SPECIAL THANKS

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Poll Question: How comfortable are you with Retinoscopy, the theory and method?

1. Not Comfortable
2. Comfortable/OK
3. Very Comfortable
Poll Question: Do you work in minus cylinder or plus cylinder?

1. Minus Cyl
2. Plus Cyl
OVERVIEW OF RETINOSCOPY

- What is Retinoscopy?
- Optics of a Retinoscope
- A Patient’s Far Point
- Assessing the Reflex
  – With, Against, Neutrality
- Technique
- Case Examples
  – Sphericals
  – Astigmats
- Retinoscopy Problems
WHAT IS RETINOSCOPY?
WHAT IS RETINOSCOPY?

The objective determination of the patient’s refractive state by locating the far point of the patient’s eye with the retinoscope and using lenses to move the far point to the examiner’s entrance pupil.

http://www.aapos.org/terms/conditions/95
HOW DOES THE RETINOSCOPE WORK?

• The retinoscope illuminates the inside of the patient’s eye

• The clinician examines the light as it is reflected from the external limiting membrane of the patient’s retina

• An objective measurement of the prescription the patient needs for distance based solely on the optics of the patient’s eye

• Usually used as a starting point for subjective refraction
TYPES OF RETINOSCOPY METHODS

Static vs Dynamic Retinoscopy

– Static: patient fixates on a distance target with accommodation relaxed and the distance Rx is determined

– Dynamic: patient fixates on a near target and the status of his/her accommodation is evaluated.

– MEM, Book, Bell’s, Stress Point, Mohindra Retinoscopy
STATIC RETINOSCOPY

What are we doing?

– Shine the streak of light into the patient’s eye and move it within the pupil
– Observe how the streak appears to move in the patient’s pupil which tells us where the far point of his eye is located
– Use lenses to move the far point to our eye
– Calculate the prescription the patient needs
OPTICS OF A RETINOSCOPE
• **Projection System:** to illuminate the retina
  – Light Source
  – Condensing Lens
  – Mirror
  – Focusing Sleeve
  – Current Source

• **Observation System:** for examiner to see the retinal reflex from the patient

SHOW ME WHAT YOU’RE WORKING WITH
Poll Question: Which is more accurate, Concave Mirror or Plane Mirror?

1. Concave Mirror
2. Plane Mirror
3. They are equal
CONCAVE MIRROR VS PLANE MIRROR
A PATIENT’S FAR POINT
FAR POINTS & REFRACTIVE ERROR

• **Far Point**: Point in space that is conjugate to the fovea, when accommodation is relaxed

• **Myopes**: Far point is BETWEEN clinician and pt

• **Hyperopes**: Far point is located BEHIND the pt

• **Astigmats**: Have 2 far points, one for each meridian

• **Emmetropes**: Far point is at INFINITY
REFRACTIVE ERROR

A MYOPIC EYE (NEARSIGHTEDNESS)

A HYPEROPIC EYE (FARSIGHTEDNESS)
ASSESSING THE REFLEX
ASSESSING REFLEX

• **WIDTH**
  
  Large RE = Narrow reflex  
  Small RE = Wide reflex

• **BRILLIANCE**
  
  Large RE = DULL reflex  
  Small RE = BRIGHT reflex

• **SPEED**
  
  Large RE = SLOW moving reflex  
  Small RE = FAST moving reflex

• **DIRECTION**
  
  Hyperopia = With Motion  
  Myopia = Against Motion
ASSESSING REFLEX

As we move the streak within the patient’s pupil, we observe how the streak appears to move.

Plane Mirror (sleeve down):

• “Against” motion - reflex moves opposite direction than streak; far point is between you & patient
• “With” motion - reflex moves same direction as streak; far point is behind you (or virtual)
• “Neutrality” - reflex does not move; pupil filled with light; far point is AT your entrance pupil
AGAINST MOTION
AGAINST MOTION

Bright, Wide, Fast

Dim, Narrow, Slow

LOW MYOPE

HIGH MYOPE
WITH MOTION
WITH MOTION

Bright, Wide, Fast

Dim, Narrow, Slow

LOW HYPEROPE

HIGH HYPEROPE
WORKING DISTANCE

• Lens needed for neutrality only gets the patient’s far point to your entrance pupil.

• To correct the patient’s refractive error, you need to get far point to INFINITY.

• Add working distance (67 or 50cm) -1.50 or -2.00 to gross findings.

• The final number is your NET RETINOSCOPY findings.
GROSS VS NET

• Gross Retinoscopy
  – Lens that brings patient’s far point to examiner’s entrance pupil

• Net Retinoscopy
  – Gross Retinoscopy + Working Distance

• Patient’s Rx is NET RETINOSCOPY

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Examples

- With sleeve down and working distance of 50cm (-2.00DS) you see “With” motion; with +2.00DS lens you find neutrality

- With sleeve down and working distance of 50cm (-2.00DS) you see “With” motion; with a +0.50DS lens you find neutrality

- With sleeve down and working distance of 50cm (-2.00DS) you see “With” motion; with a +4.50DS lens you find neutrality

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RETINOSCOPY TECHNIQUE
• Scope in right hand, use your right eye to scope OD, switch for OS
• Scope both meridians
• Neutralize the meridian with MOST PLUS, LEAST MINUS first (meridian 1 for Minus CYL Rx). Opposite for Plus Cyl
• Look at perpendicular meridian (meridian 2)...is it neutral?
  Yes = Spherical eye
  No = Astigmatic eye
• Meridian 2 must show AGAINST MOTION (for Minus CYL Rx).
  If not, you must neutralize this meridian first – this is now your spherical meridian - then go back to perpendicular meridian and neutralize that – that becomes your astigmatism meridian
• Add working distance
LET’S GO STREAKING!!

Retinoscopy motion depends on:

1. Patient’s refractive error
2. Status of accommodation
3. Lenses placed in front of patient’s eye
4. Your working distance
LET’S GO STREAKING!!

Appearance of the retinoscopy reflex:

- When far from neutrality (≈4.00D), reflex dull, slow
- When further from neutrality (>≈6.00D), appears as if no reflex, as if neutral (but dull): watch out!!

- Between 1 to 3.50D from neutrality, usually a line
- Closer to neutrality (≈ <1.00D), reflex is wide, almost fills pupil
- Even closer to neutrality, reflex moves very fast & is brighter

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LET’S GO STREAKING!!

What orientation should the streak be at?

- How do I know if my patient has astigmatism?
- Thickness & brightness of reflex rotate the streak
- You see break
- You see a skewed reflex
- After you neutralize one meridian you rotate the streak and find a meridian that is not neutralized

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CASE 1

1. Scope both meridians
2. Pick the meridian with most minus, least plus
3. Neutralize the motion, go to reversal of motion if unsure
4. Neutralize perpendicular meridian
5. Add working distance
CASE 2

1. Scope both meridians
2. Pick the meridian with most minus, least plus
3. Neutralize the motion, go to reversal of motion if unsure
4. Neutralize perpendicular meridian
5. Add working distance
CASE 3

1. Scope both meridians
2. Pick the meridian with most minus, least plus
3. Neutralize the motion, go to reversal of motion if unsure
4. Neutralize perpendicular meridian
5. Add working distance
CASE 4

1. Scope both meridians
2. Pick the meridian with most minus, least plus
3. Neutralize the motion, go to reversal of motion if unsure
4. Neutralize perpendicular meridian
5. Add working distance
CASE 5

1. Scope both meridians
2. Pick the meridian with most minus, least plus
3. Neutralize the motion, go to reversal of motion if unsure
4. Neutralize perpendicular meridian
5. Add working distance
CASE 6

1. Scope both meridians
2. Pick the meridian with most minus, least plus
3. Neutralize the motion, go to reversal of motion if unsure
4. Neutralize perpendicular meridian
5. Add working distance
1. Scope both meridians

2. Pick the meridian with most minus, least plus

3. Neutralize the motion, go to reversal of motion if unsure

4. Neutralize perpendicular meridian

5. Add working distance
PROBLEMS WITH RETTING

POOR REFLEX
HIGH REFRACTIVE ERROR
DENSE MEDIA OPACITIES
UNCOOPERATIVE PATIENT
SCISSORING
SCISSORING

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RETINOSCOPY TIPS

1. If you are not getting a red reflex, consider:
   - Reducing working distance (only momentarily!)
   - Doing Off-axis retinoscopy (attempt to get any reflex at all to get an idea of the refractive error, acknowledging that powers and cyl axis findings may be off!)
   - Bracketing lenses at large power intervals
   - Ret over existing glasses

2. Check if you overminused by adding plus lenses and repeating VA

3. If small/changing pupils: suspect latent hyperopia!

4. If large pupil: concentrate on the central area

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MOST COMMON ERRORS

1. Perform technique off-axis (you must be aligned with patient’s visual axis!)

2. Choose wrong target: not far enough, or too small

1. Examiner blocks patient’s view of target

2. Patient looks at retinoscope light, not at distance target

3. Take too long: patient’s accommodation will change during the assessment and you will likely: OVERMINUS!
MOST COMMON ERRORS

6. Creep too close (over plus/under minus) or too far away (over-minus or under-plus)

7. Not accurately determine presence of astigmatism

8. Inaccurately determine the orientation of the main meridians

9. Confuse axis of corrective cyl

10. Hold lens rack too far away (changes effective power of lens used to neutralize)

11. Hold lens rack tilted (covers other eye)
MOST COMMON ERRORS

12. Hold rack from the lenses rather than the handle (get dirty and cannot see through the lenses later!)

13. Incorrectly subtract (or do not subtract) the working distance to obtain net retinoscopy

14. Report Gross ret when your preceptor asks for your results