NCLE Advanced Contact Lens Review

Domain I - Prefit, Preparation, and Evaluation (26%)

Presented by the National Federation of Opticianry Schools – NFOS

Professor Robert J. Russo

Time: 9:45 AM - 11:45 AM

NCLE Advanced Domain I: Prefit, Preparation and Evaluation

CONTACT LENS FITTING EVALUATION

1. Rx Spectacle Refraction (Vertex if needed)
   Statement for contact lenses from referring Doctor (MD or OD)
   -No Contraindications or Ok to wear Contact Lenses
   Recommendation – Spectacle Rx should be within 6 months

Patient Form

2. Name, Address, Home number, Work number, Cell number
   Email address (Where is the best place to contact patient)

   Date of Birth: (Age) If under 18 parents consent is needed. Consider Presbyopia, Pre-presbyopia (Age 39) etc.

3. Ocular History: Any previous eye diseases, injury or surgery?
   If yes, Date? When? MD Type?

4. General Health: Currently taking any medications? For Diabetes – high sugar levels indicate a slow healing process, Thyroid condition - dryness Heart condition, Endocrine changes (Pregnancy, menopause, oral contraceptives) Skin conditions (Acne – Acutane) Diuretics – hypertension Remember – medications have side effects and should considered when fitting a patient with contact lenses. PDR – Physicians Desk Reference, Blue Book for Nursing

5. Occupation/Hobbies: Consider environment (fumes, dust, dirt etc.)

6. Sports Activities: Physical contact (Safety eyewear?) Does the sport require helmets??

7. Any visual difficulties with spectacles? (Acuity? Distortion? Asthenopia)

8. Allergies or hypersensitivities? Do they take medications? Is it seasonal? Identify (Fall, Spring or Summer)

9. Why does the patient want to wear contact lenses? Motivation? Expected Wearing time? (social or everyday) Only for sports? Flexible vs. Extended

Wear vs. Disposables vs. One Day lenses

10. Any previous lens wear? If yes

    a. Date of original fitting
    b. Name of practitioner, address, and pertinent information if available. Can it be obtained?
    c. Lens type and brand
    d. Method of care (Cold vs. Thermal) Preserved/Unpreserved solutions
    e. Date of last lens change. How long are they wearing their present lenses. When was the last time they had their eyes examined?
    f. Wearing history
    g. Any problems with lenses? (Vision, comfort, allergy)
    h. If the patient stopped wearing their lenses, why?
    i. What can and cannot be expected of contact lenses (Doctrine of Informed Consent, Duty to Warn- See handouts) You may have to explain advantages and disadvantages of the various lens materials and type of lenses.
    j. Stress the importance of maintaining personal hygiene
    k. Policy of visits and fees – Refunds?

11. Visual Acuity with Spectacles as written by Doctor
12. Keratometer Readings

    Compare corneal astigmatism to refractive astigmatism. Estimate residual

    Astigmatism with rigid and soft lenses

13. External Examination – Fissure size, blinking habits, HVID, Iris color, pupil Size

14. Biomicroscopy – Anterior segment examination – record and questionable

    findings and document on patient record card

15. Lens selection – Lens type based on all findings up until this point

    Rigid or GP lenses – use fitting rules for starting base curve, and diameter

    Soft Lenses – HVID and manufacturers guidelines

16. Trial lens fitting -

    Fit – evaluate fit first before performing over-refraction

        i. position and movement
        ii. pupillary coverage
        iii. Diameter evaluation with RGP lenses
        iv. Fluorescein pattern with RGP lenses

Over-Refraction – calculate expected power through over-refraction and be Prepared to demonstrate to patient the best sphere power, spherical equilvalent, or sphero-cylinder correction

17. Write up lens order based on clinical trial fitting and either order or dispensed depending on the type of lens you fitted (daily wear, disposables etc.)

18. If you need to order contact lenses, discuss the anticipated office procedures Finished Fitting or Delivery Visit (See handouts on checklist, forms etc.)

    a. Check lenses to see if the right lens was ordered, check brand type, base curve and power.
    b. Discuss hygiene, make-up application if applicable
    c. Discuss the proper use of solutions (red tip solutions do not go in eye)
    d. Give written instructions and have patient sign off on
    e. Demonstrate insertion technique
    f. Demonstrate removal technique
    g. Demonstrate re-centering technique
    h. Discuss adaptive symptoms
    i. Discuss Consequences of Non-Compliance (Handout)
    j. Discuss Adaptive symptoms
    k. Replacement Coverage fees (See Handouts)
    l. Schedule follow-up visit. Patient should be wearing lenses at least 6 – 8 hours when they come in for check up.

First Follow-up Visit Patient wearing lenses 6-8 hours) (Usually 1 week later)

a. Wearing history
b. Subjective symptoms *(Check Contact Lens Problem Solving Handout)*
c. Objectives symptoms *(Check Contact Lens Problem Solving Handout)*
d. Slit lamp evaluation with and without the lenses
e. Postwear "Keratometer readings"
f. Check lenses on and off the eye
g.

Convergence with Contact lenses compared to Spectacles

Myope – Eyeglasses – Base In Prism

Hyperope – Eyeglasses – Base Out Prism

A Myope requires less convergence with eyeglasses compared to when wearing contact lenses

A Hyperope requires more convergence with eyeglasses compared to when wearing contact lenses

Accommodation with Contact lenses compared to Eyeglasses

Myope – more accommodation with contact lenses, less with spectacles
Hyperope – more accommodation with eyeglasses, less with contact lenses

Magnification Effects of Contact Lenses and Spectacles

Myope – Retinal image enlarged with contact lenses, minified with spectacles
Hyperope – Retinal image enlarged with spectacles, minified with contact lenses

Contact Lens Fitting Success depends on the following:

-Understanding the eye and accessory structures
-Eyelid functions
-Ocular Pathology
-The Cornea and Topography

Adnexa Oculi

-Glands of the Eyelids
-Conjunctiva - Bulbar vs. Palpebral Conjunctiva

Functions of the Tear Film (PCTF – Pre Corneal Tear Film)

-Tear Layer
    -Lipid
    -Aqueous
    -Mucoid

Thickness of the PCTF is approximately 3µ microns
Conversion of Microns to MM – Divide the value by 1000
Conversion of mm to Microns – Multiply the value by 1000

Mucin Tear Deficiency - Commonly caused by Vitamin A deficiency

Tear Layer Deficiencies

-Keratoconjunctivitis (Dry Eye)

-Evaluation - BUT - Fluorecein
-Schirmer Test
-Rose Bengal
-Lissamine Green (Most common tests for Dry Eye - BUT and Rose Bengal)
-Jones Test
-Riley-Day Syndrome – is a disfunction of the lacrimal gland
-Sjojren's Syndrome – auto-immune disorder characterized by lacrimal and salivary gland deficiency
-Stevens-Johnson Syndrome - affects the skin and mucous membrane of the conjunctiva

SLIT LAMP BIOMICROSCOPE

Professor Robert J. Russo

1. **What is it?** It is an instrument that combines a microscope with a lamp source. It can be used to examine the anterior segment of the eye.

2. **Who makes the instrument?**

Burton
Bausch and Lomb
Marco
Zeiss
Topcon
Mentor
Nikon
Haag Streit

3. **The slit lamp has three basic parts:**

1. Microscope
2. Illumination system
3. Head rest and state support

4. **What are the parts?**

1. Joystick or control arm for horizontal and vertical movement
2. Elevation control – for height adjustment
3. Intensity control
4. On-off switch
5. Lock adjustment knob
6. Patient headrest
7. Chinrest
8. Fixation light
9. Lamp housing cover
10. Front surface mirror for illumination system
11. Eyepieces
12. Magnification knob
13. Slit width control
14. Slit length control
15. Slit rotation knob
16. Filters
17. Headrest elevation knob
18. Hruby lens

5. **Instrument Setup**

1. Microscope in low magnification
2. Microscope in line with control arm
3. Elevation knob 1 inch above its lowest point
4. Chinrest 1 inch above is lowest point
5. Medium intensity
6. Lamp housing set to approximate angel of 45 ˚
7. Set slit length to longest length possible
8. Slit rotation should be set in vertical position
9. Narrow slit width, white light

6. **Instrument Procedure**

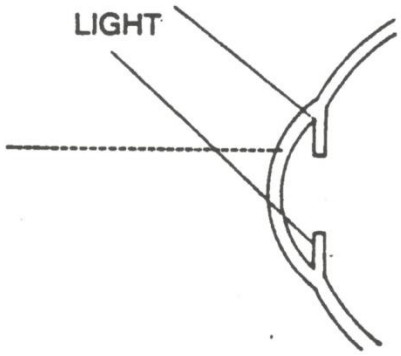
1. Set P.D. adjustment
2. Focus eyepiece
    a. Focusing bar
    b. Focus on Sclera of patient
    c. Focus on closed eyelid of patient

7. **Parfocalization**

Microscope and lamp source when in focus, are in the same center of rotation

Illuminaton Techniques

Diffuse Illumination – with blue or red-free filter, wide beam, lamp housing angle about 45°



Gross Exam – Overall view of anterior segment of the eye and eyelid margins

A. Without a contact lens, without fluorescein

* Pupil size, shape, location
* Blink reflex

* Observation of external eye structure and conditions

B. With a contact lens, with fluorescein (Cobolt filter or Wratten filter)

* Gross fluorescein pattern
* peripheral curve clearance
* Apical clearance

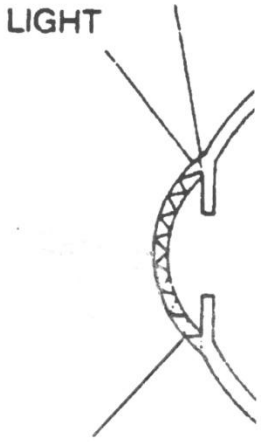
C. Without a contact lens, with fluorescein

* Break up time
* Gross staining
* Corneal dry spots

D. With a contact lens, without fluorescein

* Blink reflex
* Lens movement and position following blink
* Observation of anterior surface appearance

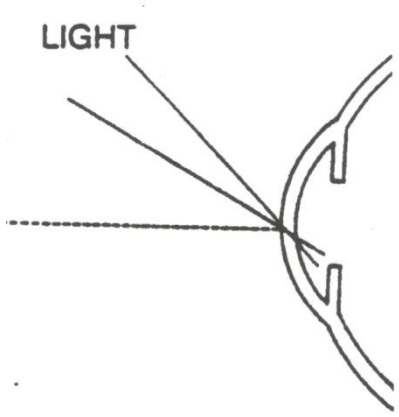
Sclerotic Scatter – White light, 3-4 mm beam width, approximate 60° angle, no microscope, beam focused at temporal limbus. Observer vies beam from opposite angle.



Used for observation of:

* Gross edema
* Corneal opacities

Direct Focal Illumination – Parallelepiped and Optic Section



Parallelepiped - without a contact lens, without fluorescein - white light, lamp housing angle approximately about 45° with a 2 – 3 mm beam width.

* General observation of the cornea
* Embedded foreign bodies
* Corneal opacities and infilitrates
* Endothelia deposits
* Vertical Striae
* Folds in Descemet's membrane
* Debris in the PCTF
* Upper lid observation

Parallelepiped – with a contact lens without fluorescein

* Mucous, debris and air bubbles under the contact lens
* Anterior lens surface deposits (wettability, scratches)

Parallelepiped – with a contact lens with fluorescein

* Observe touch areas of the contact lens on the cornea
* Peripheral curve clearance
* Staining (with cobolt filter)

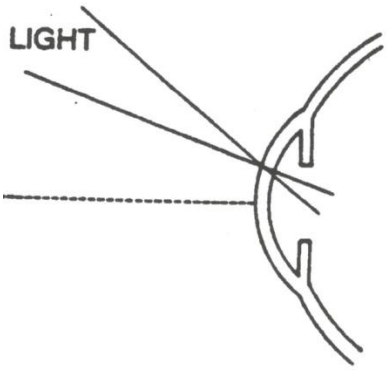
Optic Section – thinnest beam possible .5 mm in width – Without a contact lens, without fluorescein

* Depth of foreign bodies and opacities
* Crystalline lens opacities
* Elevation of growths or cysts
* Thickness of cornea

Optic Section – With a contact lens with fluorescein

* Lens-corneal relationship
* Tear exchange

Indirect Illumination – Setup same as parallelepiped except observe areas of the eye adjacent to the beam, white light, 3-4 mm width

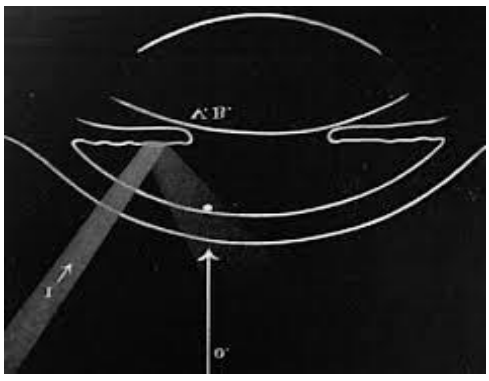


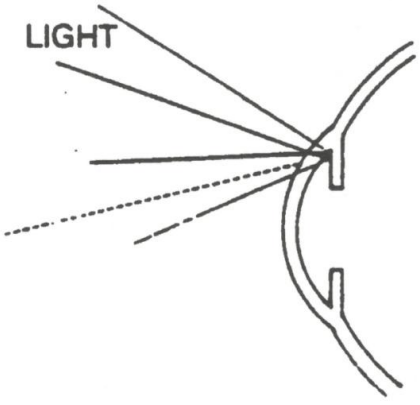
* Observation of cornea, conjunctiva and lid margins

Retro- Illumination – White light, lamp housing about 45°, 2-4 mm slit width.

Direct Retro-Illumination – light bounces directly off the iris

Indirect Retro- Illumination – observe illumination adjacent to the reflected beam.





Retro-Illumination – Without a contact lens

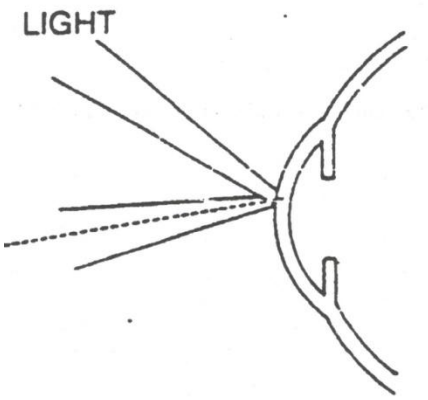
* Microcystic edema
* Endothelia deposits
* Vascularization
* Opaque foreign bodies

Retro- Illumination – With a contact lens on the eye

* Debris or frothing in tear film under contact lens
* Deposits on posterior contact lens surface

Specular Reflection –White light and microscope focused at same point with light reflected back through the oculars

* Corneal endothelium
* Epithelial surface defects
* Pre-corneal tear film observation
* Observation of the anterior surface of the contact lens for deposits, scratches and wettability



Contact Lens Evaluation and Case History

Identification Grading (Uses a +1, +2, +3, +4 Grading system)
Used in Edema Identification, Microcystic Edema, Scleral Injection, Corneal Striae, Corneal Vacularization an Corneal Distortion

Anterior Segment Conditions of the Eye (Verify through Google or other web browser for images)

Sye, Chalzion, Blepharitis, Trichasis, Pinguecula, Ptergium, Arcus Senilis, Aniridia, Coloboma, Basal Cell Carcinoma, Leukoma, Macula and Nebula, Herpes Zoster(Shingles), Melanoma, Ectropian, Entropian, Ptosis, Dacryocystitis, Subconjunctival Hemorrhage, Conjunctivitis, GPC, VKC, Episcleritis, Bullous Keratopathy, Corneal Transplant, Keratoconus, Keratoglobus, Corneal Ulcer (Disciform and Dendritic Ulcer) Hyphema, Acanthamoeba, Sjogren's Disease, Fuch's Dystrophy, Steven's Johnson Syndrome

Corneal Topography

75% of Refraction takes place at the Cornea
The average refractive power of the cornea is +43.00
The average thickness at the apex is .52 mm
Cornea is transparent and avascular

Zones of the Cornea

- Apical Zone
(Known as Corneal Cap) 4-6 mm wide, fairly regular in shape and area of reference when taking "K" readings
- Visual Center
-Apex
-Geometric Center of the Cornea

-**Transition Zone**
- area of the cornea with greatest aspheric curvature
-cornea flattens out more temporally than nasally
-**Limbal Zone**
-area about 1 mm wide and is considered the external boundary of the cornea

Layers of the Cornea (Five Layers of the Cornea)

-Epithelium
-Bowman's membrane
-Stroma
-Descemet's membrane
-Endothelium

Endothelium Disorders

-Poymegethism
-Polymorphism
-Endothelial Guttata

Corneal Transparency and Metabolism

-Osmosis (Hypertonic vs. Hypotonic status of Tears and Cornea .95% NaCL)
-Endothelial or Metabolic Pump
-Corneal Deturgescence

Keratometry

-measures corneal curvature - Universal term - Ophthalmometer
-produces a minified, virtual image off the cornea
-has doubling prisms and has plus and minus mires for recording "K" reading

- Index of the Keratometer is 1.3375
-Range of the Keratometer is 36.00 D - 52.00 D

Classification of Astigmatism

-Regular and Irregular - clarity or smoothness of mires

- Symmetrical and Asymmetrical - whether meridians are 90 degrees apart

- WTR - flattest meridian is at 180 e.g. 43.00@180/44.00@90, meridians can lie between 0-30 and 150- 180

-ATR - flattest meridian is at 90 e.g. 44.00@180/43.00@90, meridians can lie between 60 and 90 and 90 and 120

-Oblique - astigmatism between 30 - 60 degrees and 120 - 150

Extending the Range of the Keratometry

+1.25 - 9.00 Diopters to increase range of Keratometer and -1.00 - 6.00 D to decrease the range of the keratometer

Lens Selection – Lens type based on all findings up until this point

Rigid or GP lenses – use fitting rules for starting base curve, and diameter
*Soft Lenses – HVID and manufacturers guidelines

Trial lens fitting – Soft or Rigid

Fit – evaluate fit first before performing over-refraction

- position and movement
- pupillary coverage*
- Diameter evaluation with RGP lenses*
- Fluorescein pattern with RGP lenses*
- *Rigid Lenses only!

- Over-Refraction – calculate expected power through over-refraction and be prepared to demonstrate to patient the best sphere power, spherical equilvalent, or sphero-cylinder correction
- Write up lens order based on clinical trial fitting and either order or dispensed depending on the type of lens you fitted (daily wear, disposables etc.)

Point to Remember

- Minus Prescriptions from -4.00 on take less minus at the cornea
- Plus Prescriptions from +4.00 on take more plus the cornea

Finished Fitting or Delivery Visit

Check lenses to see if the right lens was ordered, check brand type, base curve and power.

Discuss hygiene, make-up application if applicable
Discuss the proper use of solutions (red tip solutions do not go in eye)
Give written instructions and have patient sign off on

- Demonstrate insertion technique
- Demonstrate removal technique
- Demonstrate recentering technique
- Discuss adaptive symptoms
- Discuss Consequences of Non-Compliance
- Discuss Adaptive symptoms
- Replacement Coverage
- Schedule follow-up visit. Patient should be wearing lenses at least 6 – 8 hours when they come in for check up.
-

Second Follow-up visit
(3 weeks or 1 month later)*
Follow same procedure as above

From original dispensed fitting date. Remember that after the practitioner is satisfied with the fitting, by federal law*, all parameters etc. must be given to the patient regardless if the patient requests this information

***FCLCA – Fairness to Contact Lens Consumers Act - 2004**

Contact Lens Rule - October, 2020 As with the FCLCA, a copy of the prescription must be given with an expiration date and in addition, an acknowledgment form that the patient received the prescription and must be signed by the patient and dated. The acknowledgement must be kept on file for three years.

Contact Lens Rule Update - April, 2021 a copy of the prescription must be given with an expiration date and in addition, an acknowledgment form that the patient received the prescription and must be signed by the patient and dated. The acknowledgement must be kept on file for three years. Practices can also adhere to the new regulations by seeking patient consent to send contact lens prescriptions electronically such as patient portal or via email.

Acceptable ways to document:

1. Patients sign a separate form
2. Patients can sign sales receipt
3. Patients can sign their prescription
4. Patients can esign and receive a copy electronically

If patient is unwillingly to sign, this should be documented on the patient record card regard refusal to sign.