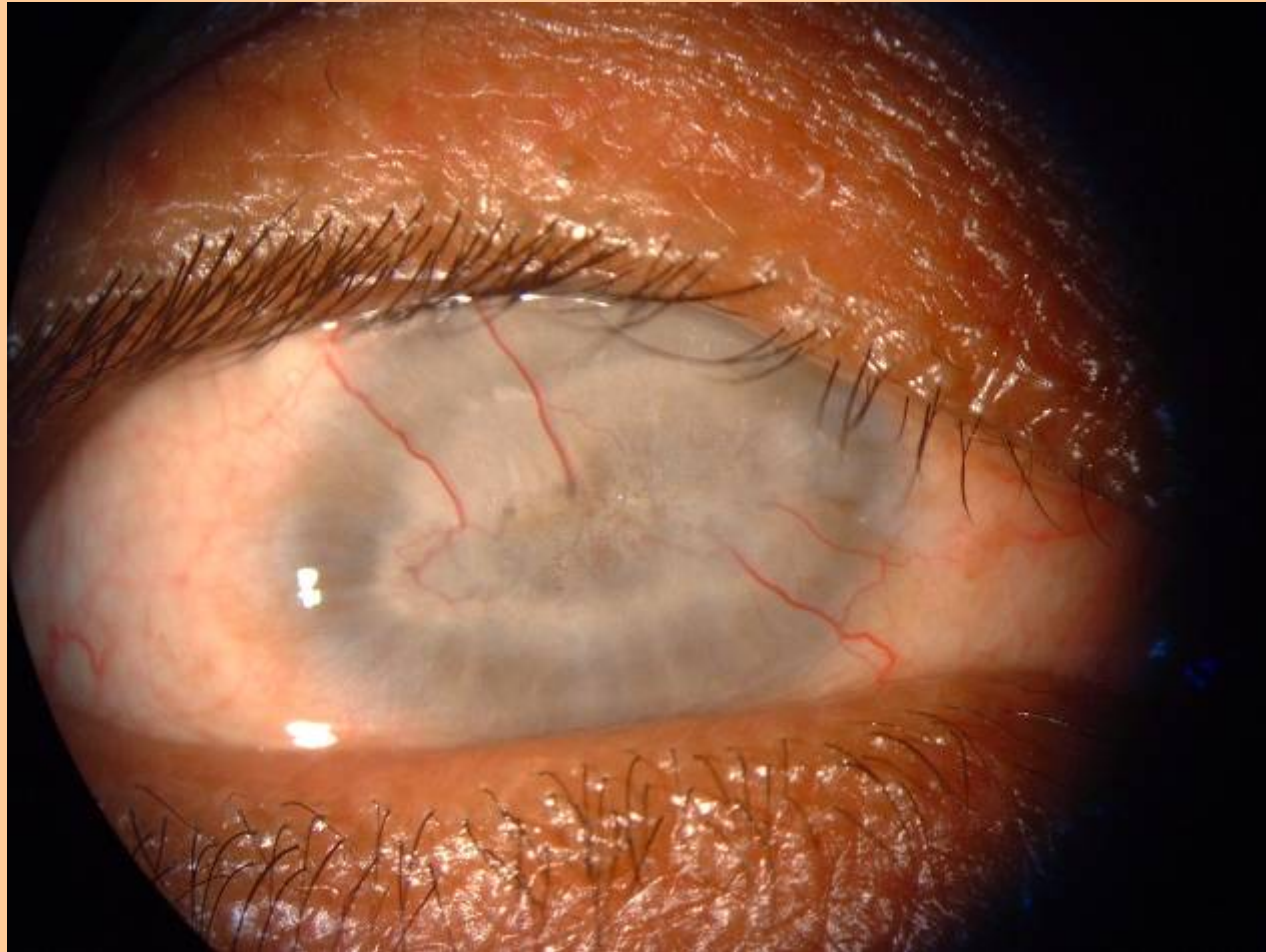


Diffuse illumination

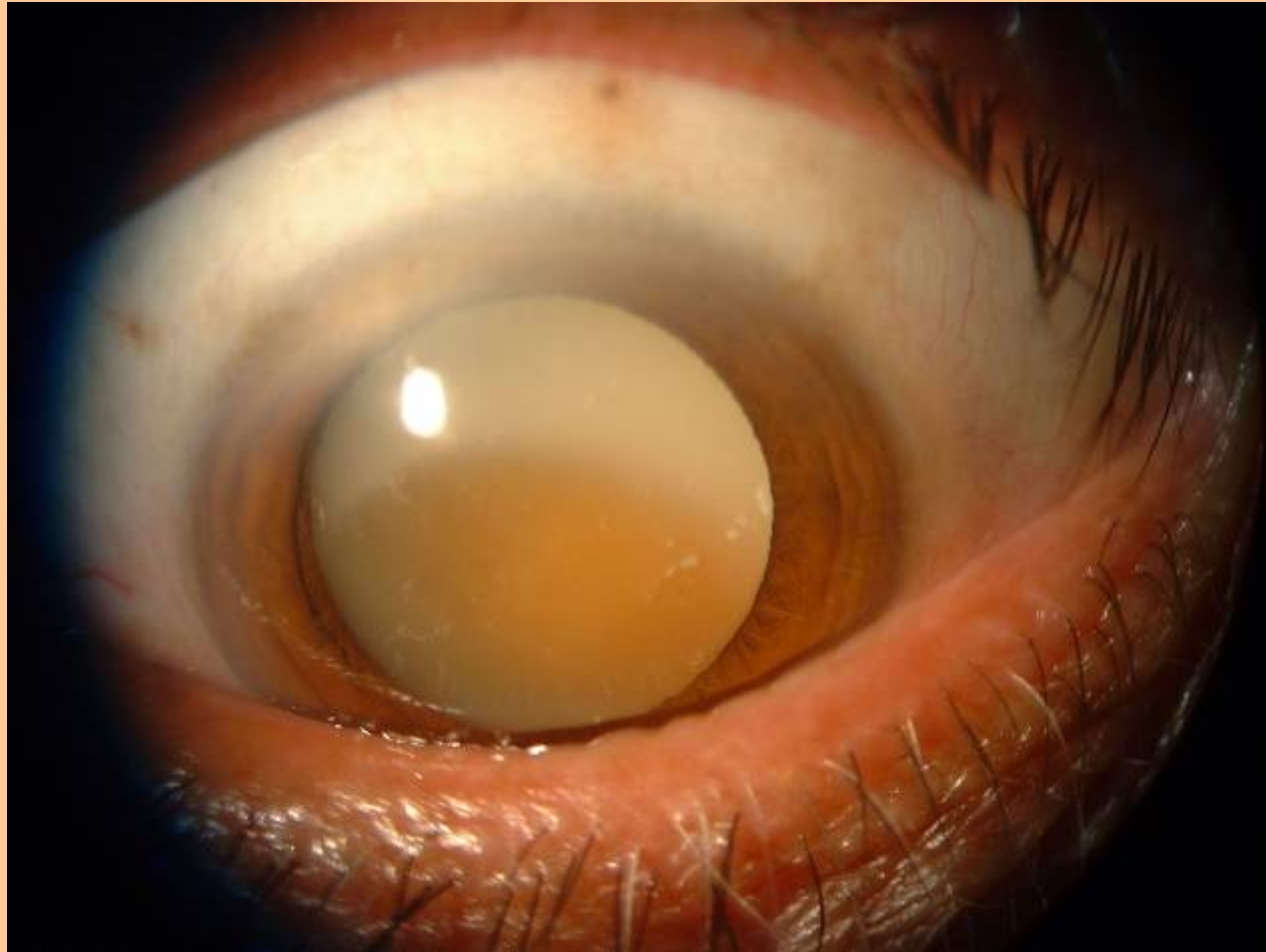
- Not all slit lamps have this option



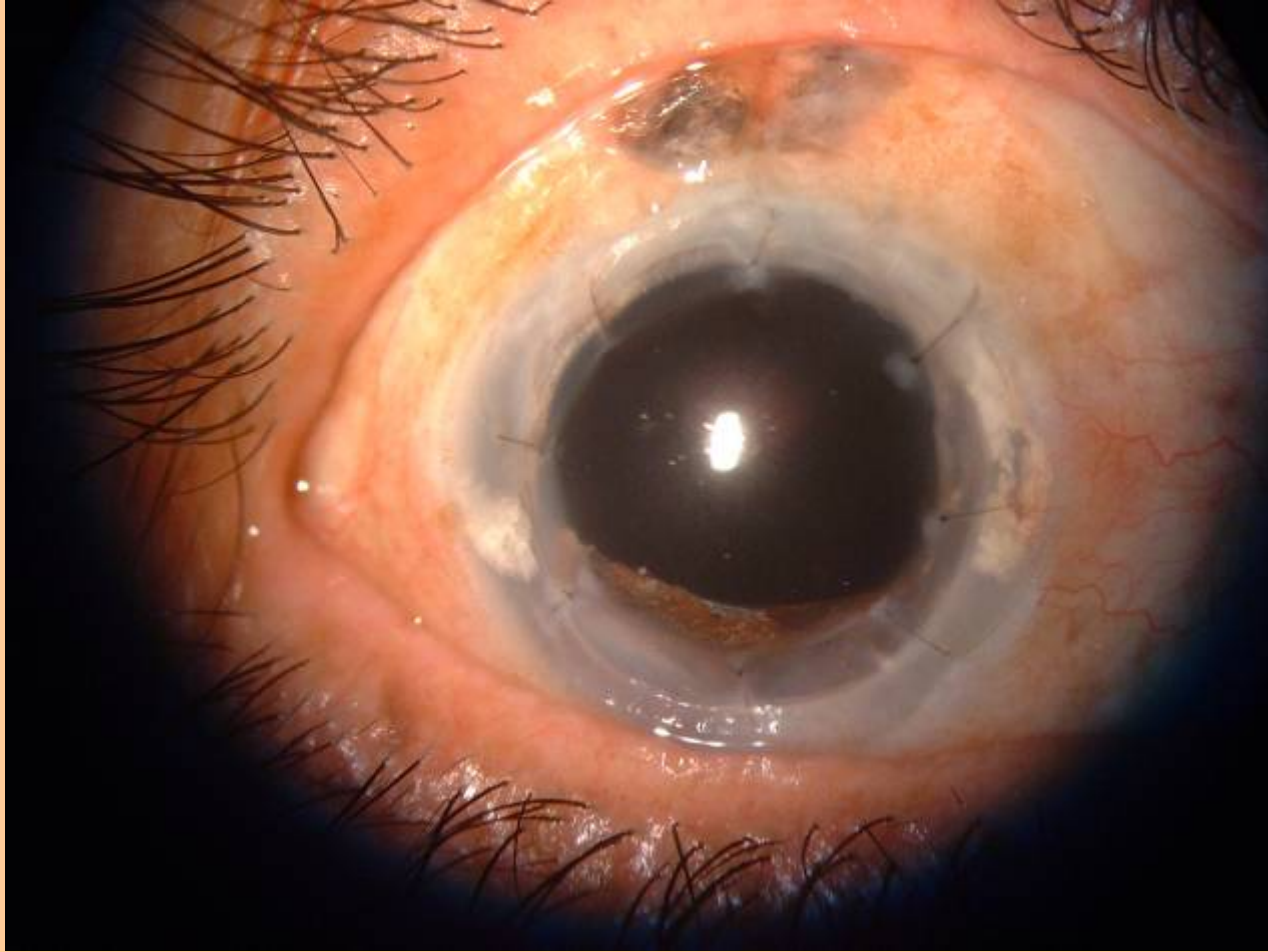
Diffuse illumination for surface details



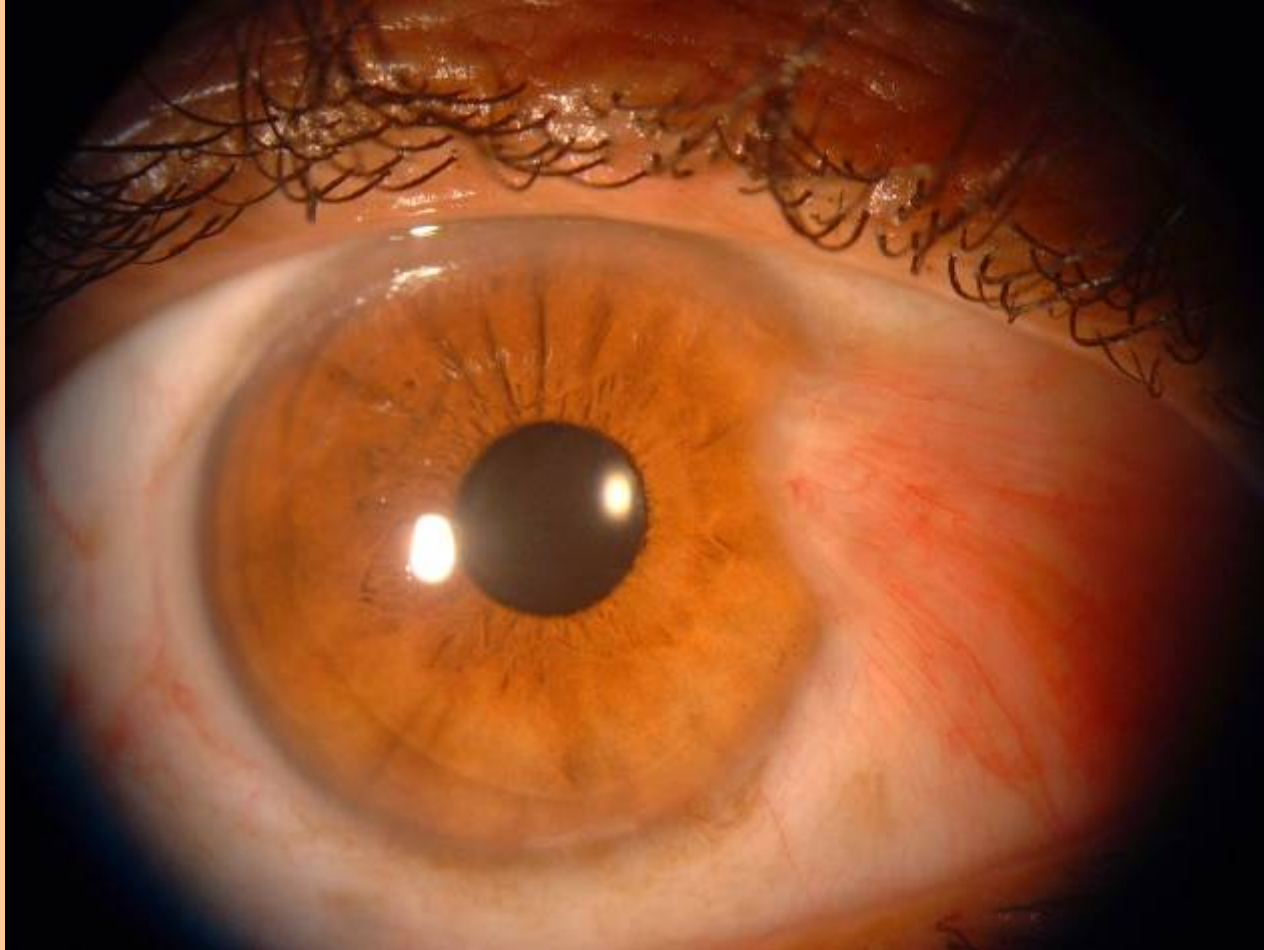
Diffuse illumination



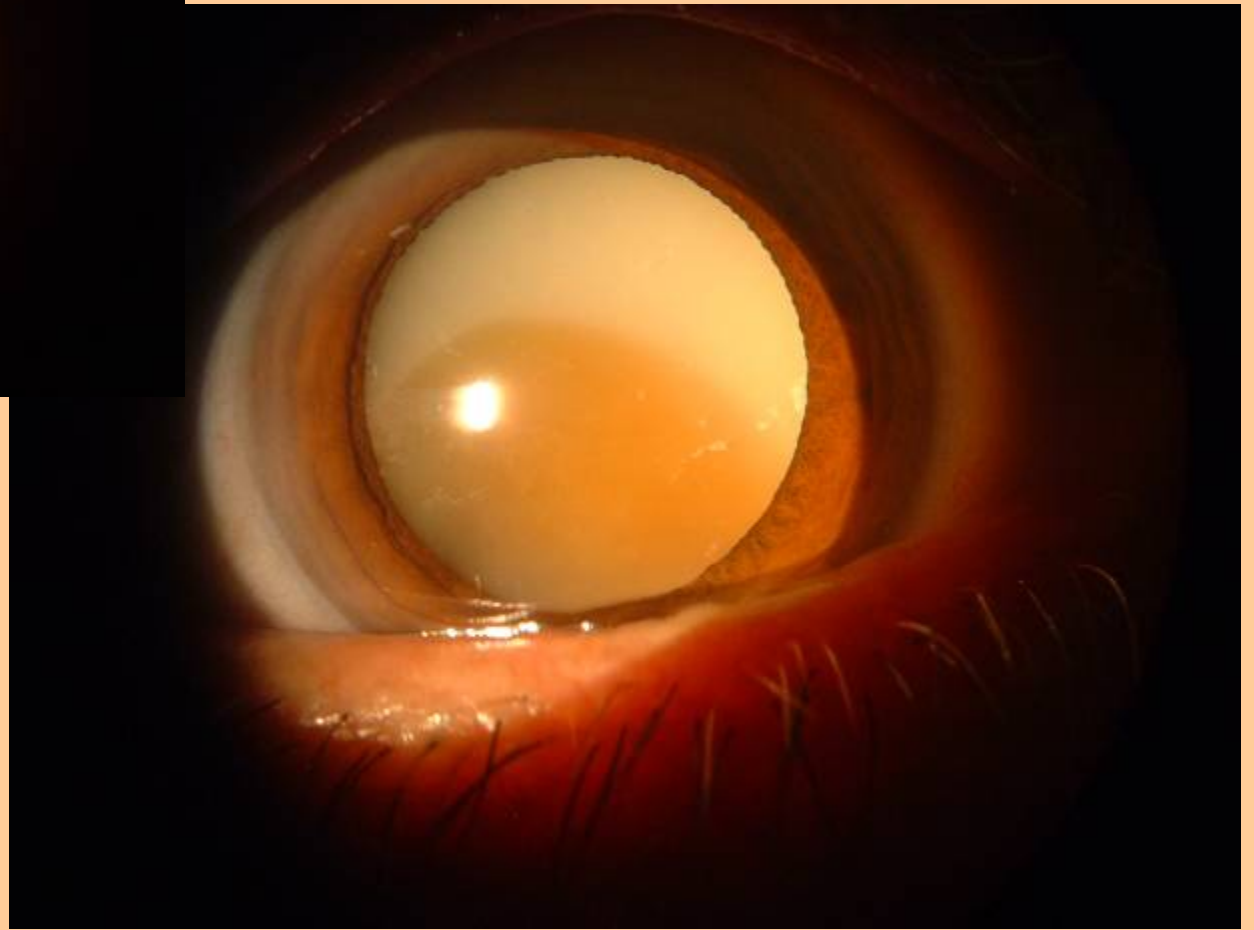
Diffuse illumination



Diffuse illumination



Focal broadband illumination



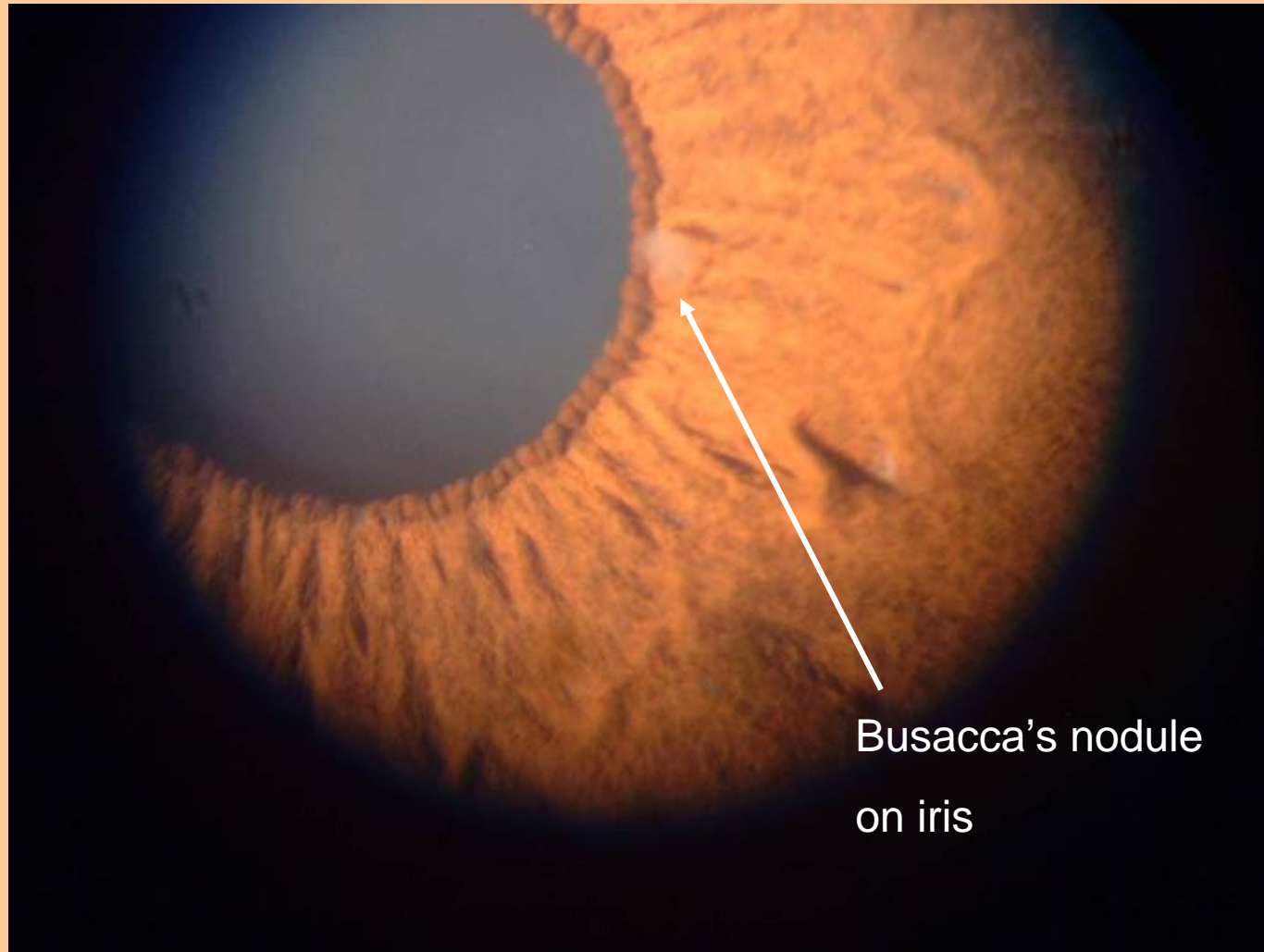


Broad beam

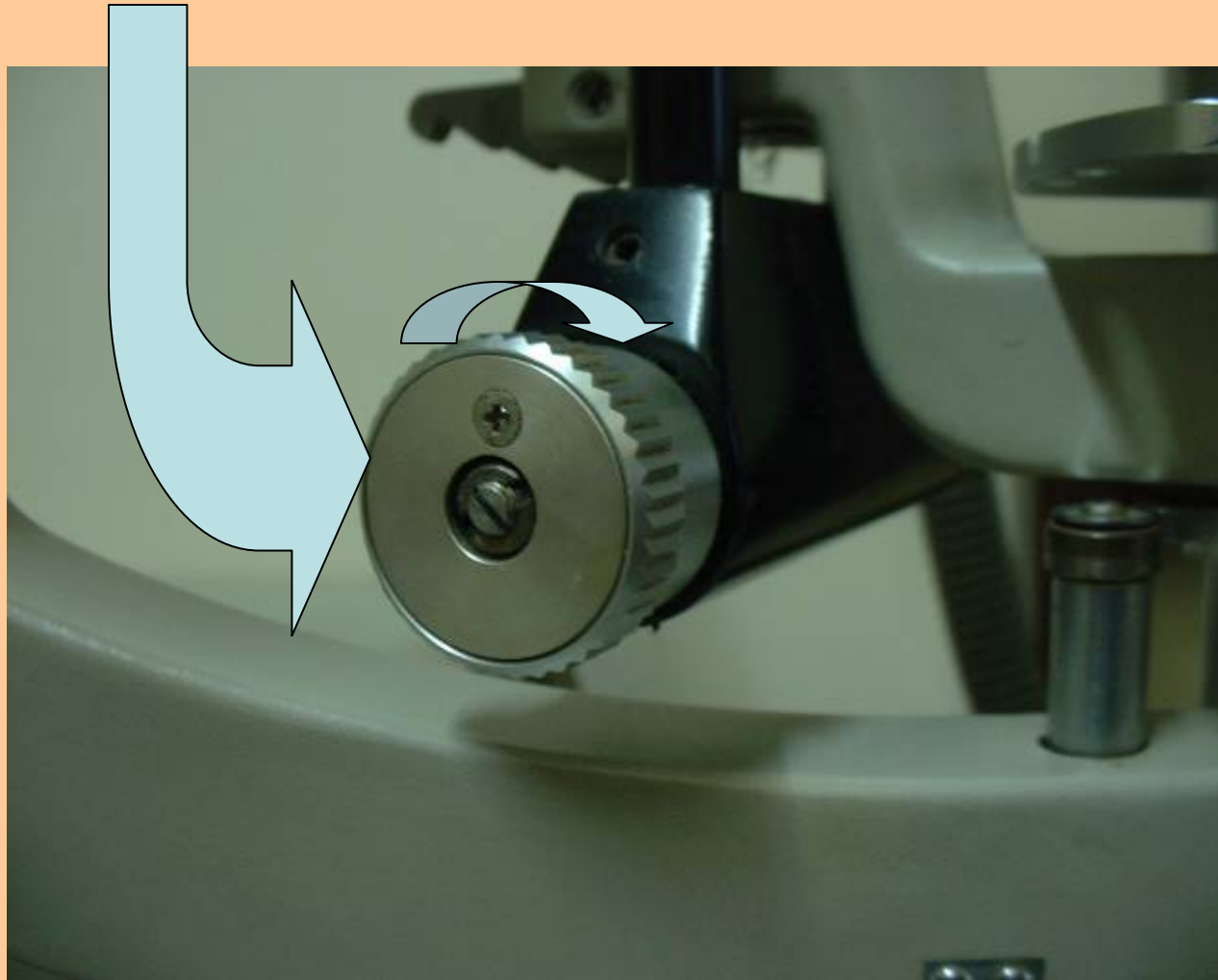


Narrow beam

Focal broad beam



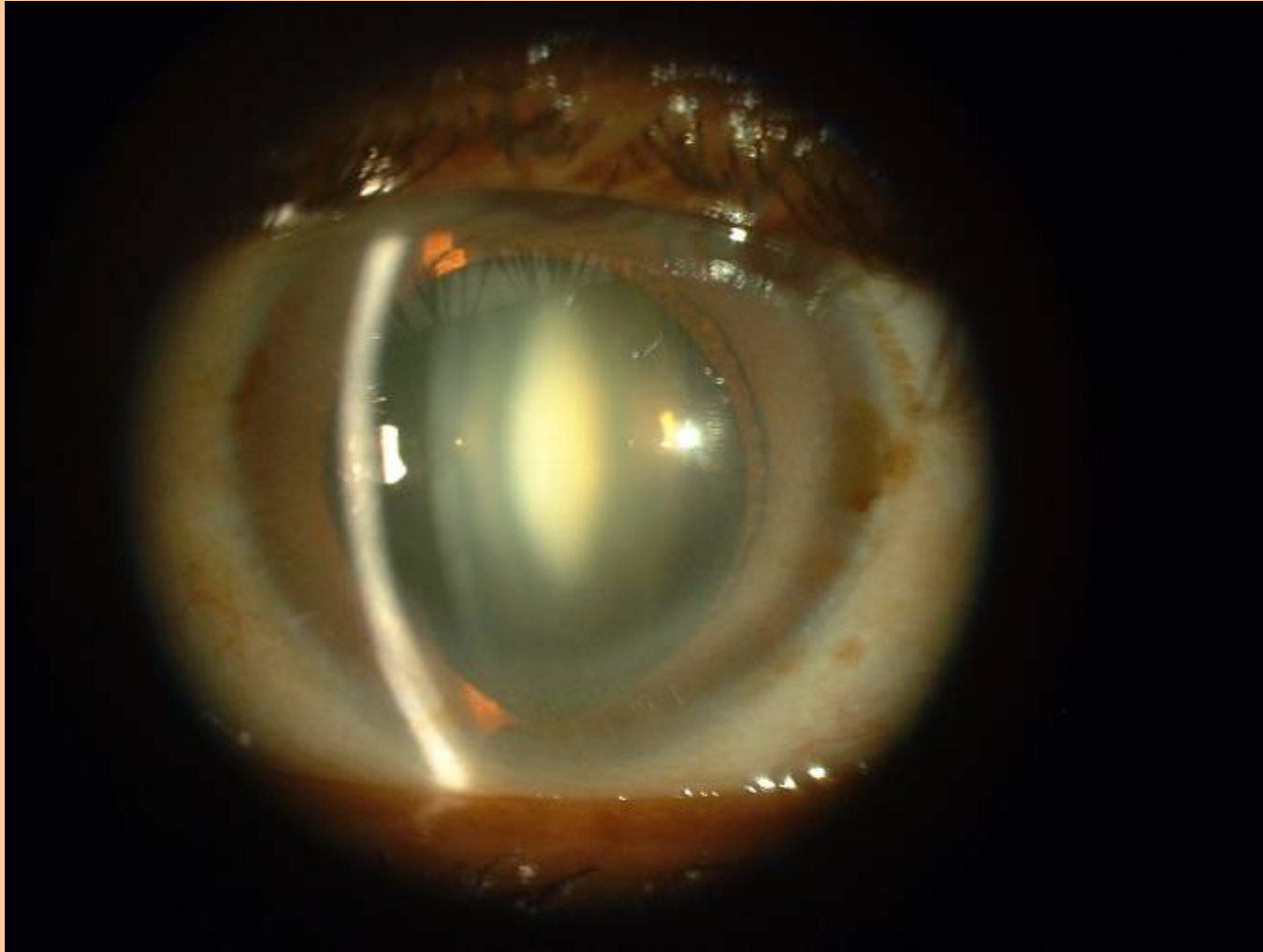
Knob to widen beam



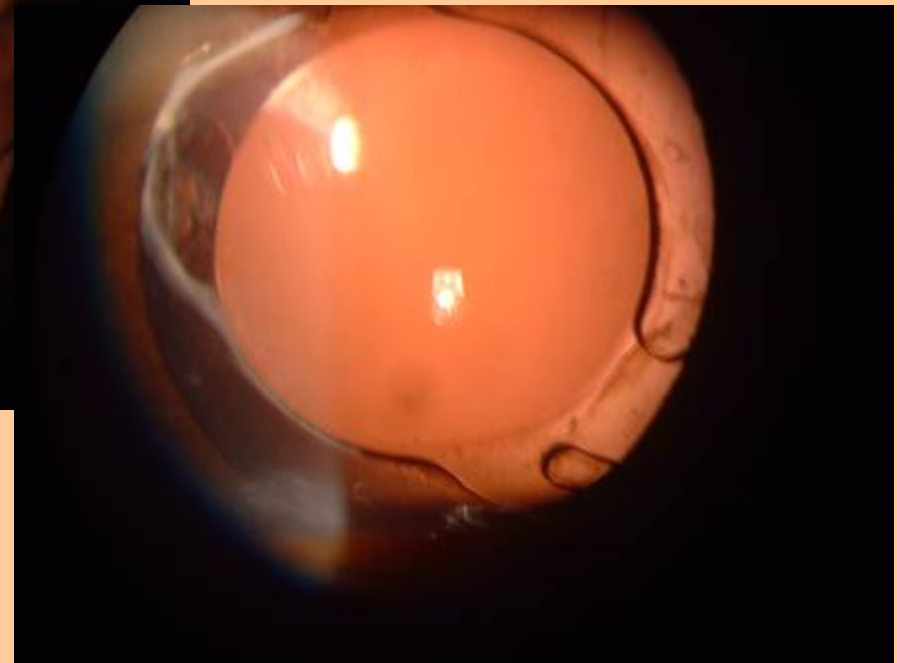
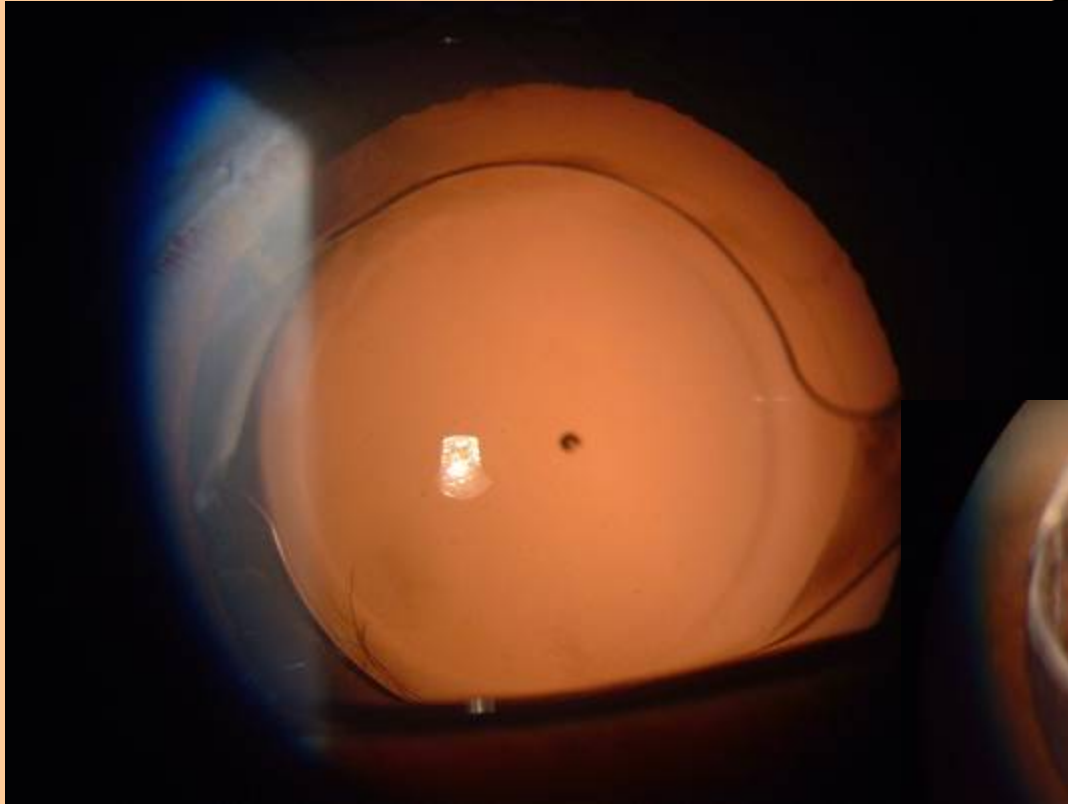
Focal slit illumination



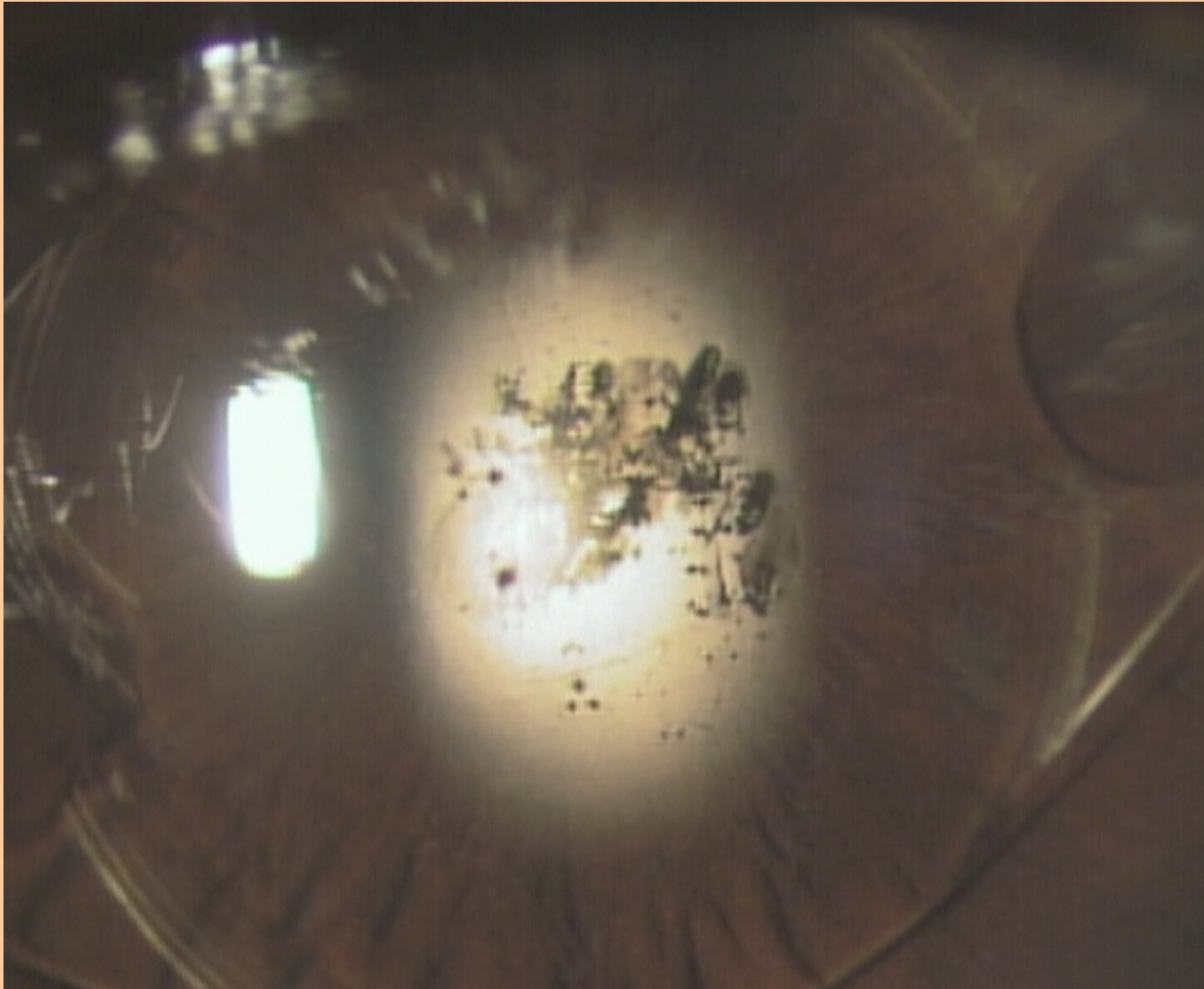
Focal slit illumination



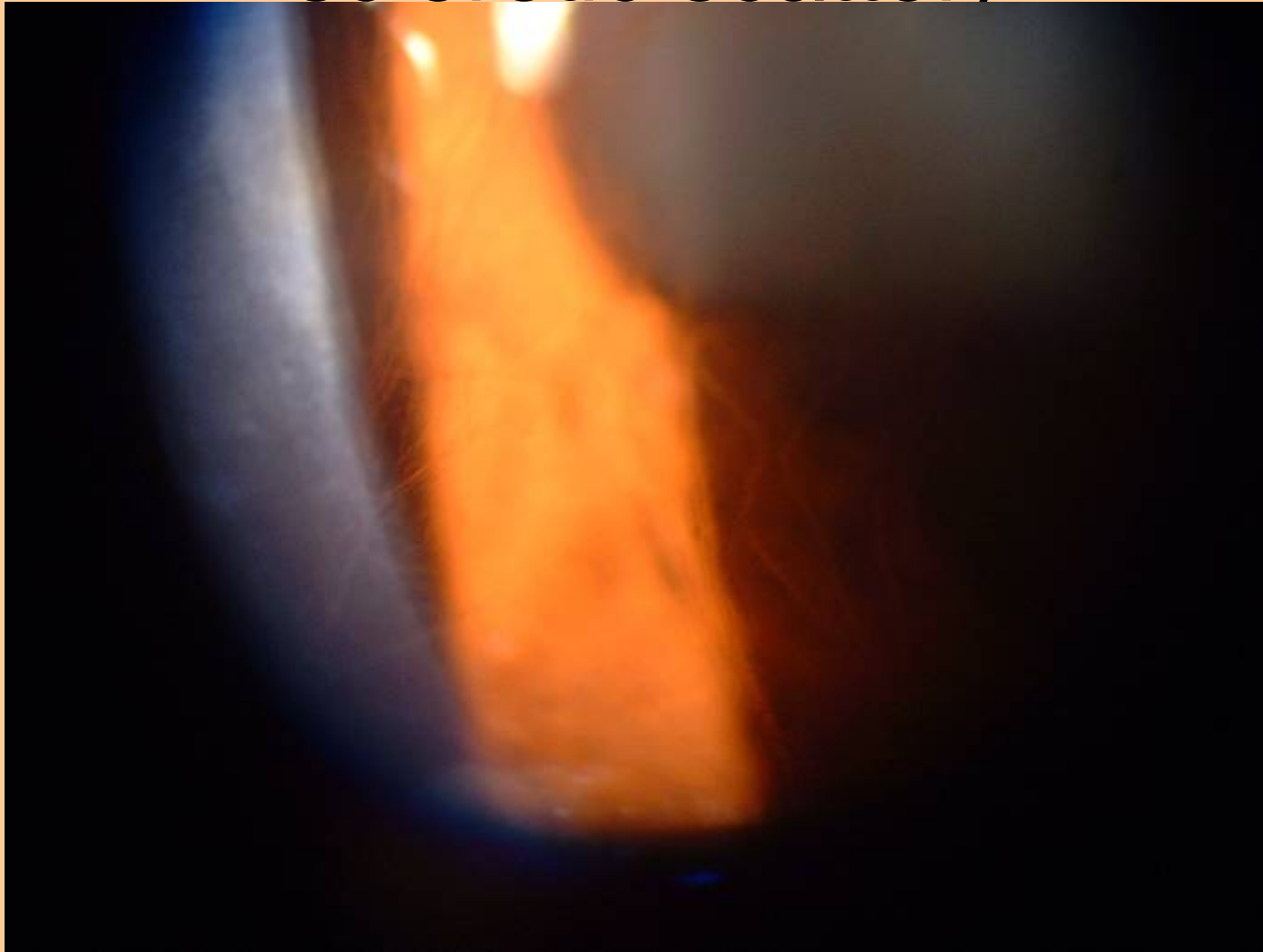
Retroillumination- against red glow



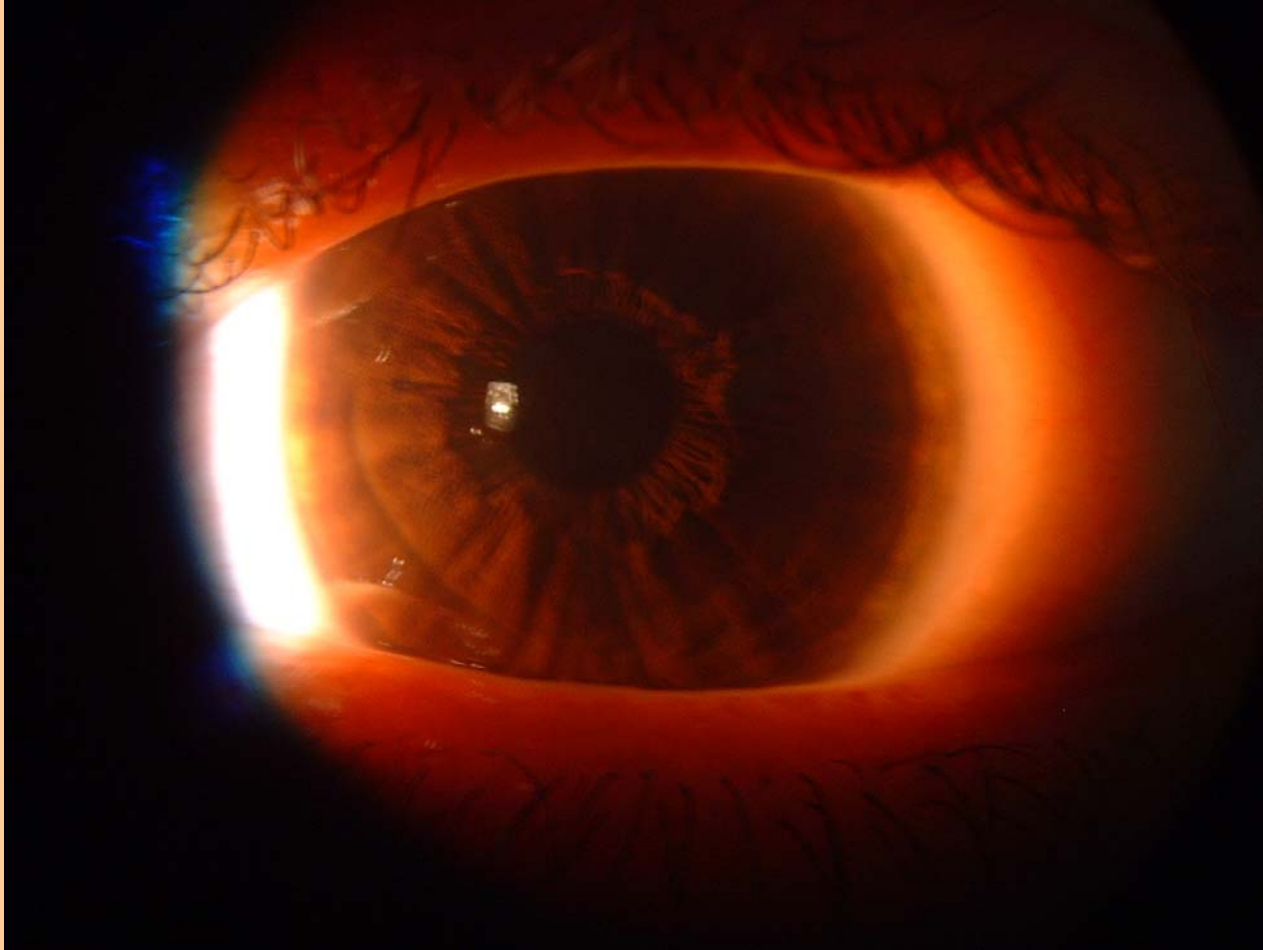
Retroillumination- YAG pits on claw IOL



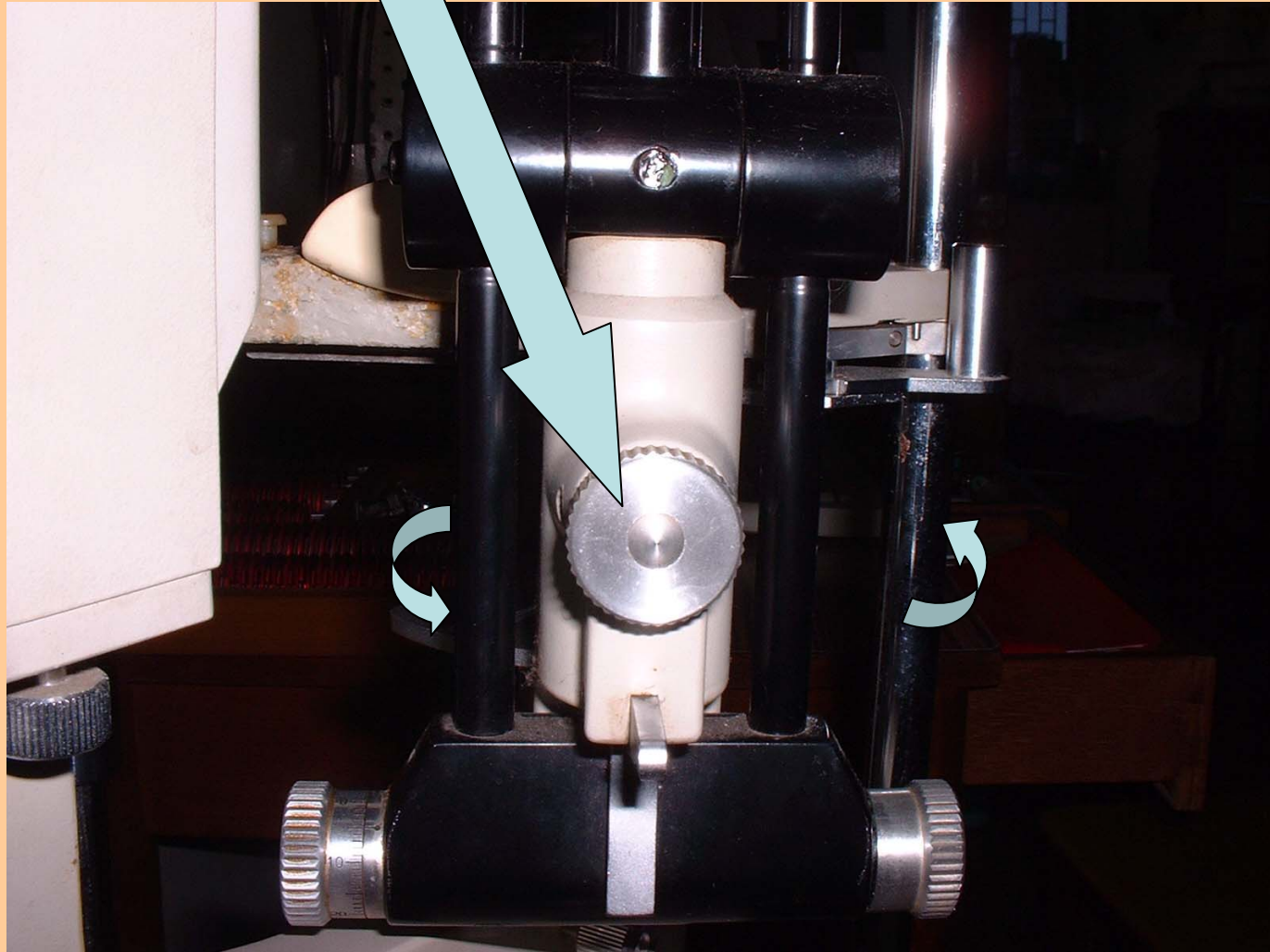
Indirect illumination(similar to
sclerotic scatter)



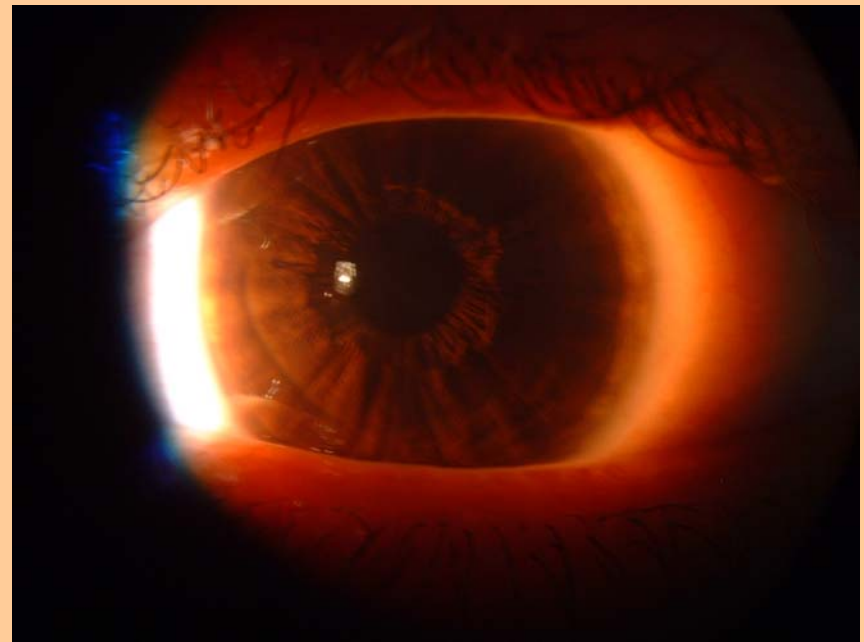
Sclerotic scatter



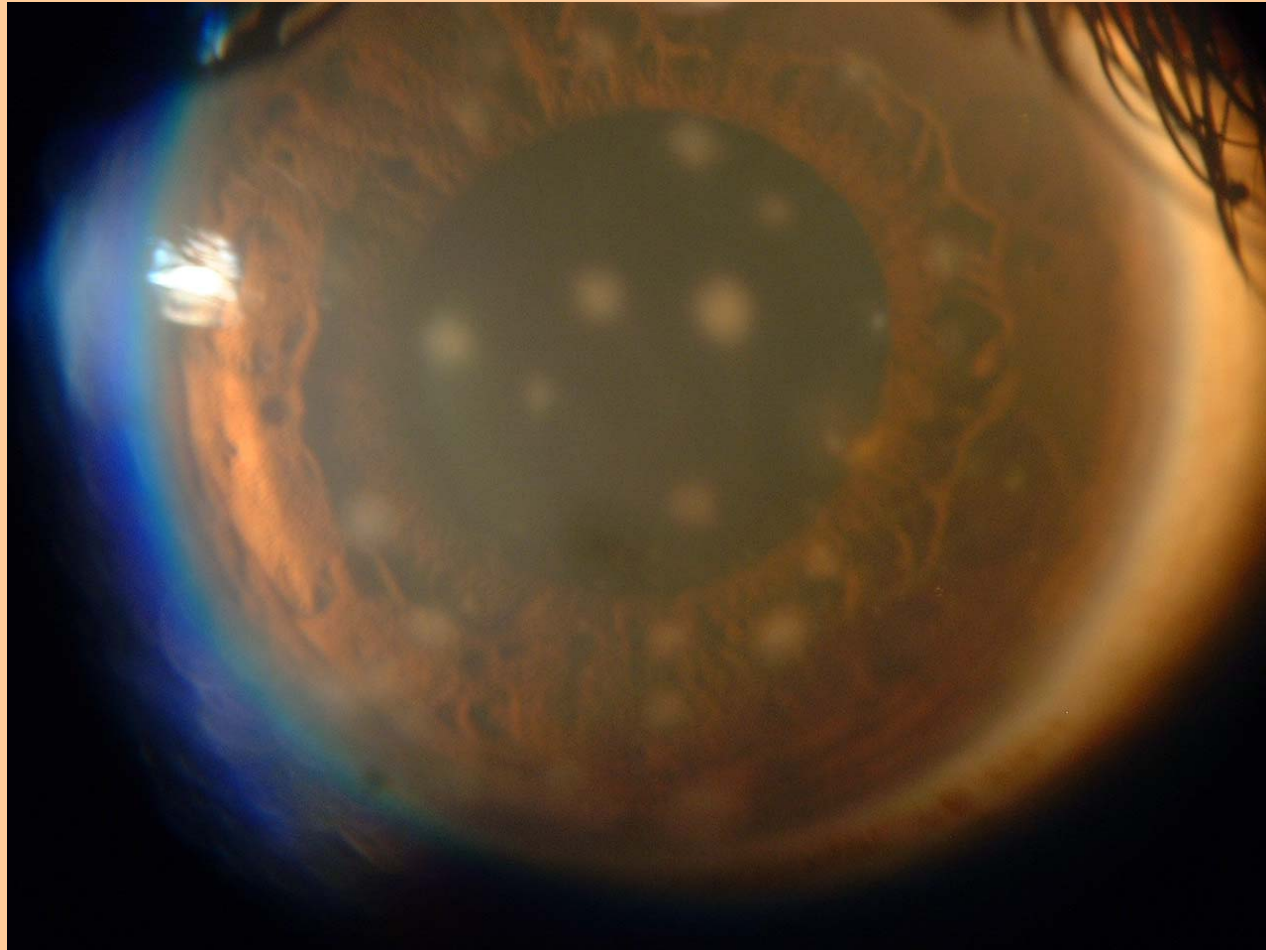
Knob for sclerotic scatter allows slit beam to be horizontally rocked



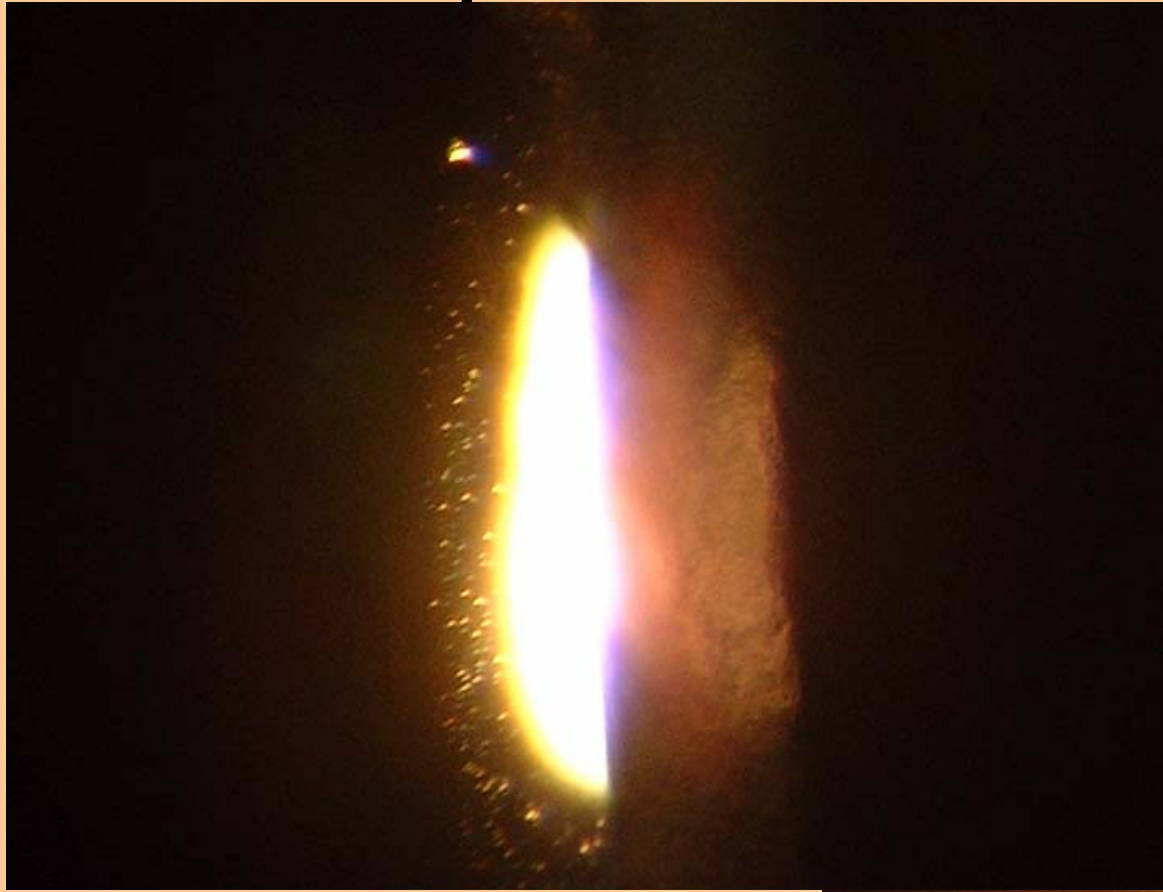
Parfocality of slit and viewing altered for sclerotic scatter



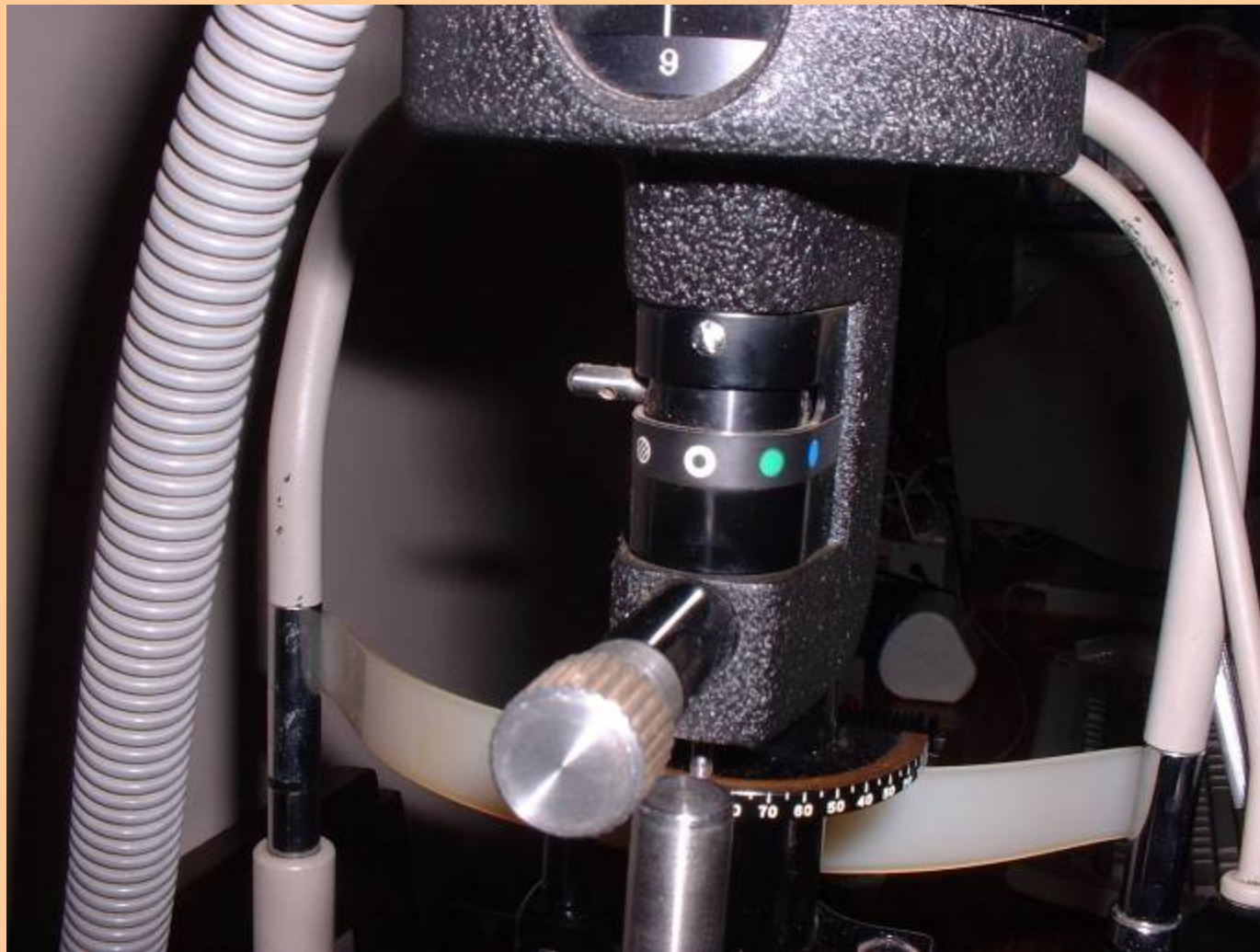
Sclerotic scatter



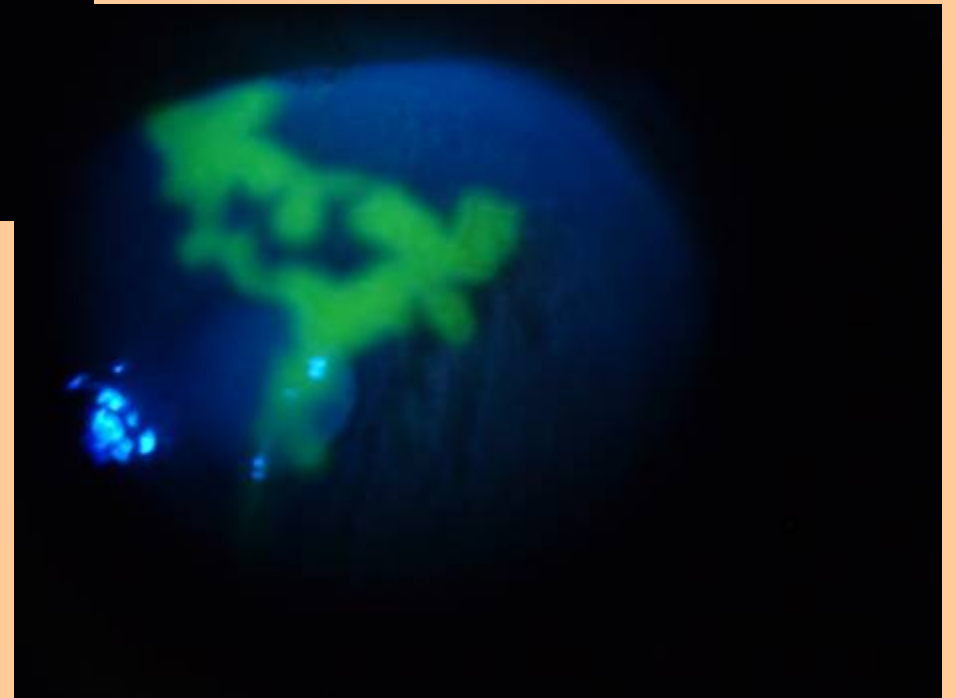
Specular illumination



Filter turret

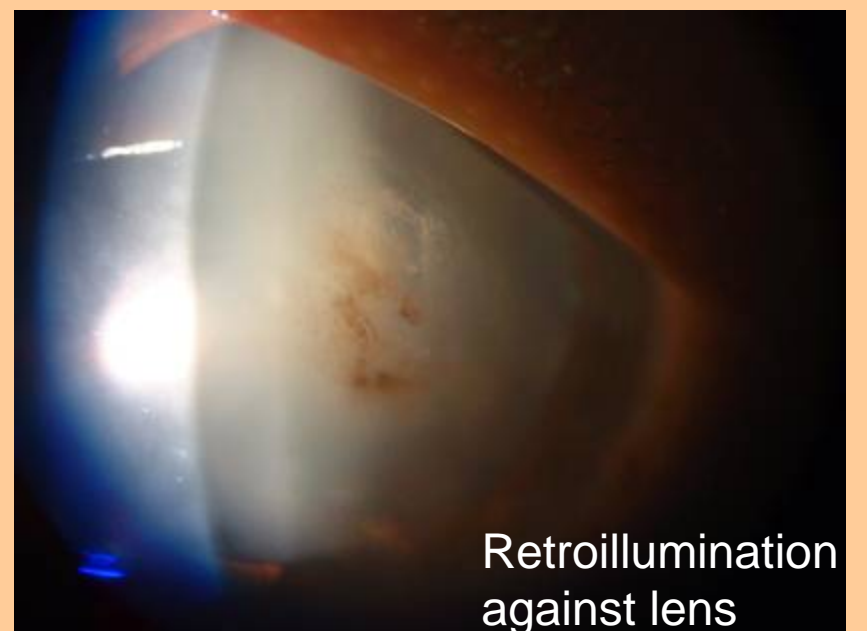
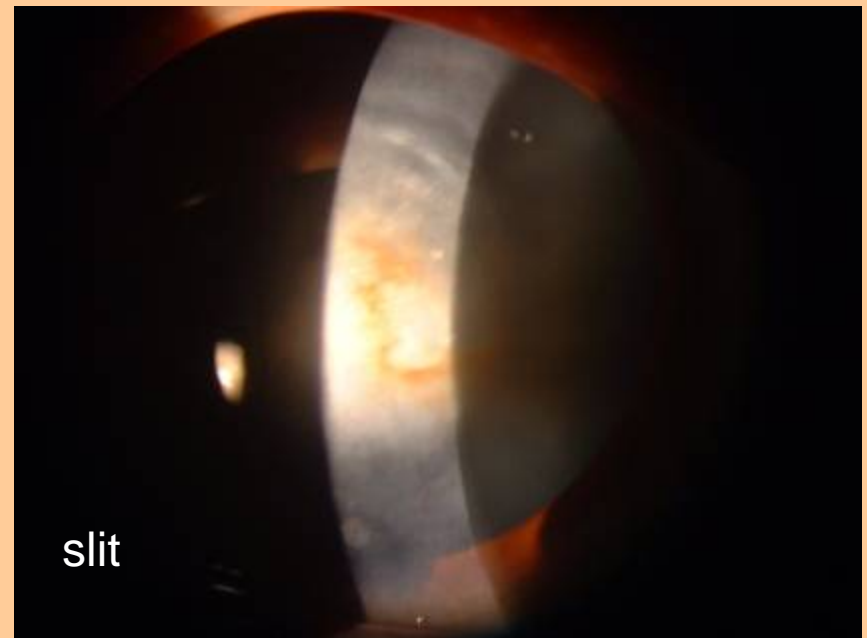


With additional dyes

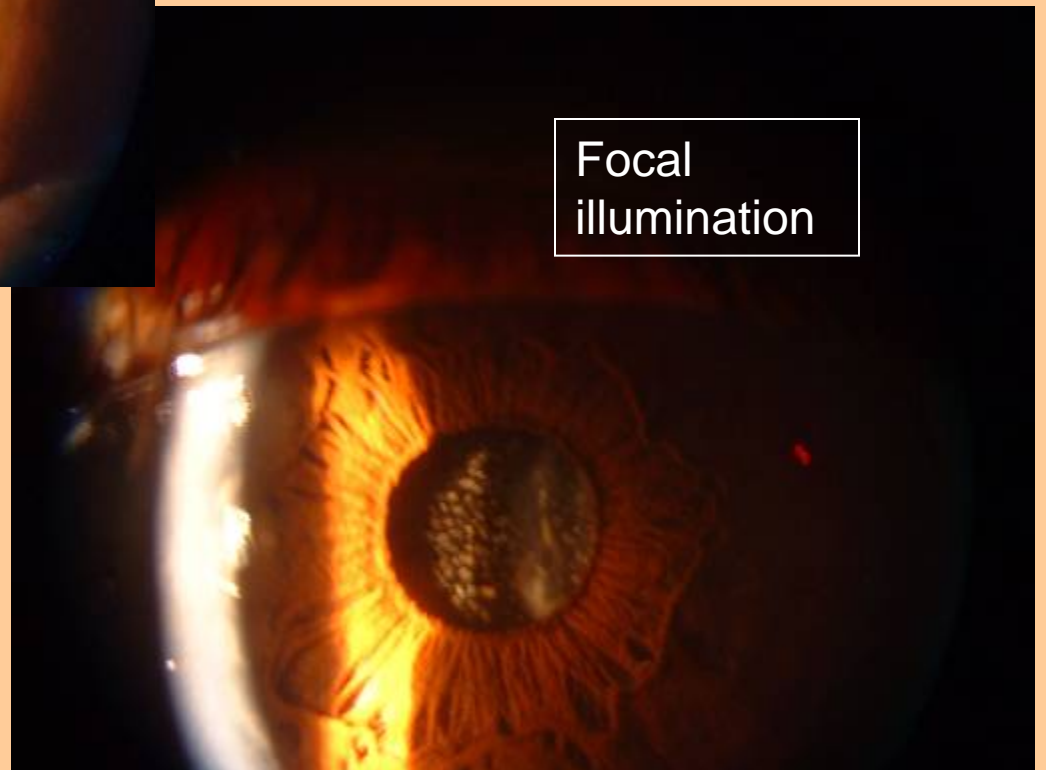
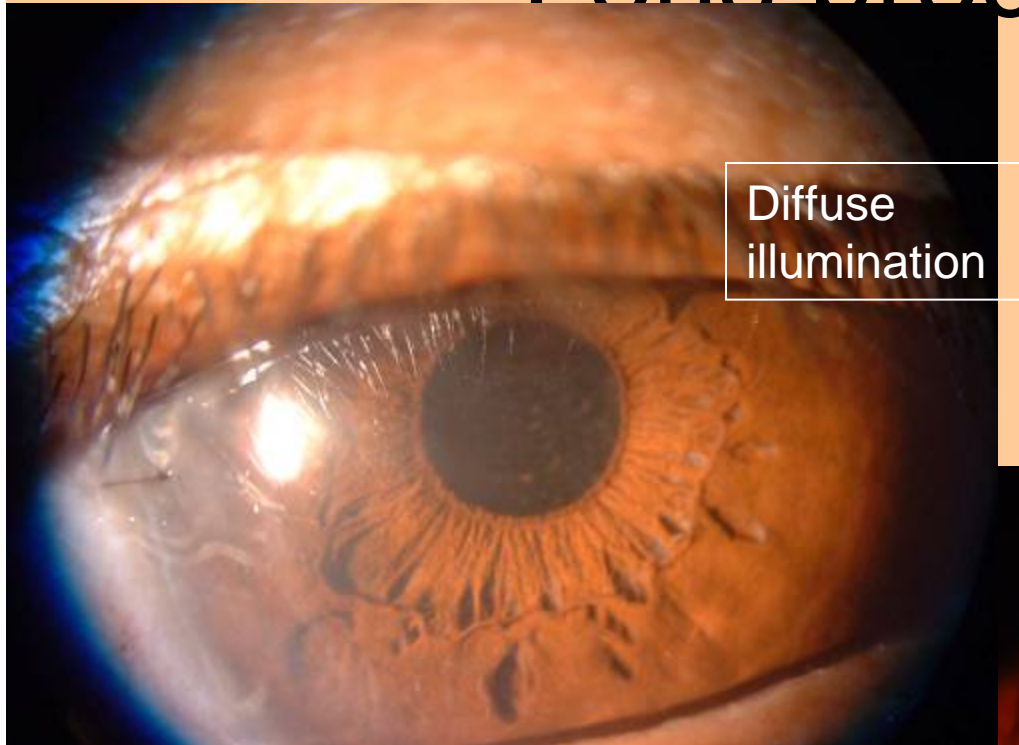




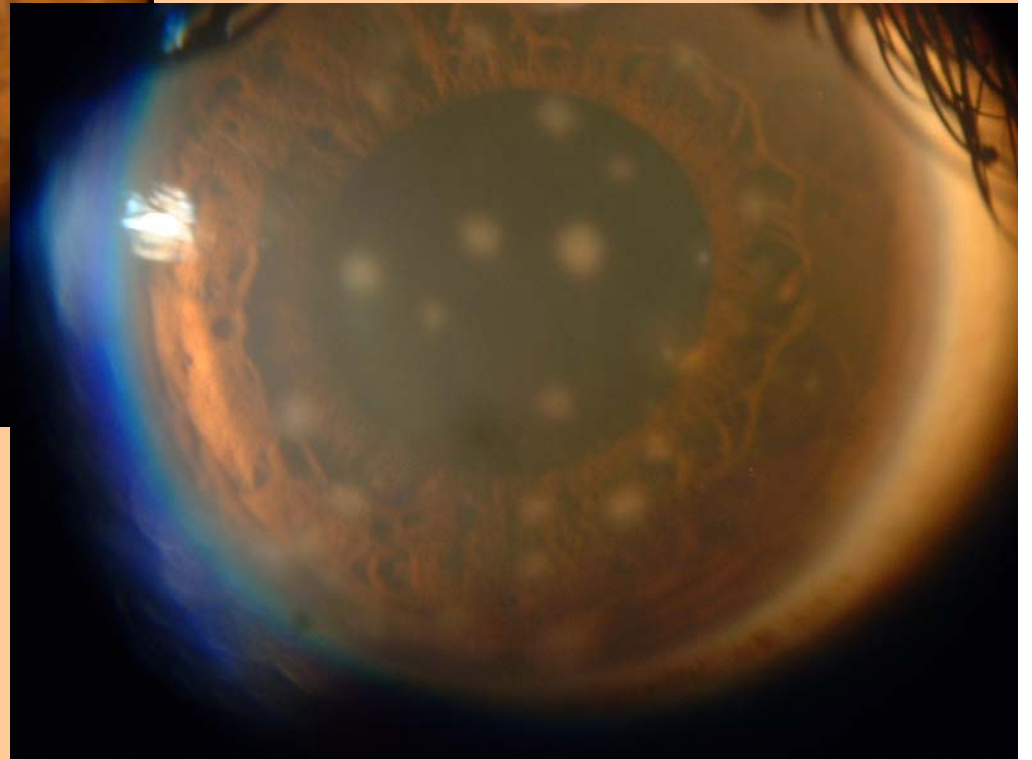
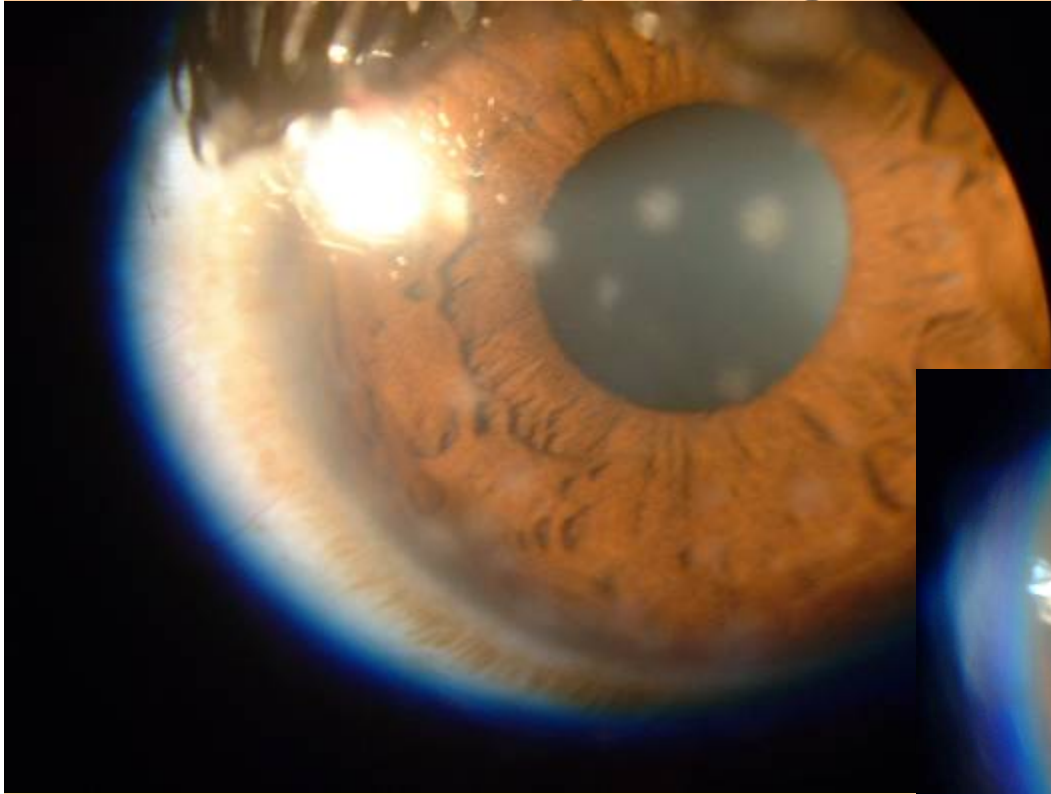
Collage

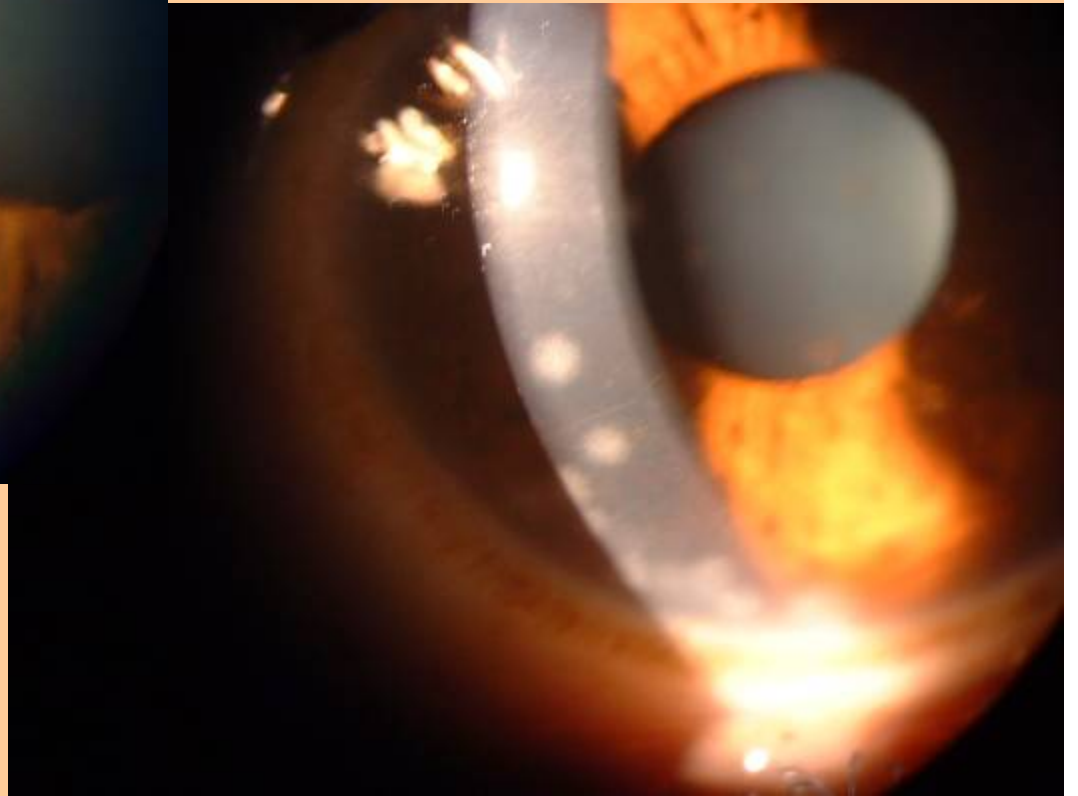
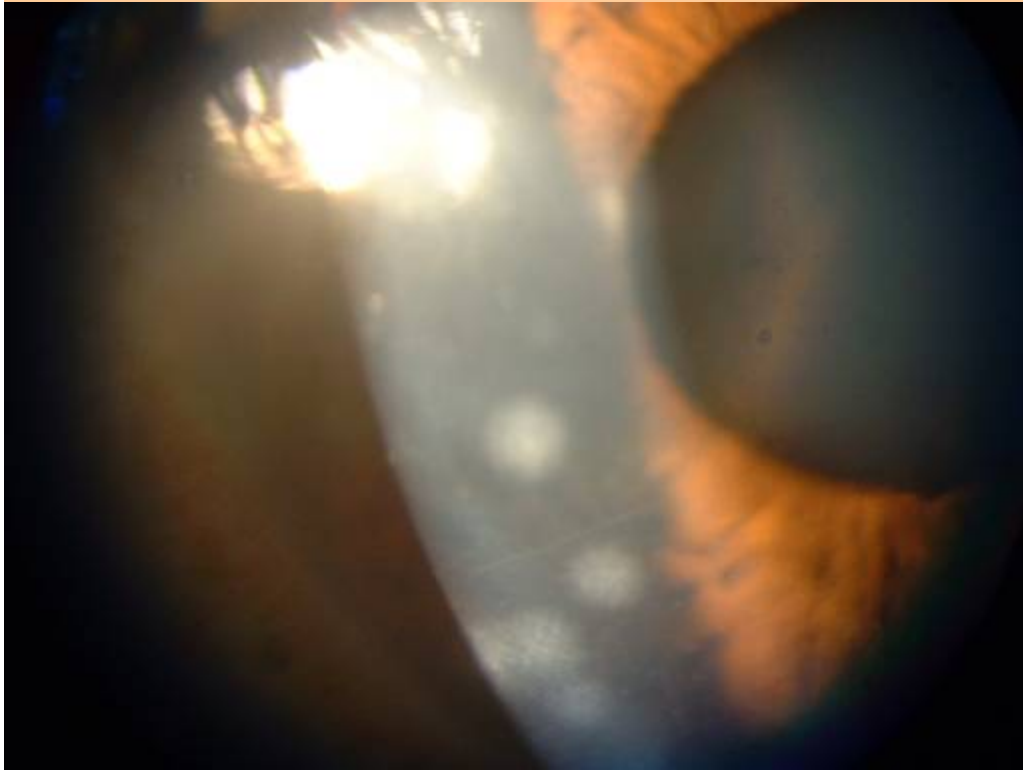


Lens precipitates

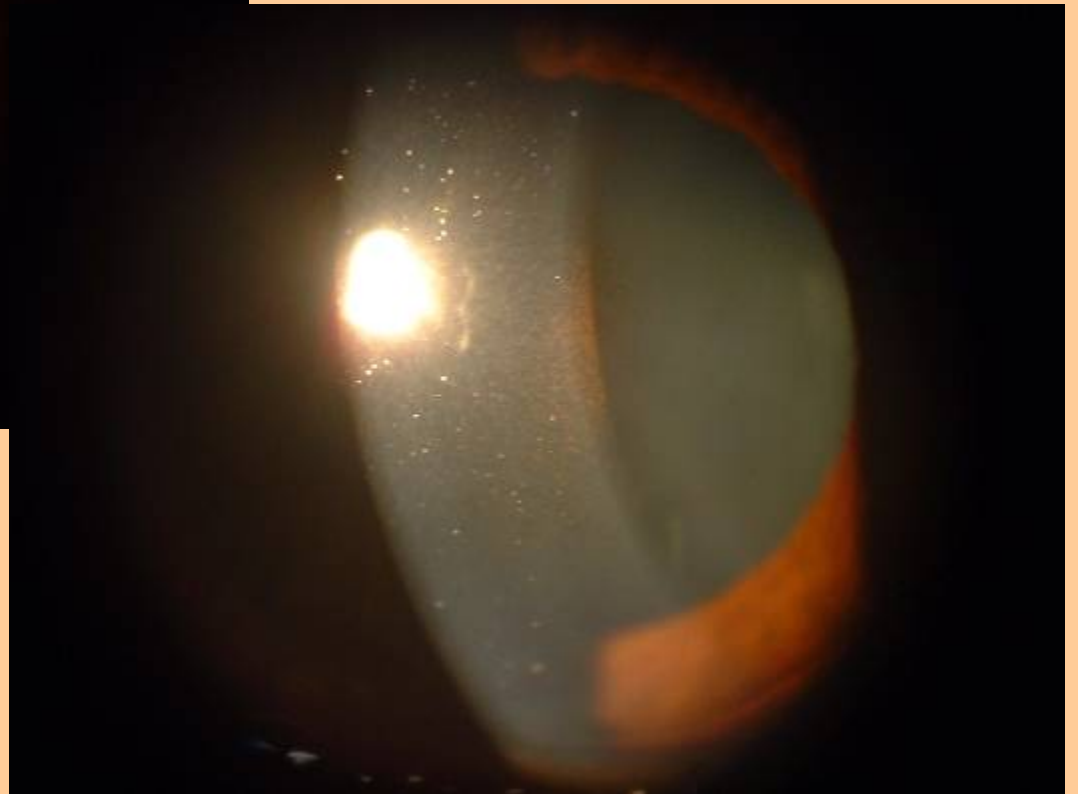
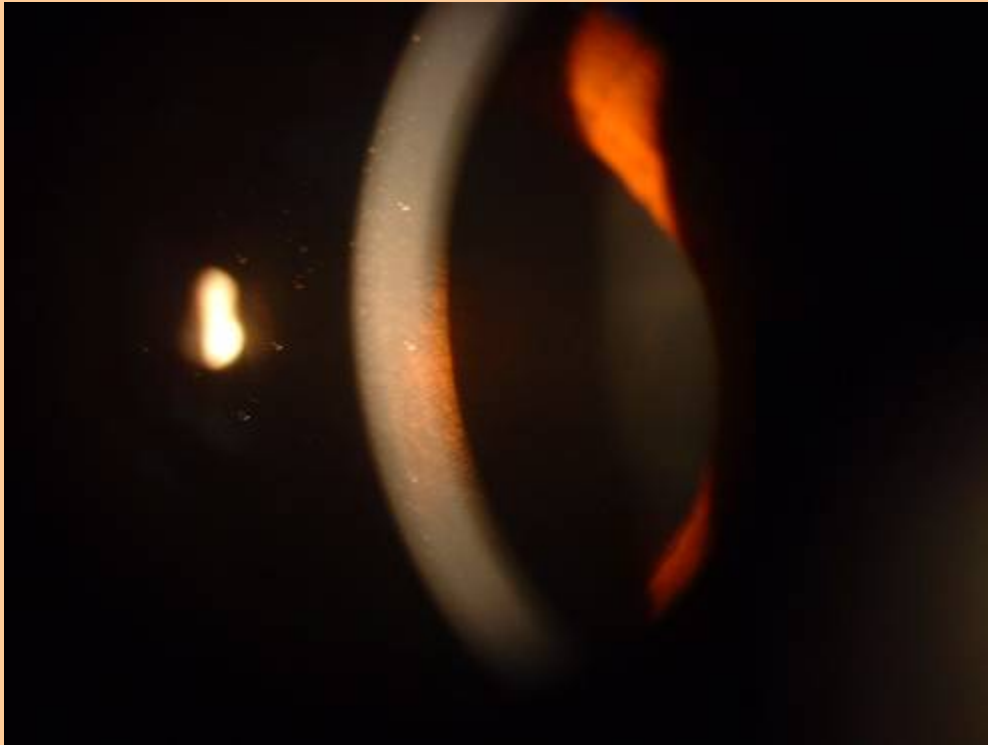


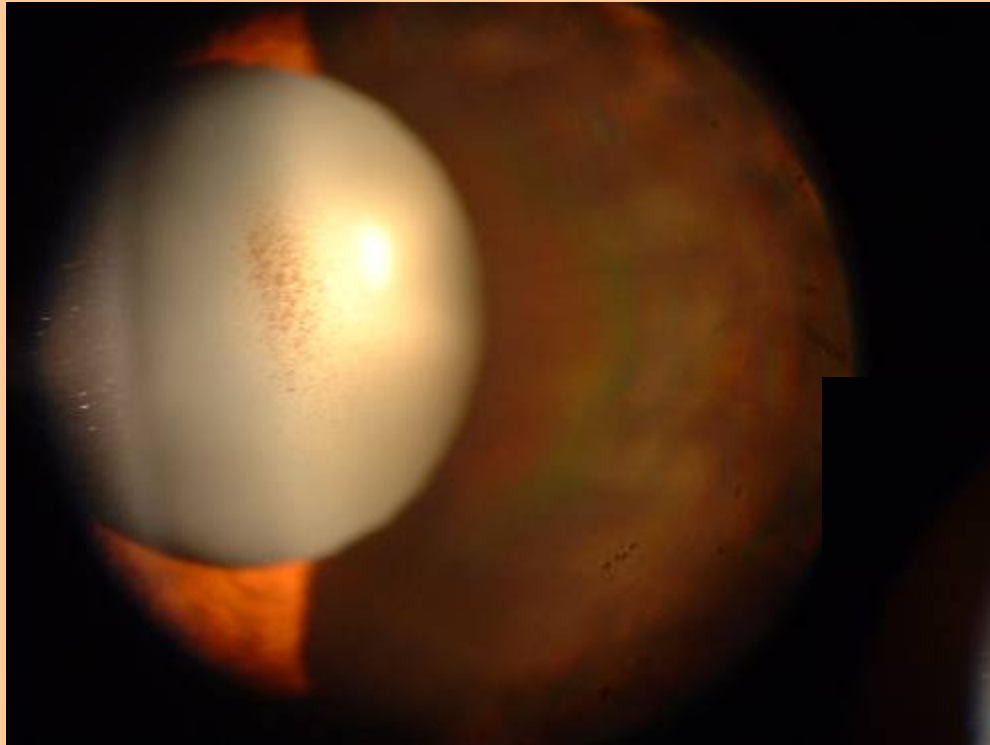
SPKS- a collage



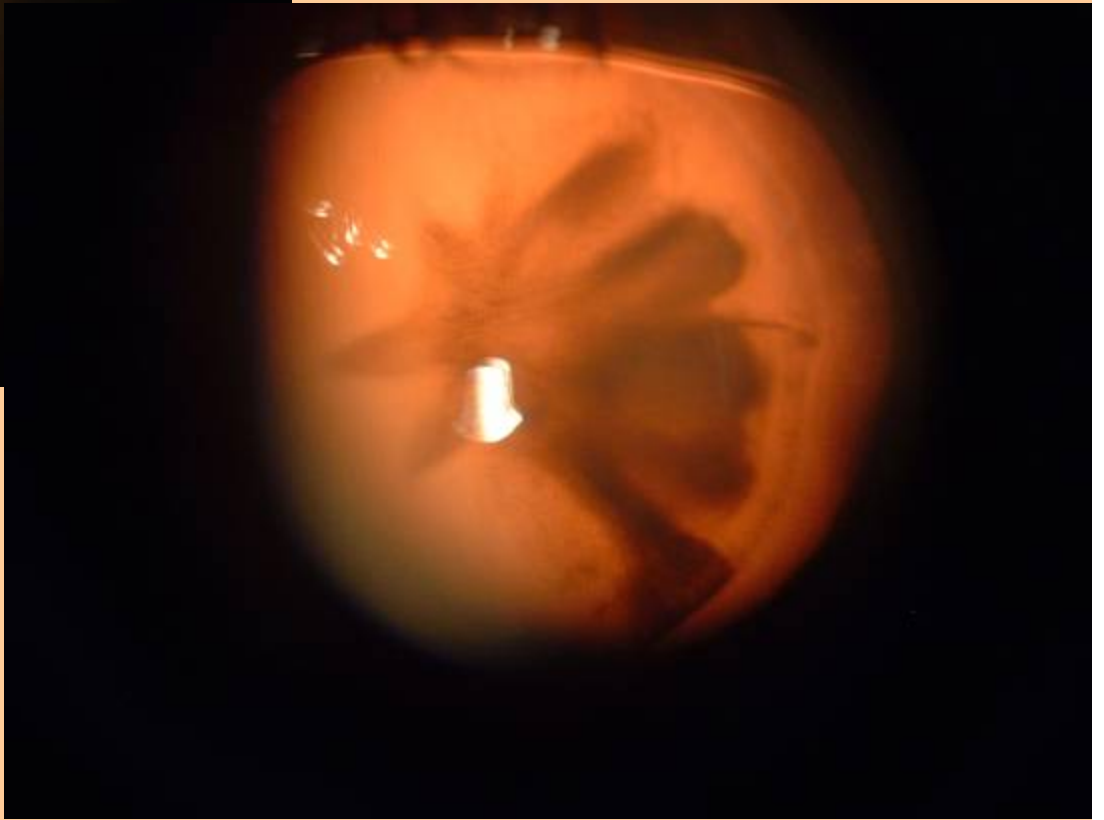


Krukenberg spindle

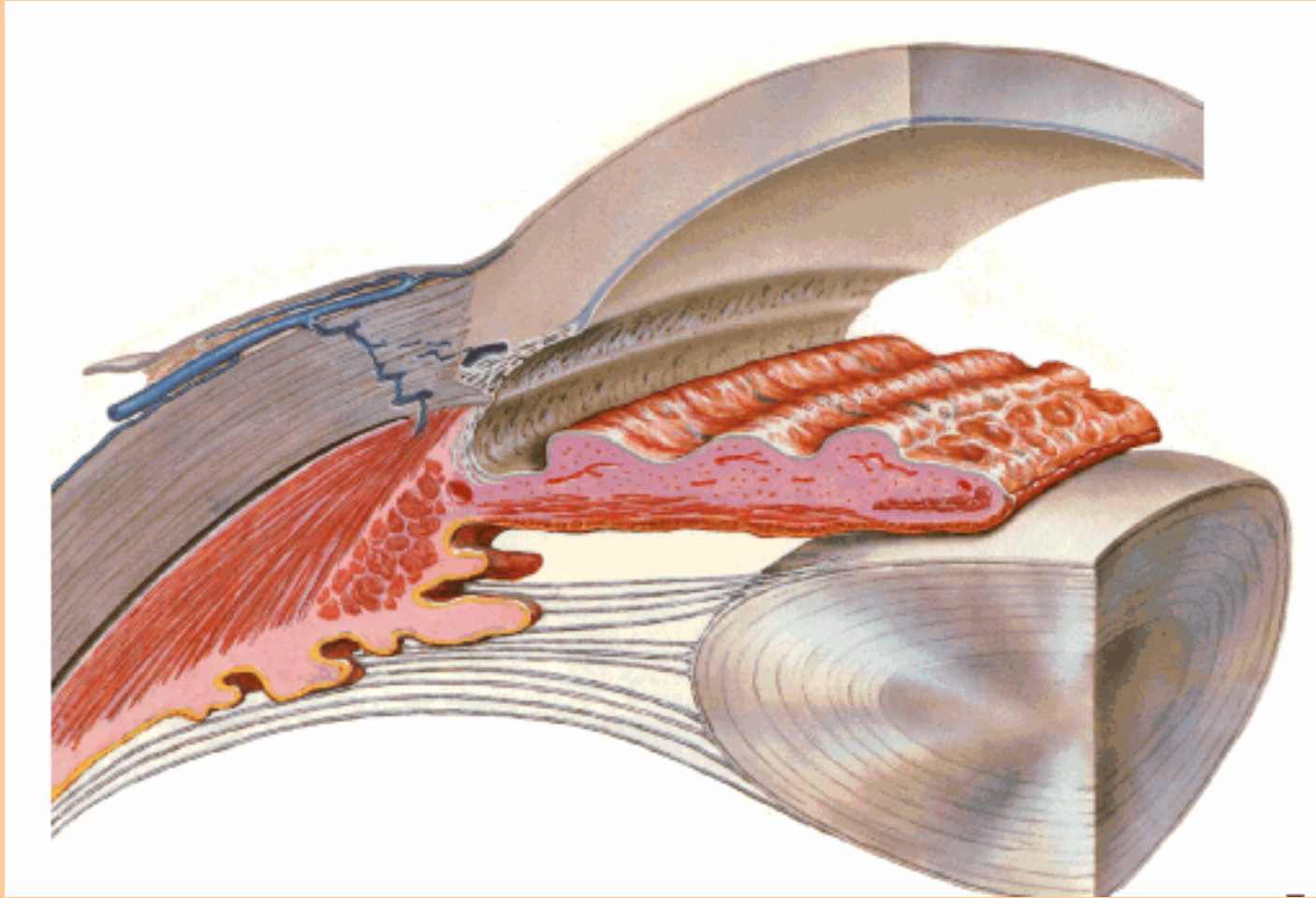




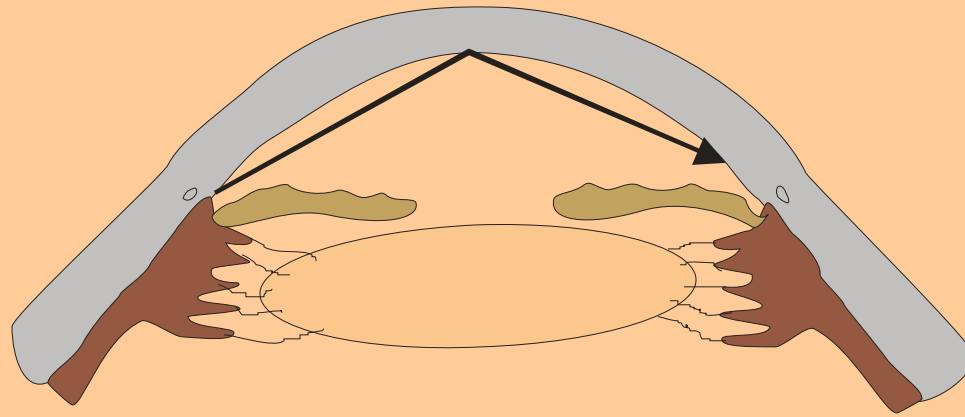
Traumatic rosette cataract



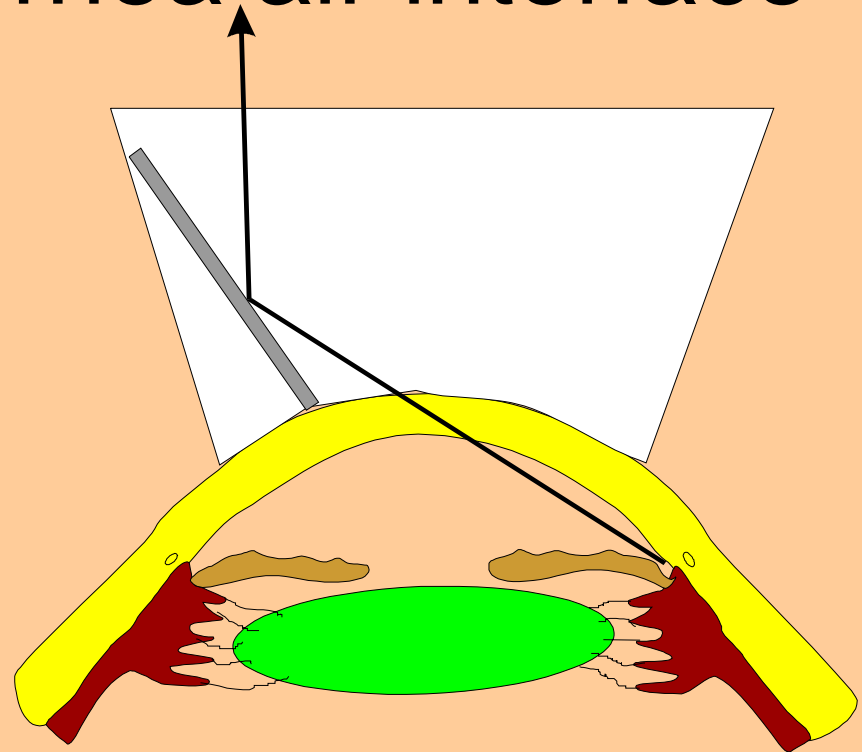
Anatomy of the angle



Normally the angle of the anterior chamber cannot be seen as light from it cannot exit from the eye due to total internal reflection at the cornea

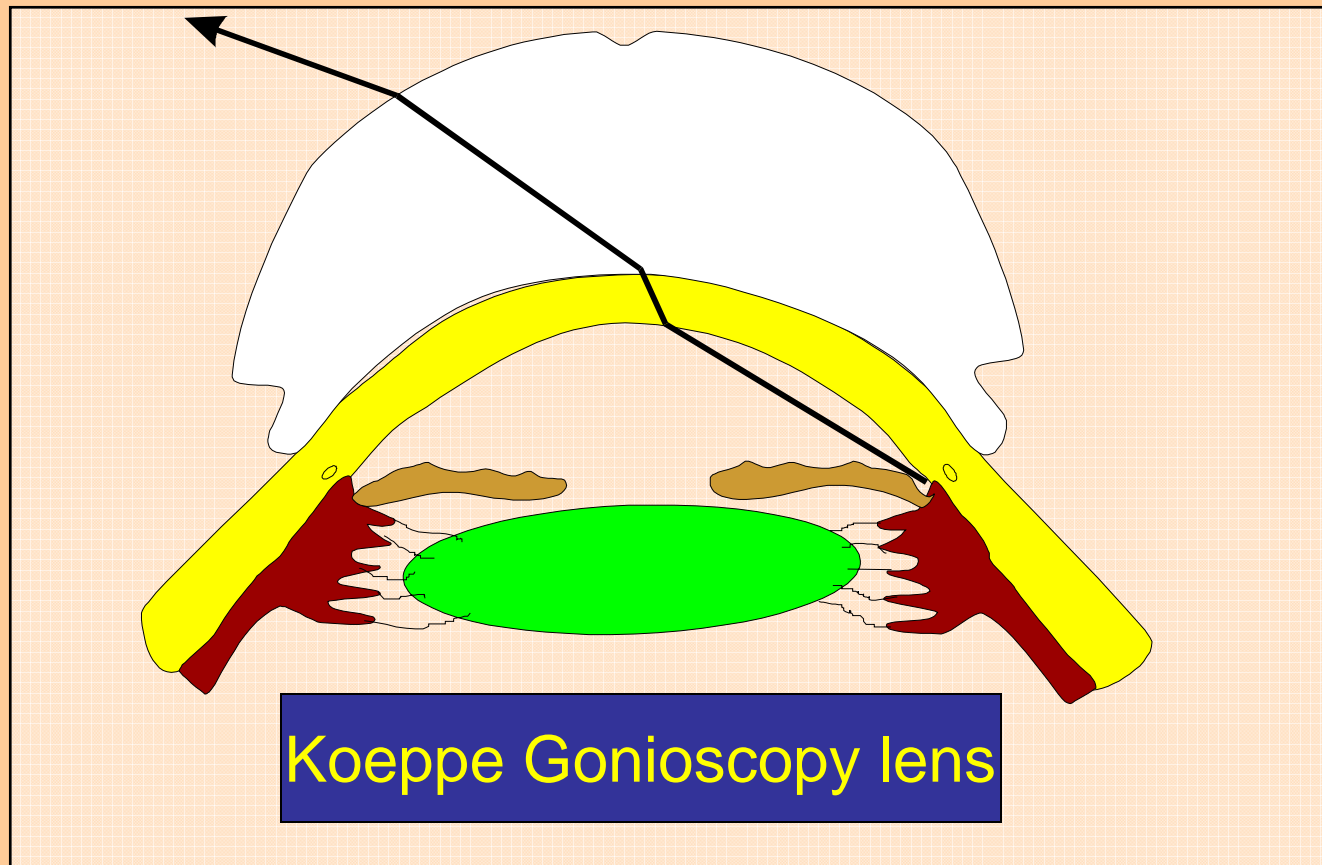


A gonioscopy lens allows light from the angle to exit the eye by eliminating the cornea air interface

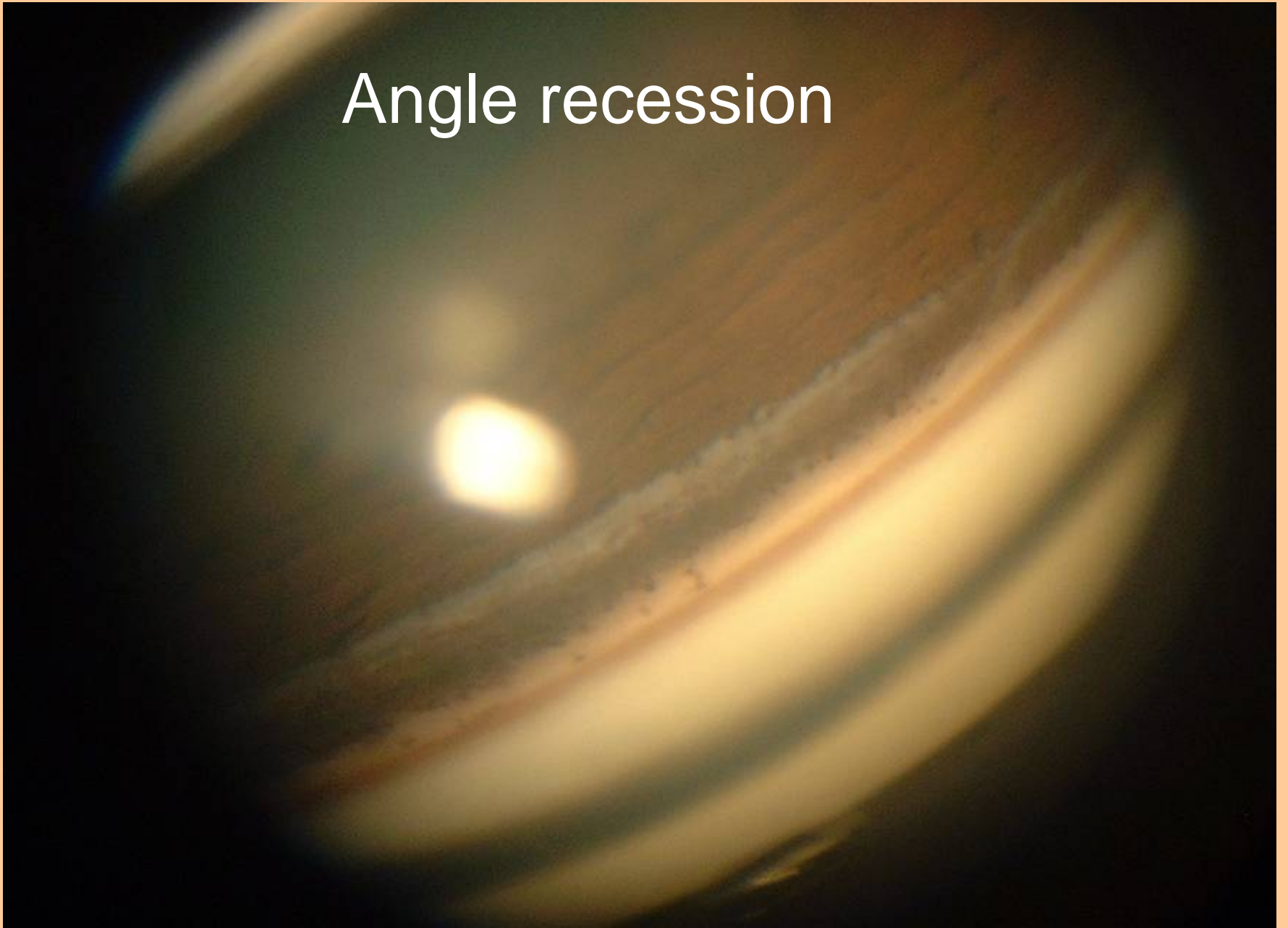


Goldman gonioscopy lens

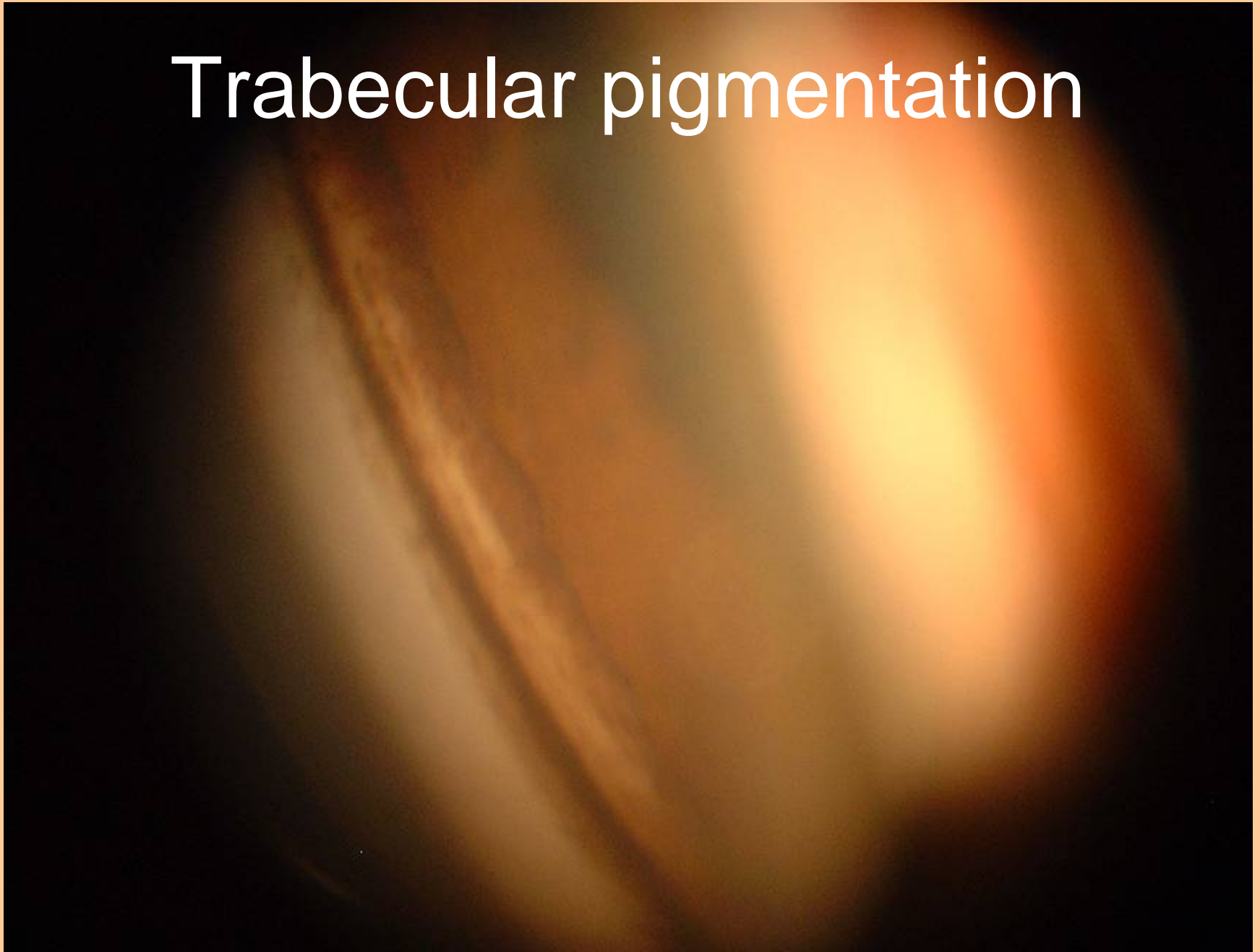
Direct Gonioscopy



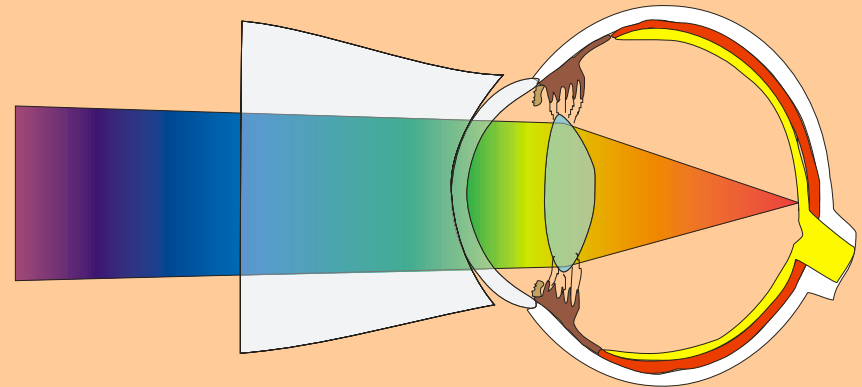
Angle recession



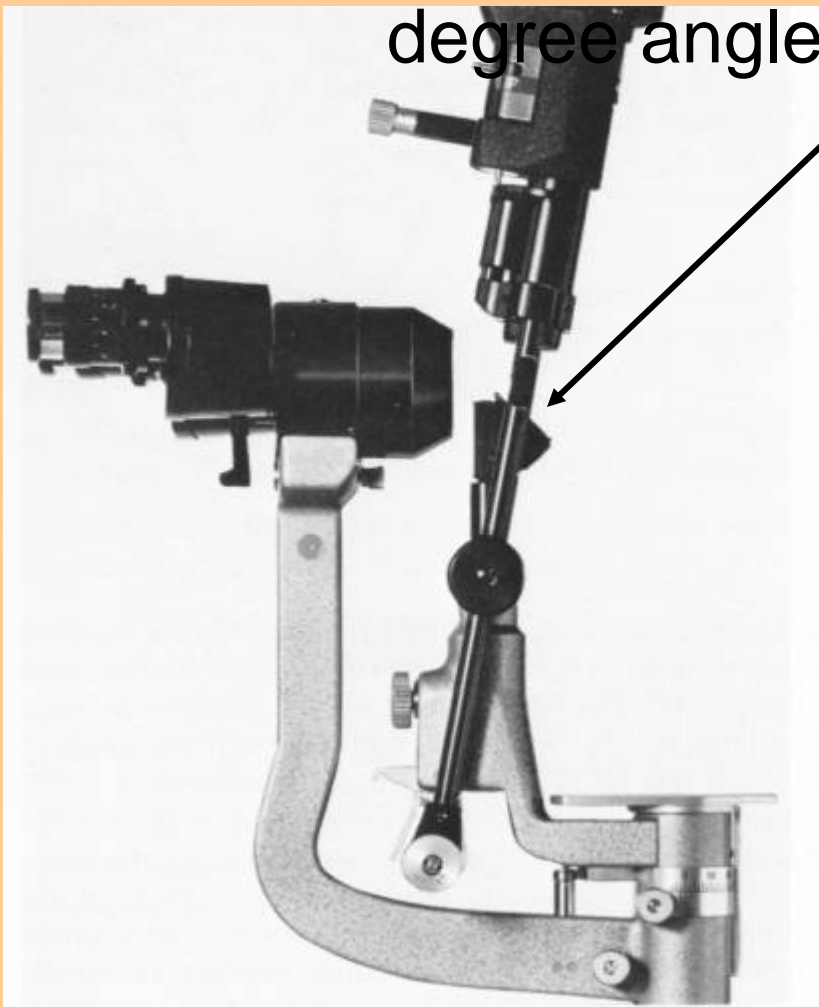
Trabecular pigmentation



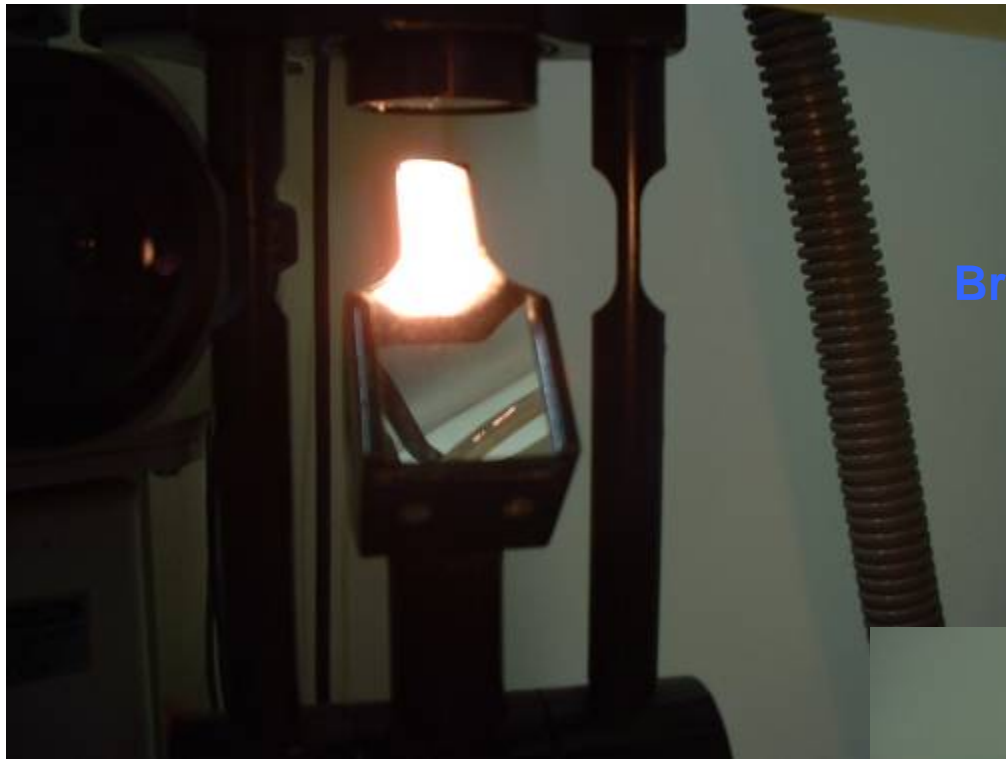
- Fundus examination can be done with a slit lamp with the use of ancillary lenses
- Ancillary lenses are required to neutralize the refractive power of the cornea .



Use of the short reflex mirror is recommended for posterior segment examination because the upward projection of the long mirror blocks one of the eye pieces when the illumination is kept at a small 3-5 degree angle from the binocular



However, the illumination beam column must then be tilted else the illumination beam will fall partly outside the mirror reducing the illumination entering the eye

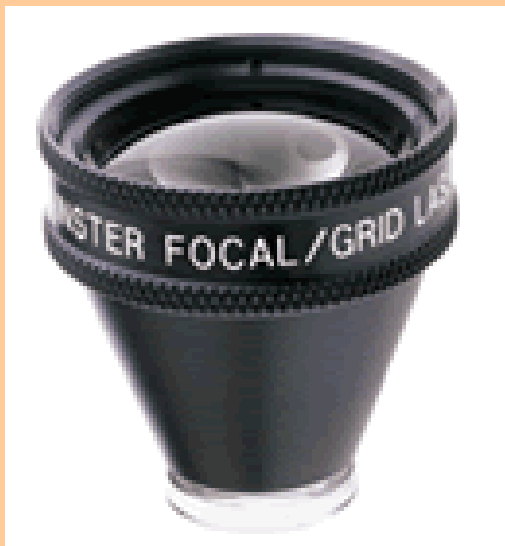


Broad beam

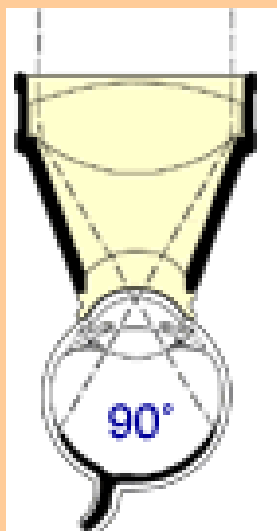


Narrow beam

Some contact Fundus slitlamp lenses



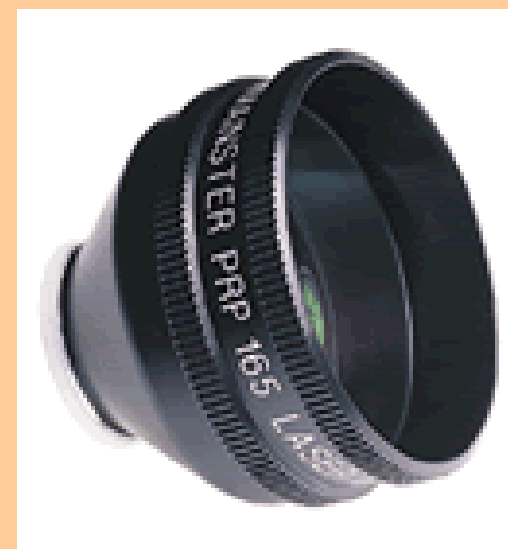
Mainster standard



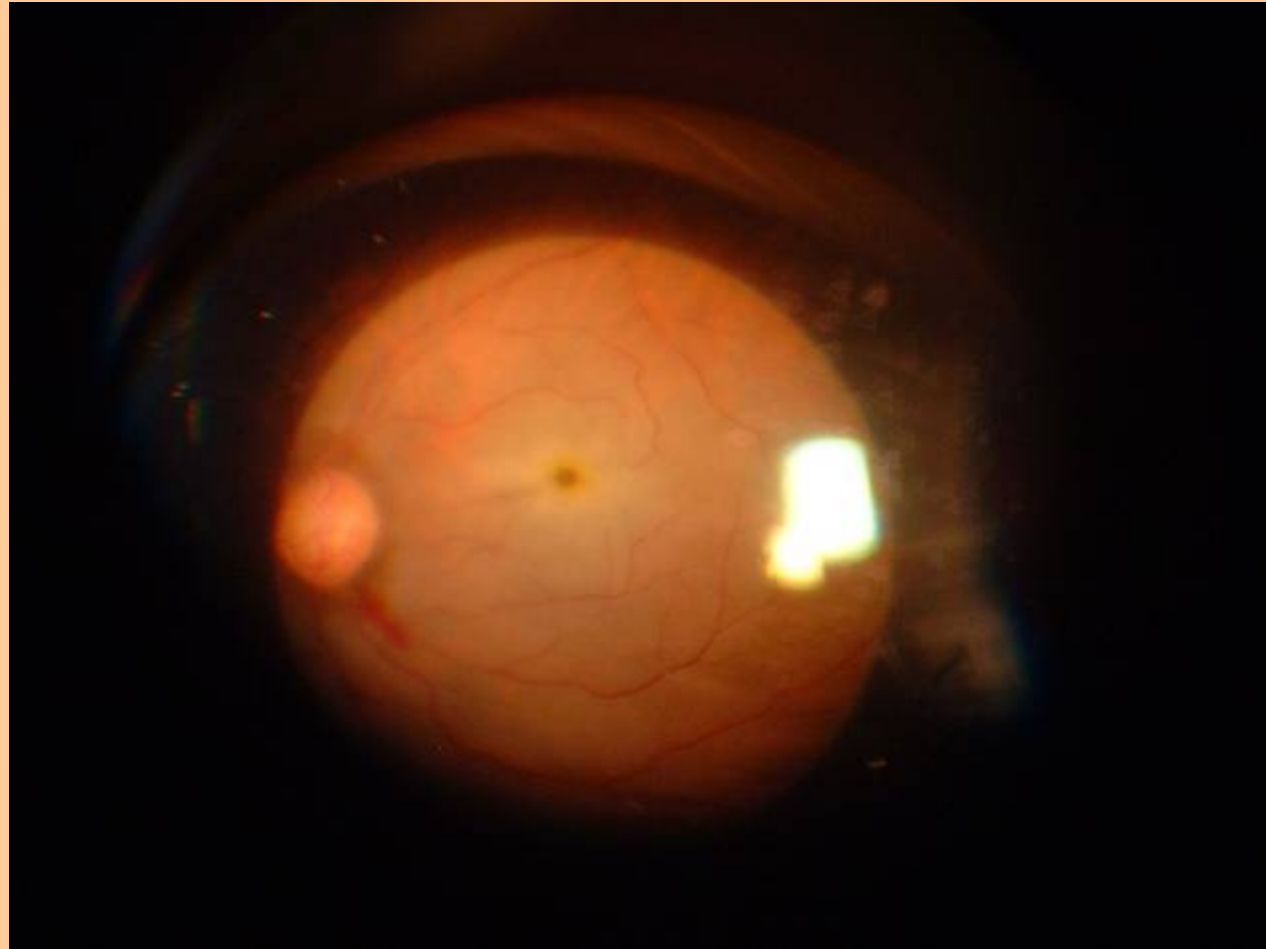
**Mainster
High
Magnification**



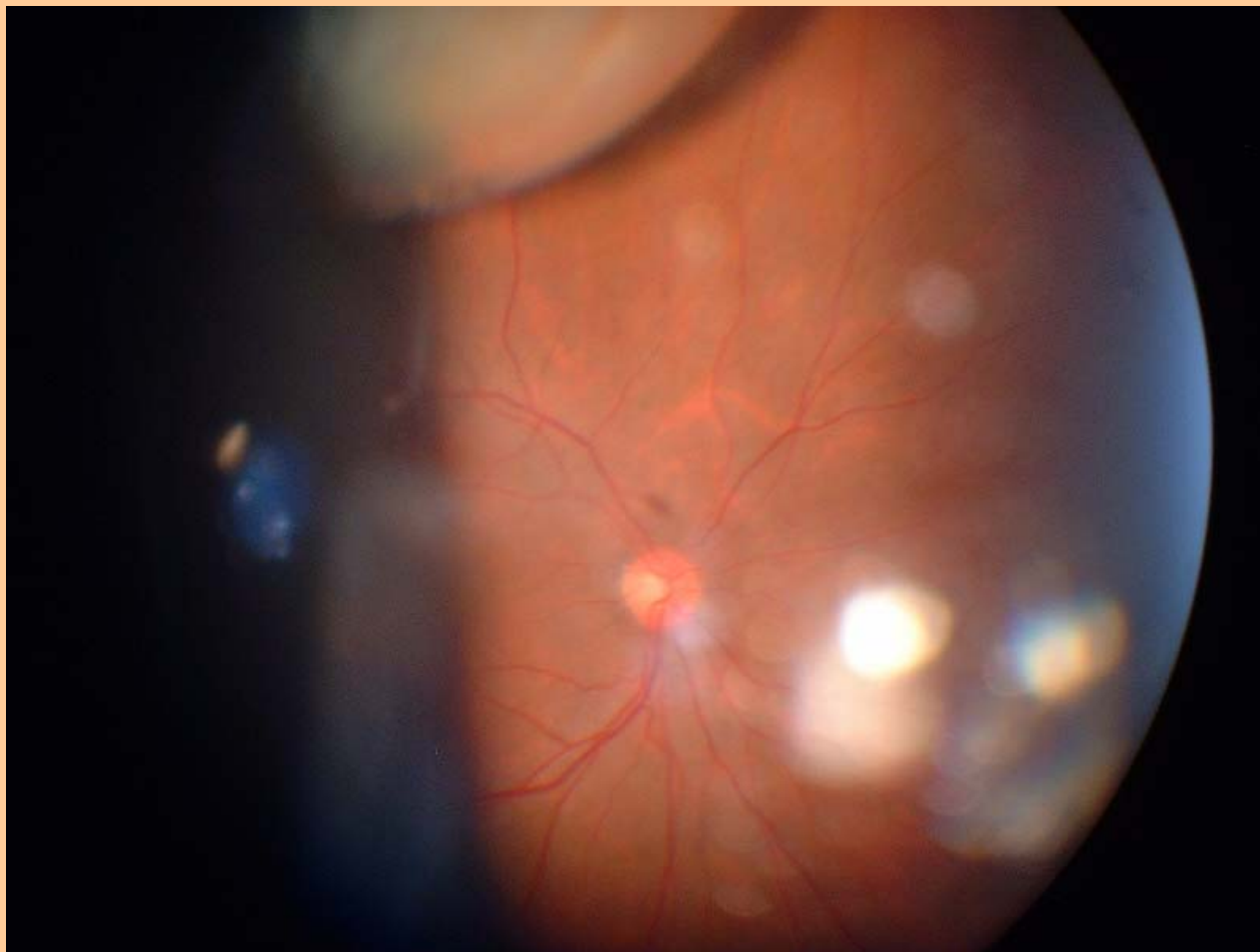
**Mainster PRP
(widefield for
panretinal
photocoagulation)**



Fundus view with slitlamp and Mainster contact lens



Slit lamp examination with a Volk quadraspheric contact lens (dislocated crystalline lens)



Thank you