NCLE Basic Exam Review

Domain V: Diagnostic Fitting of RGP Lenses and Soft Lenses

Developed by the National Federation of Opticianry Schools

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Domain V: Diagnostic Fitting (11 questions)

a. RGP Fitting and Evaluation

Rigid Gas Permeable Materials:

- PMMA, CAB, Silicone/Acrylate, Silicone, FSA-Fluorocarbon Silicon Acrylate
- PMMA – 1947 – 1971
- Complications of PMMA-Corneal Edema, Overwear Syndrome, Corneal Anesthesia
- Why Gas Permeable? Reduce Corneal Edema, Corneal Warpage, Polymegethsim
- Advantages:
    - Crisper Vision
    - More Durable than Soft Lenses
    - Aftercare of lenses is easier
    - No need to change lenses every year, lenses can be cleaned and polished
    - Patients are more loyal
    - Stabilizes Myopia in teenagers and reduces “Myopic Creep”

Fitting GP Lenses

- Considerations should involve: DK Value, Wetting angle, and Specific Gravity, Tint Availability
- Many GP lenses today come with UV absorbers.
- **Procedure**:
    - Health History
    - Refraction
    - Pre-fitting examination with Slit Lamp
    - Keratometry
    - Lens Options (Spherical Lenses, Toric Lenses) (Rigid or Soft?)
- **Methods**: Empirical & Trial Lens Fitting
- **Interpalpebral Fitting:**
    - Use of Fitting Rules
    - Fit “On K” or “Steeper than “K”
    - Diameters 8.5 – 9.2
    - Edges should be well tapered to minimize edge sensation with the upper lid

Fittings Procedure:

- **Interpalpebral Lens:**
- Transpose Rx in minus cylinder
- Compensate for Vertex Distance >+/- 4.00
- Select a trial lens consistent with a fitting philosophy
- Usually On “K” or Steeper than “K”
- Ex:
- Given the following information: K’s 45.00/44.00 @ 90
- Rx -3.00 +1.00 x 180
- -2.00 – 1.00 x 90
- 44.00, -2.00 starting base curve and power if lens if fit on “K”
- Fitting an intrapalebral lens a base curve “on K” or steeper than “K” should be chosen

- **Superior Lid Alignment/Upper Lid Attachment:**
- Transpose Rx in minus cylinder
- Compensate for Vertex Distance >+/- 4.00
- Select a trial lens consistent with a fitting philosophy

- **Diameter Lens Selection**
  - Lens Diameter is determined by:
  - Lid Position
  - Pupil Diameter
  - Palpebral Fissure Size
  - Corneal Astigmatism (The greater the astigmatism, the smaller the diameter, the flatter the cornea, the larger the diameter)

SAM – FAP

- **Steeper Add Minus**
  - 05 mm = .25 D in Tear Lens Power
  - 7.80, -2.00 $\rightarrow$ 7.75 = .05 mm steeper $\rightarrow$ Power needed at cornea = -2.25 D

- **FAP – Flatter Add Plus**
  - .05 mm - .25 D in Tear Lens Power
  - 7.80, -2.00 $\rightarrow$ = .05 mm flatter $\rightarrow$ Power needed at cornea = -1.75D

Example 1: If a patient is fit with the following lens, 44.50, -4.50 and the base curve is changed to 45.00, what is the new base curve and power?
44.50, -4.50 SAM .50 = -.50
New Rx = 45.00, -5.00

Example 2: If a patient is fit with a 7.65 mm base curve and the Rx is +4.00. What prescription would be needed if we change the base curve to 7.55?
7.65, +4.00 D
SAM
7.55, .10 mm = .50
Answer 7.55, +3.50

Base Curve radius is based on Diameter and Corneal Astigmatism (Nomogram)

Corneal Astigmatism	9.0 Diameter	9.2 Diameter	9.5 Diameter
0.00 to 1.00D	On K	0.25 D flatter than K	0.50 D flatter than K
1.12 to 2.00 D	0.25 flatter than K	On K	0.25 D flatter than K

Example # 1 -2.00 –1.00 x 180

"K"42.00@180/43.00@90
If you fit a 9.5 – base curve selection is .50 D flatter than "K" Upper Lid Attachment is achieved
Recommendation: 41.50, -1.50, 9.5

Given the following information: K's 42.00 @ 180 / 43.00 @ 90
Rx -2.00 - .75 x 180
Which of the following set of lens specifications would most simulate a lid attachment RGP fitting:

	B.C.	Rx	Dia.
a.	43.00	-2.50	9.5
b.	41.50	-1.50	9.5
c.	42.50	-2.50	8.5
d.	43.00	-3.00	8.2

Which of the following set of specifications would most simulate an interpalpebral RGP fitting?

	B.C.	Rx	Dia.
a.	44.50	-2.50	8.5
b.	43.50	-3.50	8.5
c.	43.50	-1.50	9.5
d.	44.50	-2.50	9.5

Fluorescein Pattern Evaluation:

- Fitting Procedure for GP Lenses involves an additional step over Soft Lens Fitting
- Pre-fitting and Evaluation
- Diagnostic Trial Fitting (Establish Fit first)
- Over-Refraction
- Fluorescein Evaluation
- Write up Lens order
- Slit Lamp

Fluorescein Evaluation

- Wratten filter with RGP lenses with UV inhibitor

InterpalpebralFit

- Ideal
- Flat
- Steep

Upper Lid Attachment

- Ideal
- Flat
- Steep

Correction of a Low Riding Lens (Minus Lens)

- Interpalpebral Fit (Lens may be too flat)
- -Steepen base curve

- Upper Lid Attachment (Lens may be too steep)
- -Flatten base curve or increase lens diameter or combination of both

Correction of a High Riding Lens (Minus Lens)

- Interpalpebral Fit (Lens may be too flat) Note: This is if edge of lens is slightly under upper lid
- -Steepen base curve or increase lens diameter

- Upper Lid Attachment (Lens may be too flat)
- -Steepen base curve or increase lens diameter or combination of both
- - Thin out edge design (CN Bevel or Hyperflange design)

Lens Flexure:

- New GP lenses are thinner
- If vision fluctuates, either:
- Flatten base curve first or
- Increase CT by .02 - .04
- Depending on corneal toricity sometimes new GP lens materials will bend on the eye after blinking

Edge Design

a. **Hyperflange/ CN Bevel**
    - If a high minus lens is riding too high or the edge of the lens is too thick, but the base curve relationship is adequate

b. **Myoflange**
    - If a high plus is riding too low, a minus carrier lenticular can be designed to pull the lens under the upper lid and center the lens after the blink

Fluroescein Staining

Stippling:

- Minute air bubbles get trapped under lens
- Mucous debris under lens
- Check Fit
- Clean and Polish lens and review cleaning

Punctate Staining:

- Air bubbles getting trapped under lens
- Dirty lens
- Check fit of lens
- Review cleaning procedures

Abrasion:

- Fit of lens that is too flat
- Foreign body gets trapped under lens
- Eye Patch overnigh

3&9 O'clock Staining / Peripheral Staining:

- Improper blinking
- A low riding RGP lens
- Stress the importance of blinking, Blinking exercises, Eye lubricant
- Flatten base curve or increase lens diameter

Dimple Veil:

- Not a stain but excessive air bubbles trapped under a lens
- Usually a lens that is too steep or too flat at the edge periphery

Arc Stain:

- Crescent shaped stain from improper insertion, rough edge of contact lens or improper recentering of contact lens

WTR Fluorescein Pattern

Foreign Body Stain – Sometimes referred to as "Chicken Tracks"

Crazing

Soft Lens Indications:

- Cosmetics
- Better Vision especially at the periphery
- Prosthetic use
- Bandage or Therapeutic use

Advantages:

- Lenses are more comfortable than conventional rigid lenses
- Easily Adaptable
- Flexible Wearing Schedule
- Less debris gets under the contact lens
- Safer lens for athletics/will not dislodge as easily compared to rigid lenses

Disadvantages:

- Vision not as sharp as rigid lenses
- Is more fragile than rigid lenses
- GPC and infections are more common with soft lenses compared to rigid lenses

Types of Hydrogel Modalities:

- *Daily Wear (Conventional Wear)* – is worn during waking hours. 12-13 hours. Replace every 12 months
- *Extended Wear* – may be worn during sleep usually up to 7 days. FDA regulations state 14 days and new silicone hydrogel lenses are approved for 30 days
- *Flexible Wear* – can be worn as both a daily wear and extended wear lens
- *Disposables* – These lenses can be slept with and used as a Daily wear lens
- *Disposable "Dailies"* – are discarded after one day of use every day. Usually comes in 90 and 30 day supplies packs
- Planned Placement – involves scheduled replacement of lenses from every month or three months as determined by eye care professional
- *Bandage or Therapeutic Lens* – to promote corneal healing

Soft Lens Tints

- Visibility Tint – either blue or green
- Cosmetic Tint – used to enhance eye color
- Opaque Tint – changes eye color
- Prosthetic Tint – to enhance appearance of damaged or disfigured eye.

Parameters that must be considered when fitting Soft Lenses are:

Base Curve
Power
Diameter
Water Content
Availability

Fitting Techniques:

- Soft lenses are fitted flatter than the flattest "K" reading
- A normal fitting soft lens should have a "3 Point Touch"
- Keratometry should be used as a starting point in the fitting process
- Spherical soft lenses do not neutralize corneal astigmatism, therefore the amount of refractive astigmatism should be limited to .75 – 1.00 D.
- With borderline astigmats, sometimes a thick or stiffer soft lens might mask some corneal astigmatism

Good Centration and Corneal Coverage:

- The soft lens should be large enough to cover the entire cornea
- The soft lens should be reasonably well centered
- Establish a 3 Point Touch
- Initial Selection should be determined by measuring the HVID and Palpebral fissure
- Rule of Thumb – add 2 mm to the HVID as a starting point

Movement:

- Factors to Consider: Base Curve, Water Content, Diameter,Thickness, Eyelid Forces
- Thin soft lenses move less that soft lenses that are thicker
- Thin soft lenses usually have a lower water content
- Thicker soft lenses usually have a higher water content
- Contact Lens Practitioners should be aware of the lens materials that they are fitting

Movement Characteristics and Evaluation:

- Primary Gaze – lens should move .5mm – 1mm with the blink
- Upward Gaze – lens should drop .5 mm – 1mm
- Ideal Movement – 1mm – 2 mm
- Evaluation – Slit Lamp
- Push Up Test
- When a patient blinks, the vision should be clear and crisp before and after the blink
- Variable vision may indicate a problem with the fit, improper power of the contact lens or residual astigmatism
- During the initial fitting, variable vision is to be expected until the contact lens settles in
- If the vision does not improve with Over-refraction, an astigmatic clock should be used to evaluate the presence of residual astigmatism

Stable Vision

- When a patient blinks, the vision should be clear and crisp before and after the blink
- Variable vision may indicate a problem with the fit, improper power of the contact lens or residual astigmatism
- During the initial fitting, variable vision is to be expected until the contact lens settles in

- If the vision does not improve with Over-refraction, an astigmatic clock should be used to evaluate the presence of residual astigmatism

Diagnostic Lens Selection

1. Transpose the spectacle Rx in minus cylinder form
   -3.75 + .50 x 90
   -3.25 - .50 x 180
   -3.25 is your starting power

2. Depending on refractive astigmatism, and the type of lens chosen, the Spherical Equivalent maybe used
Spherical Equivalent = ½ the cylinder power added to the sphere
-3.25 - .50 x 180 (1/2 of .50 = .25 added to the –3.25 = -3.50

Fitting:

- Keratometer readings and Corneal Diameter (HVID) help determine the starting base curve for a soft lens
- Lens Selection: Transpose/ ½ the cylinder power added to the sphere
- Guidelines
- Rule of Thumb: 45.00 > fit 8.6, 45.00 or < fit 8.9 or 8.6
- Use Flattest "K" as your reference point
- 42.00 or < - Choose an 8.90
- 42.00 – 45.00 – Choose an 8.90
- 45.00 – 46.00 – Choose an 8.60
- 46.00 or > - Choose an 8.30

Characteristics of a Flat or Loose Fit:

- Variable Vision
- Awareness
- Excessive Movement
- Edge Standoff
- Lens may fall out
- Vision is clear before the blink and blurry after the blink
- Keratometer reflex blurs after the blink
- Lens displacement
- Some Lenses that are **Loose or Flat**, may ride high
- This is usually seen in a minus lens and not in a plus lens because of the edge thickness

- **Correction**- Switch to a larger Diameter or Steeper base curve or combination of both. In clinical practice, you will probably only change the base curve.

Steep or Tight Fit:

- Lens is initially comfortable but becomes more uncomfortable as the day goes on
- Keratometer Reflex blurs before the blink
- Vision improves after blinking

Correction:

- Switch to a smaller or flatter base curve or a combination of both

Good Luck on the NCLE

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