

Examination techniques in ophthalmology

V. Matušková

Basic examination techniques

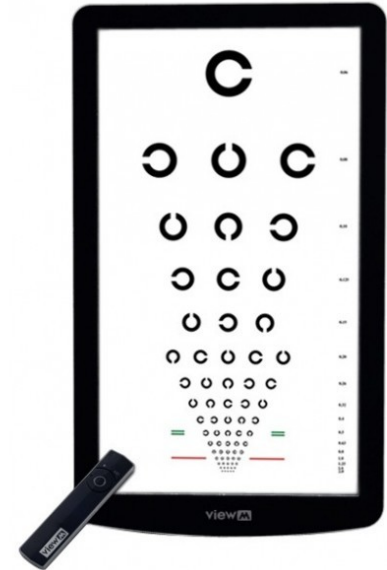
- Visual acuity (natural, best corrected)
- Measurement of intraocular pressure
- Slit lamp examination
- Fundus examination



Visual acuity

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

Charts



VISUAL ACUITY CHARTS	
Standard Snellen chart	Bailey-Lovie chart
<p>E 1</p> <p>F P 2</p> <p>T O Z 3</p> <p>L P E D 4</p> <p>P P C F D 5</p> <p>K H F C E F 6</p> <p>VELOPED 7</p> <p>DEVELOPED 8</p> <p>XXXXXXXXXX 9</p> <p>XXXXXXXXXX 10</p>	<p>D S R K N</p> <p>C K Z O H</p> <p>O N R K D</p> <p>K Z V D C</p> <p>V S H Z O</p> <p>H D K C R</p> <p>O S N H N</p> <p>S Y Z D K</p> <p>XXXXXXXXXX</p> <p>XXXXXXXXXX</p>

Near vision

Jaeger chart

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

Jaeger Eye Chart

No. 1
1.80 M

in the preceding generation, the state of this country to reduce the population and encourage
of rural population, and to encourage the growth of the rural population, and to encourage the growth of
the rural population.

No. 2
.80 M

the public administration was conducted in the most efficient manner, and the
the public administration was conducted in the most efficient manner, and the
the public administration was conducted in the most efficient manner, and the

No. 3
.60 M

the public administration was conducted in the most efficient manner, and the
the public administration was conducted in the most efficient manner, and the
the public administration was conducted in the most efficient manner, and the

No. 4
.45 M

the public administration was conducted in the most efficient manner, and the
the public administration was conducted in the most efficient manner, and the
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No. 5
1.00 M

the public administration was conducted in the most efficient manner, and the
the public administration was conducted in the most efficient manner, and the
the public administration was conducted in the most efficient manner, and the

No. 6
1.20 M

the public administration was conducted in the most efficient manner, and the
the public administration was conducted in the most efficient manner, and the
the public administration was conducted in the most efficient manner, and the

No. 7
1.50 M

the public administration was conducted in the most efficient manner, and the
the public administration was conducted in the most efficient manner, and the
the public administration was conducted in the most efficient manner, and the

No. 8
1.75 M

the public administration was conducted in the most efficient manner, and the
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No. 9
2.00 M

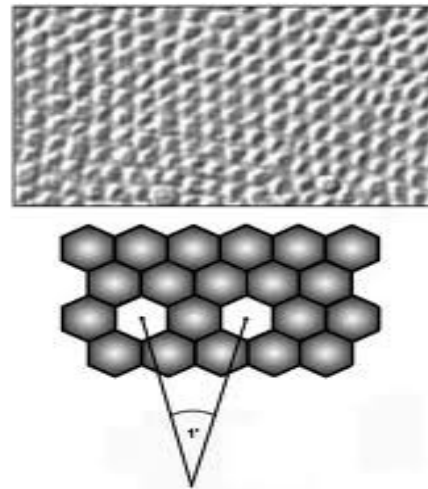
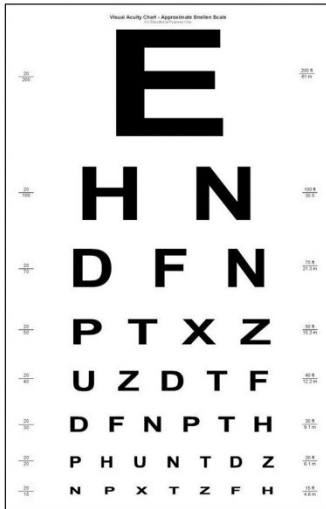
the public administration was conducted in the most efficient manner, and the
the public administration was conducted in the most efficient manner, and the
the public administration was conducted in the most efficient manner, and the

No. 10
2.25 M

the public administration was conducted in the most efficient manner, and the
the public administration was conducted in the most efficient manner, and the
the public administration was conducted in the most efficient manner, and the

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



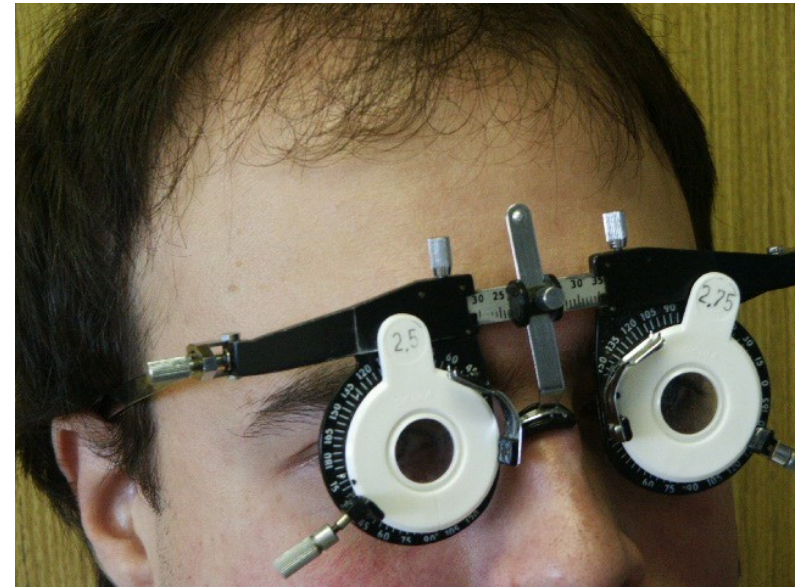
Visual acuity

- 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



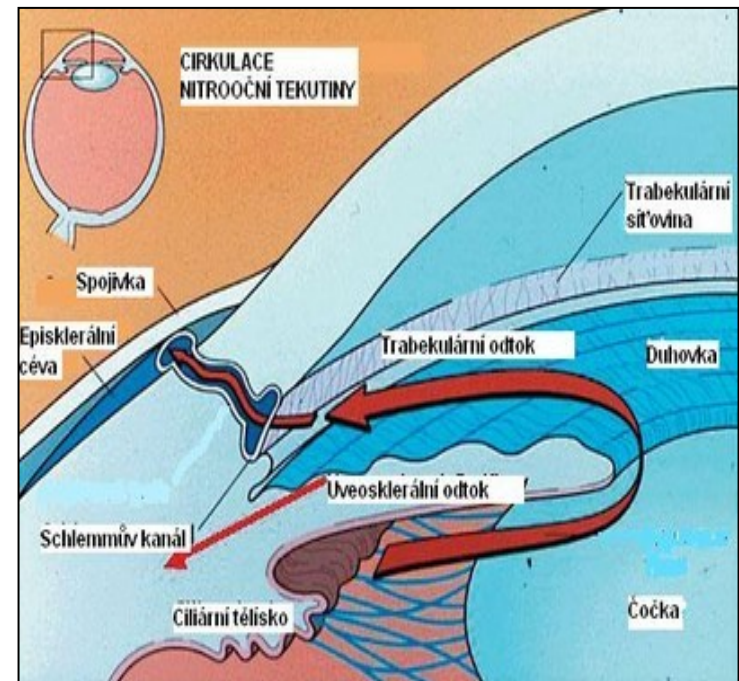
Tonometry

Contact techniques

- Schiötz tonometry
- Goldmann applanation tonometry

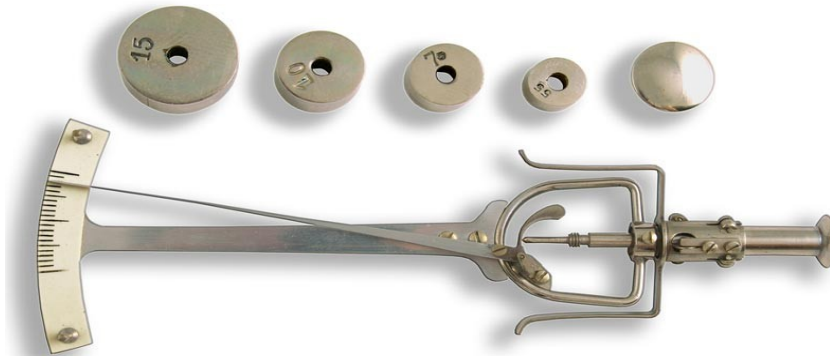
Non contact techniques

- Jet air (air puff)



Schiötz tonometry

- 7/7,5
- Topical aneesthesia

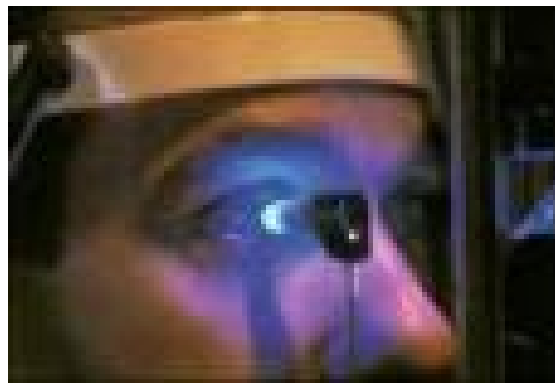


Schiötz tonometry

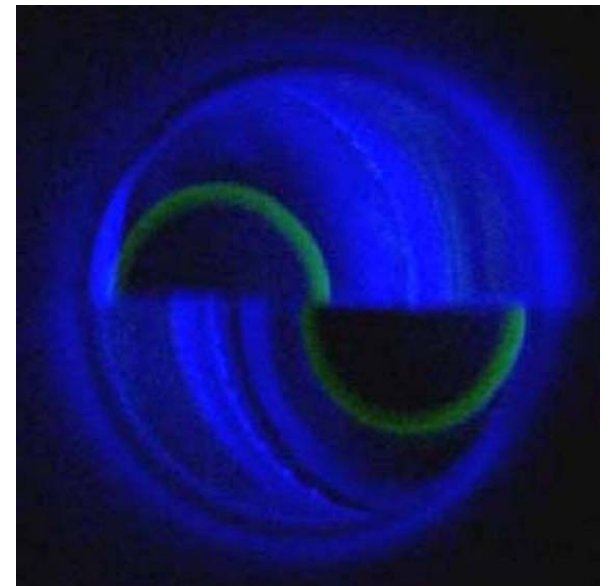
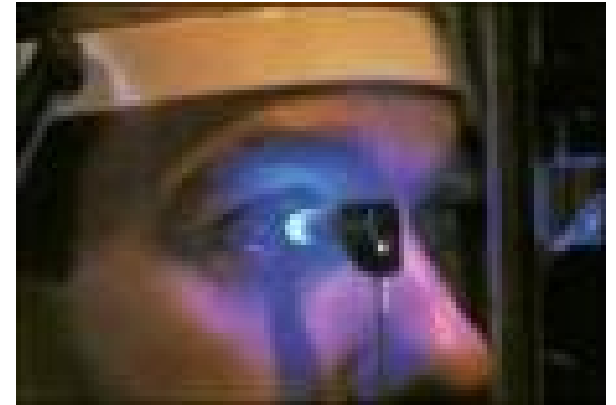
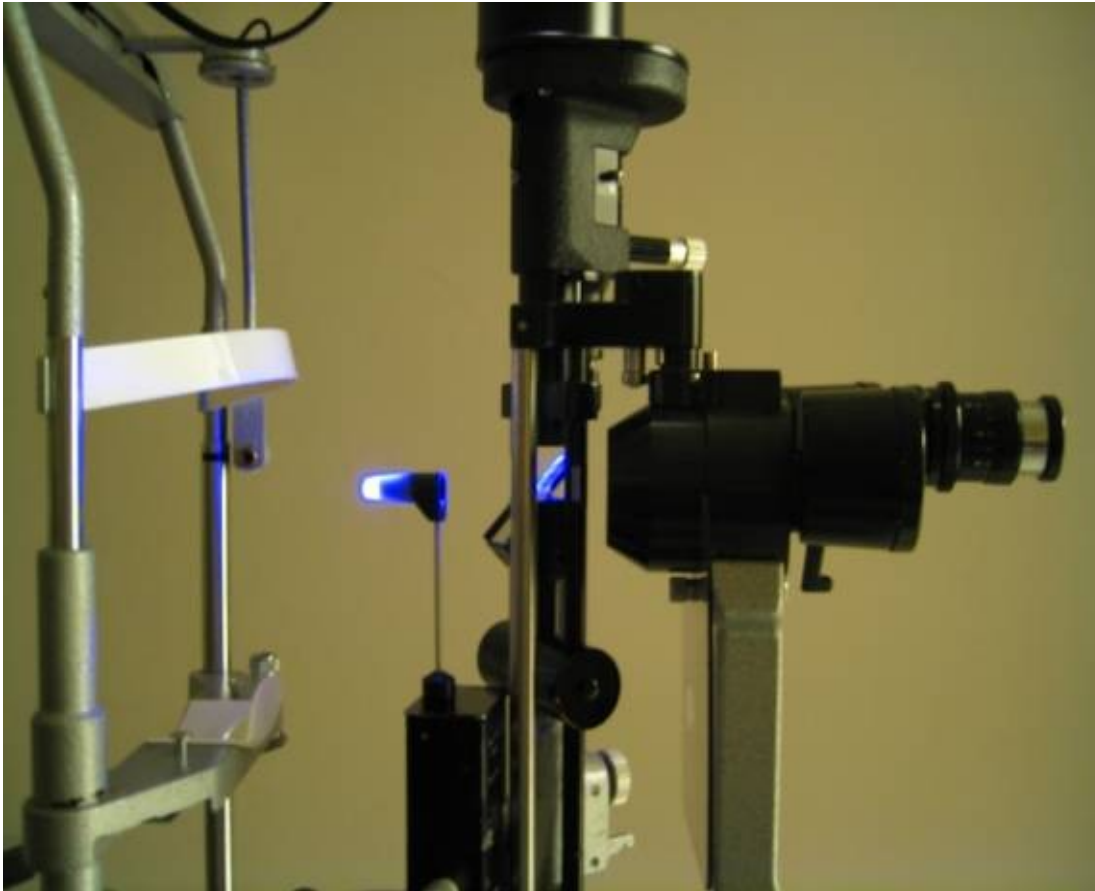


Goldmann tonometry

- 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



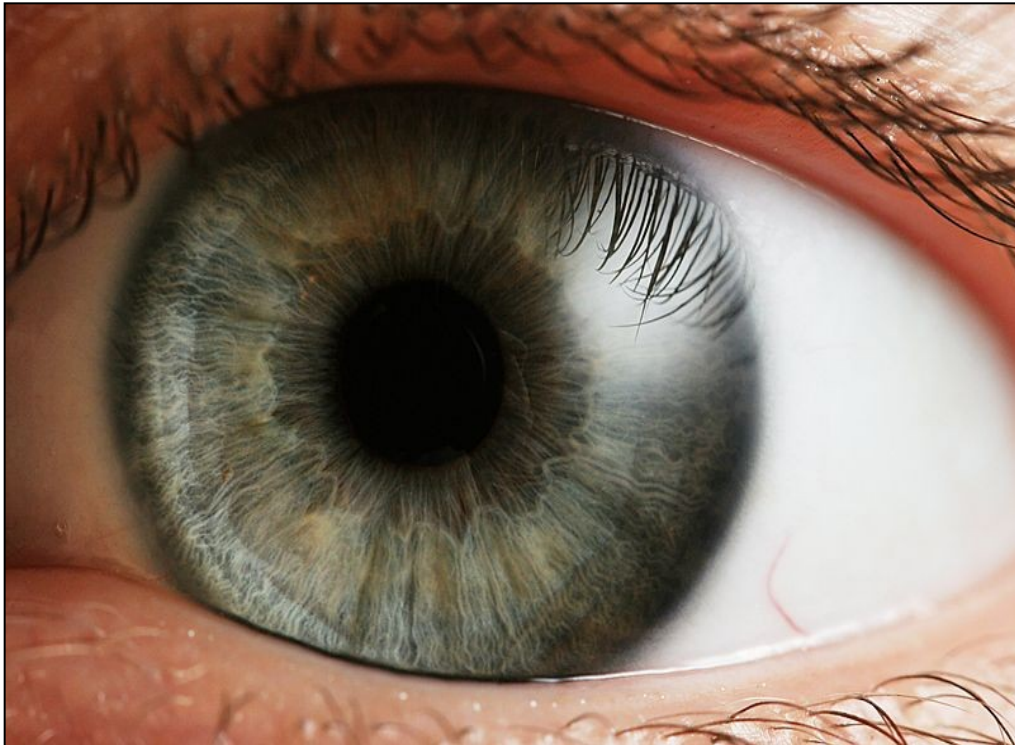
Lagopthalmus



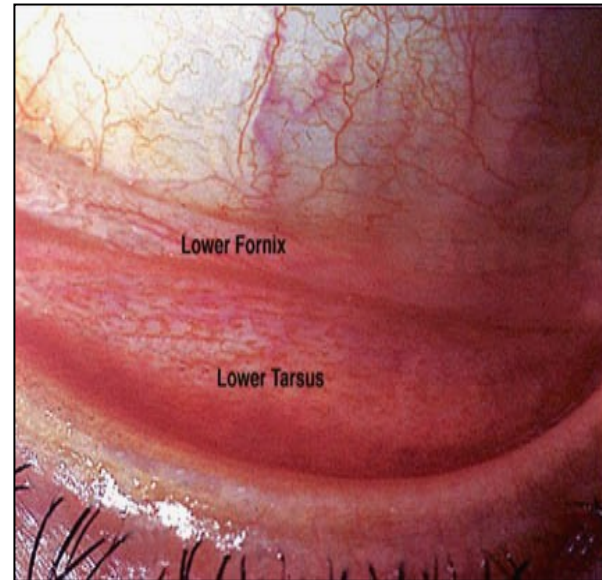
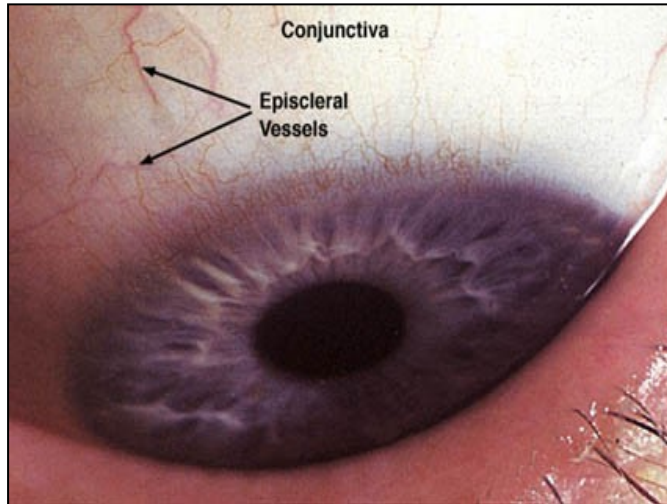
Entropium

Slit lamp biomicroscopy

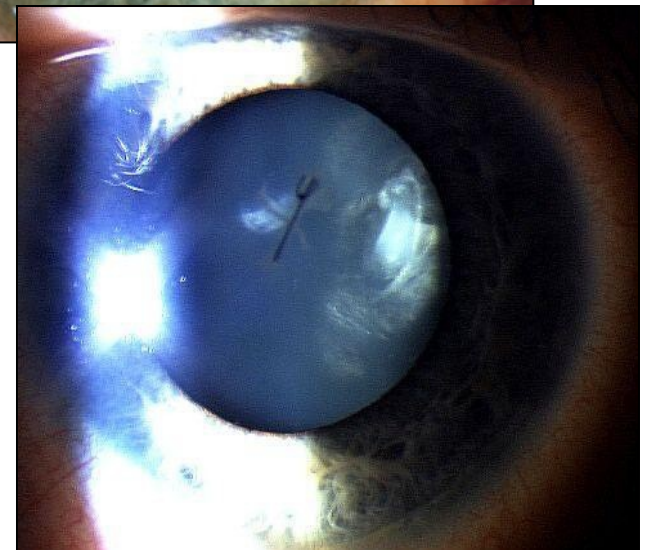
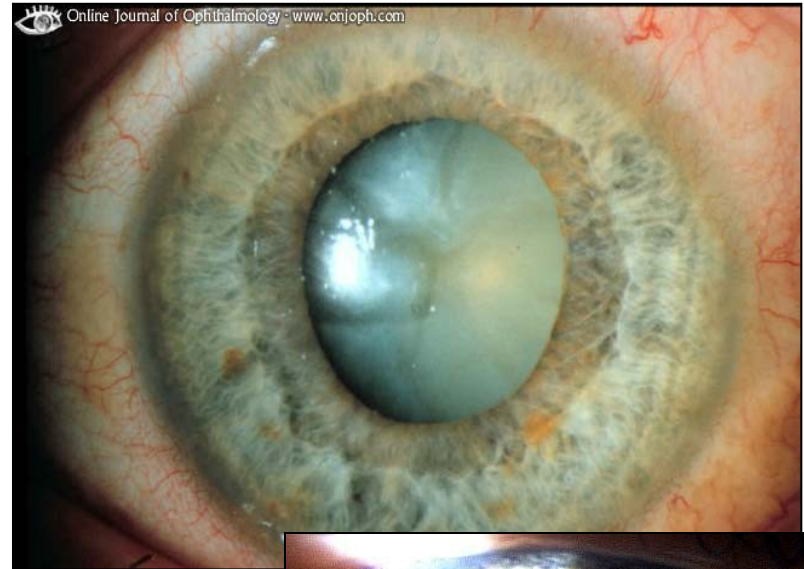
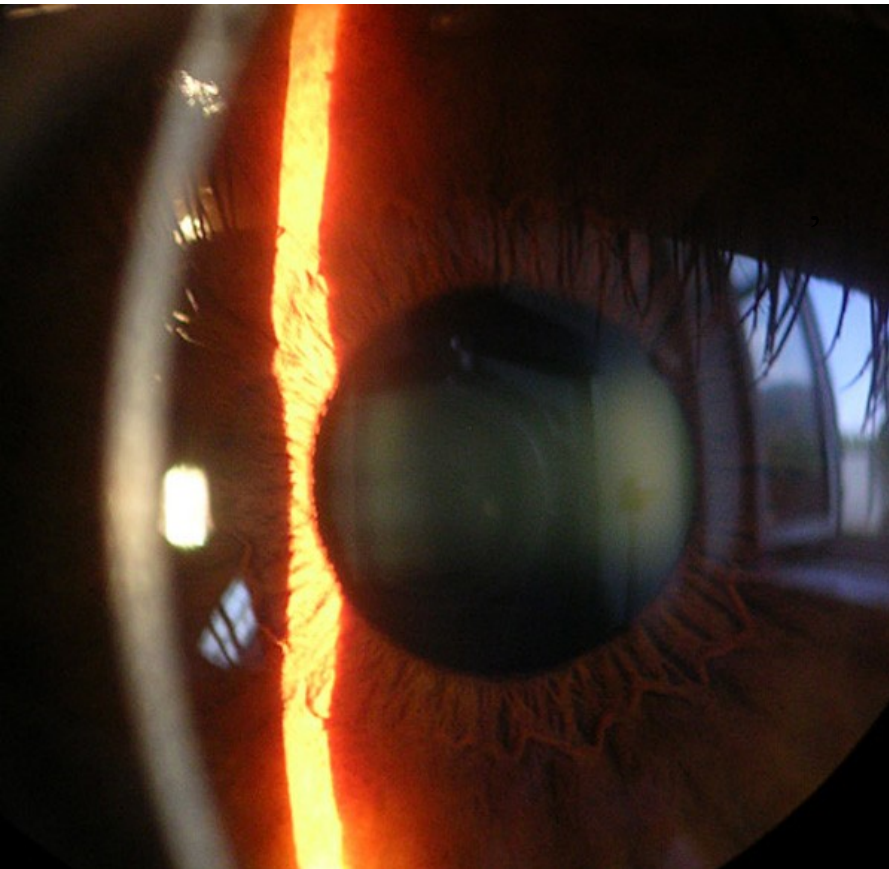
- table mounted microscope with a special adjustable illumination source attached



Slit lamp biomicroscopy



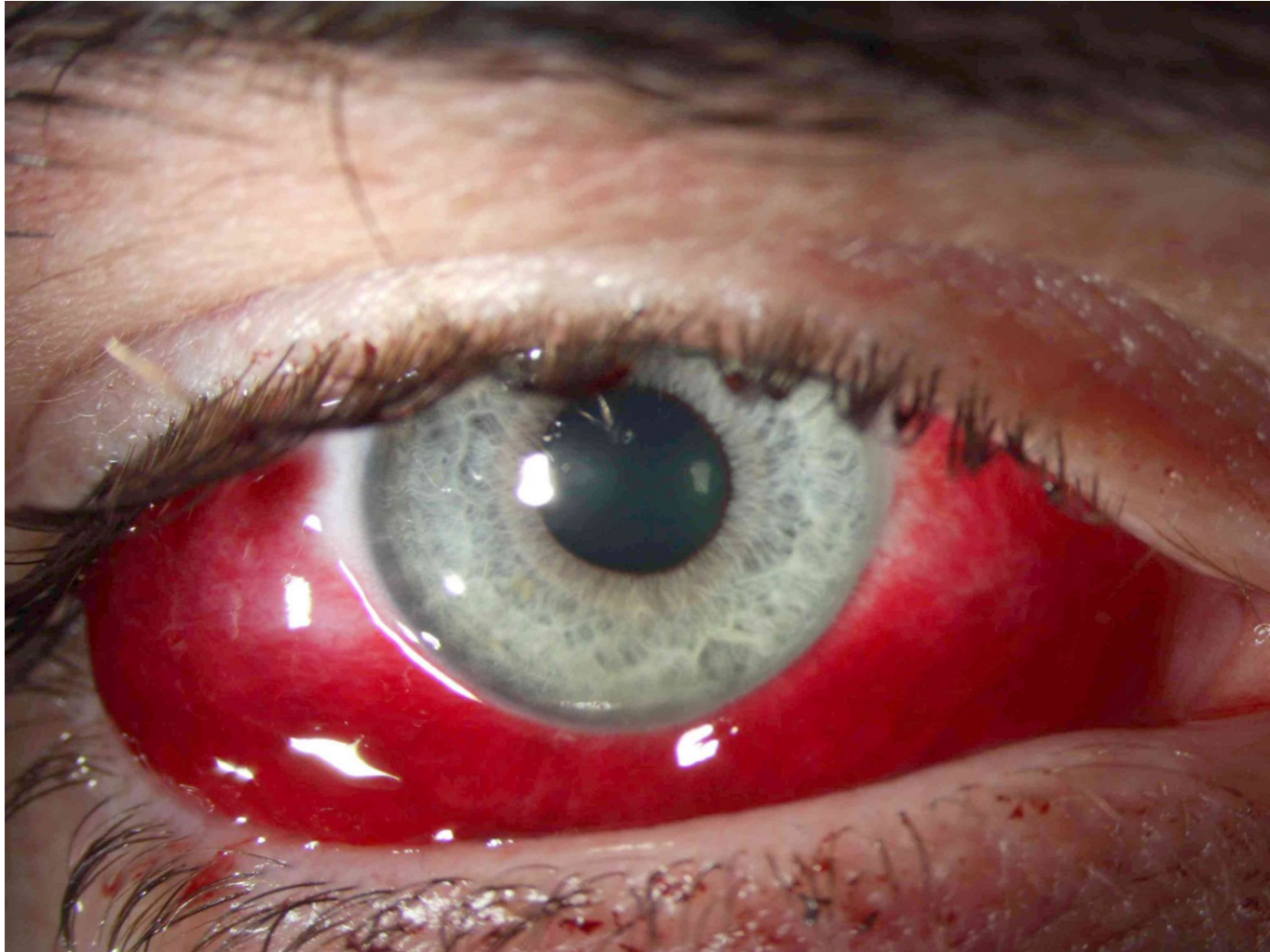
Slit lamp biomicroscopy



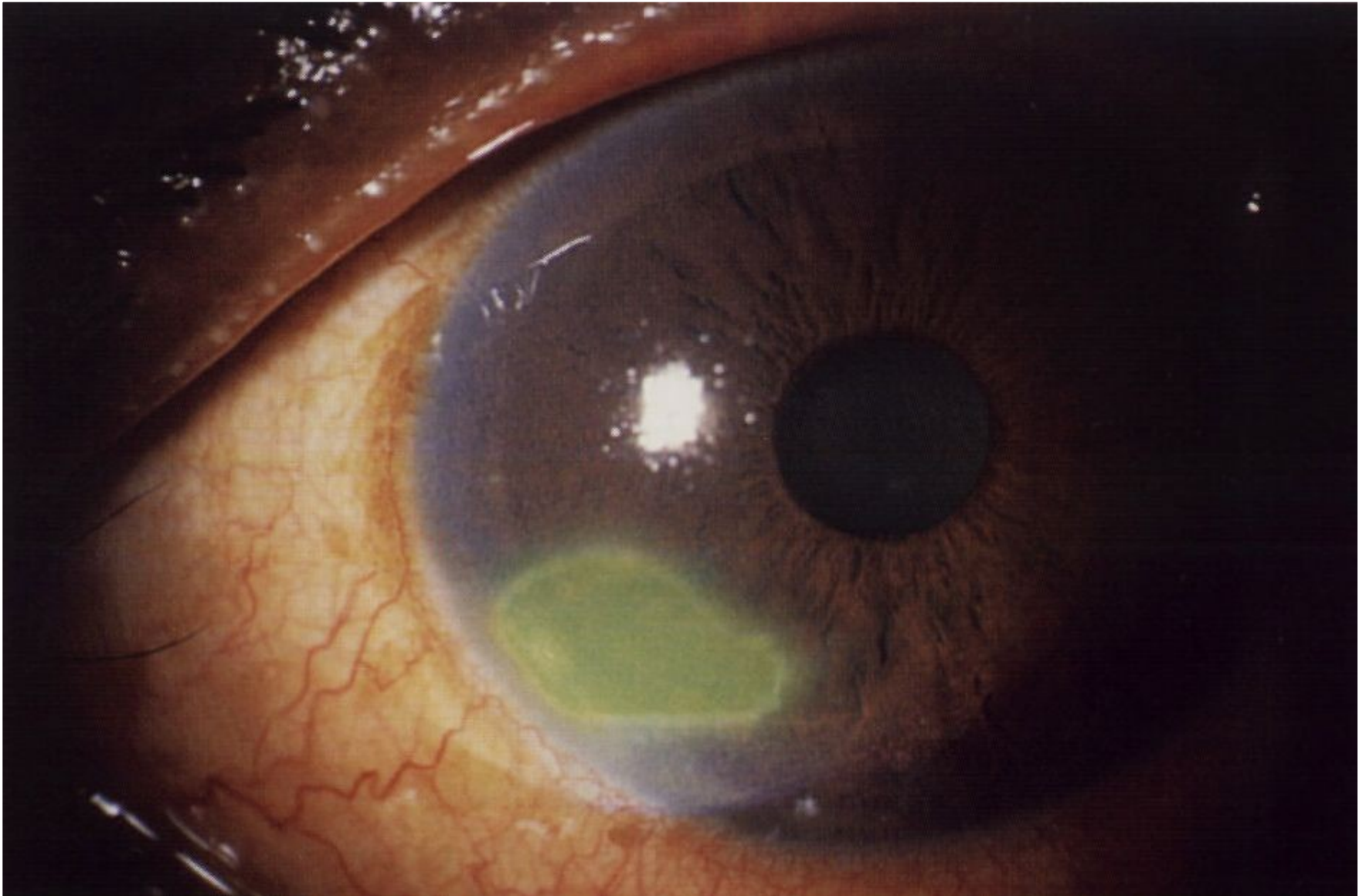
Synechia posterior



Sunconjunctival haemorrhage



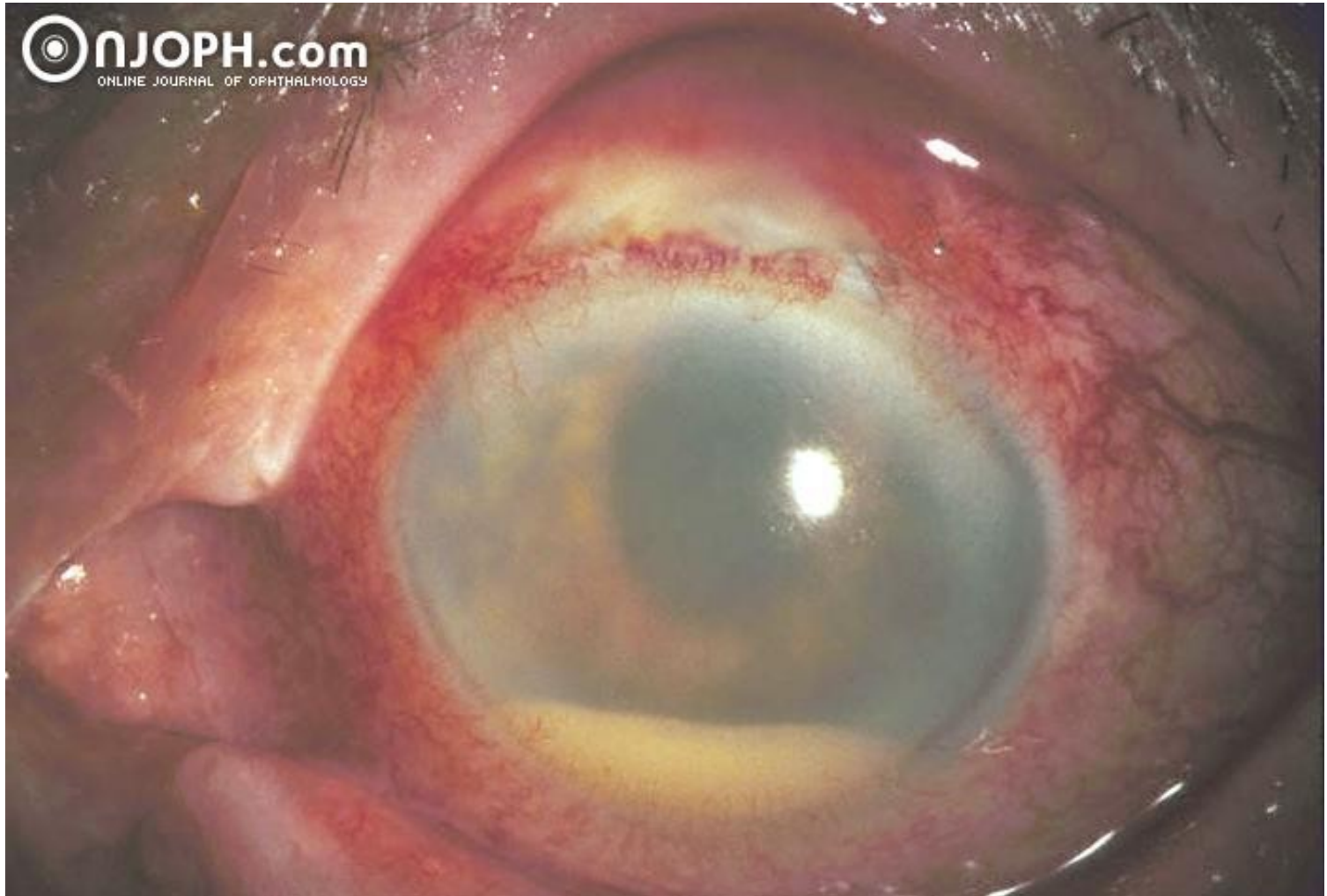
Corneal abrasion



Hyphema

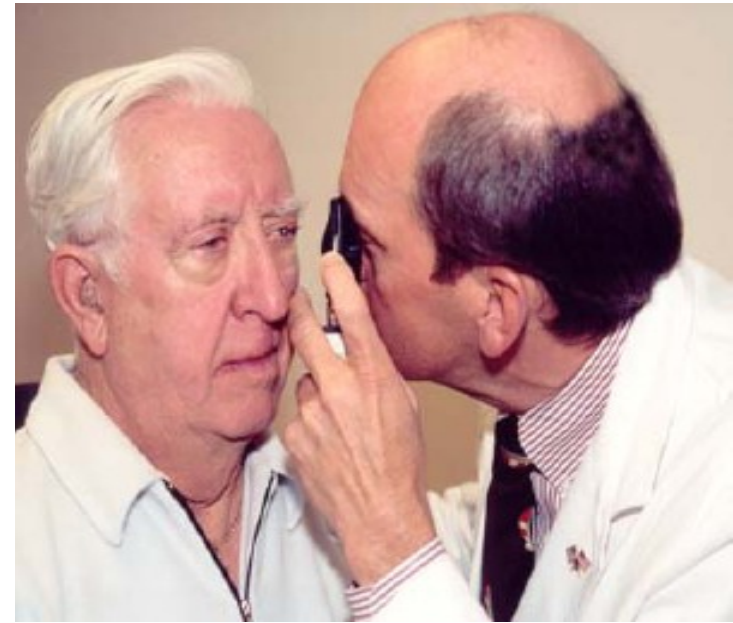


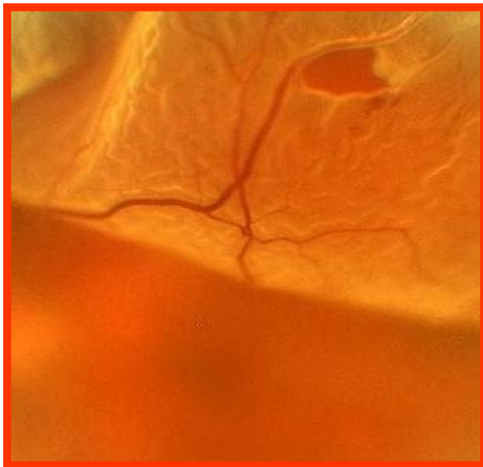
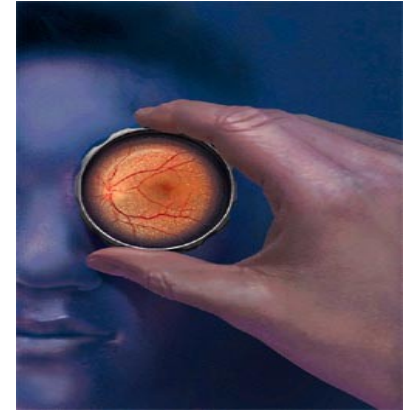
Hypopyon



Examination of fundus

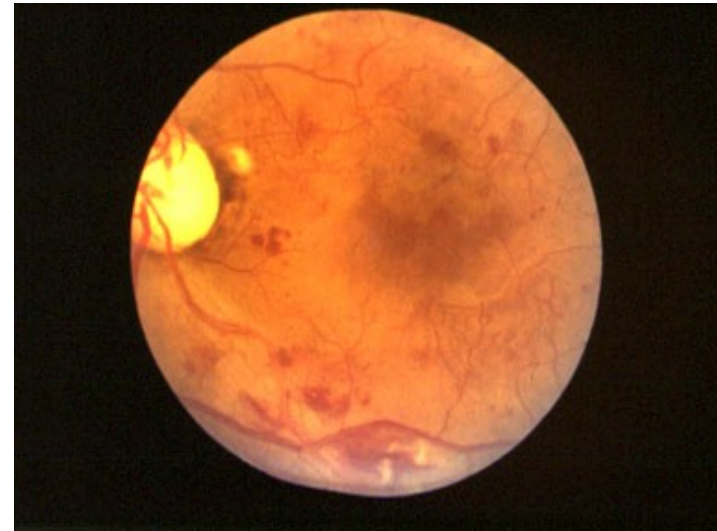
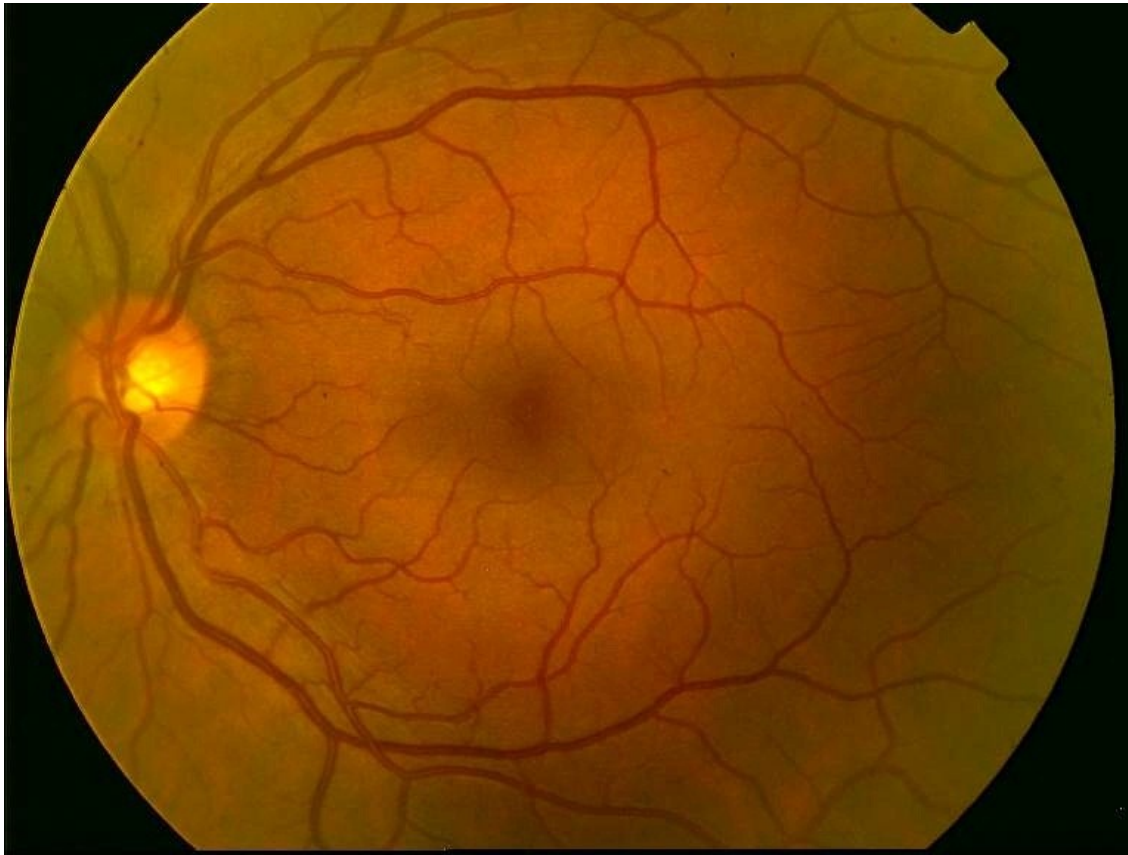
- **Ophthalmoscopy - direct (no stereopsis, worse for periphery)
- indirect**
- **Slit lamp biomicroscopy**
(high power convex lens, the image is vertically inverted and laterally reversed)
- **Mydriasis is necessary !**





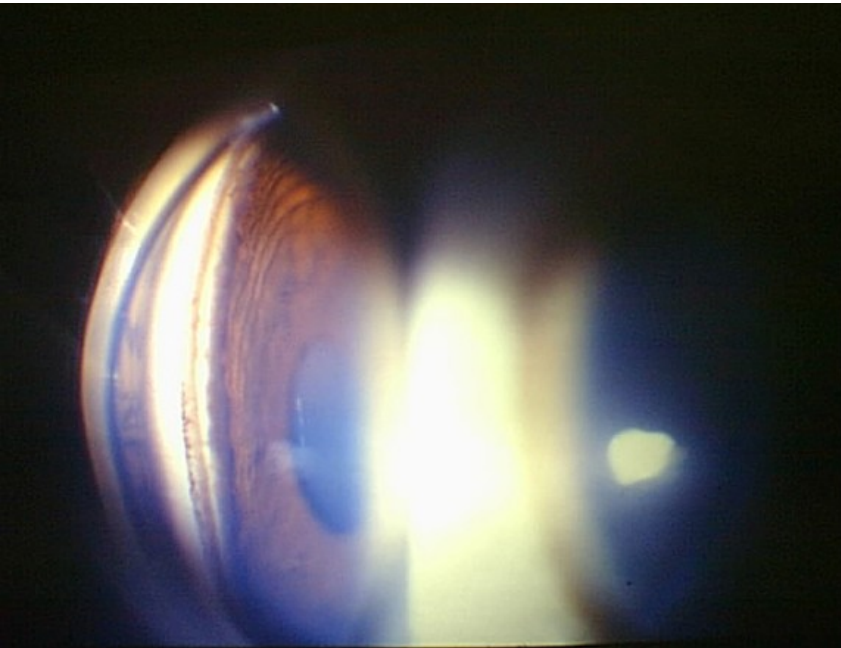
Features	Direct Ophthalmoscopy	Inverted Ophthalmoscopy (45°)	Field Ophthalmoscopy
Field	18 degrees	180 degrees	18 degrees
Examiner's distance from patient	10 cm and patient's eye retinal focus	same length	same length
Form of the fundus image	Real	Real	Real
Size of the	Intermediate	Small	Large

Ocular fundus



Special examination techniques

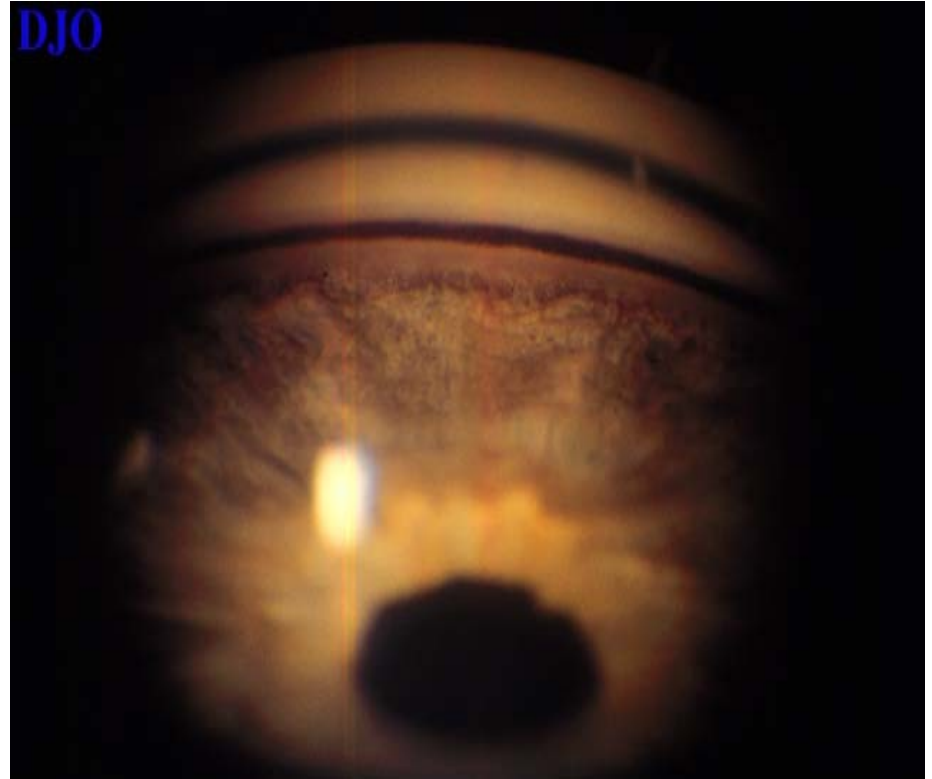
Gonioscopy

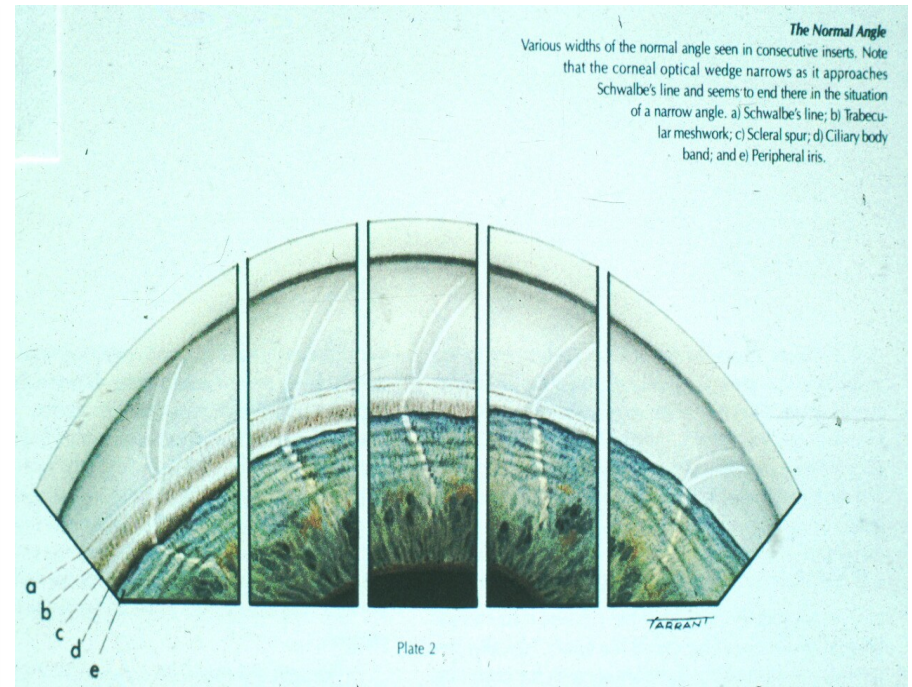
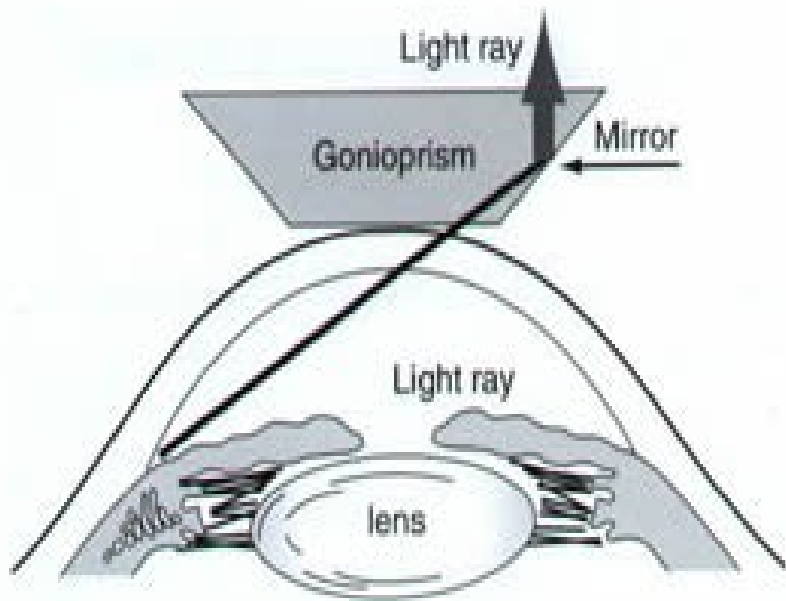


- Gonio lens (mirrors)
- Angle structures
- Fundus examination



DJO





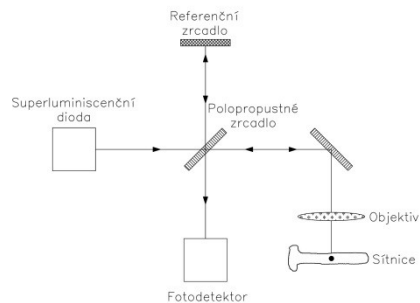
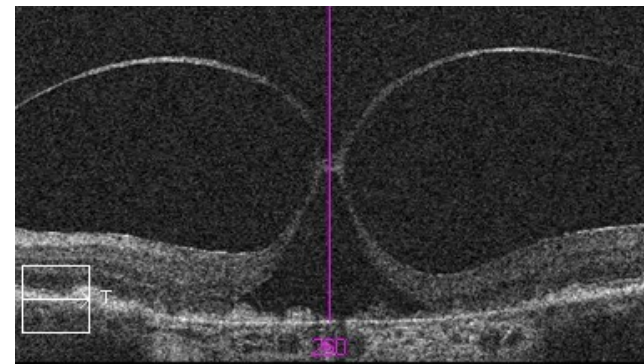
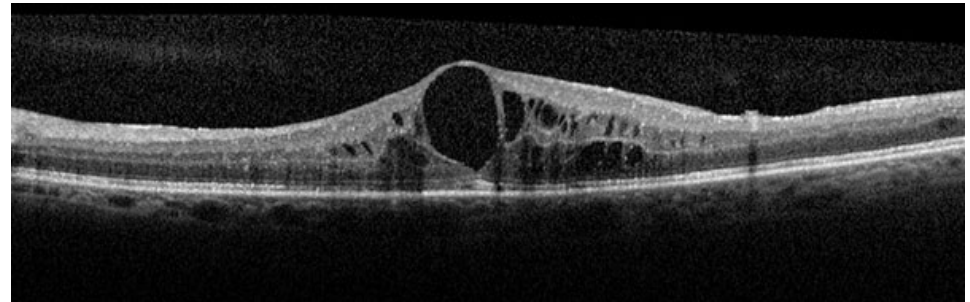
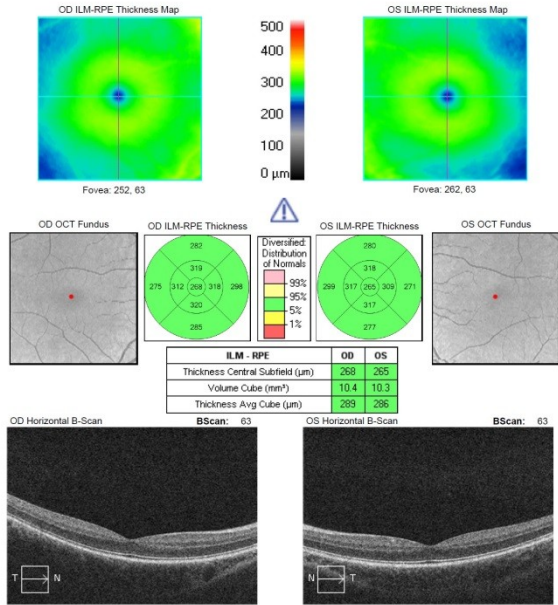
Optical coherence tomography

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

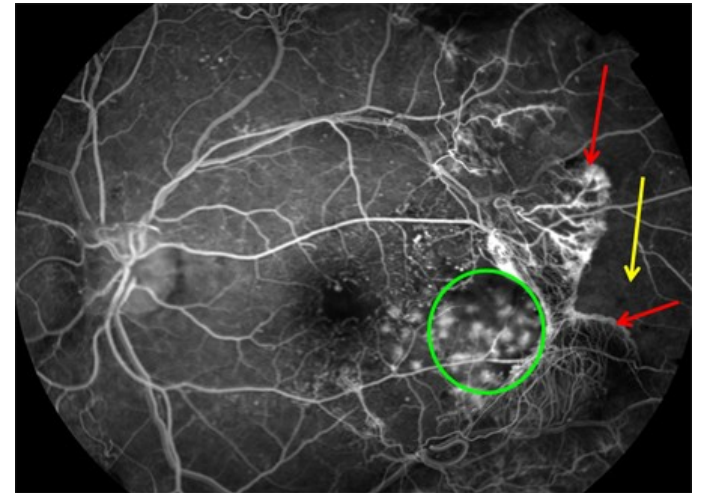
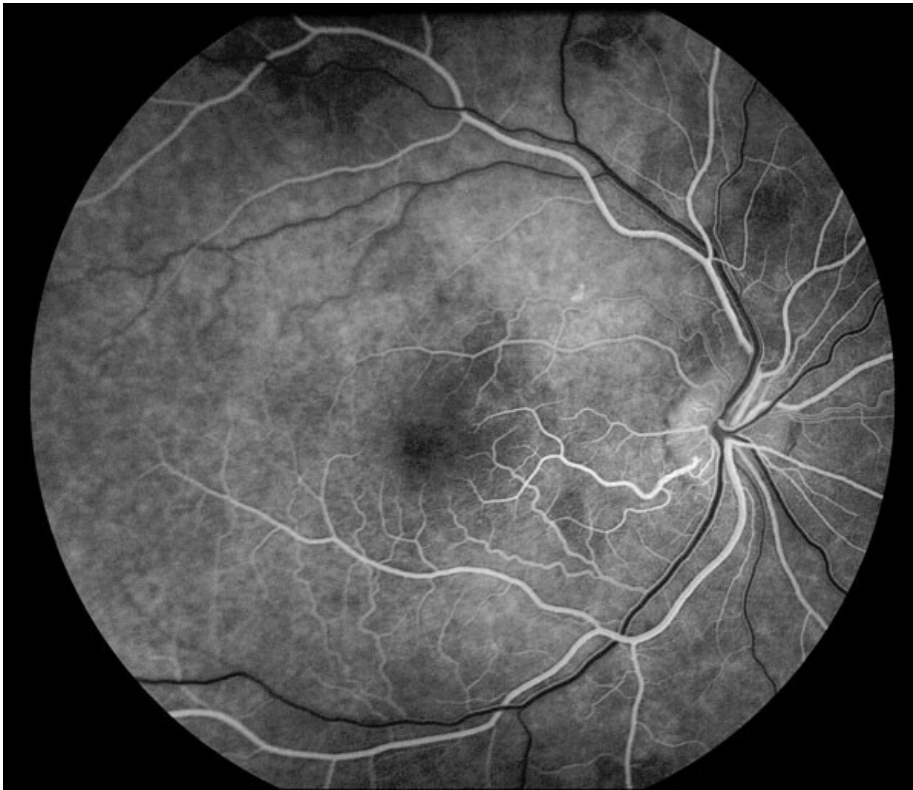
OD OS
 Exam Date:
 Exam Time:
 Serial Number: 4000-11302 4000-11302
 Signal Strength: 9/10 9/10

ZEISS
 CZMI

Macula Thickness OU: Macular Cube 512x128 OD OS



Fluorescein angiography

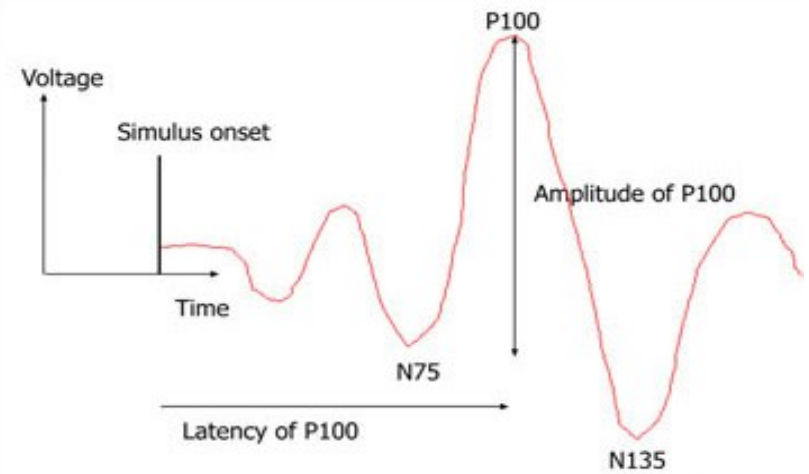
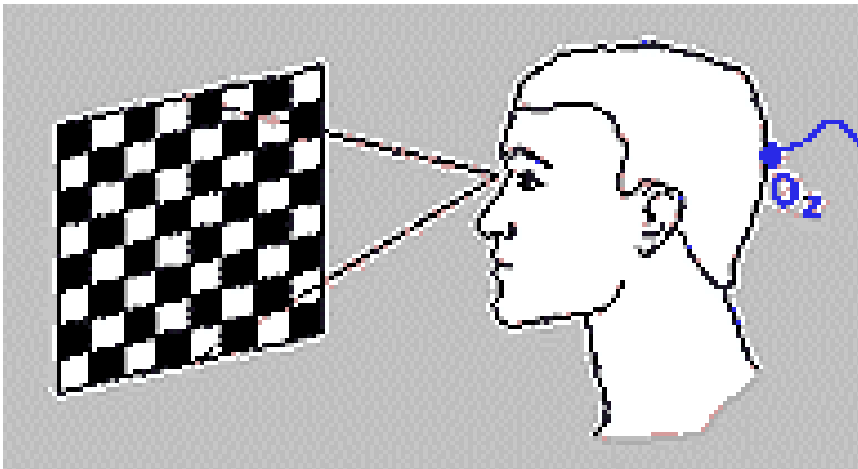


Electrophysical tests

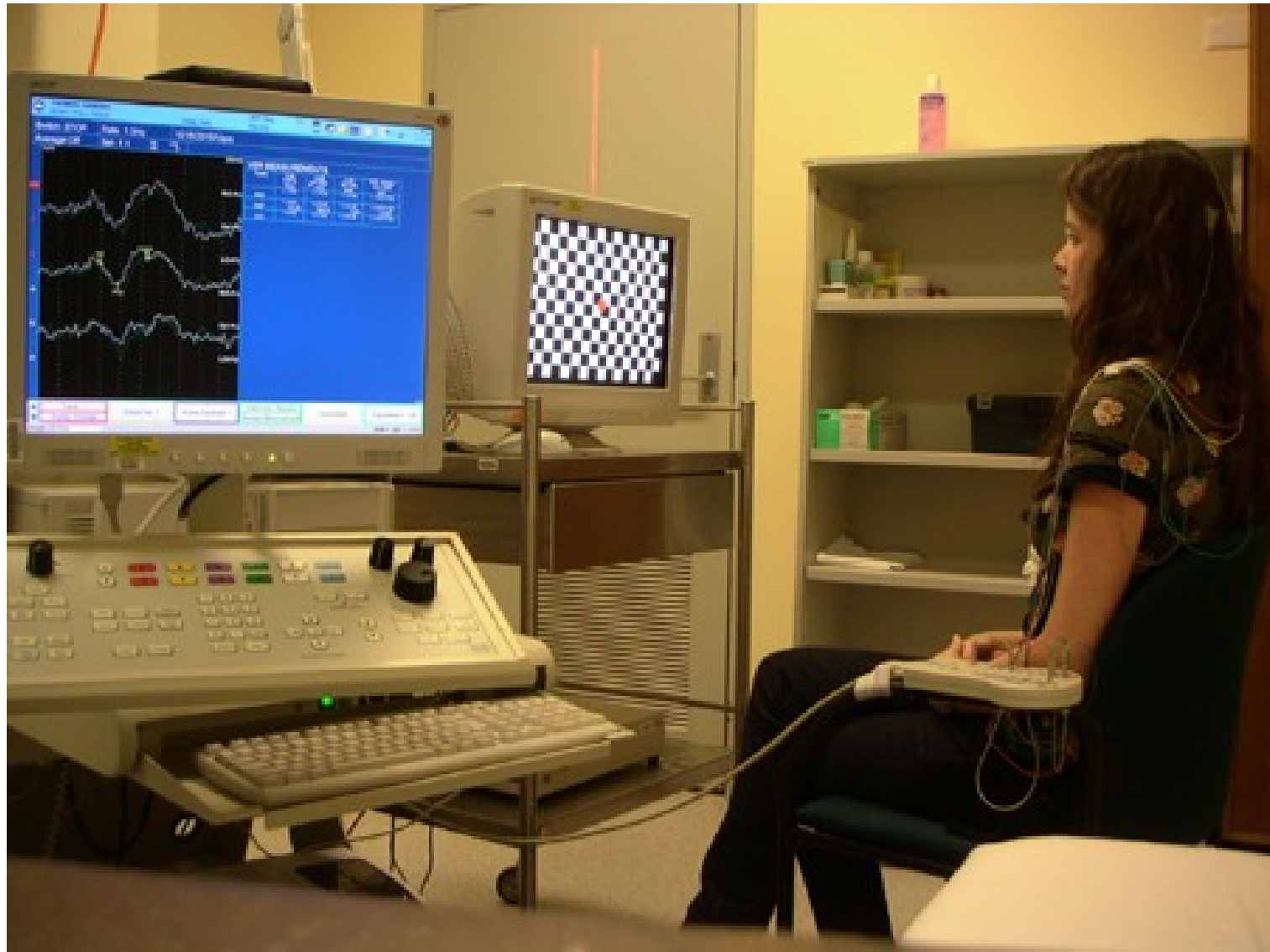
- **ERG (electroretinography)**
diagnosis of functional defects of retina
- Record of an action potential produced by the retina when it is stimulated by light

- **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

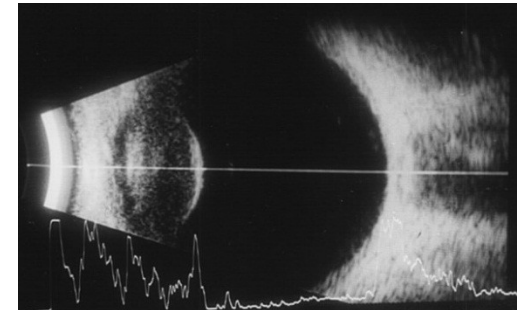
Electrophysical tests



Electrophysiological tests

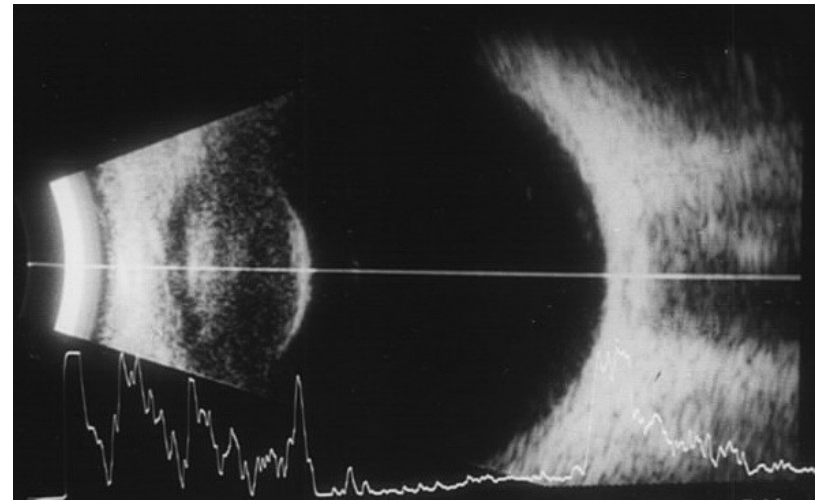
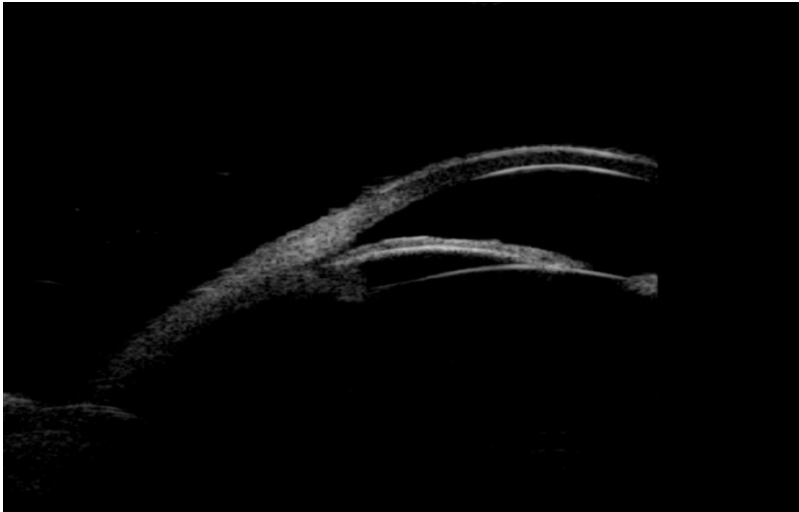


Ultrasound



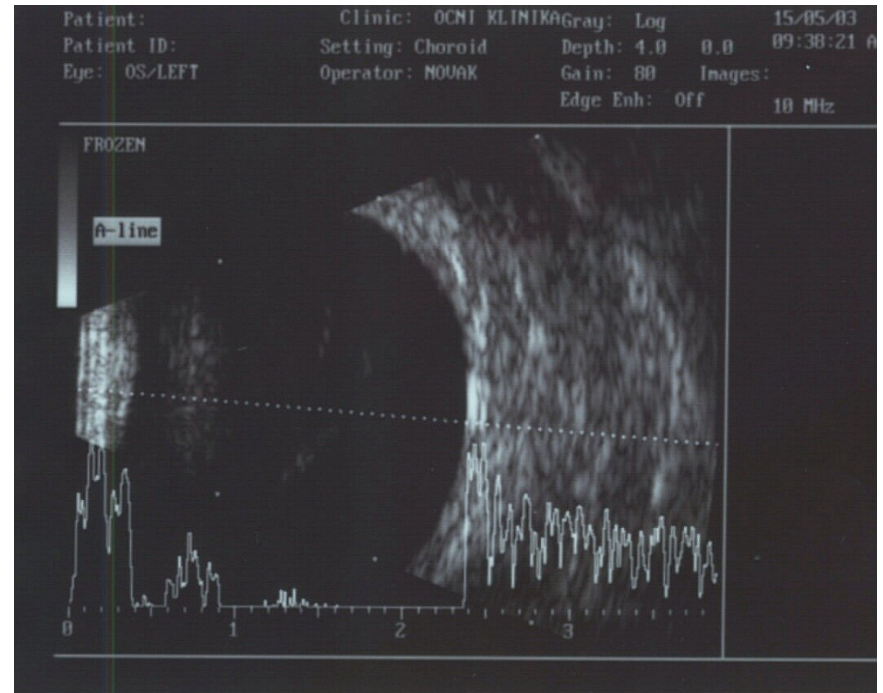
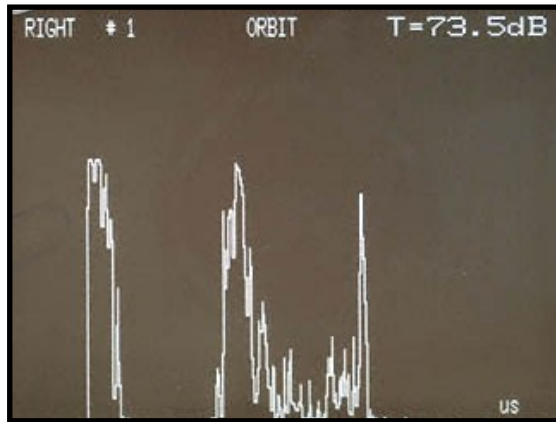
Ultrasound

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

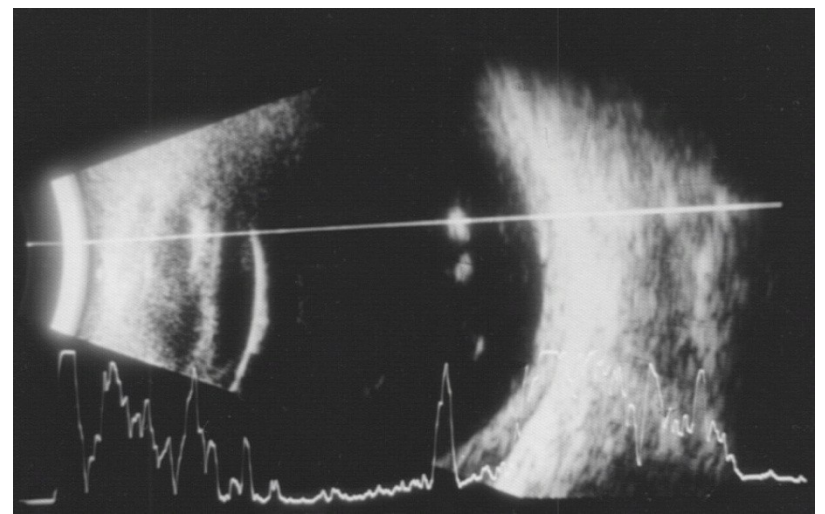
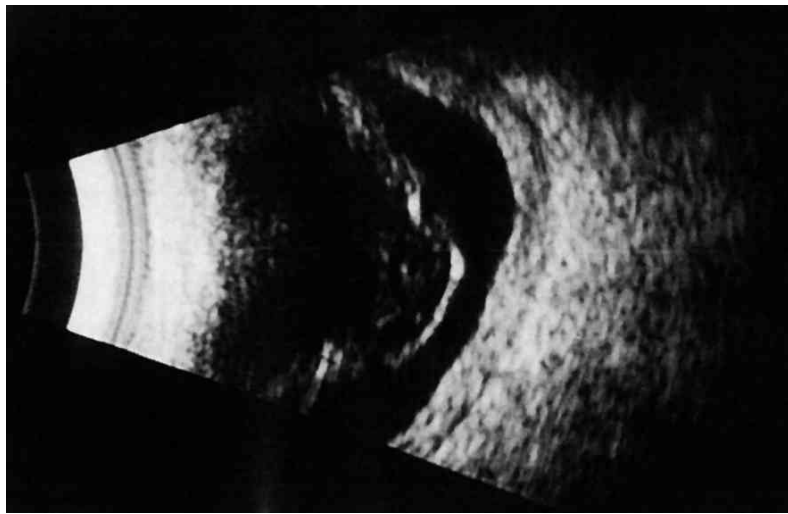
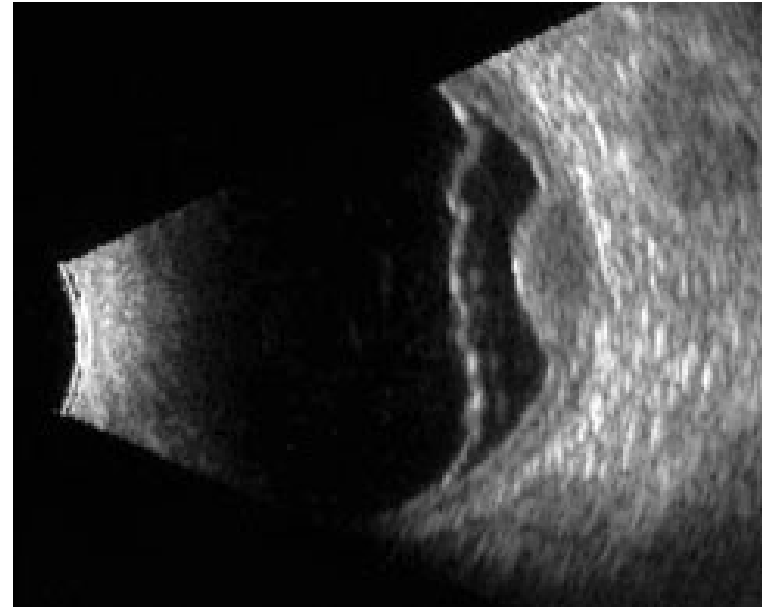
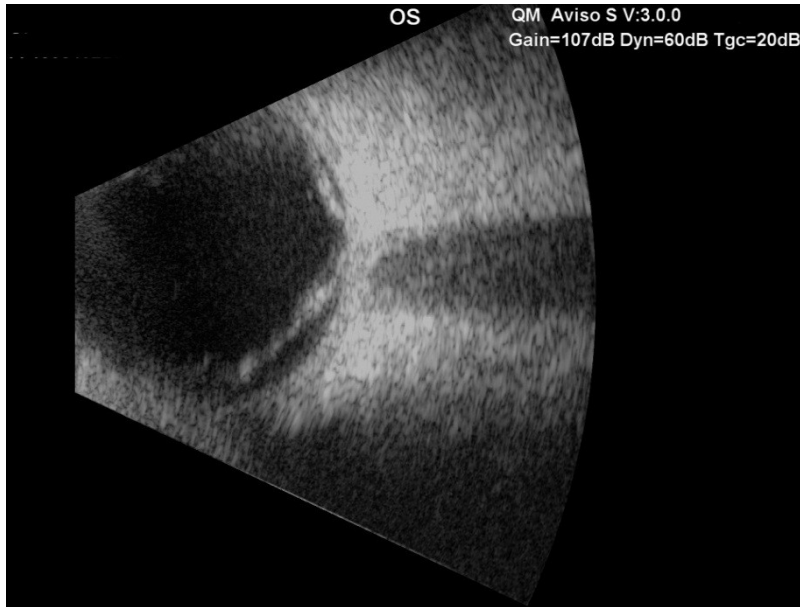


Ultrasound

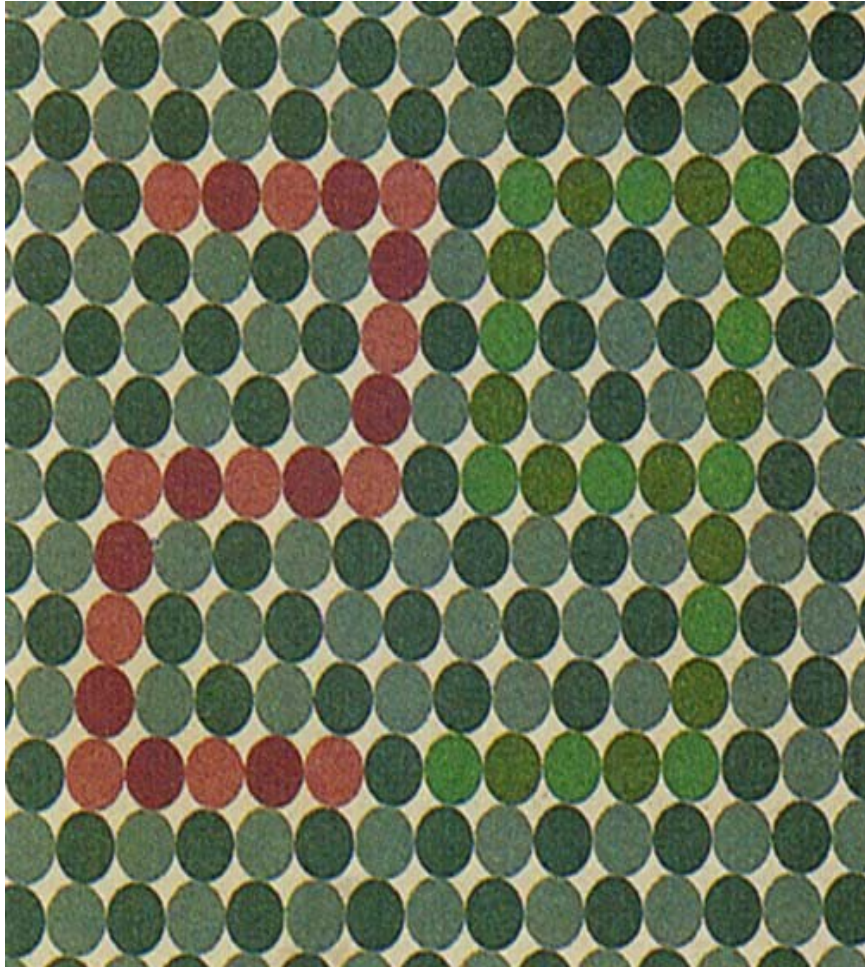
- A scan (biometry)
- B scan



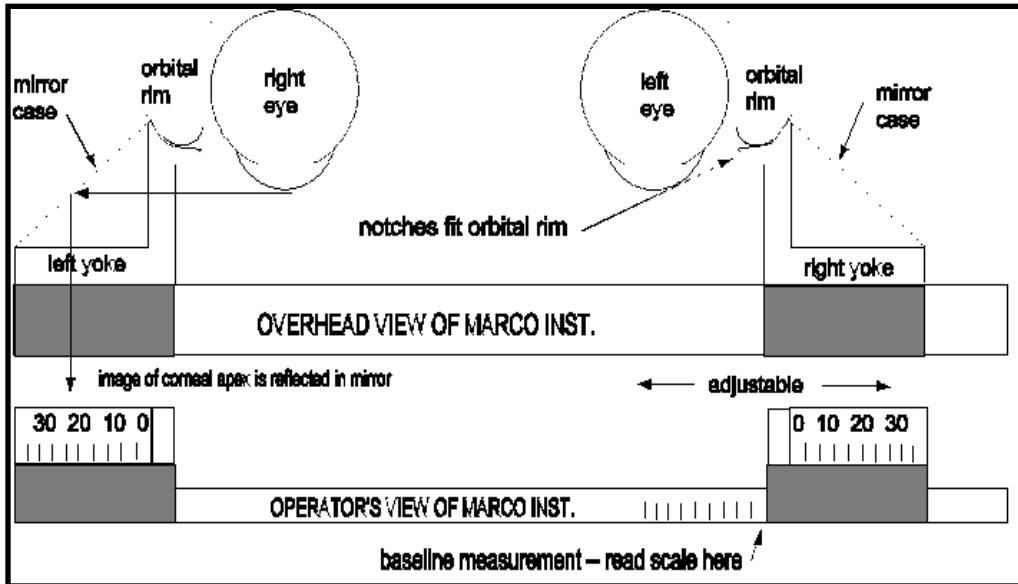
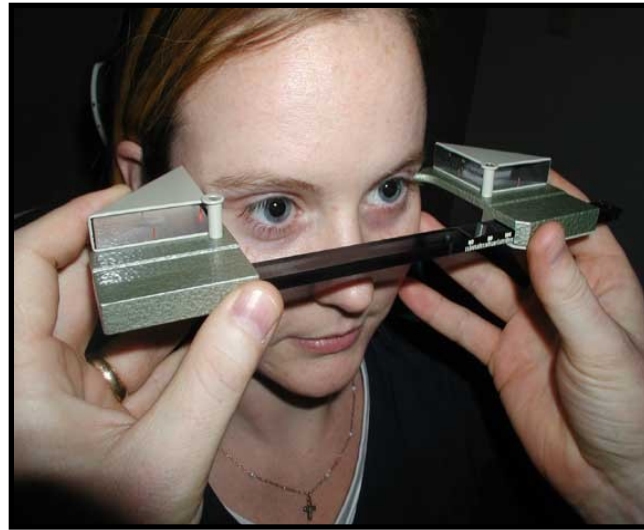
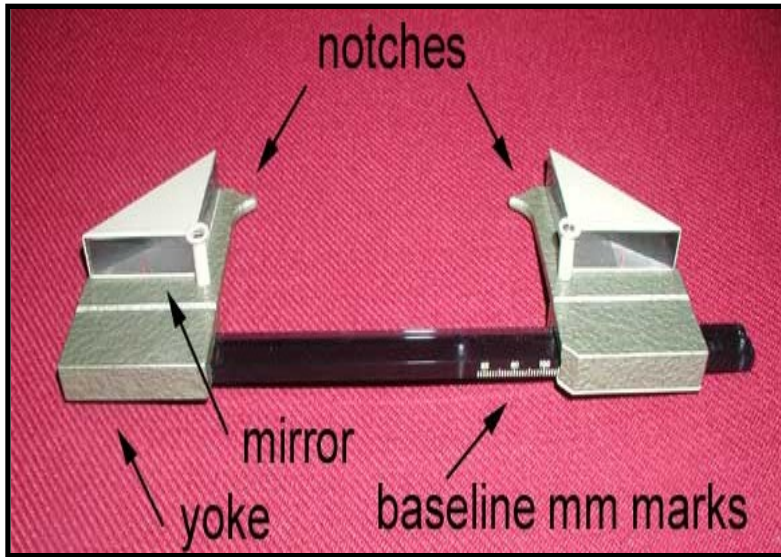
Ultrasound



Color vision – HUE test



Hertl exoftalmometry



Děkuji za pozornost!

