Anatomy of the Optometric Exam Room

Dr. Kris Kerestan Garbig
krisgarbig@fuse.net

Definition of Anatomy
- Study of human body and its parts
- DETAILED EXAMINATION or ANALYSIS

Examination Room

What is lurking behind those doors??

What are we going to be “analyzing”?
- Examination room tools
- Examination room instrumentation
- Pretest instrumentation
- Auxilliary testing instrumentation

Examination Room Lighting

WHEN and WHY should it be BRIGHT?
- Near VA
- Amsler grid
- Muscle testing
- Confrontation visual fields (?)
- Others

Examination Room Lighting

WHEN and WHY should it be DIM?
- Distance VA
- Pupil testing
- Retinoscopy
- Refraction
- Slit Lamp exam
- Confrontation visual fields (?)
- Others
Behind the Exam Room Door

“Stuff” on/in the Counter/Drawers
“Stuff” on the Shelves

Occluder (Cover Paddle)

- Muscle balance
- Cover test
- Accommodation testing (Amps)

Examination Room Counter/Drawers

Near acuity card
- Snellen
- Numbers
- Allen figures
- Lea symbols

Prism Bar

- Quantifies the magnitude of horizontal and vertical alignment
  - Eso/Exo/Hyper/Hypo/Phoria/Tropia
- Vergences
  - Testing
  - Treatment

Occluder (Cover Paddle)

- VA’s – D/N
- Confrontation visual fields
- Pinhole occluder??

Cover Test Muscle Testing

http://www.youtube.com/watch?v=myyA-d44I_q
**Push-up Paddle**
- Accommodative amplitudes (Amps)
- Near point of convergence (NPC)
- Tx. of accommodative or convergence insufficiency

**PD Rule**
- Measurement of PD
- Corneal diameter
- Aperture size
- Amps.
- NPC
- Fitting ht.

**Pupil Abnormalities**
- Anisocoria
- RAPD
- Marcus Gunn
- Horner’s Syndrome
- Adie’s tonic pupil
- Pharmacological dilation

**Transilluminator**
- Pupil testing (PERRLA)
- Angle Kappa & Hirschberg (Eso/ Exo with pupil reflexes)
- Pupil center for fitting height

**PERRLA**
- Equal
- Round
- Reactive
- Light
- Accommodation

http://www.youtube.com/watch?v=E2XzBaO0X8g

**Angle Kappa**
- Positive when light reflex is nasal
- Exo deviation
- Negative when light reflex is temporal
- Eso deviation
Maddox Rod

- Horizontal and vertical ocular alignment... used with penlight

Retinoscope

- Refractive status of infants, children, illiterate adults, developmental delayed, deaf... Completely OBJECTIVE technique
- Erratic focusing... accommodative spasms or paresis and high hyperopes (must use cycloplegics)

Amsler Grid

Diagnosis and monitoring of ARMD

- Normal
- Indication of AMD
- Normal Vision
- Macular Degeneration

Ophthalmoscope

- Internal examination
- Minimally used due to better methods (what better methods?)

Computer

- EHR
- Review retinal photos
- Integrate pt. data
- Patient education

Tonopen

- Measurement of IOP
- Quick
- Easy to use
- Screening method ONLY
- Not extremely accurate
Blood Pressure Kit

Why measure BP??
- Detect HBP for first time
- Hypertensive retinopathy
- Subconjunctival hemorrhage
  - Straining
  - Blood thinners
  - Tumor

3-D Vision Screening

3-D’s:
- Discomfort
- Dizziness
- Lack of 3-D perception

Color Vision

Tests:
- Ishihara pseudo isochromatic
- Farnworth D15
- Preschool

8.0% of males & .05% females
Can color vision change throughout life?

3-D Vision Screening

Reduced depth perception can indicate:
- Poor binocularity
- Poor focusing
- Poor convergence
- Poor eye movements

Stereo Acuity

Measure of depth perception and binocularity

Tests:
- Randot
- Stereo fly

Trial Frame & Lenses

- Demo BVA for new wearers
- Rx. changes for current wearers to minimize adaptation problems
  +, - , cyl, prism, pinhole
Assorted tools
- Tweezers
- Alger brush
- Spatula
- Punctal dilator
- Syringe

Uses??

Examination Room Shelves

Ophthalmic drops
- Dilating ophthalmic drops
- Diagnostic ophthalmic drops
- Therapeutic ophthalmic drops

Patient Education Materials

Dilating Drops
- Tropicamide
  - .50% and 1.0%
- Phenylephrine
  - 2.5% and 4.0%
- Paremyd
- Cyclopentolate
  - 1.0%

Any thing else on the Counter ???

Which do we use for Adults?

Routine exams:
- Paremyd - Combo
  - .50% tropicamide < than 60yrs
  - 1.0% if > than 60

Specialized testing:
- 1.0% tropicamide
  for VF, OCT, Optomap,
  Retinal photos
Which do we use with Children?

Routine exams:
- .50% tropicamide
  if cycloplegic not required

Specialized testing:
- 1.0% cyclopentolate
  for high + and accommod. issues

Diagnostic Dyes

Diagnostic drops

- Proparacaine
- Fluress
- Flo Glo strips
- Rose bengal
- Lisamine green

What are they used for?

Dyes?
- Fluorosceine-yellow
- Rose bengal-pink
- Lisamine-green

What are they used for?

Numbing agent?
- Proparacaine/caines
  - Pre-dilation
  - Foreign body removal

Numbing + Dye?
- Fluress
  - Goldman tonometry
  - Foreign body
  - Abrasions

What are they used for?

Dry Eye:
- Systane
  - Ultra, Balance, Gel drops
- Refresh
  - Tears, Optive, Liquigel
- Soothe
  - XP, XP
- Restasis - only rx. gtt.

Therapeutic Drops
Therapeutic Drops

Red Eye:
- Antibiotic gtts
  - ycins
  - oxins
- Antibiotic-steroid combos
  - Tobradex/ST
  - Zylet

Any thing else on the Shelves??

Therapeutic Drops

Red Eye:
- Allergy gtts
  - Pataday
  - Lastacaft
- Steroids
  - Lotemax
  - Pred forte

Examination Room Instrumentation

- Visual acuity charts
- Refraction systems
- Phoroptor
- Slit lamp
- Binocular Indirect Ophthalmoscope
- Optomap
- Retinal camera
- Others

Therapeutic Drops

Glaucoma:
- Prostaglandin Analogues
  - Travatan Z
  - Xalatan
  - Lumigan
  - Combigan
- B-Blockers
- Alpha agonist

Visual Acuity Charts

Projector Charts

Manual
Automatic
Visual Acuity Charts

Digital Acuity Charts

Visual Acuity Testing

- Snellen
- Numbers
- Allen figures (pictures)
- LEA characters
- Others

Refraction Systems

Phoroptor – SUBJECTIVE
instrument used to determine refractive status

- Myopia (-)
- Hyperopia (+)
- Astigmatism (cyl)
- Presbyopia (Add)
- Binocularity
- Balanced rx.
- Distance stereo
- Fixation disparity

Additional Tests

- Color vision
- Red/Green balance
- Fixation disparity
- Distance depth perception

Additional Tests

- Color vision
- Red/Green balance
- Fixation disparity
- Distance depth perception
**Slit Lamp - Specialized microscope and light source**

**ANTERIOR SEGMENT**

- Eye lid/lashes
- Conjunctiva/Sclera
- Cornea
- Anterior Chamber
- Crystalline Lens

**Slit Lamp**

- Cornea - clear external refractive surface
  - Tear film
  - Red eyes
  - Dry eyes
  - Degenerations
  - Dystrophies
  - Keratoconus

**Slit Lamp**

- Lid/lash margin
  - Blepharitis
  - Meibomianitis
  - Lumps/Bumps
  - Trichiasis

**Slit Lamp**

- Anterior Chamber - chamber between posterior cornea and anterior lens
  - Clarity/cloudy
  - Hypopion - inflam. cells
  - Hyphema - blood
  - Angle depth - important for prevention of Acute Angle Closure GLA (Medical Emergency)

**Slit Lamp**

- Bulbar Conjunctiva - thin transparent membrane of eye
  - Allergic conj.
  - Subconj. Hemm.
  - Pinguecula
  - Benign nevi

- Palpebral Conjunctiva - thin membrane under eyelids
  - Follicles
  - Papillae
  - GPC

**Slit Lamp**

- Lens - internal refractive structure of the eye
  - Cataracts
  - Pseudoexfoliation syndrome
  - Subluxated lens
Slit Lamp

POSTERIOR SEGMENT
- Vitreous
- Optic nerve
- Macula
- Posterior Pole

Slit Lamp

Macula - most critical part of retina responsible for central vision
- Dry ARMD
- Wet ARMD
- Macular edema
- Macular dystrophies

Slit Lamp

Vitreous - clear jelly-like substance internally consisting of collagen and protein
- Floaters
- Posterior vitreal detachment
- Strands/fibers
- Hemorrhage
- Asteroid hyalosis

Slit Lamp

Retina - highly vascular back surface of the eye
- Diabetic retinopathy
- Retinitis Pigmentosa
- Hypertensive retinopathy
- Artery occlusions
- Vein occlusions

Slit Lamp

Optic Nerve - Largest nerve in the body/actual brain tissue
- Glaucoma
- Optic neuritis
- Papilledema
- Multiple sclerosis

Goldman Tonometer

Gold standard for IOP measurement
- Most accurate method
- Requires fluoress
**Volk Lenses**

- **90D/78D**
  - Internal examination of central pole (what’s that?)

- **20D/14D**
  - Internal examination of mid to mid-periphery (what’s that?)

**Retinal Camera**

- High Mag. View of ANTERIOR and POSTERIOR segments
  - Excellent central detail
  - 30 and 45 degrees
  - Stereoscopic view
  - Poor peripheral

**Binocular Indirect Ophthalmoscope**

- Internal view of posterior segment
- External view for infants & children
- Low mag view
- Fundus lenses 20D / 14D

**Optomap**

- Poor central detail (Daytona?)
- Excellent for periphery
- Age range?

**Auxiliary Testing**

- Visual Fields
- OCT
- Specular Microscopy
- Pachymetry
- Corneal topography
Visual Fields

- Neurological test of entire visual pathway
  - GLA
  - MS
  - RP
  - Optic neuritis
  - Papilledema
  - Tumors: brain, pituitary, etc.

OCT

Normal Retina

Visual Field Deficits

- Glaucoma
- Pituitary Tumor
- Retinitis Pigmentosa

OCT

Glucoma

Anterior Chamber Angle

Optical Coherence Tomography - OCT

Scanning laser technology:

- Glaucoma testing
- Retinal nerve fiber layer
- Macular thickness
- Macular disease
- Depth of anterior chamber

Dry ARMD

Wet ARMD
Specular Microscope

Health status of corneal endothelial cells
- Corneal edema/hypoxia
- Contact Lens wearers
- Fuch’s dystrophy
- Corneal degeneration
- Keratoconus

Corneal Topographer

Detailed map of corneal surface
- Specialty CL fitting
- Diagnose and monitor corneal disease

Specular Microscope

Normal Gutatta

Pretest instruments

Auto Refractor/Keratometer
- Initial refractive status
- K’s for CL fitting and corneal disease

What conditions cause difficulty when trying to obtain measurements?

Pachymeter

Measures corneal thickness
- Glaucoma
  - Thicker corneas better protected
- Refractive surgery
  - Thicker corneas better candidates

Pretest instruments

Lensometer
- Measurement of current eyewear prescription
Thank you for your attention!!

Have a BLESSED DAY!

krisgarbig@fuse.net