

Examination techniques in ophthalmology

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Basic examination techniques

- Visual acuity (natural, best corrected)
- Measurement of intraocular pressure
- Slit lamp examination
- Fundus examination



Visual acuity

- Visual acuity (natural, best corrected)
- Distance vision
- Near vision
- **Charts**
 - Snellen
 - Landolt ring
 - Pictures
 - ETDRS
- **Jaeger**

Near vision

Jaeger chart

VODS: s +2,5 Dsf
J.No. 1

Jaeger Eye Chart

No. 11
.25 M

in the preceding generation, the state of this country is reduced to the same level as that of the preceding generation.

No. 10
.30 M

the public administration was conducted in the most efficient manner, and the state of the country was such as to enable the people to enjoy the benefits of the public administration.

No. 9
.35 M

the nature of the work. The principal object of the business was to produce the most efficient results, and the state of the country was such as to enable the people to enjoy the benefits of the public administration.

No. 8
.40 M

increased the business to such an extent that the public administration was conducted in the most efficient manner, and the state of the country was such as to enable the people to enjoy the benefits of the public administration.

No. 7
.45 M

the undertaking became every day more difficult, the more doubtful, and the more precarious, and less beneficial. The experience of Augustus added weight to these salutary reflections, and effectually convinced him that, by the present vigor of

No. 6
.50 M

his country, it would be easy to secure every advantage which the safety or the dignity of Rome might require from the most formidable barbarians. Instead of exposing his person or his legions to the arrows of the Parthians, he obtained, by an honor-

No. 1
1.00 M

able treaty, the restitution of the standards and prisoners which had been taken in the defeat of Crassus. His generals, in the early part of his reign, attempted the reduction of Ethiopia and Arabia Felix. They marched near a thou-

No. 8
1.75 M

and miles to the south of the tropic; but the heat of the climate soon repelled the invaders, and protected the warlike natives of those sequestered regions.

No. 9
2.00 M

The northern countries of Europe scarcely deserved the expense and labor of conquest. The forests and morasses of Germany were

No. 9
2.00 M

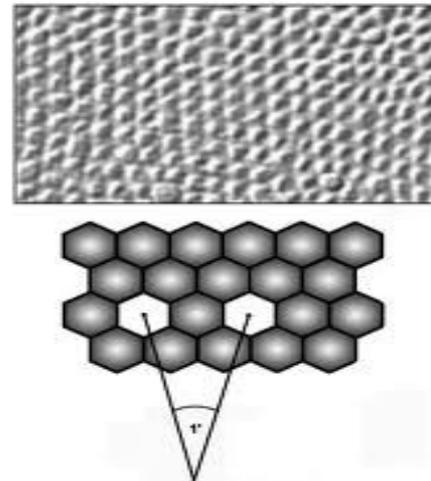
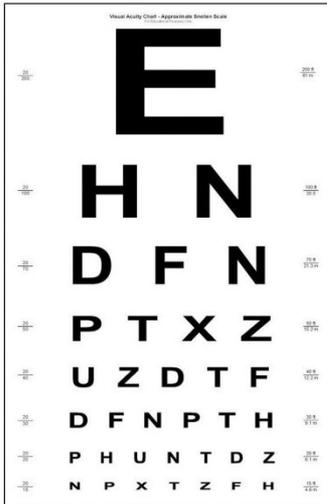
filled with a hardy race of barbarians who despised life when it was separated from freedom; and though, on the first

No. 10
2.25 M

attack, they seemed to yield to the weight of the Roman power, they soon, by a signal

Visual Acuity

- 5/50 (metres, feet 20/200)
- 0,1
- Minimum separabile – minimum angle of resolution



Visual acuity

- Counting finger (metres)
- Hand movement
- Light perception
- Amaurosis
- Practical blindness



Refraction

- Refractive error is an optical abnormality in which the shape of the eye fails to bring light into sharp focus on the retina, resulting in blurred or distorted vision.
- In optometry, a "refraction" procedure is the measurement of refractive error
- **Autorefractor**



Autorefractor



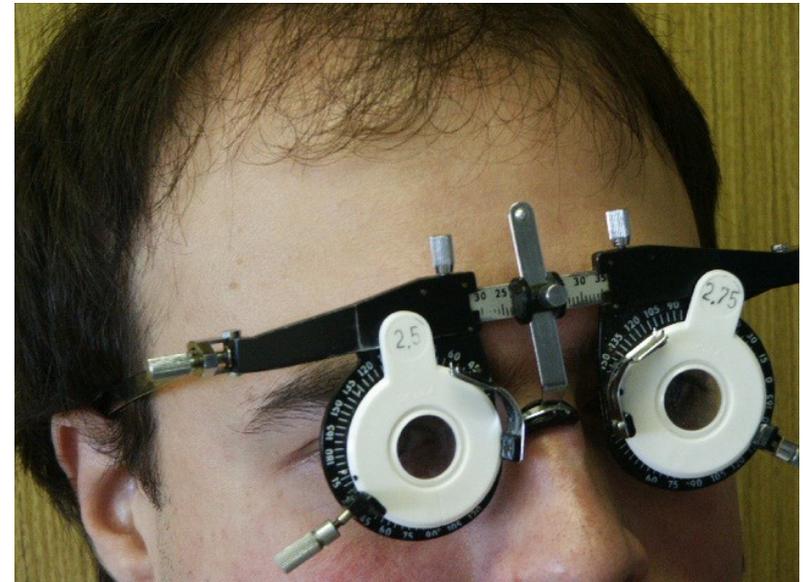
Visual acuity

- VOD: 5/50, s – 2,0 Dsf a -1,0 Dcyl ax 90 5/5
- VOS: 5/30, s – 2,5 Dsf a -1,5 Dcyl ax 100 5/7,5,

-
- VOD: visus oculi dextri
 - VOS: visus oculi sinistri
 - Dsf: dioptry sferic
 - Dcyl: dioptry cylindric
 - Ax: axis

Visual acuity

- Frame
- Lenses
- Axis



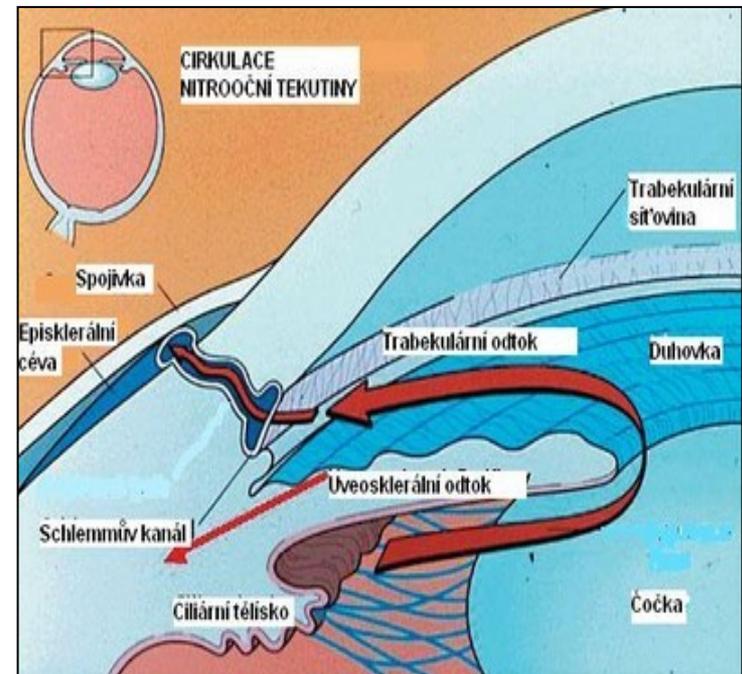
Tonometry

Contact techniques

- Schiötz tonometry
- Goldmann applanation tonometry

Non contact techniques

- Jet air (air puff)

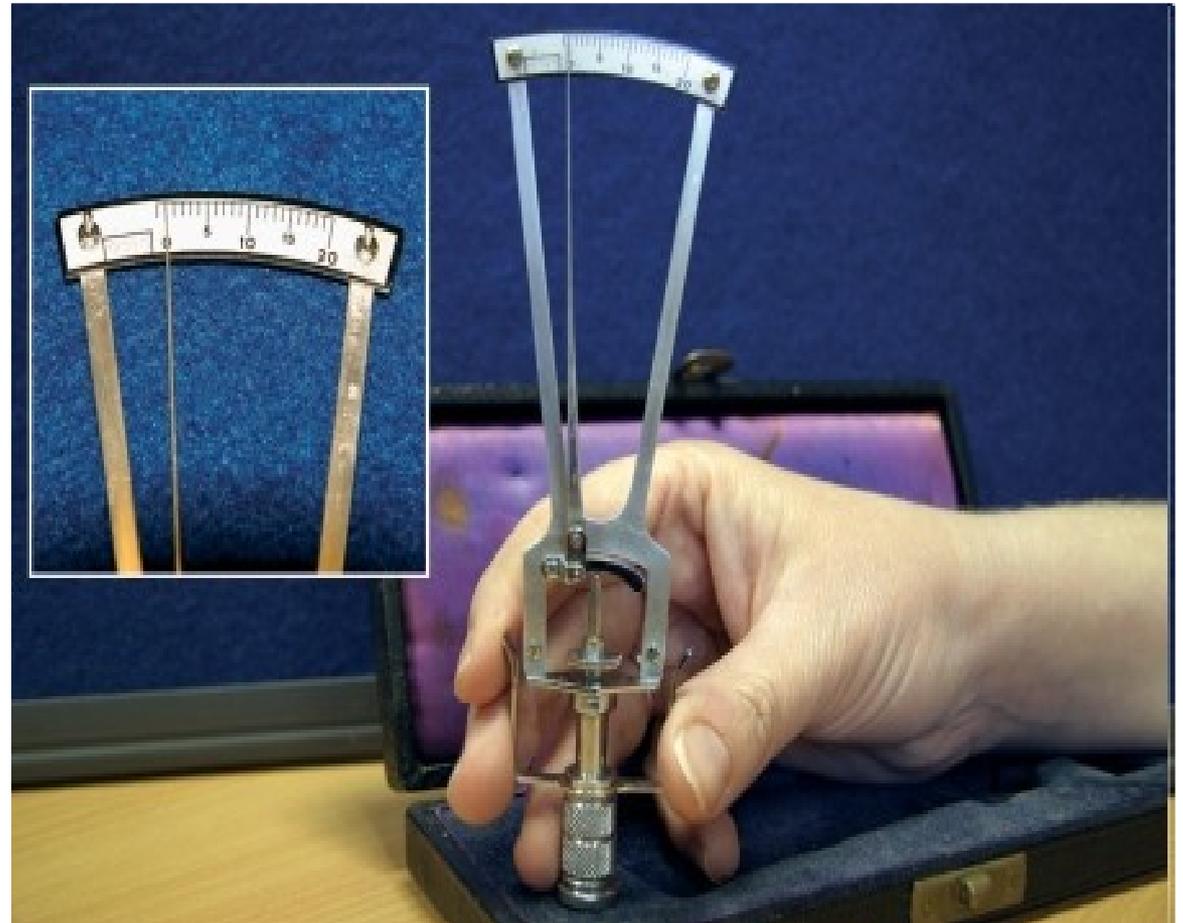


Schiötz tonometry

- 7/7,5
- Topical aneesthesia



Schiötz tonometry

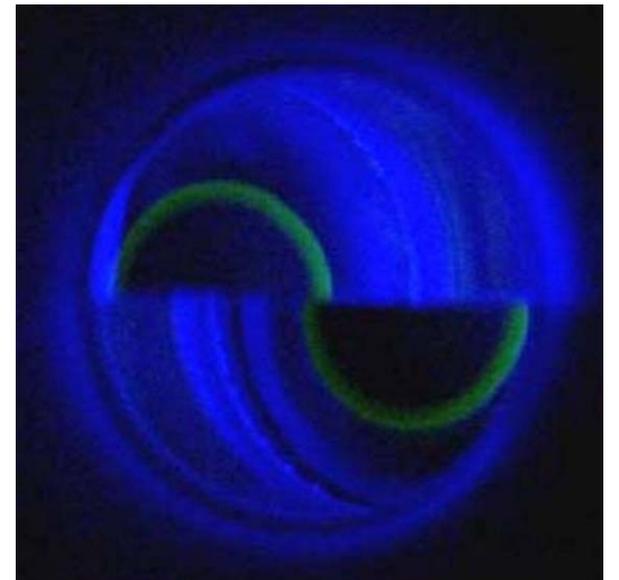
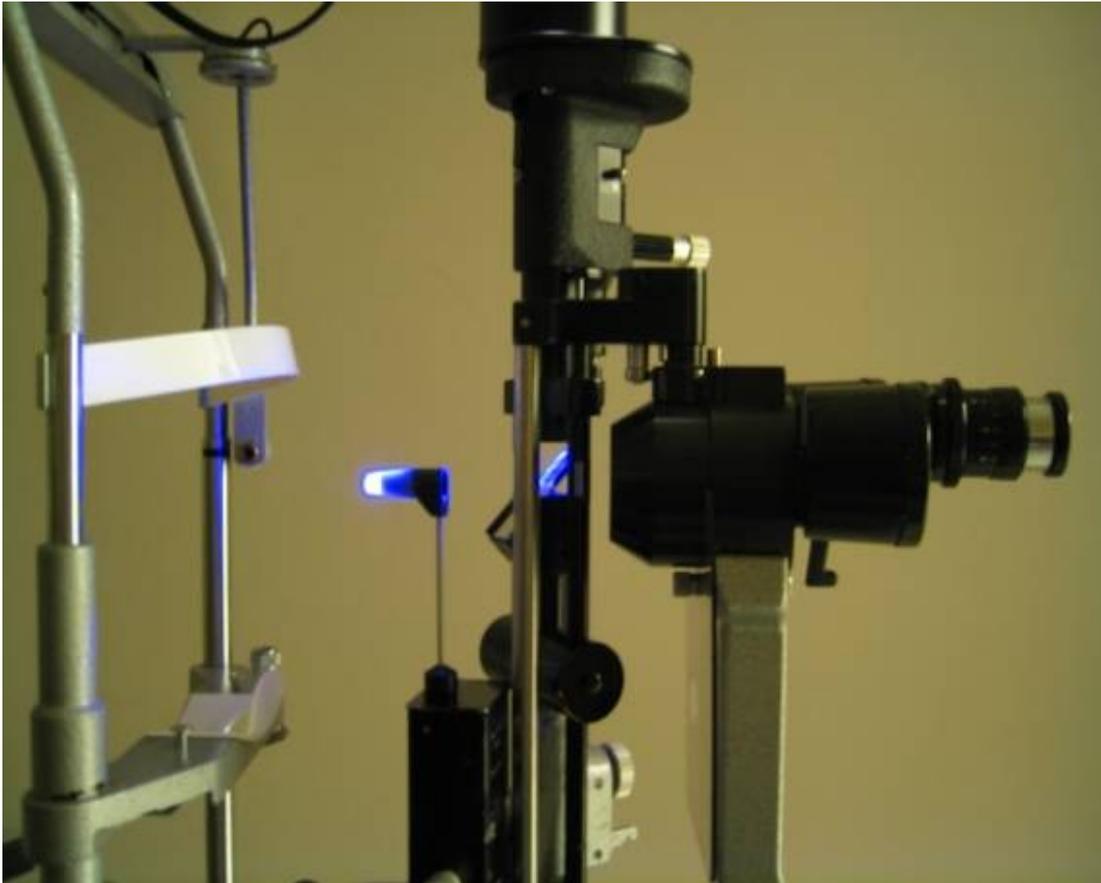


Goldmann tonometry

- The normal range is 10-21 mmHg
- Topical anesthesia, fluorescein
- Force required to flatten the cornea



Goldmann tonometry



Non contact tonometry



Examination of anterior segment

Aspection



Ectropium



Ptosis



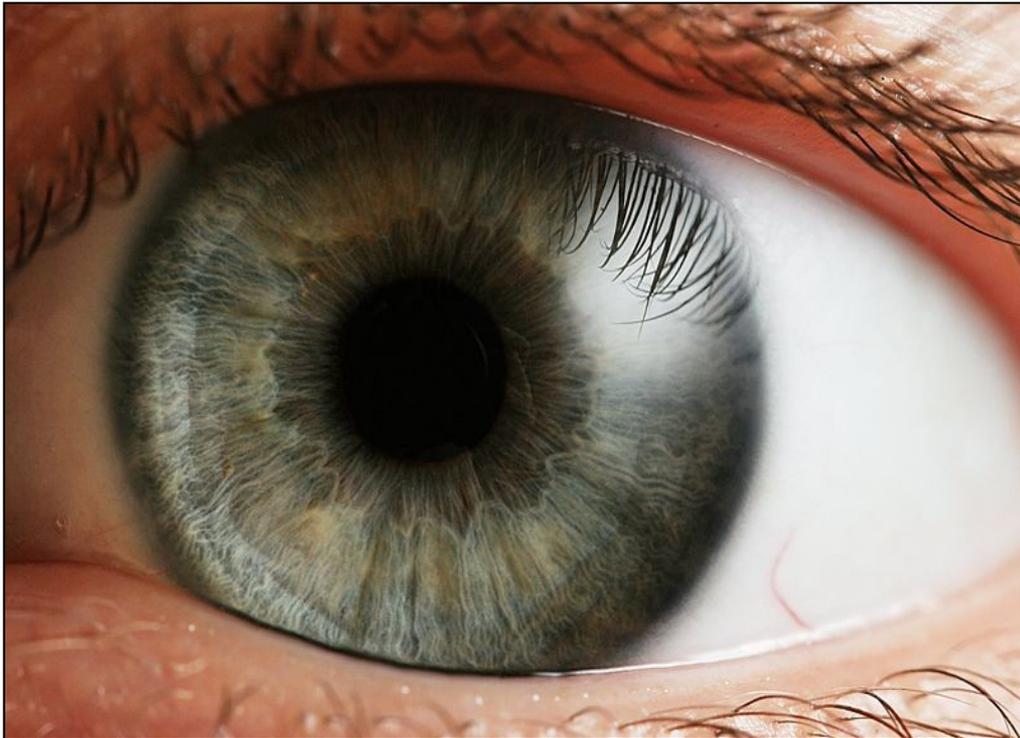
Lagophthalmus



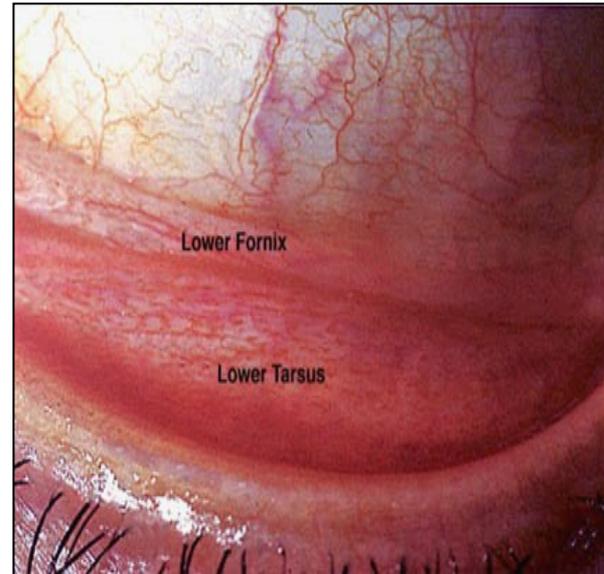
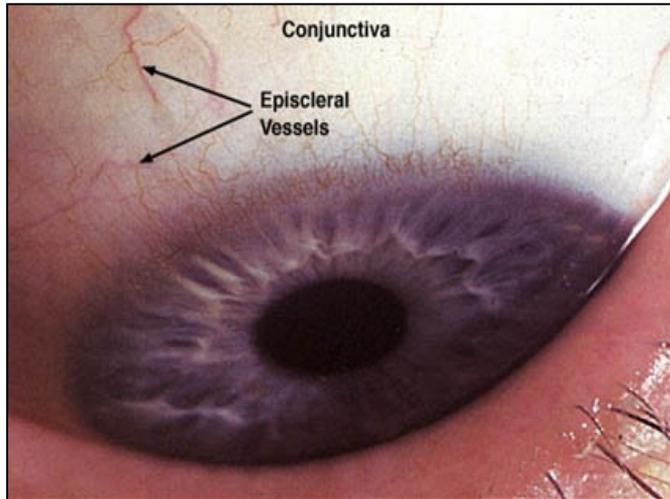
Entropium

Slit lamp biomicroscopy

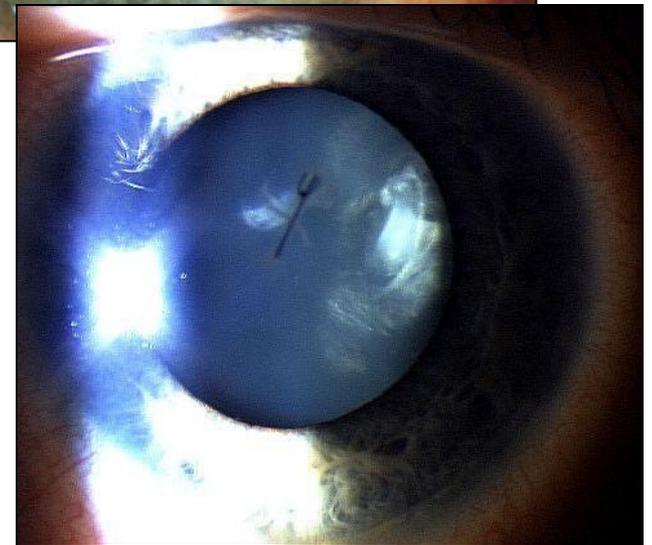
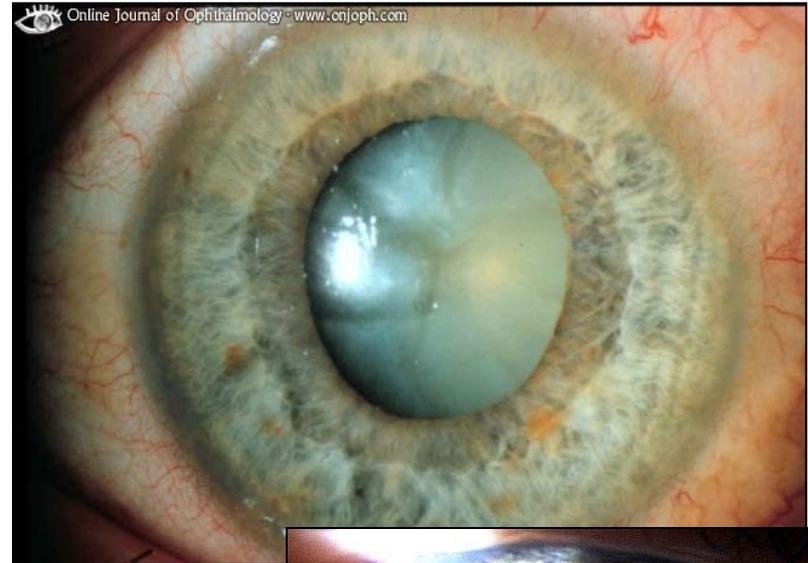
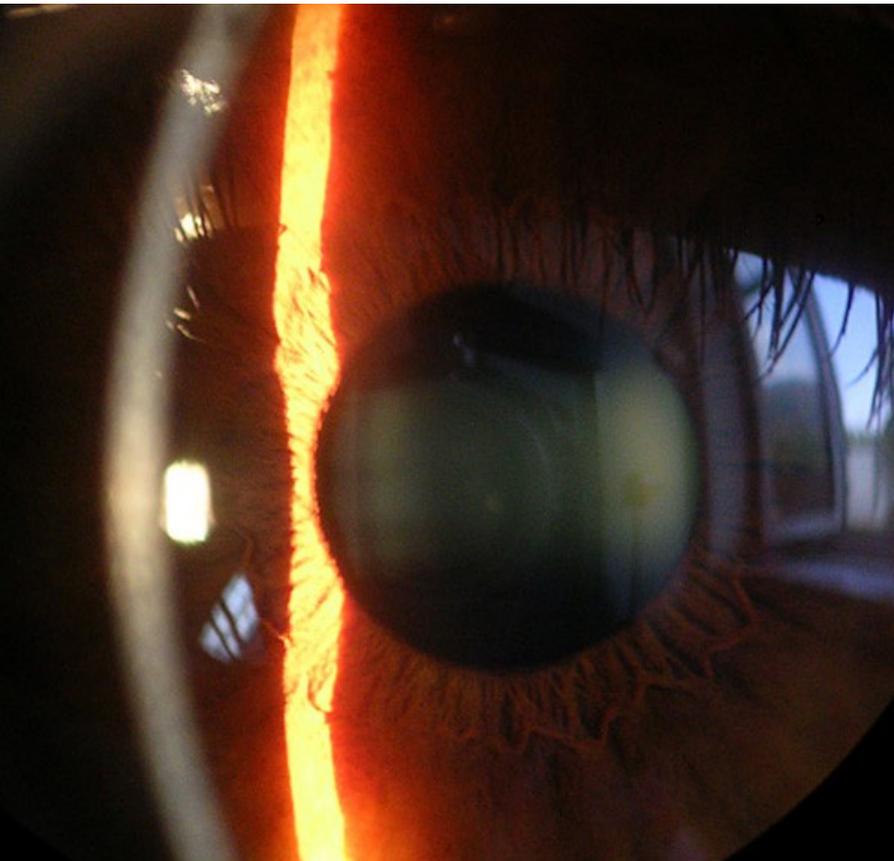
- table mounted microscope with a special adjustable illumination source attached



Slit lamp biomicroscopy



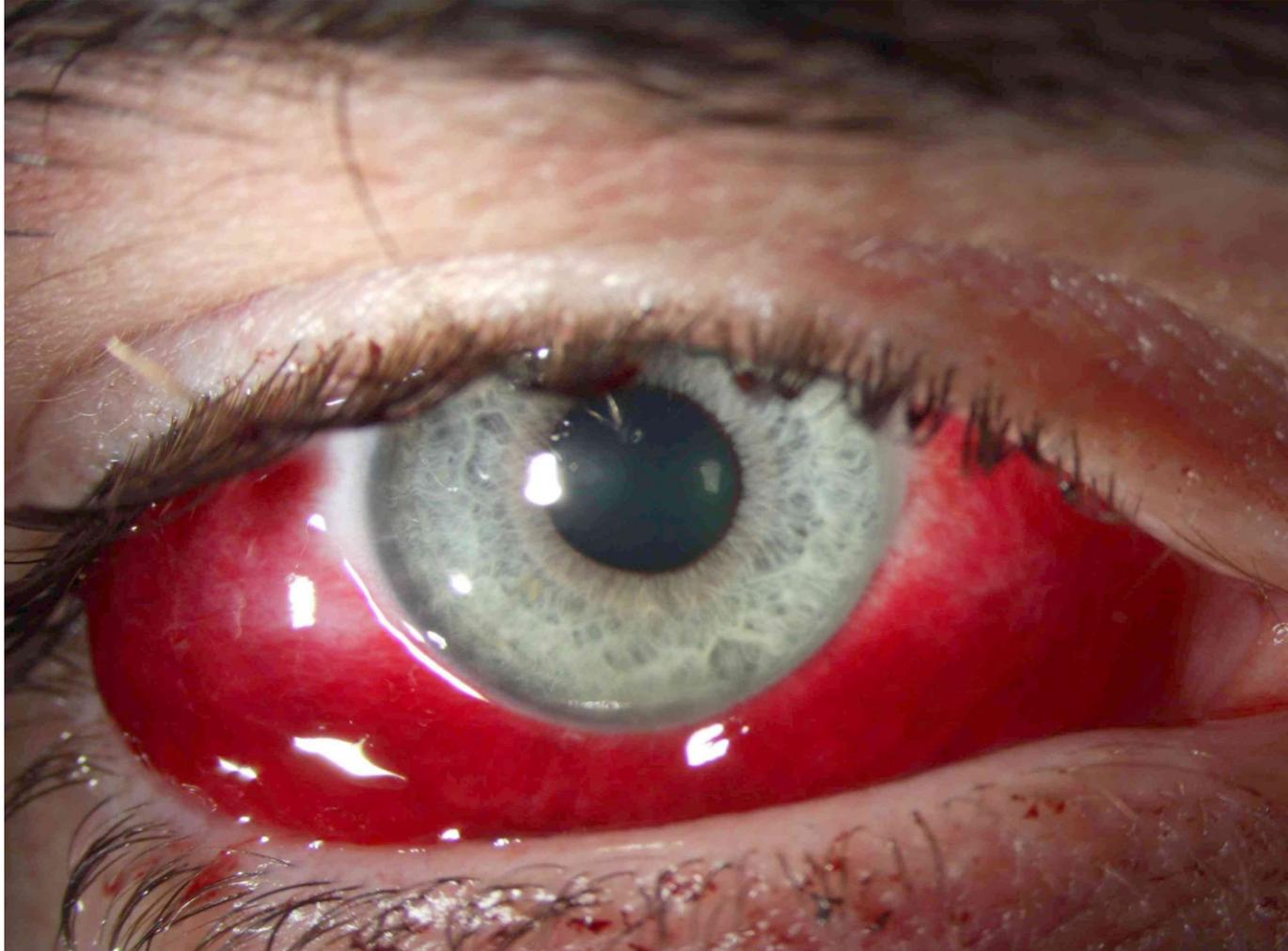
Slit lamp biomicroscopy



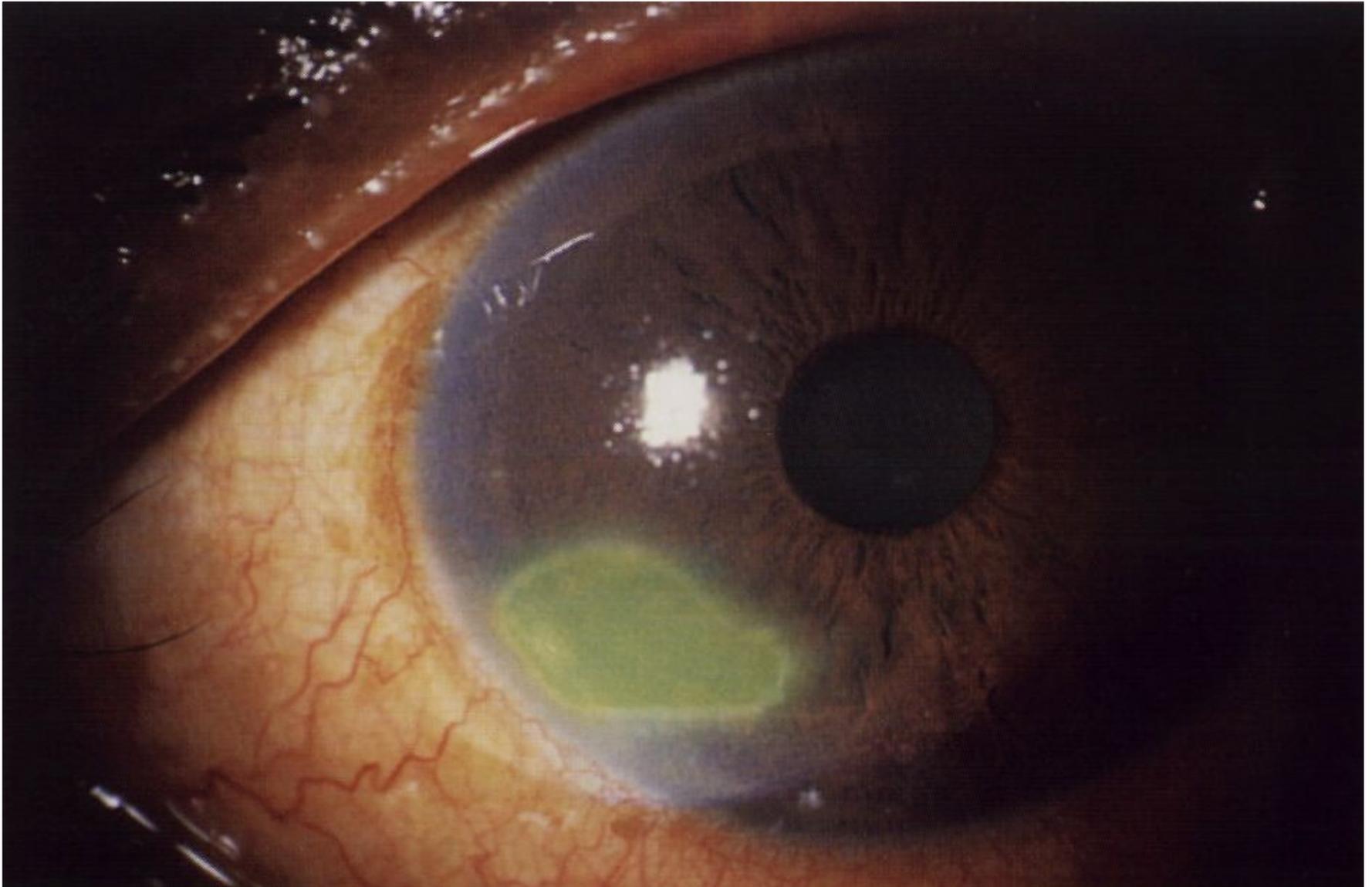
Synechia posterior



Sunconjunctival haemorrhage



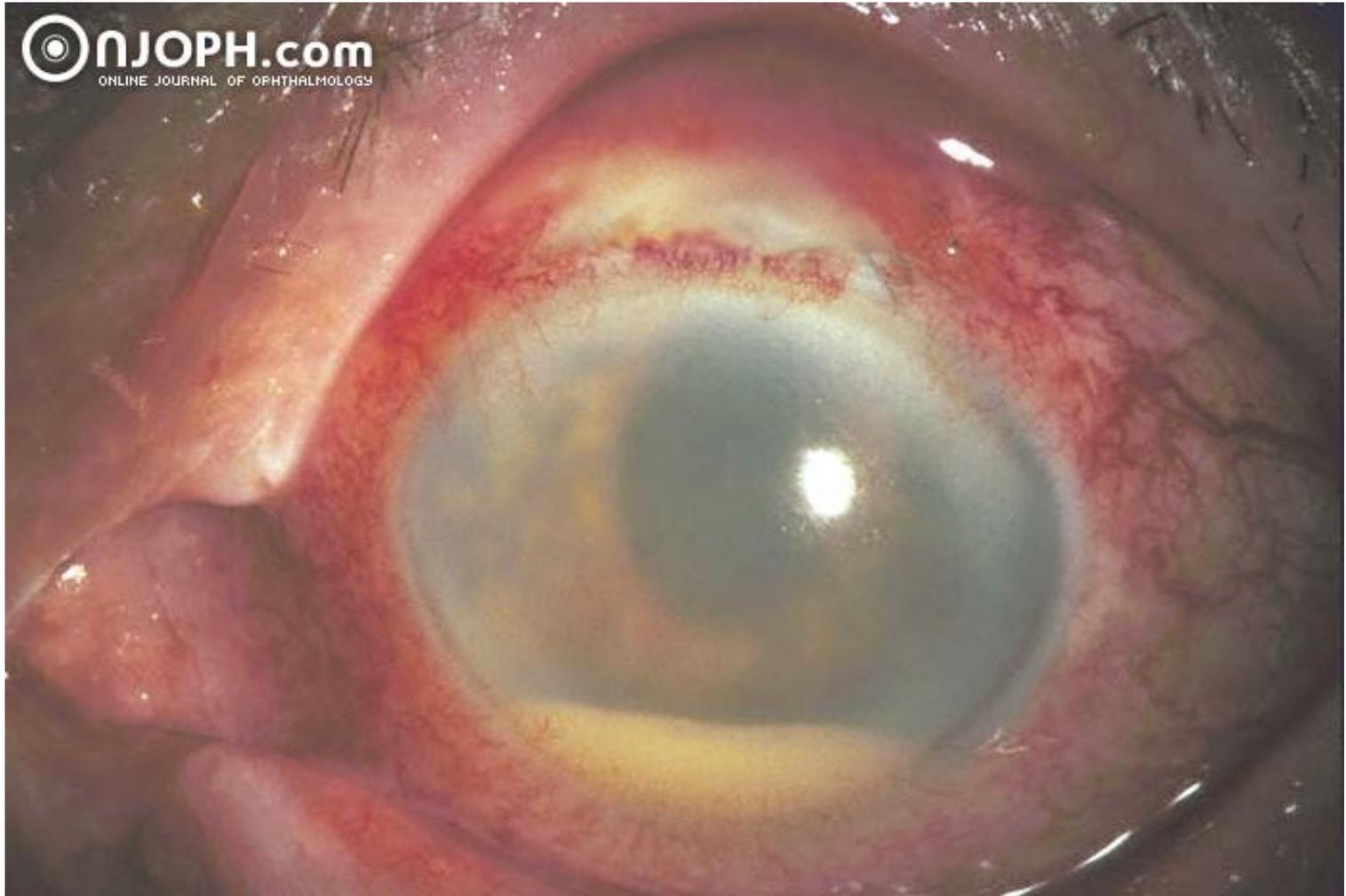
Corneal abrasion



Hyphema

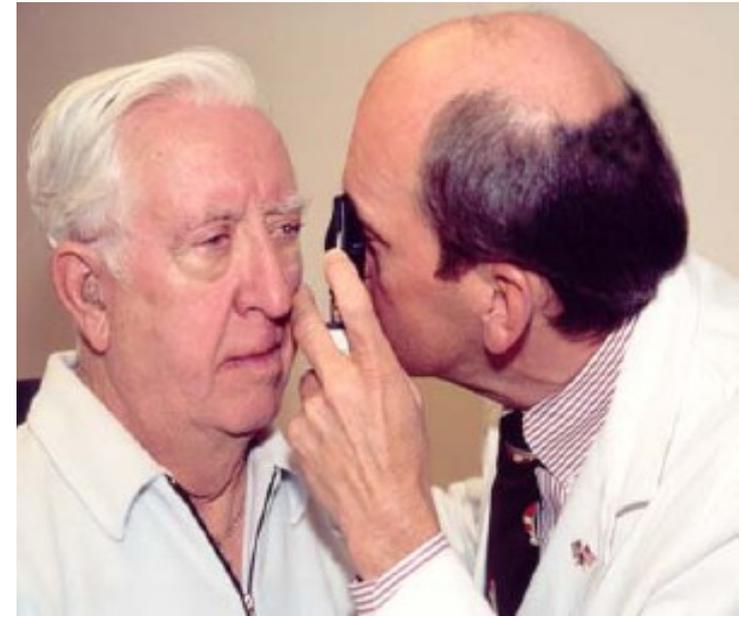


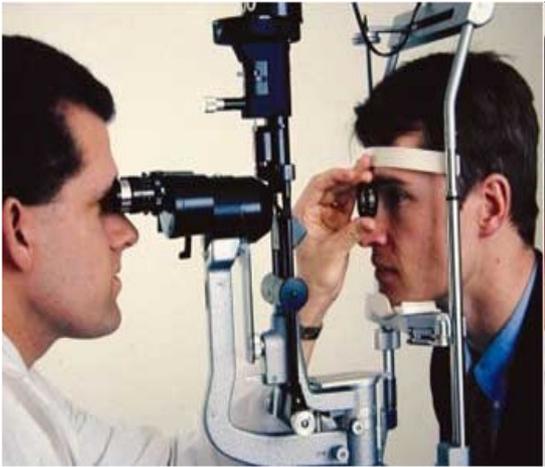
Hypopyon



Examination of fundus

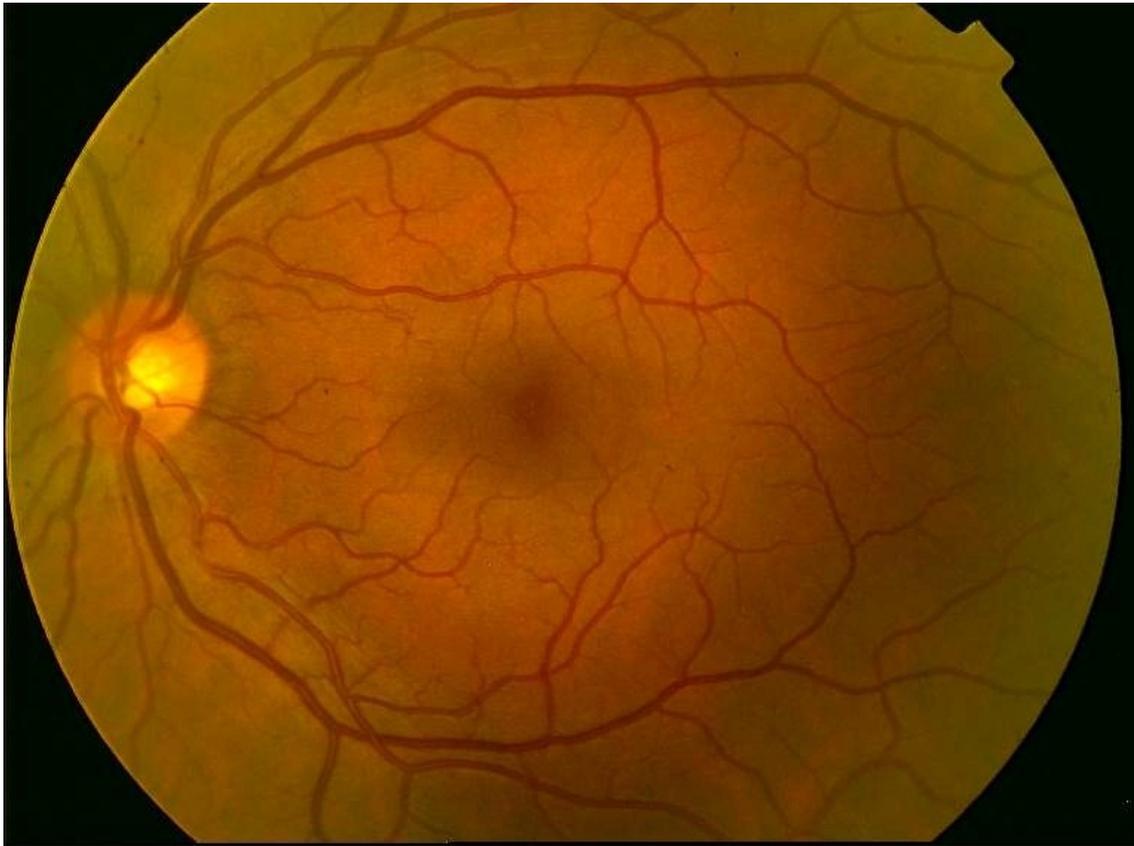
- **Ophthalmoscopy - direct (no stereopsis, worse for periphery)
- indirect**
- **Slit lamp biomicroscopy**
(high power convex lens, the image is vertically inverted and laterally reversed)
- **Mydriasis is necessary !**





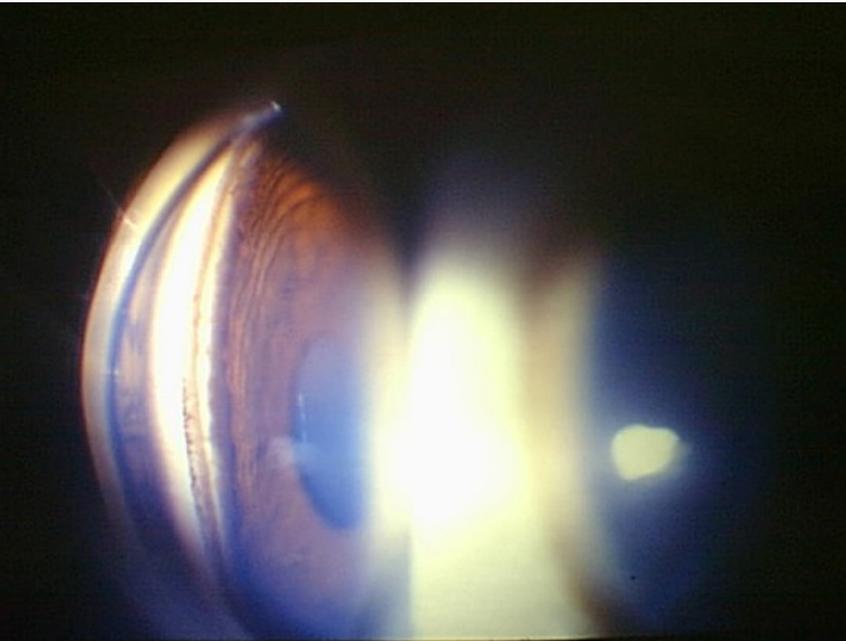
Features	Direct Ophthalmoscopy	Inverted Ophthalmoscopy (N6)	Field Ophthalmoscopy
Field	18 degrees	180 degrees	18 degrees
Examiner's distance from patient	10 cm and patient's eye retinal focus	same length	same length
Form of the fundus image	Real	Real	Real
Size of the	Intermediate	Small	Large

Ocular fundus

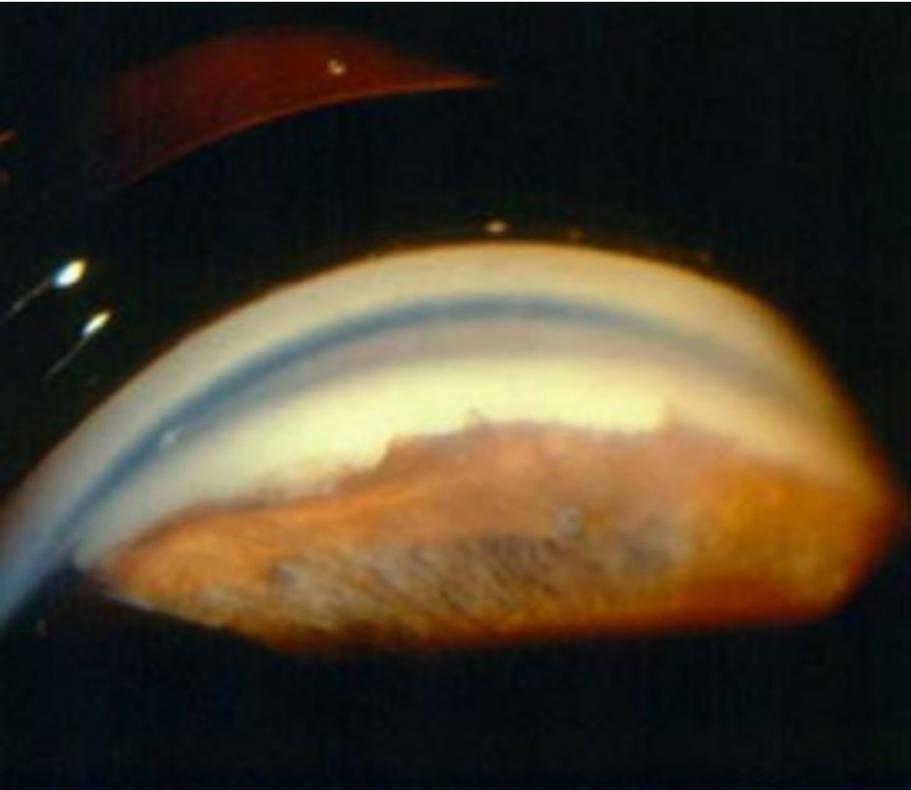


Special examination techniques

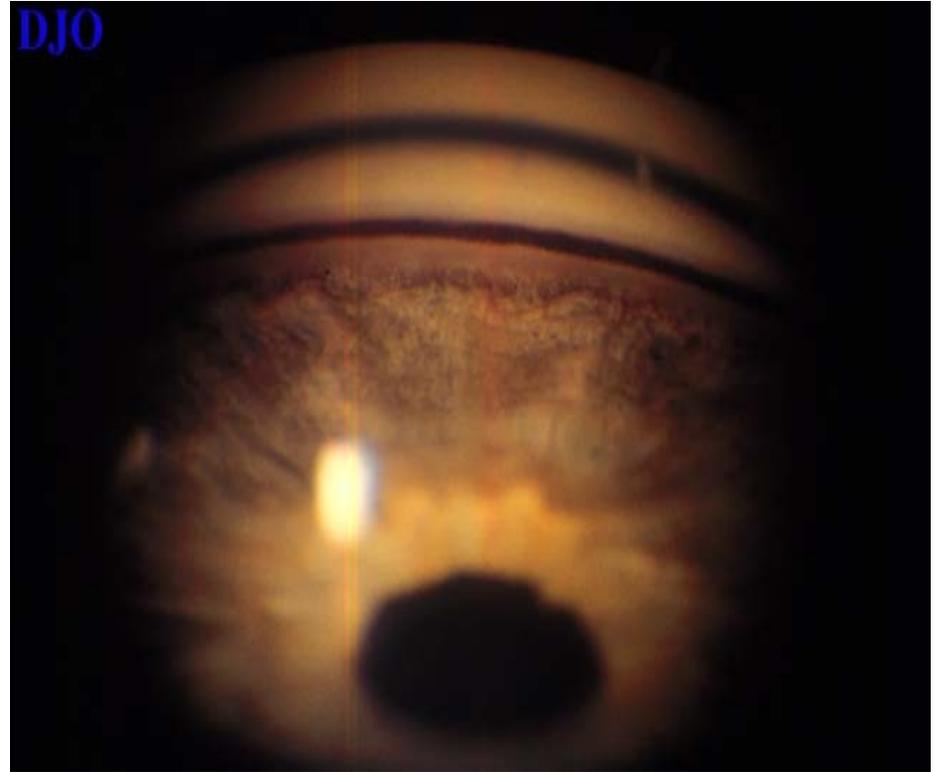
Gonioscopy

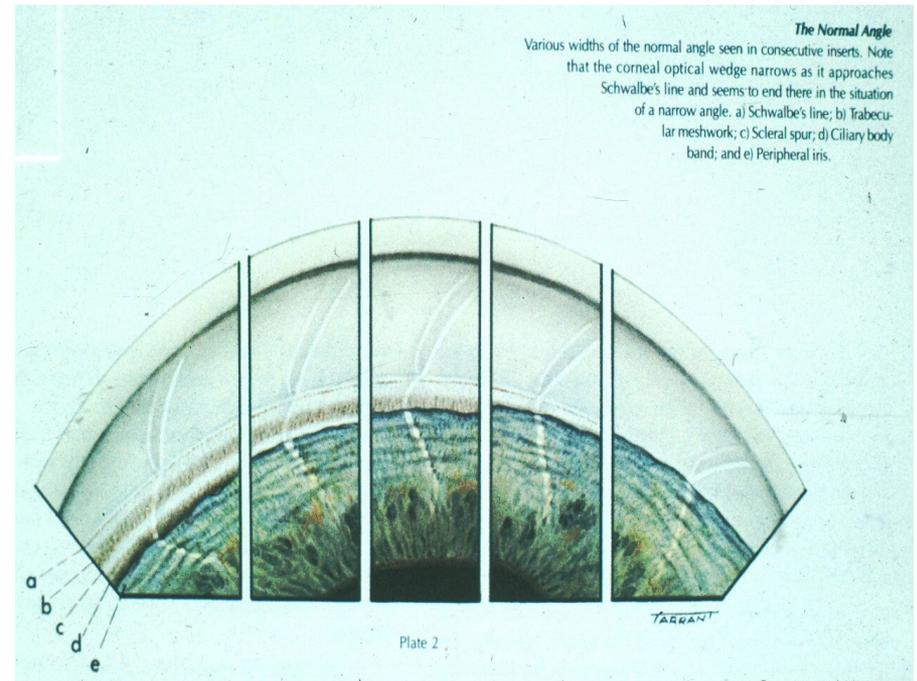
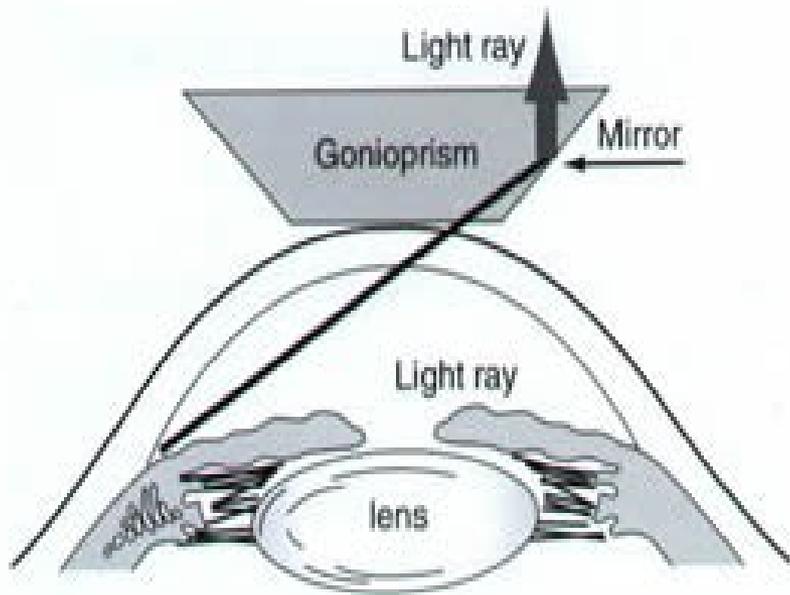


- Gonio lens (mirrors)
- Angle structures
- Fundus examination



DJO





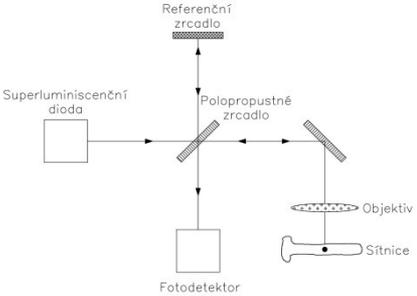
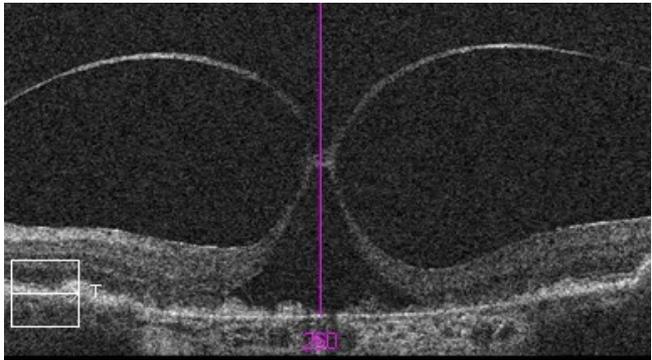
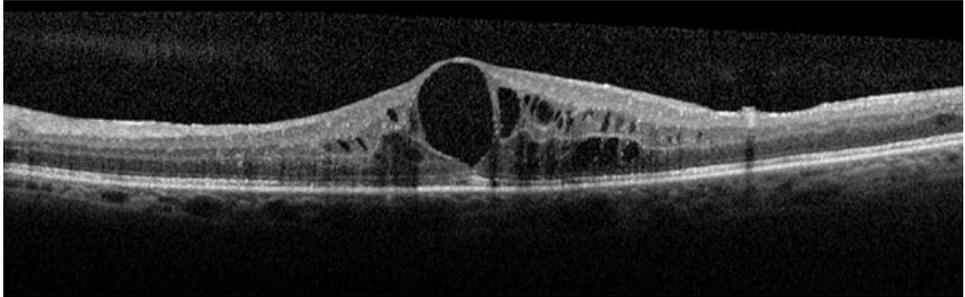
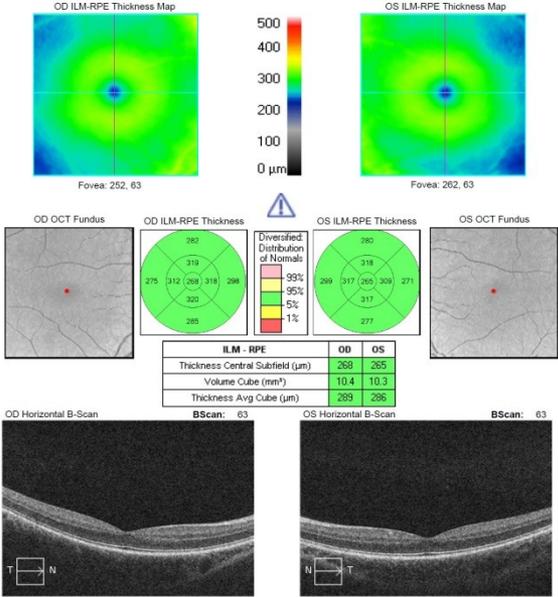
Optical coherence tomography

Name:
 ID:
 DOB:
 Gender: Unknown
 Technician: Operator, Cirrus

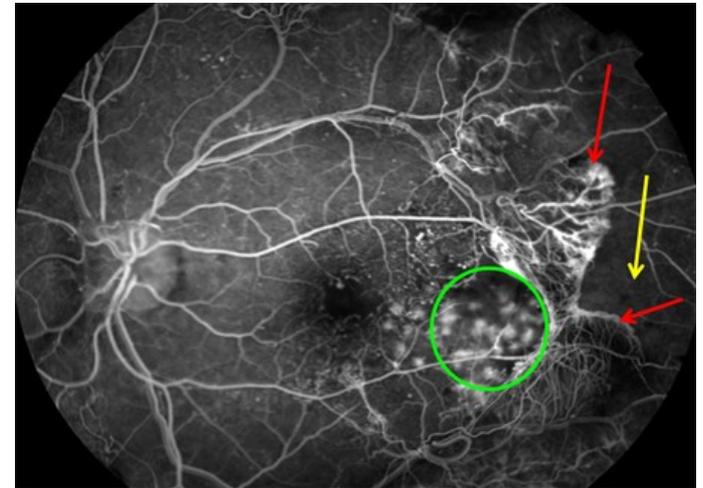
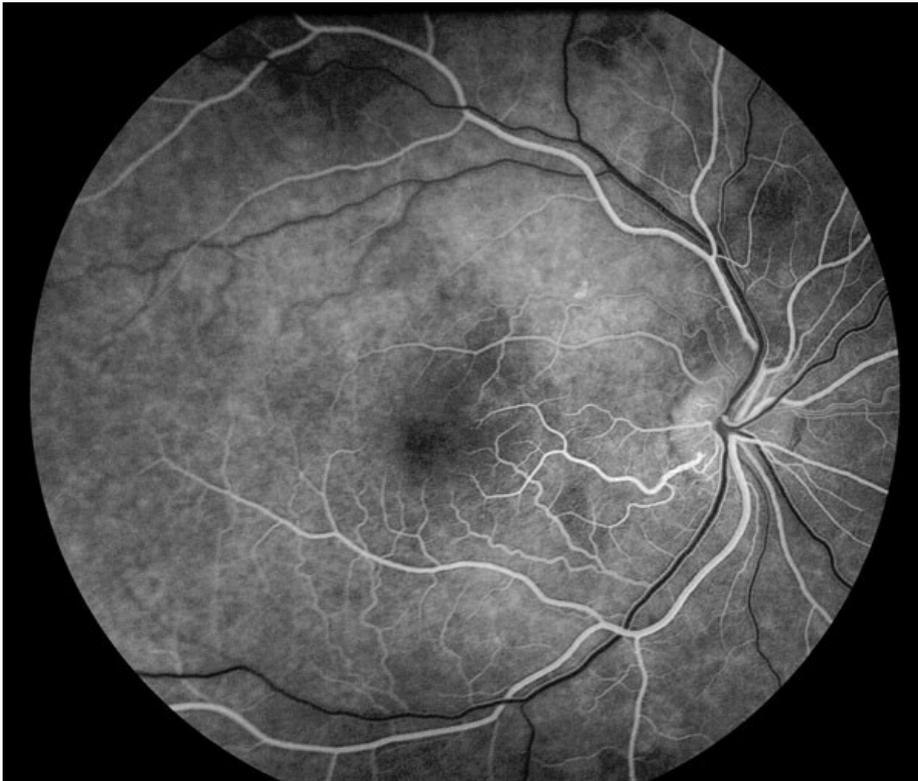
Exam Date:
 Exam Time:
 Serial Number: 4000-11302 4000-11302
 Signal Strength: 9/10 9/10

OD OS
 CZMI
 ZEISS

Macula Thickness OU: Macular Cube 512x128
 OD OS



Fluorescein angiography

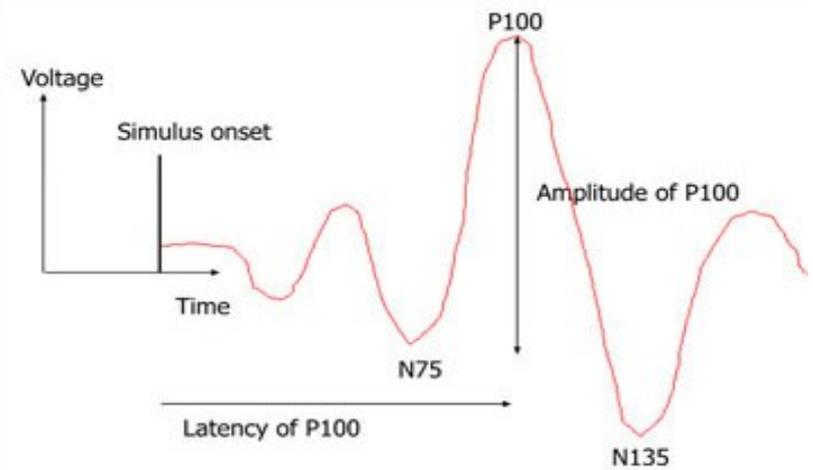
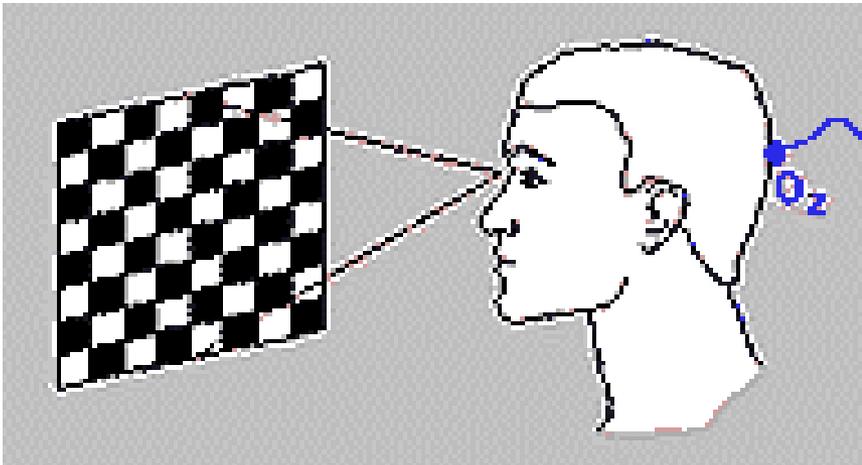


Electrophysical tests

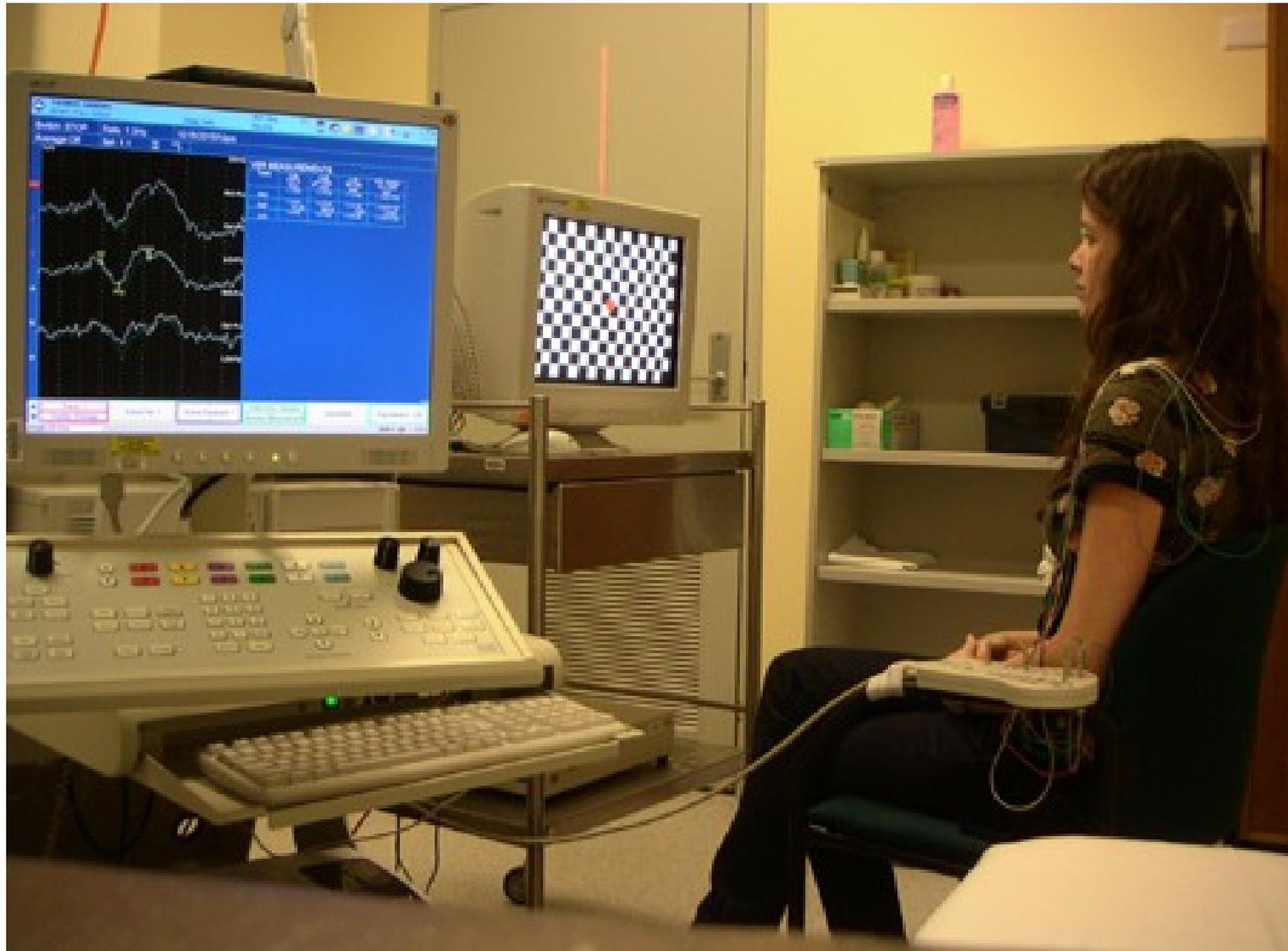
- **ERG (electroretinography)**
diagnosis of functional defects of retina
- Record of an action potential produced by the retina when it is stimulated by light

- **VEP (visual evoked potential)**
-diagnosis of functional defects of visual pathways
- Record of electrical activity of the visual cortex created by stimulation of the retina

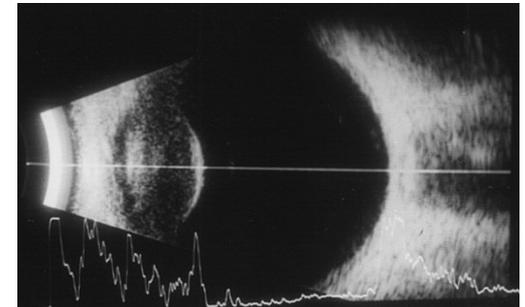
Electrophysical tests



Electrophysiological tests

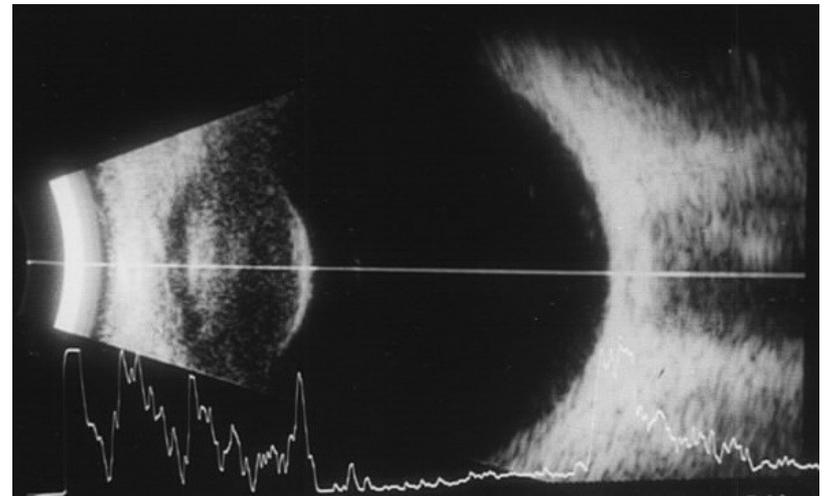
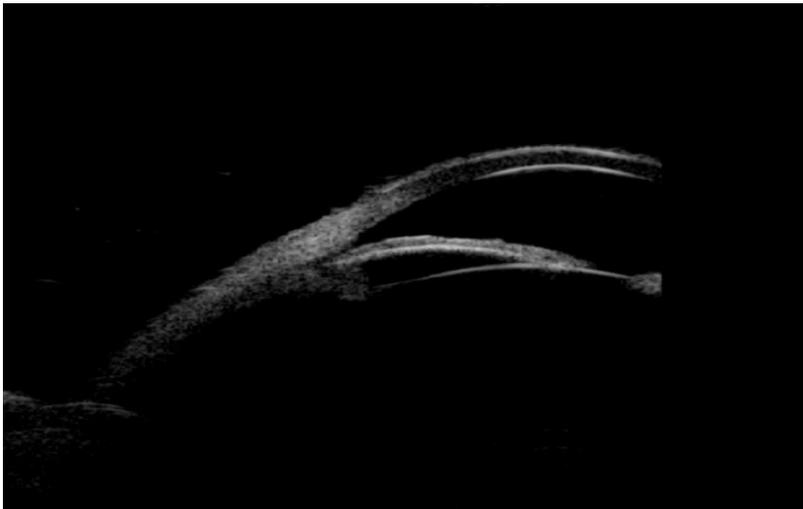


Ultrasound



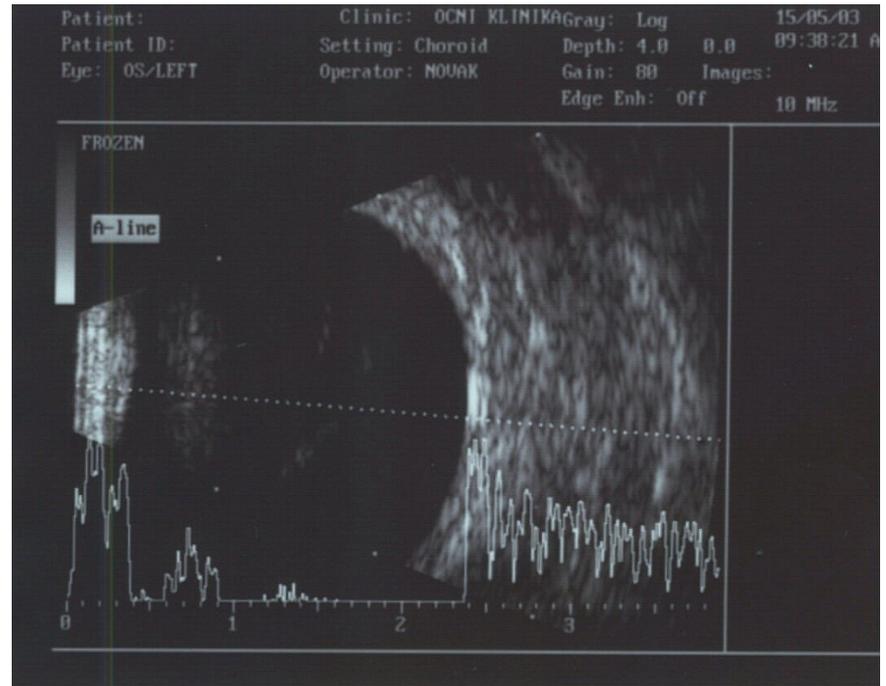
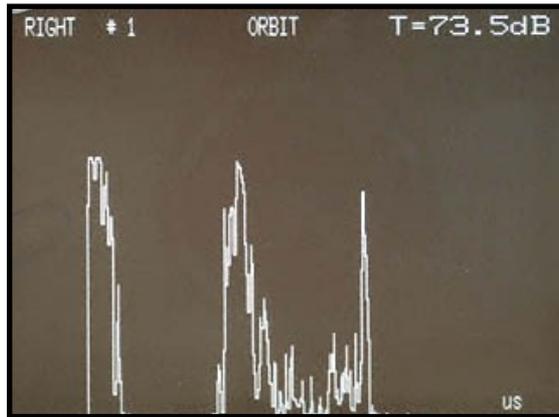
Ultrasound

- Non transparent optical media
- UBM- high frequency ultrasound – imaging of anterior segment

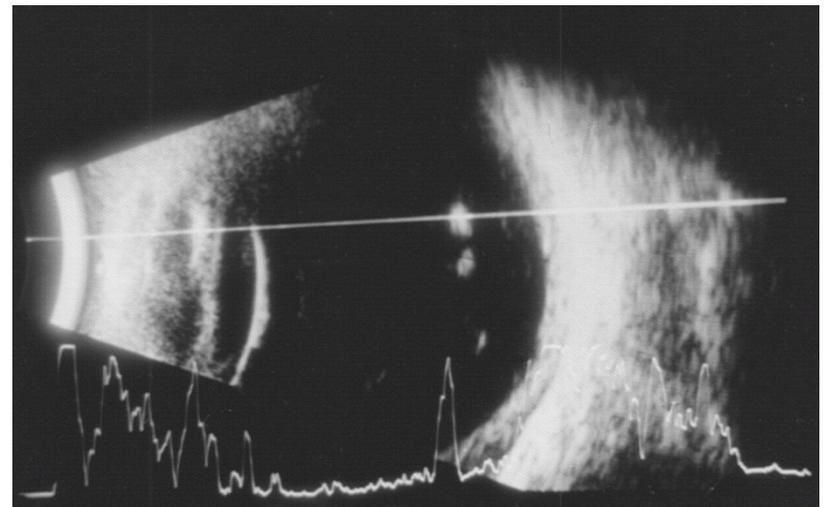
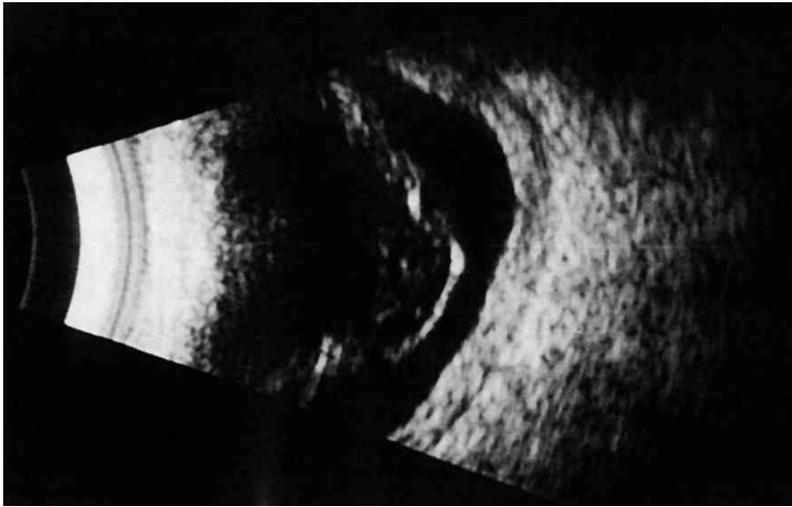
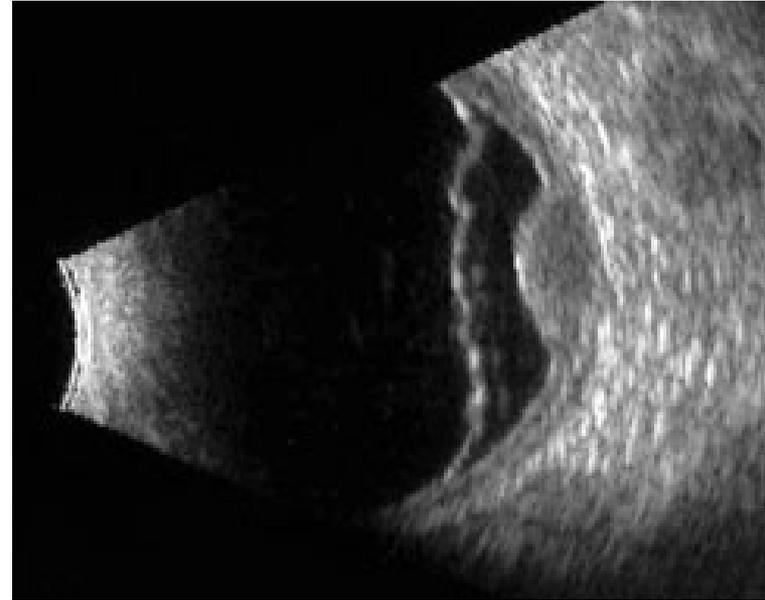


Ultrasound

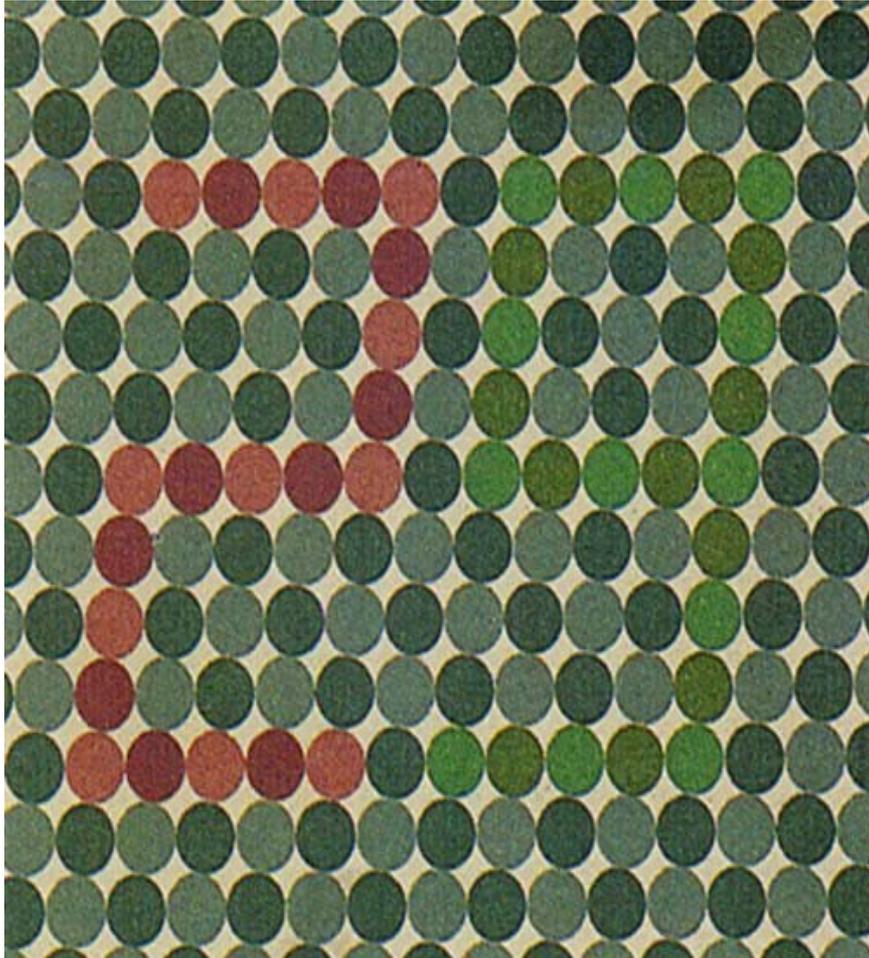
- A scan (biometry)
- B scan



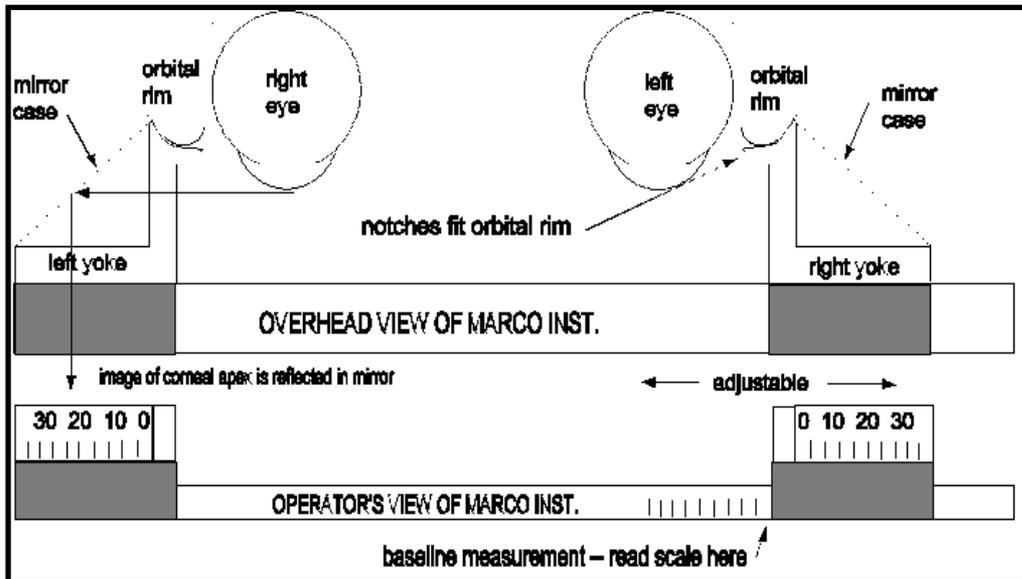
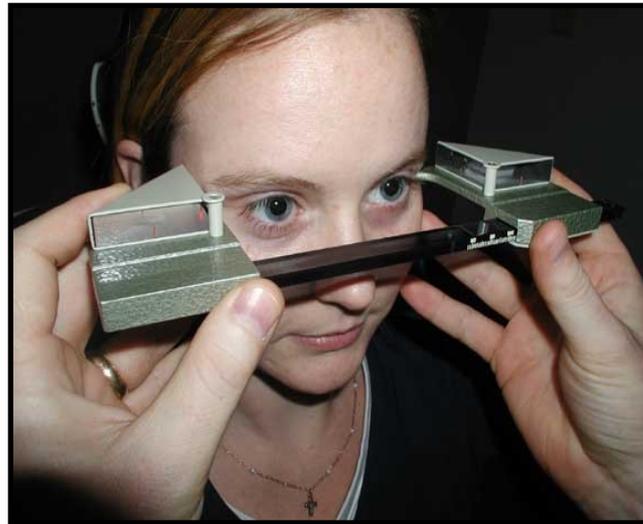
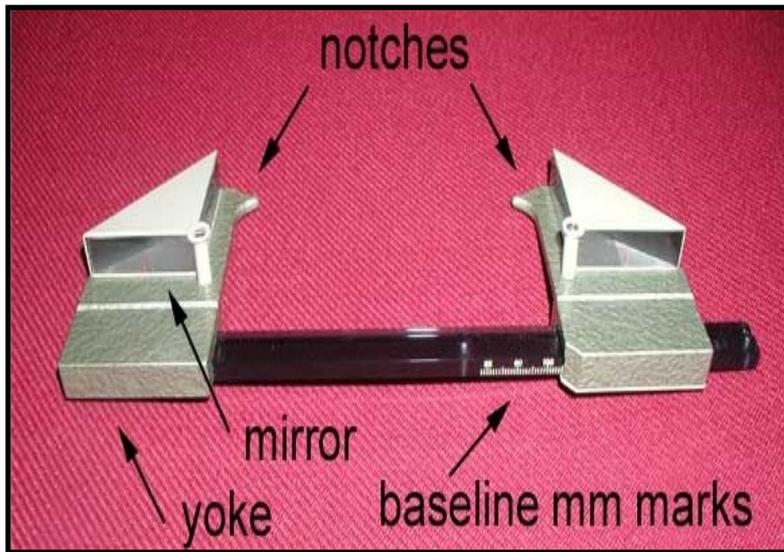
Ultrasound



Color vision – HUE test



Hertl exoftalmometry



Děkuji za pozornost!

