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New York State Continuing Education Mail-In Course

Patient Compliance -- A Continuing Challenge

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The responsibility of patient education lies with the eye care professional. Proper patient education is vital. Written material regarding lens handling and cleaning, as well as wearing schedules are a must and allow the patient to refer to them as needed. It is well known that patients tend to turn to friends, family or pharmacists when they have questions, however, these sources are limited in expertise regarding contact lenses and their care. Patients must be educated in the need for routine follow-up and affirm that they are in agreement with those requirements.

As contact lens fitters, it is our responsibility to inform patients of any complications that result from noncompliance. It may be helpful to display a poster in your contact lens fitting room depicting conditions which have developed due to negligence on the part of the patient. These pictures can serve to elicit questions and comments.

Properly fit contact lenses are safe. Should the contact lens patient not adhere to the prescribed wear/care regimen, they risk creating opportunities for a number of ocular complications. Personal hygiene is paramount in the prevention of contamination of the contact lens by bacteria and microorganisms. The natural defense mechanism provided by the tears and blinking may not be enough to defend against infection by one of these adherent organisms. While the solutions and care systems of today will virtually eliminate the adherent bacterial or organic challenge, the patient must be aware of the increased likelihood of a problem secondary to inadequate compliance.

- Washing hands before handling lenses remains one of the most positive steps a patient can take to avoid contaminating the lenses and eliminating the risk of infection. Unwashed fingertips can transmit bacteria and fungi to the lens from multiple sources including skin flora and ocular cosmetics. In rare cases, keratomycosis, an inflammation of the cornea caused by a fungus may result.
- There are a number of areas relating to lens care in which a patient can compromise the system. It must be emphasized to the patient to never re-use solutions, to never use saliva to re-wet the lens, and to never store lenses in tap water. This can lead to an increased risk of **microbial or ulcerative keratitis** (Fig. 1) which is an inflam-

This course is worth one (1) New York State Contact Lens Credit, which can be applied to Ophthalmic Dispensing licensing requirements.

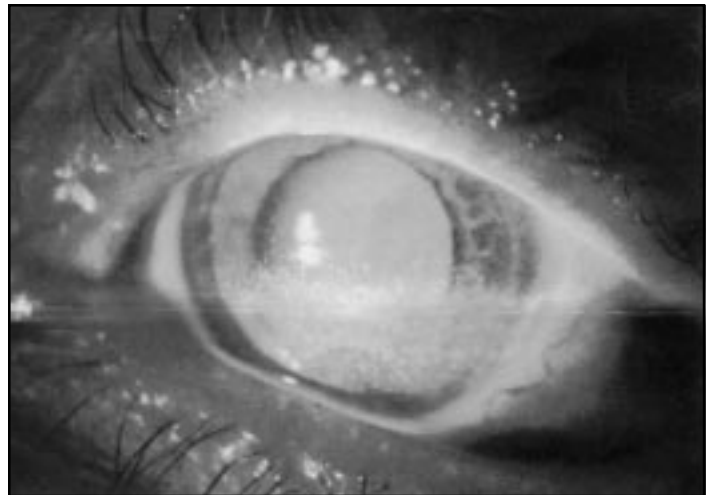


Figure 1: Keratitis can be an unfortunate complication of noncompliance.

mation of the cornea produced by replicating microorganisms. These microorganisms, usually exogenous (originating from an outside source), and may be bacterial or fungal, the latter being divided into filamentary (mold) or yeast types.

- Care of the contact lens case must not be overlooked. The case should be left open to dry in-between uses and regularly scrubbed with a toothbrush as well as replaced regularly. **Pseudomonas** organisms, which appear to be the most common and most virulent bacterium causing corneal ulcers, can survive well in the moist chamber of a contact lens case. It has been shown to adhere to contact lenses making this organism more resistant to cleaning regimens. Studies have shown that the frequency of recovery of **Pseudomonas** from spoiled soft lenses was con-

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siderably higher than that of other organisms. Contact lenses suppress corneal epithelial turnover, so that desquamating cells may be trapped by surface coatings and provide sites of adherence for the organism. The **Pseudomonas** organism adheres preferentially to desquamating cells.

- It is the responsibility of the practitioner to strongly advise patients against wearing their lenses when swimming, using the hot tub, and above all to never make their own saline solution. This is because **Acanthamoeba** organisms have been recovered from swimming pools, hot tubs, streams, lakes, oceans, well water, tap water, and open jugs of distilled water. **Acanthamoeba** is a genus of small amoebae that is ubiquitous in our environment, and has also been recovered in standing water, brackish water, horse troughs, condensate from air conditioning units, and viral culture media. The organism is found especially in water, but may also be found in soil and in the air. It is resistant to osmotic and temperature extremes and has even been recovered at the North Pole. The pathogenic mechanism of **Acanthamoeba** infections in contact lens wearers is storing, rinsing, or wetting the contact lens with a liquid contaminated with **Acanthamoeba**. The lens serves to carry the organism onto the surface of the eye. It has also been traced to a contaminated contact lens case. Contact lens wearers who swim or immerse in a hot tub while wearing their lenses may be exposing the lenses to an additional source of **Acanthamoeba** contamination. However, infections occur most commonly in contact lens patients who made homemade saline from distilled water. The **Acanthamoeba** parasite is capable of causing severe corneal ulcers (Fig. 2) with loss of vision. It is important to emphasize that **Acanthamoeba** is a rare condition and was more prevalent in the 1970s when the use of homemade saline was widespread. Prevention is the key.
- The patient must also be instructed to only use the solutions prescribed by their Eye Care Professional. Mistakenly combining incompatible lens care products can cause a red eye response. Patients may also develop toxic adverse corneal and conjunctival responses when using a thimerosal preserved product while on oral tetracycline. Mixing sorbate or chlorhexidine with quaternary ammonium compound can also result in corneal staining and discomfort. The patient must never wear a lens that is defective or has a nicked lens edge as wearing structurally damaged lenses can result in red burning eyes. The practitioner must be aware that rarely do microbes penetrate intact corneal epithelium. A breakdown in the ocular surface defense mechanisms must first take place to provide a portal of entry for microorganisms. However, contact lens wear does provide for rare occasions for epithelial defects: by accidental abrasion during lens insertion or removal, by epithelial hypoxia from lens-related tear film stagnation or reduced oxygen availability, and by transient endothelial dysfunction. Most patients will make every effort to comply, once they are informed of the complications that can result from non-compliance. Instructions given to the patient must be explicit and comprehensive.
- Normal routine blinking is an involuntary event that in

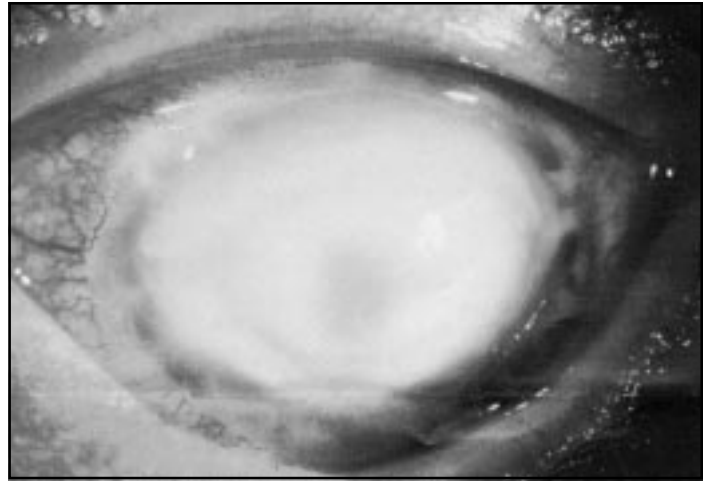


Figure 2: The *Acanthamoeba* organism can cause serious damage to the cornea and may even result in loss of vision.

the average person occurs approximately every four seconds. Adequate blink rate and quality are necessary for proper contact lens movement and positioning, as well as to insure circulation of the tears beneath the lens. However, disruption of normal blinking can occur as a result of contact lens wear. Patients must be instructed in proper blinking. Poor blinking habits can make a well-fit lens create as many symptoms as a poorly fit one. The front surface of the lens becomes misty and greasy, requiring frequent cleaning because of drying and lack of surfacing by the lids. The tear film under the lens thins and becomes stagnant. This situation can create symptoms of poor vision, lens awareness, tearing, burning and photophobia. The mechanism of **false blinking**, in which the upper lid does not complete a full blink but stops upon touching the upper edge of the contact lens, can also result in **corneal and conjunctival desiccation**.

- A deficiency, excess or imbalance of the various tear layers can lead to the classic **dry eye** or **keratoconjunctivitis sicca**. The cornea and the conjunctiva react because of dryness. In the condition, **filamentary keratitis** may be present in which small filaments of mucus, combined with tags of epithelium, hang from the corneal surface. As the lid comes down and moves the filament, it pulls on the nerve endings in the epithelium and causes pain. Dry eye patients are most susceptible to filament formation and therefore require frequent ocular lubrication. Decreasing wearing time aids in maintaining corneal health.
- All worn contact lenses develop a complex coating in which new material is deposited on a residuum after incomplete cleaning of the lens. Because contact lenses are incapable of desquamation, accumulated materials remain. The coating process is rapid. Within 30 minutes, approximately 50% of the anterior surface of new, never-worn contact lenses is covered; after 8 hours approximately 90% of the surface is covered; and all continuously worn lenses are 100% covered. Should lenses not be regularly replaced, these coatings can trigger **giant papillary conjunctivitis (GPC)**. In general, the higher the water content, the greater the amount of coating and the harder it is to clean the coating from the

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lens. Long wearing time per day, lack of proper cleaning procedures and neglecting to replace lenses more frequently favor the development or exacerbation of **GPC**. Fortunately, with the introduction of disposable and frequently replaced soft lenses, this complication is becoming less and less common.

- Patients have been known to wear lenses overnight although they have been advised not to do so and many lenses are not suitable for extended wear. Be clear with your patients on wearing schedules. The patient who, against the advice of the practitioner, wears contact lenses on an extended wear basis may experience **corneal edema**. **Corneal edema** results when the combined actions of those forces normally dehydrating the cornea are overcome by those forces driving water into the cornea. **Edema** begins in the layer of the cornea that is the initial side of fluid influx. Causative factors include excess or inconsistent wearing time, or extensive coating of the lens with deposits.
- When patients push the limits of wearing time even further resulting in progressive hypoxia, it can lead to the formation of **microcysts**. These represent fluid that has accumulated in the intercellular spaces because of the rupture of cell membranes of necrotic epithelial cells. The cells comprising the microcysts will take a number of days to surface on the epithelium. The cysts are discernible using retro-illumination.
- A hypoxic situation can also produce superficial **corneal vascularization** or exacerbate it if already present. This is an asymptomatic invasion of blood vessels into the normally clear, avascular cornea (Fig. 3). The inciting factor is chronic epithelial injury. This is usually caused by either persistent epithelial hypoxia and accompanying edema or, less commonly by recurrent epithelial defects. Sometimes the neovascularization is due to conditions other than hypoxia. Patients who have rosacea have an increased vascular response. When corneal vascularization is persistent, the source of hypoxia must be addressed and eliminated. Attention should be directed to monitoring the patient's wearing time. This will stop progression but it is non-reversible. Ghost vessels will remain.
- Excessive wearing time may also play a role in hypoxia induced corneal striae. **Corneal striae**, as seen in contact lens wearers, are delicate, vertically oriented, translucent lines located at or near the level of Descemet's membrane. They are difficult to detect and can best be seen with retro-illumination or with direct illumination utilizing high magnification and bright illumination with the slit lamp beam angled at 30 degrees to 45 degrees at one side. **Striae** will not appear until corneal thickness has increased by at least 6%. **Striae** are seldom seen in RGP contact lens patients and they are not seen in all soft contact lens patients who develop corneal edema.
- **Corneal infiltrates** can be solution-related, lens-related and/or patient related. **Infiltrates** are small discrete clusters of cells located deep in the epithelium or the superficial stroma and may occur in a variety of bacterial, viral, or hypersensitivity reactions. **Infiltrates** appear punctate, oval or stellate in shape and are generally a grayish white. **Corneal infiltrates** are an acute, red eye inflammatory response. The onset of the infiltrate is almost al-

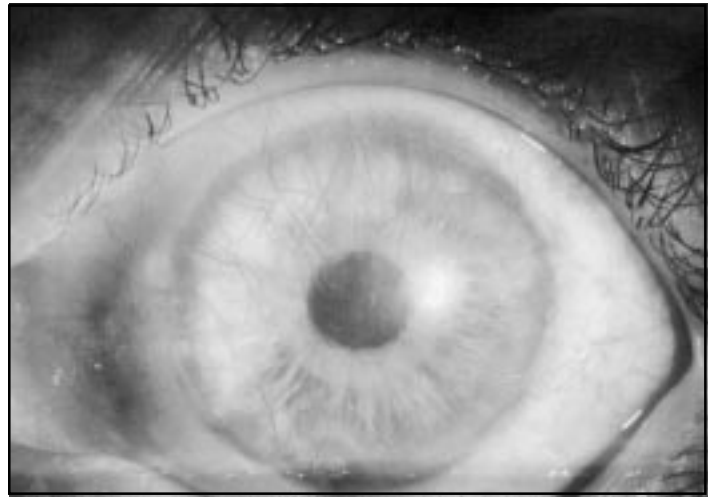


Figure 3: Corneal vascularization, an asymptomatic invasion of blood vessels, can result from chronic epithelial injury.

ways during sleep, or upon waking in the morning, in only one eye. The onset is acute with no symptoms during the preceding evening. The ocular debris that forms during sleep remains trapped between the contact lens and the cornea, triggering the inflammatory reaction. When lenses are allowed to become coated and deposited, the metabolic penetration will be reduced and less metabolic by-products will be allowed to escape from beneath the surface of the lens. The deposits can cause mechanical or toxic irritation from chafing the conjunctiva as well as the cornea.

Patients appropriate for contact lenses should be free of eyelid margin abnormalities and should be mentally and physically capable of good personal hygiene and compliance. Pre-existing dry eye syndrome, abnormal corneal epithelium, diminished corneal sensation, corneal edema, or a history of contact lens abuse would be relative contraindications. Fitters must be knowledgeable about optimal lens care techniques and be able to effectively communicate that information to the patient. After initial patient education, contact lens practitioners should observe and correct lens hygiene as performed by the patient. Follow-up biomicroscopy is necessary to examine lenses periodically for visible microbial contamination and spoilage. Patients should be carefully instructed and observed regarding optimal techniques of lens insertion and removal and advised to remove their lenses immediately should any adverse condition occur.

Contact lens wear is a safe and effective means of vision correction that can easily be problem-free if the patient understands and follows the basic tenets of wearing and caring for their lenses. However, with time, a negligent attitude can easily develop. A long-term relationship with the practice, which includes scheduled follow-up appointments, is required to reinforce the importance of lens hygiene and to monitor corneal changes. Patients must be advised to get in touch with the practitioner whenever redness, sudden visual loss, or pain occurs and should be seen by the practitioner on an emergency basis. Detailed fitter and patient education, including written instructions, hands-on demonstrations and verbal explanations with periodic reinforcement are essential steps to ensure compliance and a minimum of complications.

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Patient Compliance -- A Continuing Challenge

Circle the best answer for each question and return to:
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Mailing Address _____

NYSSO Member: Yes No **If no, the registration fee is \$30.00; please complete the section below and the membership application on the reverse side:**Method of Payment: Check (payable to NYSSO) Credit Card (please complete section below):Type of Credit Card: Visa Mastercard Dollar Amount _____

Expiration Date: _____ Card #: _____ Signature: _____

1. Giant papillary conjunctivitis is probably due to:

- a. Trauma alone
- b. The combination of trauma and an immunologic event
- c. The material of the contact lens
- d. Improper fit

2. Corneal hypoxia is manifested by:

- a. Spectacle blur
- b. Severe pain
- c. Double vision
- d. Epiphora

3. The disinfection system that reliably kills Acanthamoeba is:

- a. No present system
- b. Heat disinfection
- c. Hydrogen peroxide
- d. B and C

4. Corneal infiltrates are:

- a. Always associated with ocular infection
- b. Due to acute corneal inflammation from hypoxia
- c. Vertically oriented translucent lines
- d. None of the above

5. In patients with contact lens associated microbial keratitis, the infecting microorganisms usually originate from:

- a. The normal conjunctival flora
- b. A contaminated contact lens solution
- c. Meibomian gland dysfunction
- d. All of the above

6. The onset of corneal infiltrates is:

- a. Acute with no symptoms
- b. Acute with symptoms of burning
- c. Always occurring in the evening
- d. Always affecting both eyes

7. Incompatible contact lens solutions can cause the following conditions:

- a. Blepharitis
- b. GPC
- c. Dry eyes
- d. Red eyes

8. A form of corneal dehydration afflicting the contact lens wearer is:

- a. Three and nine o'clock staining
- b. With-the-rule astigmatism
- c. Superior corneal erosions
- d. Pinguecula

9. Fungi related to contact lens contamination can result in:

- a. Metabolic degradation of the lens
- b. Changes in lens parameters
- c. Fading of tinted lenses
- d. Gummy residue

10. Pseudomonas organisms preferentially adhere to:

- a. Extended wear lenses
- b. Desquamating cells
- c. Surface coatings of the lens
- d. The contact lens case

11. The most common and most virulent bacterium causing corneal ulcers is:

- a. Adenoviruses
- b. Fungal organisms
- c. Pseudomonas
- d. Calcium phosphate

12. A causative factor of corneal edema include:

- a. Use of non-preserved solutions
- b. Overnight use of lenses
- c. High Dk materials
- d. Use of antihistamines

13. An inciting factor of corneal vascularization is:

- a. Chronic epithelial injury
- b. Narrowing of the interlamellar spaces by tissue edema
- c. Proper fit
- d. Tear film deficiency

14. Striae as seen in contact lens wear are vertically oriented, translucent lines located at:

- a. The epithelium
- b. Bowman's membrane
- c. Descemet's membrane
- d. The stroma

15. Striae are most often seen in:

- a. RGP wearers
- b. Low water content soft lens wearers
- c. Emmetropes
- d. Overnight wearers

16. Patients with the following conditions can be successful in contact lens wear:

- a. Acne
- b. Rosacea
- c. Blepharitis
- d. All of the above

17. Proper contact lens hygiene includes:

- a. Enzymatic cleaning
- b. Using hypoallergenic make-up
- c. Thoroughly cleaning the hands immediately prior to lens handling
- d. Using soap with cold cream additives

18. Which preservative for soft lens care solutions is more likely to produce a toxic response of the eye?

- a. Polyquad
- b. Thimerosal
- c. Chlorhexidine
- d. Sorbate (sorbic acid)

19. Bacteria adhering to contact lenses can most effectively be removed by:

- a. Proper disinfection
- b. Good blinking habits
- c. Saline rinses
- d. Artificial tears

20. Adherent organisms killed by disinfectants are:

- a. Completely removed from the lens
- b. The cause of an immune reaction to the eye
- c. Transformed into an antigenic mass
- d. B and C only

Membership Application

INDIVIDUAL'S NAME _____ COMPANY _____


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BUSINESS ADDRESS _____ EMAIL ADDRESS _____

PHONE (HOME) _____ PHONE (BUSINESS) _____

Preferred Address: Home Business Preferred Phone: Home Business

Membership Type: Active (\$150) Newly Licensed-Active (\$75) Associate (\$75)
 (see below for category descriptions) Corporate (\$150) Student (\$10)

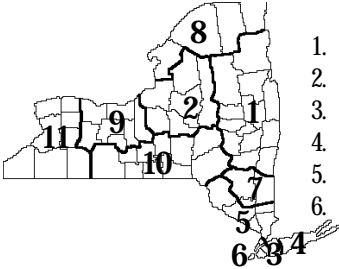
Method of Payment: Check (payable to NYSSO) Credit Card (please complete section below) 

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<p>Please indicate to which organizations you belong:</p> <p><input type="checkbox"/> American Board of Opticianry Certified (ABO) <input type="checkbox"/> Fellow, National Academy of Opticianry (FNAO) <input type="checkbox"/> Opticians Association of America (OAA) <input type="checkbox"/> National Contact Lens Examiners (NCLE) <input type="checkbox"/> Contact Lens Society of America (CLSA)</p>		<p>NYSSO Chapters</p> <table border="0"> <tr> <td>1. Capital District</td> <td>7. Mid Hudson Valley</td> </tr> <tr> <td>2. Central</td> <td>8. North Country</td> </tr> <tr> <td>3. Long Island-Nassau</td> <td>9. Rochester</td> </tr> <tr> <td>4. Long Island-Suffolk</td> <td>10. Southern Tier</td> </tr> <tr> <td>5. Lower Hudson Valley</td> <td>11. Western</td> </tr> <tr> <td>6. Metropolitan</td> <td>Out of State</td> </tr> </table>	1. Capital District	7. Mid Hudson Valley	2. Central	8. North Country	3. Long Island-Nassau	9. Rochester	4. Long Island-Suffolk	10. Southern Tier	5. Lower Hudson Valley	11. Western	6. Metropolitan	Out of State
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* For new members, membership fees with applications received after March 1 will be pro-rated at 50%.