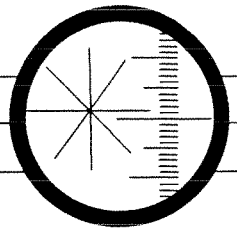
EXAM PREPARATION

FOR CONTACT LENS DISPENSERS

Part

6

Modification & Delivery



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MANAGEMENT DEVELOPMENT

OPTICAL TRAINING INSTITUTE

EXAM PREPARATION

FOR CONTACT LENS DISPENSERS

6: Modification & Delivery

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Introduction

This final section of the NCLE Preparation Home Study Course will cover the subjects of in-office contact lens modification of rigid lenses, and delivery to the patient. Also included in this section is some supplementary information on the use of the radiuscope, on DK Value and gas permeable lenses, and ANSI standards for rigid and soft lenses.

The in-office modifications which are possible with rigid lenses include: reducing the overall lens diameter, flattening the base curve, blending transition zones, removing scratches, adding minus power, adding plus power and dotting the lens for identification. The use of the radiuscope will be described and illustrated as it is used to verify the radius of curvature of a spherical surface.

Part 6 continues with a discussion of the uses of contact lens solutions for rigid and soft lenses. These include wetting, cleaning, and soaking solutions for rigid lenses, and cleaning, disinfecting, rinsing, and re-wetting solutions for soft lenses. This is followed by a discussion of patient instruction techniques for lens insertion and removal as well as recommended "breaking-in" wearing schedules.

An abbreviated table of ANSI standards is also part of this section. This table consists of the most referenced standards for rigid and soft lenses— those which you may be called upon to know.

Part 6 concludes with a glossary of important terms which were used throughout this course, as well as some which you may be seeing for the first time. Occassionally, a term which is rarely used by the contact lens fitter—such as *endophthalmitis*— will appear on the exam, possibly as one of the wrong answers. Knowing its meaning will aid in the selection of the correct answer. If you study and learn the terms found in this glossary there are likely to be very few "surprises" for you on the NCLE Exam.

This section includes a twenty-nine question practice test. As a final preparation for the NCLE Exam, review all of the practice test questions found throughout this course. More important than the questions themselves, however, are the principles underlying each correct answer. If any of these are still unclear be sure to review the appropriate sections in the workbooks and tapes.

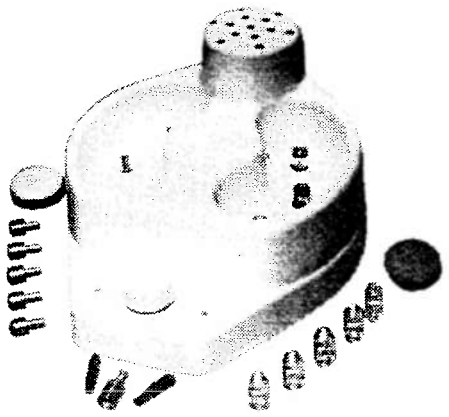
6: Modification & Delivery

In office modifications of rigid contact lenses enables the practitioner to provide better and faster service to the patient. In many cases it allows the patient to continue with an uninterrupted wearing schedule.

Most contact lens modification units are simple in design and relatively inexpensive.

Office Modification

Lens Modification Unit



The information for Part 6, may be found on Tape 7, side 2. As usual, follow along in the workbook as you listen to the tape for the first time. Then go back and review the material, at your own pace.

The table below outlines those in-office adjustments that can be made to rigid and rigid gas-premeable lenses. All of the adjustments listed will have the effect of actually loosening the fit of the lens and/or increasing the tear flow between the lens and cornea. If the fit of the lens needs to be tightened, it would require the fabrication of a completely new lens.

Possible In-Office Lens Modifications For Rigid Clontact Lenses

1. Blend transition or junction zones
2. Reduce optic zone diameter
3. Reduce overall lens diameter
4. Flatten intermediate curves
5. Add minus power
6. Add plus power
7. Remove scratches
8. Polish and refinish lens edge
9. Adjust peripheral curves
10. Identify the lens
11. Fenstrate the lens
12. Flatten the base curve

Office Modification

Polishing Compounds: Lenses can be polished using a polishing compound which is a mild abrasive agent. These agents are known as *Silvo* or *Xpal* and are mixed with either oil or water. Since Silvo is a coarser abrasive, it tends to scratch the relatively soft gas permeable materials, therefore the finer compound Xpal is generally more desirable. Also, there are several commercially available polishing solutions which are specifically designed for gas permeable lenses such as *Alox PG*, or *Sil O2 care*.

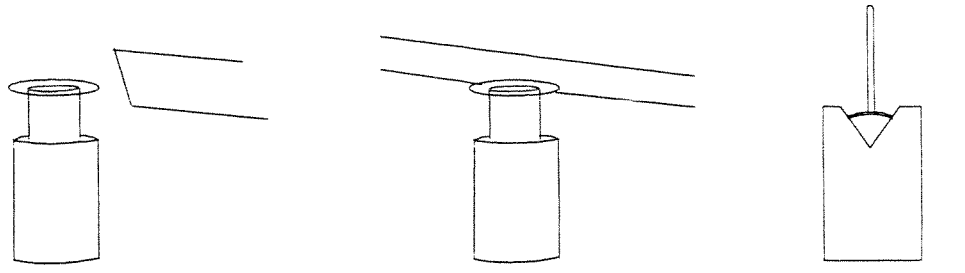
Blending Transition or Junction Zones: The junction zone between two curves should be a smooth transition. If not, it can interfere with tear exchange under the lens. If the junction zone is particularly sharp, it may irritate the cornea in a manner similar to a sharp lens edge. A transition zone may be blended by using a tool in which the radius of curvature is half way between that of the two curves being blended. The junction may occur either between the CPC and IPC or the IPC and PPC.

Reducing the Optic Zone Diameter: Doing this will loosten the fit of the lens since the size and curvature of this zone will help determine how tight or loose the fit will be. This may be accomplished either by increasing the width of the PPC or IPC, or by adding a blend or increasing the width of the blended area.

Reducing the Overall Lens Diameter: This adjustment will also have the effect of loosening the fit of the lens. As illustrated below, it may be accomplished either through the use of a razor blade, an emery board, or by employing a cone shaped stone.

Flattening the Intermediate Curves: This is accomplished by resurfacing the existing intermediate curve with a felt-covered tool of a flatter radius of curvature.

Adding Minus Power: Up to one diopter of minus power may be added to a lens. It is accomplished with a tool covered either with a piece of velvateen or sponge.



Razor Blade Emery Board Conical Stone

Office Modification

Adding Plus Power: Up to one diopter of plus power may be added to a rigid contact lens. The technique is similar to that used for adding minus power.

Removing Scratches: It is possible to remove scratches from both the front and back surfaces of a rigid gas permeable or PMMA contact lens. However care must be taken not to alter the power of the lens in the process.

Polishing and Refinishing the Lens Edges: Several techinques may be used for this purpose. The most widely used method utilizes a felt disc.

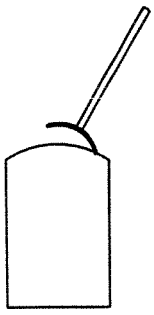
Adjusting Peripheral Curves: Peripheral curves may be flattened , blended, or made wider. This is generally achieved through the use of a diamond impregnated tool of the correct radius of curvature.

Flattening the Base Curve: The base curve of a lens may be flattened by about 0.50 D. This in not a frequently performed in-office lens modification.

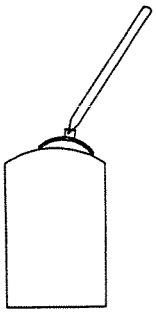
Identifying the Lens: In order to more easily distinguish the right lens from the left, the right lens often contains an identification marking such as a red dot. The marking can be applied through the use of one of several available in-office techniques.

Fenstrating the Lens: The drilling of one or more holes through a rigid lens is known as fenstrating and there are modification units designed specifically for this purpose. Fenstration has the effect of loosening the fit of a lens. It does not significantly increase the flow of oxygen through the lens as is sometimes believed.

General Comments: Although all of the above-mentioned modifications are possible, those most frequently performed include blending the transition zones, removing surface scratches, adding minus power, and dotting the lens for identification.



Rod or Suction Cup Lens Mounting



Double Rotation Technique

Radiuscope

The radiuscope is designed to accurately measure the radius of curvature of the anterior and posterior surfaces of rigid contact lenses. All the commonly avaliable radiuscopes operate using procedures similar to the following:

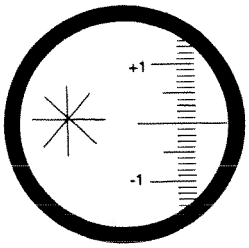


1. A drop of water is placed on the lens mount upon which a contact lens is floated convex side down.

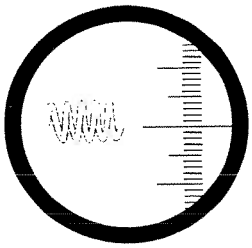
2. A spot of light is centered in the middle of the lens and the body of the microscope is raised as high as it will go.

3. The microscope is then focused downward until a spoke pattern, the first of three images, comes clearly into view. This is called the *aerial image* and represents the reflection from the posterior surface of the lens. Once the aerial image becomes sharply focused a pointer is set to zero on the scale.

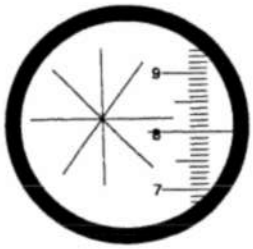
4. Continue to move the body of the microscope downward. On the way to its final location, an image of the *bulb filament* will come into view. Continue beyond this image.



Aerial Image



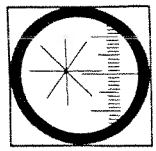
Bulb Filament



Spoke Pattern

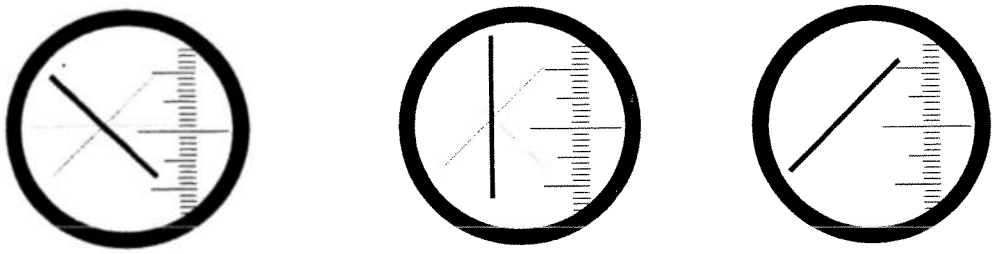
5. Eventually, another spoke pattern will come into focus. This represents the level of the lens surface, so it is possible to observe surface details at this point. Focus this third image as sharply as possible. The reading on the scale now represents the radius of curvature of the lens surface in millimeters.

6. It is generally advisable to double check the final reading. This can be accomplished by focusing the microscope all the way up to the original aerial image. At this point the pointer should once again be on zero. If not, reset it at zero and repeat the entire process.



Toric Curves: Toric curves are somewhat more complex to interpret than spherical curves, although the technique employed is the same. Since a toric surface contains two separate radii of curvature not all the spokes in the pattern will be in focus simultaneously. Taking an accurate reading, therefore is a matter of making two separate measurements for each lens surface.

A parallel may be drawn here to the use of a lensometer for the purpose of neutralizing a spectacle lens. While spherical lenses contain only one power, those containing cylinder require the reading of two powers.



When a toric contact lens is rotated in a clockwise motion different spokes on the target will come into focus as illustrated in the figures above.

Gas Permeable Rigid Lenses

DK Value: The term DK value is used to describe the amount of oxygen which is able to transmit through a contact lens. Technically, the gas permeability or DK is a characteristic of a given lens material at a given temperature where D is equal to the diffusion of the substance or gas through the material and K is equal to the solubility of the substance within it. Another term sometimes used in this context is *Oxygen Flux.* Oxygen flux is defined as the amount of oxygen that can pass through a given area of the material in a given amount of time, driven by a given partial pressure difference of oxygen across the material. Therefore oxygen flux will vary with the DK of the material, the lens thickness and the pressure drop across the lens.

Thinner lenses generally permit more oxygen to pass through the lens so thickness is an important aspect of lens performance.The term *oxygen permeability* indicates the DK divided by the lens thickness which can be expressed in the following formula: oxygen transmissibility=DK/L where L represents the lens thickness.

Advantages of Gas Permeable Lenses

More Comfort: Since they can be fit tighter, there is minimal movement which results in more comfort.

Rapid Adaptation: Lenses can generally be worn on a full time daily wear basis within one week.

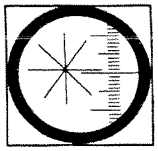
Spectacle Blur Uncommon: Hypoxia- induced spectacle blur is greatly reduced.

Corneal Distortion: Corneal distortion or "molding" which can be an unfortunate side effect of PMMA lenses is virtually non-existant with gas permeable lens materials.

Can Be Made Larger: Larger lenses permit better centration resulting in greater comfort. Also larger lenses can generally cover greater amounts of corneal astigmatism, sometimes up to 5 diopters.

Greater Safety: Long term corneal physiologic changes are less likely to occur than with PMMA.

Less Flare: Larger lenses permit larger optic zones which in turn minimize the probability of lens flare in dim light situations. Some optic zones can be as large as 8.5 mm, larger than the total diameter of some PMMA lenses.



Gas Permeable Rigid Lenses

Disadvantages of Gas Permeable Lenses

Quality Control: The larger diameters demand stringent quality control measures. Edge and peripheral curve designs become especially crucial.

Lenses Are More Fragile: Greater care is needed in cleaning and handling to avoid scratching and breaking.

Deposits: Waxlike lipid deposits are more likely to form on lenses containing silicone.

Protein Deposits: Protein deposits can form on the lens need to be removed with special cleaners.

Scratch Easier: Gas permeable rigid lenses will scratch easier than their PMMA predecessors.

Fitting Gas Permeable Lenses:

These lenses are generally fit through the use of a trial set or by reference to a lens nomogram supplied by the manufacturer.

Solutions
Rigid Lenses

Wetting Solution

Rigid contact lens materials are, for the most part, inherently hydrophobic. They therefore need to be specially treated in order to improve the wettability of the lens. Wetting solutions serve this purpose by allowing the tear to spread uniformly over the lens surface rather than break up into small drops. Since a wetting solution coats the lens, it also helps to prevent oils and debris from being transferred from the finger to the lens.

Storage or Soaking Solution

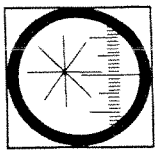
As the name suggests, the lenses are stored in a storage solution rather than being stored in a dry case. This serves to reduce the levels of pathogens contaminating the lens surface, and it will also tend to clean the lens and keep it wet. However wetting solutions are still required to render the lens more hydrophillic. Storage solutions should be changed on a daily basis.

Cleaning Solution

This solution is used to clean a lens surface which may have become smudged with dried mucus, nail polish, oil, nocotine or nonsoluble cosmetics. Cleaning solutions are routinely recommended as part of the daily lens maintenance regimen.

Combination Solution

A combination solution is an all-in-one solution with chemicals that permit cleaning, soaking, and wetting, or just soaking and wetting. The advantages of a combination solution include improved patient compliance, convenience, and to some degree, economy. While combination solutions do perform adequately, they are generally not as effective as when the individual solutions are used separately.



Solutions Soft Lenses

Soft contact lens solutions may be divided into four categories: cleaning agents; disinfection solutions both chemical and thermal; rinsing solutions; eye drops for lubricating, rewetting, and cleaning.

Cleaning Agents

Over a period of time, soft lenses can gradually become coated with debris such as protein, inorganic films, mucin, lipids, and minerals. These coatings can interfere with the clarity of vision, act as an irritant, and may cause adverse tissue responses. If these surface deposits are not regularly removed, their buildup could result in the following:

A decrease in vision
A red or irritable eye
An increase in lens mass which may effect the fit
Decreased oxygen transmission
Giant papillary conjunctivitis
Corneal and bulbar conjunctival inflammatory response

There are three types of soft lens cleaning agents. These include surface acting, oxydative, and enzyme cleaners.

Surface acting: Consists of cleaning agents which serve to remove accumulations of proteins, lipids and minerals from the surface of the lens. Should be used on a daily basis.

Enzyme Cleaners: Used primarily on a weekly basis to remove protein deposits from the lens.

Oxydative Agents: Serves a similar function as the surface acting agents but work through a combination of heat and oxydation. Since oxydative agents can discolor the lens they are only infrequently used.

Solutions
Soft Lenses

Disinfection of Soft Lenses:

A distinction should be made between *disinfection* and *sterilization*. Sterilization implies the complete death of all bacteria, spores, and fungi. Disinfection, on the other hand, refers to the physical or chemical procedures that kill common pathogenic organisms, but are likely to permit other nonpathogenic organisms to survive. Disinfection is adequate for soft lens care.

There are two basic methods used to disinfect soft lenses: heat or thermal disinfection, and chemical disinfection.

Thermal Disinfection: Essentially, the lenses are boiled either in a preserved or nonpreserved saline solution. The lenses are subjected to a minimum temperature of 80 degrees centigrade for 10 to 20 minutes.

There are four common systems of chemical disinfection for soft lenses:

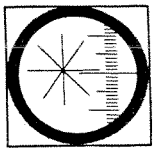
Chlorhexidine-Thimerosol System: This was the first approved chemical disinfection system for soft lenses and was first marketed under the trade name, Flexsol. Other brand names now include Flexsol and Normol. The lens is soaked in the solution overnight and then rinsed with saline before being reinserted in the eye. A significant percentage of patients have developed allergic reactions to the thimerosol ingredient in this system.

Iodine Solutions: If a soft lens has a relatively low water content, less than 45%, the lenses may be stored in Pliacide, a solution containing 0.1% iodine, for disinfection purposes.

Quaternary Ammonium Solutions: These may be used as a combination cleaning and storage solutions. Among the companies marketing this method are Hydrocare, Allergan, and Bausch & Lomb.

Hydrogen Peroxide: This system provides excellent cleaning and disinfection for all soft lenses. However the patient must be sure to adequately neutralize the hydrogen peroxide before inserting the lens to avoid corneal damage. Brand names for this method would include Lensept, and Septicon.

The lens is first soaked in a 3% hydrogen peroxide solution for 10 minutes. It is then transferred to a second container containing normal saline solution and a catalyst where it soaks for at least 6 hours. Prior to inserting in the eye the lens is soaked in fresh saline solution for 3 minutes.



Solutions
Soft Lenses

Rinsing Solutions:

Rinsing solutions may be used to rinse debris from the lens after cleaning, or to rinse the lens after chemical disinfection in order to minimize any possible adverse reactions from the chemicals.

Rinsing solutions may consist either of preserved saline, unpreserved saline, or distilled water. Unpreserved saline solution may be made from salt tablets, or from individual doses of saline such as the commercially available Unisol. If the solution is freshly prepared from salt tablets, it must be discarded after each use to avoid contamination and possible eye infection. A drawback to the use of unpreserved saline solutions is patient compliance. Instead of distilled water, some use tap water which can vary in its quality. In addition many patients do not prepare fresh saline daily.

Lubricating/Re-Wetting Solutions:

Varying degrees of ocular discomfort can occur while wearing soft contact lenses. It may be the result of certain environmental conditions such as tobacco smoke, smog, dust, or other pollution. Low humidity conditions such as those created by heaters or air conditioners in the car or work place may cause the lens to partially dehydrate causing discomfort. Inadequate tear production may also contribute toward lens dehydration. Drops, applied while the lens is on the cornea, can serve to help alleviate some of the above mentioned causes of discomfort. They include such brand names as Adapettes, Clerz, and Comfort.

Contact Lens Instruction

Insertion Techniques:

Many patients experience difficulty with lens insertion in the beginning. Informing the patient of this can help instill confidence in the event the first few attempts at lens insertion are not met with success. Let them know that lens insertion is a skill which needs to be learned. The following training techniques will prove helpful in assisting the new patient.

1. Keep the elbows out while inserting the lens. If they are positioned too far in, toward the body, it may restrict the movement of the index finger into the space between the lids.



2. The lower lid should be held down with the middle finger of the dominant hand while the upper lid is held with the middle finger of the other hand. Holding the lids apart creates an opening large enough to accommodate the lens and it delays the normal blinking reflex.

3. While inserting the lens the patient should look straight ahead. At first, a mirror should be used so the patient can actually watch the lens as it is applied to the cornea. Eventually, if the patient continues to look straight ahead during the insertion process, a mirror will not be necessary.

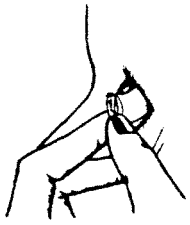
4. If after several tries, your patient continues to experience difficulty inserting the lenses, it might be best to leave the room and let the patient continue alone. Some people are simply more at ease practicing alone.

5. If difficulty is still experienced, have the patient use the two-handed technique as described above. But this time to touch the cornea with the index finger with no lens present. This can sometimes help to instill confidence.

Contact Lens Instruction

Removal Techniques for Soft Lenses:

The patient should look straight ahead at a spot directly in front.



The gaze should then be directed upward, being sure not to move the head.

Pull the lids apart in a manner similar to the technique used to insert the lens.

Gently slide the lens straight down from the cornea to the sclera with the index finger of the dominant hand.

While the lens is being held on the sclera by the index finger, bring the thumb onto the eye and gently pinch the lens out.

Removal Techniques Hard Lenses:

The lens should be centered on the cornea



Open the eye wide enough so that the edges of the lens are not in contact with the eyelids. Then pull the outer corner of the eyelids slightly to make them tight.

Quickly blink in an effort to remove the lens from the cornea as the result of a bumping action created by the eyelids. While the opposite hand covers the eye to catch the lens, it is recommended that a tissue or soft cloth is used to cushion the lens in the event it falls.

Contact Lens Instruction

Breaking-In Wearing Schedules

PMMA: PMMA lenses should be worn no more than two to three hours the first day with the wearing time gradually increased one hour per day. They should be worn no more than eight hours in a single day until the patient can be seen for a follow up visit. However the lenses should only be worn for as long as they are comfortable.

Gas Permeable: These lenses can generally be worn about four hours the first day, increasing the wearing schedule two hours each day for as long as they remain comfortable. If prolonged wearing time results in decreased comfort, the wearing time should be limited so that it does not exceed the point of comfort. In many cases the lenses can eventually be worn from 12 to 18 hours per day, provided they remain comfortable and the eyes are not red. Unless they are specifically approved and prescribed for extended wear purposes, the lenses should not be worn overnight, regardless of how comfortable they may feel.

Soft Contact Lenses: Initial wearing schedules can vary. However on a healthy eye, a well fit lens can sometimes be worn for a full day right from the start. A more conservative schedule might indicate six hours the first day, with an increase of four hours each day until a maximum of eighteen hours is reached. Again, the lenses should never be worn beyond the period of comfort. Should the lenses become very uncomfortable, they should be removed and a follow up visit scheduled.

Ansi Standards

ABBREVATED TABLE

	PMMA	Rigid Gas Permeable	Soft (50%-69% water)
Diameter	±0.05 mm	±0.05 mm	±0.25 mm
Base Curve	±0.025 mm	±0.050 mm	±0.20 mm
Center Thickness	±0.02 mm	±0.02 mm	±0.03 mm
Refractive Power (diopters)			
0.00 to 5.00	±0.12 D	±0.12 D	±0.25 D
5.12 to 10.00	±0.18 D	±0.18 D	±0.25 D
10.12 to 15.00	±0.25 D	±0.25 D	±0.50 D
15.12 to 20.00	±0.37 D	±0.37 D	±0.50 D
over 20.00	±0.50 D	±0.50 D	±0.75 D

ANSI Publications Of Interest To The Contact Lens Fitter

Z80.2-1989	*Rigid Contact Lenses—Requirements*
Z80.6 1983	*Conventional Hard Plastic Contact Lenses—Physiochemical Properties*
Z80.8—1986	*Soft Contact Lenses—Prescription Requirements*

The abbreviated table of ANSI Standards for contact lens tolerances are the ones you will most likely be required to know. The three publication listed which are of interest to the contact lens fitter may be purchased directly from the American National Standards Institute at the following address:

American National Standards Institute
11 W. 42nd Street
New York, NY 10036
(212) 642-4900

Practice Test

___1. The base curve of a rigid gas permeable contact lens must be verified to be within _____ of that specified.

a. ± 0.50 mm
b. ± 0.25 mm
c. ± 0.02 mm
d. ± 0.05 mm

___2. A PMMA rigid lens wearer returns to the office for follow-up keratometry. The readings obtained at this time should be within _____of the original readings.

a. ± 0.50 D
b. ± 1.00 D
c. ·0.30 mm
d. none of the above

___3. Which of the following modifications may be made to a rigid lens?

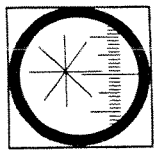
a. adding minus power
b. removing scratches from the surface
c. flattening the peripheral curves
d. all of the above

___4. It is possible to reduce the diameter of a rigid contact lens through the use of:

a. the file technique
b. the razor blade technique
c. an abrasive stone
d. all of the above

___5. The thickness of a contact lens may be verified with a:

a. lens clock
b. con-ta-chek
c. diameter gauge
d. thickness gauge



Practice Test

___6. A - 6.50 D PMMA lens measures 8.6 mm in diameter and is found to be riding too high because of attachment to the upper lid. Which of the following modifications could improve the fit?

a. increase the size of the lens
b. add minus power
c. reduce the edge thickness
d. none of the above

___7. Which of the following modifications are *not* possible to perform on a RGP lens?

a. steepen the peripheral curves
b. blend the transition zone
c. flatten the secondary curve
d. reduce the diameter of the optical zone

___8. Which of the following power modifications may be most easily performed?

a. adding plus power
b. adding minus power
c. adding cylinder power
d. adding prism power

___9. One purpose of grinding a posterior intermediate curve onto a rigid contact lens would be to:

a. taper the edge
b. tighten the fit
c. loosen the fit
d. reduce the diameter

___10. Wetting solutions serve all of the following functions *except:*

a. cleans the lenses after they are removed from the eye
b. provides lubrication between the lens surface and the lid
c. provides a protective coating over the lens surface so that it does not come in contact with the finger during lens insertion
d. converts the hydrophobic lens surface into a hydrophillic surface

Practice Test

___11. A soaking solution will perform each of the following functions *except:*

a. it will prevent eye infections from a contaminated lens
b. it will aid in cleaning the lens after it is removed
c. it helps to maintain the lens in a state of hydrated equilibrium
d. it permits the lens to float freely when not being worn

___12. When the diameter of a minus lens is reduced:

a. the center thickness increases
b. the CPC becomes steeper
c. the center thickness is reduced
d. the weight of the lens is reduced

___13. Normal adaptive symptoms to contact lenses do occur. Which of the following is *not* considered to be a normal adaptive symptom?

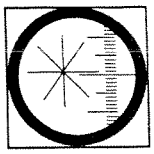
a. tearing
b. excessive blinking
c. slight scleral injection
d. the lens frequently falling out

___14. One of your patients has been successfully wearing soft lenses for a period of over 6 months. Suddenly, he experiences varying visual acuity, lens decentration, and decreased comfort. The most likely cause for this would be:

a. lens inversion
b. too steep a fit
c. too flat a fit
d. incorrect diameter

___15. Upon delivery of a set of contact lenses to a patient, the recommended wearing schedule should:

a. not be specified
b. be determined only according to the patient's level of comfort
c. be specified both verbally and in writing
d. vary with the refraction



Practice Test

___16. A rigid contact lens is ordered with a power of -5.00 D. Before delivery to the patient, the lens must be inspected and found to be within _____of that specified.

a. ± 0.75 D
b. ± 0.59 D
c. ± 0.25 D
d. ± 0.12 D

___17. Which of the following solutions is generally not recommended for use in the handling of contact lenses:

1. saline
2. saliva
3. tap water
4. flexsol

a. 1 only
b. 1 & 2 only
c. 2 & 3 only
d. 1, 2, 3, & 4

___18. A change in which of the following lens parameters will most noticeably effect the lens-corneal relationship of a soft contact lens?

a. anterior lens surface
b. lens thickness
c. lens diameter
d. shape of the edge

___19. It should always be mentioned to the new contact lens patient that:

a. soft lenses can last indefinitely
b. follow-up visits will not necessary except in an emergency
c. lenses should be removed whenever they become uncomfortable
d. hard lenses should be polished at least once every three months

___20. A contact lens patient enters your dispensary complaining of sudden flashes of light and a possible loss of visual acuity. What is the first thing the fitter should do?

a. fenstrate the lens
b. re-evaluate the "K" readings
c. refer the patient to the prescribing practitioner
d. reorder the lens

Practice Test

___21. The base curve of a rigid gas permeable lens was specified at 45.00 D (7.50 mm). However radiuscope verification revealed that the base curve received from the lab was actually 44.00 D (7.67 mm). This lens should be:

a. rejected
b. double checked on the slit lamp
c. modified
d. dispensed to the patient

___22. A RGP lens was ordered with the following specifications:

BC	Power	Diameter
44.50 (7.58)	-3.75	8.7

but was received with :

45.00 (7.50)	-4.00	8.7

this lens:

a. is acceptable under ANSI Standards
b. is not acceptable under ANSI Standards
c. should be modified in the office to meet ANSI Standards
d. should be dispensed as it is to the patient

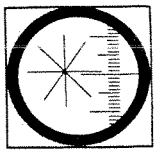
___23. When performing follow-up keratometry one month after the initial fitting, it is observed that the K readings have steepened by a full two diopters. What should the fitter do?

a. make no change
b. increase the lens diameter
c. increase the lens thickness
d. flatten the CPC

___24. When attempting to verify the power of a lens in a lensometer, it is found that the mires are blurred. Which of the following conditions could contribute to this problem?

1. distorted optics
2. dirty lens
3. lens not properly aligned on the lensometer head

a. 1 only
b. 3 only
c. 1 and 2 only
d. 1, 2, & 3



Practice Test

___25. Upon delivery of a pair of *rigid* lenses, which of the following instructions should be included?

1. use of the solutions
2. use of the ascepticizing unit
3. wearing schedule
4. general care and handling of the lenses

a. 1 & 2 only
b. 2 & 3 only
c. 1, 3, & 4 only
d. 1, 2, 3, & 4

___26. Your patient has shown a moderate amount of corneal edema on the first follow-up visit. After the lens has been modified, the patient should be instructed to:

a. not wear the lenses for one month
b. wear the lenses, but return in one month for a follow-up visit
c. wear the lenses in the office for two hours
d. wear the lenses for seven days then return for a follow-up visit

___27. The patient in the previous question should also be instructed to:

a. blink more frequently
b. store their lenses wet
c. remove the lenses every half hour
d. change to a different brand of wetting solution

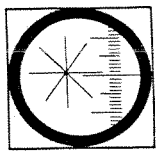
___28. When modifying rigid gas permeable lenses_____is *not* a recommended polishing compound.

a. silvo
b. Xpal
c. Alox PG
d. Sil O2 Care

___29. Although some extended wear lenses have been approved for wear up to 30 consecutive days, the FDA has recently recommended that contact lenses be worn for a maximum of_____ before removing them for maintenance.

a. 25 days
b. 14 days
c. 10 days
d. 7 days

GLOSSARY



Glossary

A

annular bifocal contact: a lens with distance portion ground into the center of the lens and the near portion ground into the periphery.

aphakic lenses: lenses designed for post-cataract fitting.

apical zone of cornea: the central ortion of the cornea with a constant radius of curature. Also called the corneal cap.

artificial tears: wetting agents for the cornea to supplement the loss of tear formation.

aspheric lens: a lens which is not spherical in shape. The curvature gradually flattens as the periphery is approached.

B

bactericide: a chemical that disinfects and kills pathogenic organisms.

benzalkonium chloride: a preservative used in contact lens solutions because of its germicidal qualities.

biomicroscopy: a method of examining the cornea under a magnification of from 10 to 50 times utilizing a slit lamp.

bullous keratopathy: total swelling of the cornea with painful blister formation at the epithelial level; treated frequently with a therapeutic soft lens.

Burton lamp: an ultraviolet light used to illuminate the fluorescein dye that is used to analyze the fit of a rigid contact lens.

C

chord length: the straight-line measurement of the contact lens diameter from edge to edge.

circumcorneal injection: redness around the limbus surrounding the cornea.

Glossary

contact lens wetting angle: the angle between the liquid and the lens surface.

contour lens: a tricurve lens designed to conform to the curvature of the cornea, which flattens as it extends in the periphery.

copolymer: two or more chemicals that are combined to form a new chemical compound.

corneal cap: the apical zone or central zone of the cornea that has a constant area of curvature.

corneal diameter: the diameter of the cornea, usually taken along the horizontal meridian with a ruler. Also called visible iris diameter.

corneal edema: swelling of the cornea caused by hypoxia or insufficient oxygen.

D

deturgence, corneal: the state of relative dehydration maintain by the normal intact cornea that enables it to remain transparent.

diagnostic fitting set: a set of trial lenses used to gain an overview of the fit of a contact lens.

disinfection: physical or chemical procedures that kill common pathogenic organisms but may permit some nonpathogenic organisms to survive.

DK value: a measure of the oxygen permeability through a given material where D is the diffusion coefficient for oxygen movement in the lens material and K is the solubility of oxygen in this material.

double slab-off lenses: sometimes called thick-thin lenses; the upper and lower portions of the lens are reduced in thickness so that when the lens is placed on the eye these portions lie under the upper and lower eyelids. The thin zones aid in stabilizing toric soft lenses.

dry spots: areas of drying as noted by absent areas of fluorescein-stained tear film on the cornea when the patient stares.

Glossary

Dyer nomogram system of lens ordering: a simplified system of ordering rigid lenses based on clinical experience, corneal topogometry, and charts of associated lens parameters.

E

endophthalmitis: an inflammation of the entire eye including the outer coats.

enzyme cleaner: a cleaning agent that acts on a soft lens by a digestion of protein.

epithelial edema: edema of the superficial layer of the cornea.

esthesiometer (Cochet-Bonnet): a device used to evaluate corneal sensitivity, consisting essentially of a nylon thread mounted in a handle so that its length may be varied and calibrated in milligrams of weight necessary to bend a given length of the thread when pressed against the cornea.

eversion of the eyelid: the folding back of the eyelid on itself.

F

finished lens: a complete lens with anterior and posterior curves, a specified diameter, a designated peripheral curve, and edge design.

fitting set: a complete inventory of lenses of graduated powers and base curves.

flare: flutterings or fringing of lights caused by a lens with an optic zone too small as a decentered lens or an excessively loose lens.

flat cornea: a cornea with a K value less than 41.00 D.

fluid lens: power created by having a very convex or concave tear film.

fluorescein: an organic compound that is inert and used to stain the tear film for contact lens fitting and to assess the integrity of the cornea.

Glossary

giant papillary conjunctivitis (GPc): large elevated papules in the tarsal conjunctiva. Usually associated with soft lens wear.

H

haptic: the part of a contact or intraocular lens that supports the optic portion and touches the peripheral or nonoptic portion of the cornea: the word indicates "fastening, contact, sense of touch."

hydrogen peroxide: a bactericide used for soft lenses.

hypoxia: low in oxygen

K

keratitis: inflammation of the cornea

keratoconjunctivitis sicca: drying of the cornea and conjunctiva.

keratoplasty: a corneal transplant

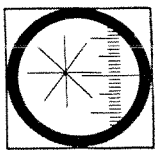
L

LD +2: the longest diameter (LD) of the optic zone plus 2 mm (for the intermediate and peripheral curves) yields the diameter of a lens; determined by use of the topogometer.

lenticular lens: relatively large lens most suitable for large, flat eyes; consists of a central optic zone and a surrounding nonoptic flange.

limbal zone: junction between the periphery of the cornea with the sclera.

loose lens: a contact lens with excessive movement; it can be caused by a lens that is too small in diameter, too thick or too flat.



Glossary

M

microthin lens: a lens less that 0.10 mm in thickness.

minus carrier: a lens designed with an edge configuration similar to that of a minus lens that is thicker at its periphery; often used with high-plus lenses such as aphakic lenses.

monovision: single-vision contact lenses used for presbyopes for whom the power of the lenses is such that one eye is used for distance vision and the other is used for near vision.

N

nomogram: a table of precalculated mathematical values used to arrive at the specifications of a rigid lens design.

O

orthokeratology: the technique of flattening the cornea and thus correcting refractive errors by the use of a series of progressively flatter contact lenses.

overwearing syndrome: a misnomer for acute corneal hypoxia characterized by a latent interval after removal of the lens; extreme pain and congestion of lids, cornea, and conjunctiva are experienced. It is more common with rigid lenses.

oxygen flux: a measure of the amount of oxygen that will pass through a given area of material in a given unit of time.

oxygen permeability: the degree to which a lens permits the passage of oxygen across it. It depends on the composition of the plastic (that is, silicone has excellent permeability, whereas PMMA has no permeability), the thickness of the lens, and its water content. It is often expressed as the DK value.

Glossary

P

pachometer: an instrument used to measure the thickness of the cornea and depth of the anterior chamber.

photokeratoscope: an instrument designed to photograph annular rings of the cornea and to aid in making a contact lens that will contour to the cornea.

photophobia: sensitivity to light.

Placido's disc: a disc with concentric rings to determine the regularity of the cornea when its reflection is revealed on the corneal surface.

plano lens: a lens with zero power.

polymer: a chain of linked molecular unity of dimension greater than 5 monomer unity.

polymerization: the union of molecules of a compound to form larger molecules and a new compound.

polyvinyl alcohol: a wetting agent.

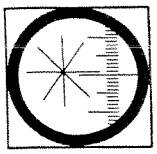
prism ballast lens: contact lens with base-down prism added inferiorly to improve the stability of the lens. Usually 1 to 1.5 D of prism is added.

R

radial keratotomy: a surgical procedure in which clocklike incisions are made into the cornea to flatten the cornea and correct myopic refractive errors.

residual astigmatism: the astigmatism present after the corneal astigmatism has been nullified by a contact lens.

retroillumination: light is focused on deeper structures such as the iris, while the microscope is adjusted to study the cornea.



Glossary

S

Schirmer test: measures normal tear secretion; the ability of the eye to wet in 5 minutes 15 mm of a 5 x 35 mm strip of filter paper.

semifinished blank: a contact lens blank in which the posterior curve of the contact lens has been fabricated.

soaking solution: a solution designed to keep a lens moist and free from contamination.

Soper lens: a rigid lens designed by Joseph Soper with a steep central posterior curve to accommodate large cones of keratoconus.

spectacle blur: blurred vision that lasts for 30 minutes or longer after a rigid lens is removed and spectacles are employed.

specular reflection: a reflection from a mirror surface, such as the back of the cornea.

spheric equivalent: It is the spheric power of the lens plus half the cylindric power.

sterilization: a method to ensure the complete death of all forms of bacteria fungi, and spores;

stippling: dotlike staining of the cornea

superficial punctate keratitis (SPK): diffuse stippling of the cornea.

surfactant: a cleanser that acts on the surface of a contact lens.

T

tear film breakup time (BUT): an evaluation of tear quality; the tear film will normally break up in 10 to 30 seconds and show dry sports. Any dry spot that appears in less than 10 seconds is pathologic.

Glossary

thermal disinfection: disinfection of a lens by heat

thickness of a lens: the measurement of the center of a lens;

thimerosol (Merthiolate): a mercurial agent used for disinfection.

three and nine o'clock staining: erosion of the cornea a the 3 and 9 o'clock position; seen usually in patients wearing rigid lenses;

three-point touch: that area of the cornea between the apical zone and the limbal zone.

truncation: a design feature used in toric lenses to reduce lens rotation by cutting off a peripheral portion of the lens to conform with the lower lid border.

U

ulceration of the cornea: a large defect in the cornea which may be caused by hypoxia, trauma, or infection.

V

V-groove gauge: a ruler measure with a groove to measure the diameter of a rigid lens.

vascularization: increased blood vessels occurring in a cornea.

visible iris diameter (VID): a term that represents the iris diameter and aids in selecting the initial lens; often used in place of the corneal diameter.

W

warpage: a permanent bending of a rigid lens. May also refer to a semipermanent altering of the corneal curvature.

wet storage: the use of soaking solution to store rigid contact lenses.

wetting solution: solutions that increase the spreading or wettability of liquids in the plastic contact lens by converting the surface of a lens from a hydrophobic to a hydrophilic surface.

Notes

Notes