



National Academy of Opticianry

## **Continuing Education Course**

Approved by the National Contact Lens Examiners

# **The Effect of Cosmetics on Contact Lens Wear**

### **National Academy of Opticianry**

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Revised and Updated 2019

# National Academy of Opticianry

## **PREFACE:**

This continuing education course was prepared under the auspices of the National Academy of Opticianry and is designed to be convenient, cost effective and practical for the Optician.

The skills and knowledge required to practice the profession of Opticianry will continue to change in the future as advances in technology are applied to the eye care specialty. Higher rates of obsolescence will result in an increased tempo of change as well as knowledge to meet these changes. The National Academy of Opticianry recognizes the need to provide a Continuing Education Program for all Opticians. This course has been developed as a part of the overall program to enable Opticians to develop and improve their technical knowledge and skills in their chosen profession.

The National Academy of Opticianry

## **INSTRUCTIONS:**

Read and study the material. After you feel that you understand the material thoroughly take the test following the instructions given at the beginning of the test. Upon completion of the test, mail the answer sheet to the National Academy of Opticianry, 8401 Corporate Drive, Suite 605, Landover, Maryland 20785 or fax it to 301-577-3880. Be sure you complete the evaluation form on the answer sheet. Please allow two weeks for the grading and a reply.

## **CREDITS:**

The National Contact Lens Examiners have approved this course for One (1) Continuing Education Credit toward certification renewal. To earn this credit, you must achieve a grade of 80% or higher on the test. The Academy will notify all test takers of their score and mail the credit certificate to those who pass. You must mail the appropriate section of the credit certificate to the ABO and/or your state licensing board to renew your certification/licensure. One portion is to be retained for your records.

## **AUTHOR:**

Diane F. Drake, LDO, ABOM, FCLSA, FNAO

## **COURSE DESCRIPTION:**

This course will discuss cosmetics as they relate to contact lens wearers. Instruction will be offered for contact lens wearers with regard to proper handling of contact lenses and hygiene. The three tear layers will be discussed with regard to how improper cosmetic use can affect these layers and the success or lack of success of the contact lens wearer.

## **LEARNING OBJECTIVES:**

At the completion of this course, the participant should be able to:

- Discuss the various three layers of the tear film.
- Explain where the three layers of the tear film come from.
- Explain the functions of the different layers of the tear film.
- Explain how cosmetics can affect the tear film and therefore contact lens wear.
- Discuss proper contact lens handling and hygiene with contact lens wearers.
- Discuss the relationship of the tear film/oxygen to the five layers of the cornea

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# The Effect of Cosmetics on Contact Lens Wear

Diane F. Drake, LDO, ABOM, NCLEM, FNAO

As we begin this course, I would remind each of you that we DO have a responsibility to ensure that we do not adversely affect the anatomy of the eye, nor the overall ocular health and vision of our patients. Improperly fitting contact lenses, as well as the instructions that we give them, could do any or all of these things.

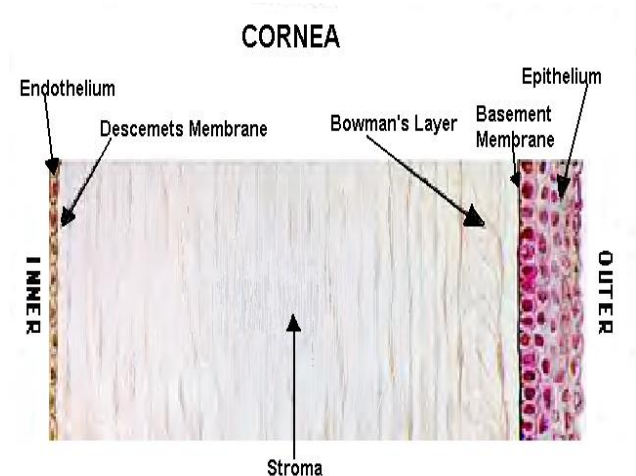
Our patients expect that we take care of their visual needs as well as their emotional needs. By observation, knowledge, understanding, and explanation, we can help ensure that we are meeting the challenges that we have been entrusted with by our patients, thereby giving them a "Better quality of life through better vision"

This course will be presenting information of the cornea, the eyelids, the conjunctiva, the tear layers, the importance of the tear film, various types of cosmetics. It will also be presenting information on the prefit examination, cosmetic usage, patient instructions and finally, communication.

## Cornea

There are five distinct layers of the cornea: The Epithelium, Bowman's layer (which used to be called Bowman's membrane), the Stroma, Descemet's membrane and the Endothelium.

The cornea is the clear bulging surface in front of the eye. It is the main refractive surface of the eye. It is the primary refractive surface of the eye, having an index of refraction of 1.37. It is normally transparent and is uniformly thick. It is an avascular structure which is richly supplied with nerve fibers, making it highly sensitive to foreign bodies, cold air, and chemical irritation.



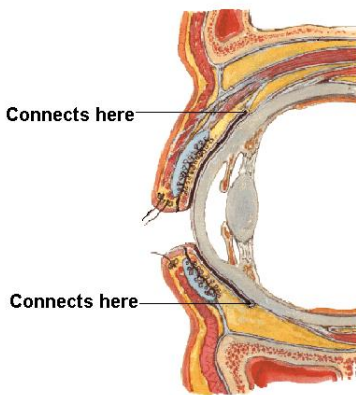
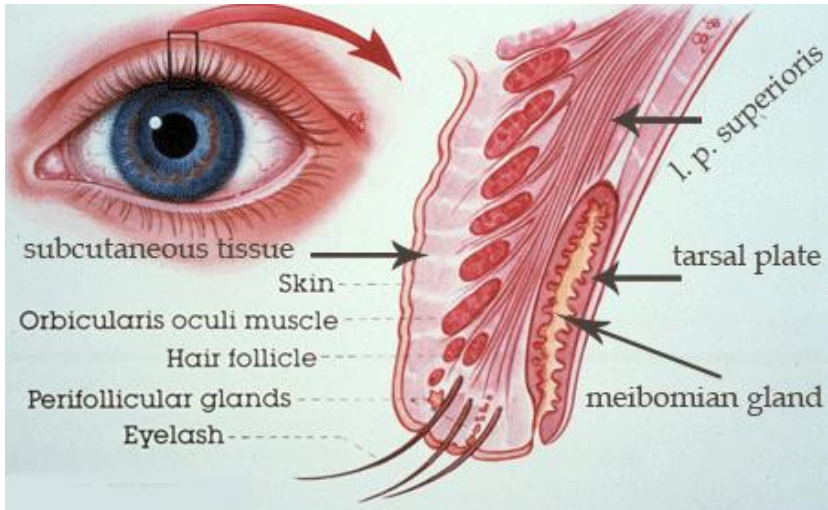
It derives its nutrition from the aqueous humor and tear layer. The tears maintain oxygen exchange and water content and improve optical quality.

The eyelids are important to the overall health of the eye. They help to keep the eye moist, distribute tears, oxygen, and nutrients. They also help protect the eye from light and injury and well as assist in giving the face expression. The eyelids are elastic and tend to lose that elasticity with age.

The opening in the eyelids is termed the palpebral aperture while opened and it must be noted that the aperture is not always the same size. The lids also contain the meibomian glands, and the conjunctiva (which we will discuss later).

Patients will be concerned that their contact lenses can get lost behind the eye. Unless there was a forceful blow to the eye, that cannot happen. We should educate our patients to that effect.

The conjunctival membrane runs continuously from the edge of the iris around the eye to the back and connects to the eyelid along the eyelid margin.



The conjunctiva contains goblet cells, which produce mucins (which we will discuss in-depth). It also contains the glands of Krause and the glands of Wolfring

Any inflammation of the conjunctiva is referred to as conjunctivitis and is usually caused by bacteria or a virus. Allergies can also cause allergic conjunctivitis. The symptoms include pain, photophobia (light sensitivity), impaired vision (reduced visual acuity) and produces a discharge.

The conjunctiva's blood supply becomes injected (red) when it is inflamed. Because it is also highly innervated, the conjunctiva is also very sensitive.

The lacrimal glands provide what is referred to as reflex tear secretion. This is the type of tears produced from any irritation to the eye, crying, coughing, sneezing, tasting or smelling. Breathing the oils from cutting up an onion will produce reflex tears. Newborns have a minimal output of reflex tears.

The accessory glands provide basic tear secretion (or the steady state secretion). They are the Glands of Wolfring and Krause. The accessory glands are mostly concentrated in the upper lid with a few being in the lower lid.

Normal tears contain various antibacterial and immune substances to clean and protect eyes. They include inorganic salts, glucose, urea, immunoglobulins (antibodies), lysozyme (bactericidal) and various other proteins.

Dehydration of the aqueous can cause a dry eye. Because of these natural antibacterial substances present in the aqueous, we see a higher incidence of infection and blepharitis in a person with tear deficiency.

The nerve supply helps to stimulate tear production. During the blink, the lids stimulate nerve endings producing tearing.

Tear drainage is through the lacrimal puncta, into the canaliculi (tear canals) and passes down into the nose through the lacrimal duct or drains down the throat.

Remember that any drops or substance such as fluorescein that are instilled into the eye will ultimately enter the body's system, so it would be important to understand any known allergies. You will also want to explain the color of fluorescein (or show it) to the patient so they won't have any surprises.

The tears form a thin film over both the cornea and the conjunctiva. It will create a tear meniscus on the lower lid margin. This tear meniscus is also referred to as the tear prism or the tear lake. If a person has exophthalmos (eye protrusion) or ectropion, (the lid is everted), there is no substantial lower lid margin for the tears to rest on and they will simply run out of the eye. These patients have severely dry eye, but that's another course entirely.

Tears move upward and downward with each blink, spreading tears over the entire eye and the conjunctiva. Because the eyelids actually blink temporal to nasal, the tears rotate, rather than just move up and down. The upper lid actually touches the lower, and grabs the tear meniscus from the lower lid and pulls the tears up, distributing them across the surface of the eye.

Now let's discuss the tear film or more accurately the precorneal tear film. There are three layers to the tear film: Lipid layer, Aqueous layer, and Mucin layer

Each layer is vitally important to eye health.

The outermost layer is the oily layer or the lipid layer. It is produced by meibomian glands, which are located along lid margin vertically. There are approximately 25 - 30 in the upper lid and 30 - 40 in the lower lid.

The main purpose of the lipid layer is to prevent the aqueous from evaporating. It also helps to stabilize the tear film. The sebaceous oil glands along the lids also produce lipids which help to prevent the tears from spilling out over the lids. These glands can become inflamed or clogged and then the lipids will not be able to be expressed. The consistency of the lipids should be relatively thin, as though you would visualize vegetable oil. If too little oil is secreted, the tear layer evaporates quickly and the cornea may get dry spots.



The illustration to the right demonstrates meibomian gland dysfunction. You can see how the lipids are thick and would not be able to spread across the surface of the eye.

The middle layer is the aqueous (water) layer. As mentioned previously, it is produced primarily by the lacrimal glands, which is located at the upper temporal aspect of the orbit, just behind the orbital rim.

There are 10 to 12 openings, mostly in the upper lid with the remainder in the lower lid where the aqueous mixes with the other layers of the tear film.

Persons who are on certain medications that have a tendency to dehydrate, such as hormone replacement therapy, anti-depressants, acne medications, alcohol, and others, will also have dehydration of the aqueous, which will cause dry eyes.

The innermost layer is the mucin layer, which is also referred to as the mucous layer or the mucoid layer. It is produced by the goblet cells which are located along the conjunctiva. It is the 'wetting' solution and actually attaches the tears to the cornea. It decreases surface tension and allows the tears to spread evenly on the eye.

If the goblet cells are compromised and produce less mucins, the tears will not adhere to the eye, and the patient will experience 'dry spots' on the eye.

As the tear layer is important to the overall health of the cornea, it would be noted that any interruption of the three layers could result in a dry eye. It could make it difficult if not impossible to wear contact lenses. It could also affect overall corneal health for both contact lens wearers or non-contact lens wearers.

Interruptions of the tear film causing dry eyes could be systemic, it could be chemically induced as previously mentioned by medicines. It could be caused by environmental factors. Or it could be caused by exposure to various types of cosmetics or other chemicals.

Prior to fitting contact lenses, the contact lens fitter needs to perform a prefit evaluation. Things to include would be, (but not limited to) the lids, the orbit, the lashes, as well as others. The fitter should also perform a tear break up test (tear BUT) to determine the quality and quantity of the tear layer.

The fitter should also note any abnormalities. It's possible that contact lenses would benefit a patient with certain abnormalities, such as a coloboma as shown here.



You also need to observe cosmetic use before fitting the patient with contact lenses.

In reality, both cosmetics and contact lenses are an emotional choice. There is no need to sacrifice either. The important thing is to educate yourself first about cosmetics and how they will affect contact lens wear and then educate your patient.

As an eye care professional, you won't convince a woman who wears cosmetics to give them up.

Cosmetics, by themselves, are not necessarily bad. However, the improper use or application of cosmetics or the use of improper types of cosmetics can be devastating for contact lens wearers. Therefore, it is vitally necessary to explain cosmetics, both types of cosmetics and the application and removal to your patients.



It is equally important for contact lens fitters and technicians to understand and adhere to the rules themselves. Unfortunately, many contact lens fitters and technicians inappropriately apply and remove their own cosmetics.

We've discussed the cornea and the tear layers, let's now discuss cosmetics and how they could affect contact lens wear. We need to discuss the obvious first, which we will identify as colored cosmetics, and facial cosmetics.

The NOT so obvious cosmetics include perfumes, colognes, and aftershaves, lotions and creams of all types, including the creams that we use to remove cosmetics. Hairspray and deodorant are also cosmetics that can get in the eye or on the hands and transferred to the eye and contact lenses.

Other cosmetics include various types of soaps, including those that contain deodorant, creams, lotions, perfumes. Many facial tissues that are soft on the nose or skin contain lotions, which can get on the hands and be transferred to the contact lenses. Also, consider things you work with to clean or cook, that can get on your hands and transferred to the contact lenses.

Any lotions on the face or hands that come into contact with the eye or lenses will produce similar problems. Therefore, it is wise to advise patients to wash their hands with a soap that is free of oils, fragrances, or deodorants. There are several hand soaps available to contact lens practices. These soaps rinse free of any residue.

This is where the not so obvious issues of cosmetics come in. Even people who do not apply COLORED cosmetics, still use cosmetics. The application of perfumes, colognes, and aftershaves should be done in a manner that the product will not get in the eye. Another consideration is since the patient uses their hands to apply these fragrances, appropriate hand washing techniques should be used. This, however, does not totally eliminate them from the hands.

Extra caution should be used when applying sprays. Hairsprays are very harmful to contact lens. They generally contain gel, wax or lacquer which can coat the lenses, and in some cases are impossible to remove. It is advisable to inform your patients who use hairspray, to close their eyes while applying, and leave the room until the residual mist settles.

Let's discuss the proper types of cosmetics, application, and removal of cosmetics. Men seem to have difficulty discussing this particular issue with their female patients, but if you want your contact lens patients to be successful, you need to be able to discuss it with them.

Start with the type of eye cosmetics. They should be a brand that is recommended for contact lens wearers, and consideration can be given to any hypoallergenic type. They should only be used by one individual and should be discarded and replaced every three months. They should be covered or make sure that no lids are left off of the product for extended periods. They should be oil-free, wax free or fat-free. They should also be free of any mica or seashell products, or metals. Most of the glittery eyeshadows contain one or more of these products.

Eye cosmetics, such as eye shadows and powders that contain mother of pearl, glitter, mica, seashell, or metal products, have a tendency to flake off into the eye. These products, can become embedded in a soft lens, scratch a rigid lens, scratch an eye, or get under a contact lens and make contact lens wear uncomfortable and difficult or even impossible. They have also been found to embed themselves in the conjunctiva of the lids and cause severe irritation and/or infections.

Facial powders will also find themselves into the eye, if just loosely dusted on the face, without caution of avoiding the eye area. It is common to see face and body glitter. The danger of the glitter getting into the eyes and causing problems should be discussed with your patients.

The patient should use a water-based mascara that is not prone to flaking and apply two thin coats rather than one thick coat. Discourage the use of lash-extending mascaras with artificial fibers. In addition, they should be instructed to the end of the lashes only, not to the base of the eyelash or on the lid margin. Encourage your patients who wish to use eyeliners to use a soft pencil eyeliner rather than a liquid or powdered version that will flake off. It is important to tell them to apply it to the outside of their lashes rather than on the lid margins as well. Lining the lid margins can clog the openings to the meibomian glands, not allowing the lipids to be expressed and will cause the aqueous to evaporate, causing a dry eye.

Remember that improper types of cosmetics or the improper USE of cosmetics can clog meibomian gland openings causing dysfunction. They can also get directly in the eye and coat the contact lenses.

Eye cosmetics that contain fats, oils or waxes can adhere to the lens and reduce visual acuity by coating the lens. They can also clog the opening to the meibomian glands, thereby reducing the lipids from coming out and combining with the tear film.

Even if an appropriate cosmetic is inappropriately applied, the tear film could be compromised. No eyeliner should be applied to the inner lid margin of the eyes. If a patient insists on using eyeliner, they should apply it to the area outside of the eyelashes, not inside.

One of the reasons is that the meibomian gland openings and the sebaceous gland openings are located in this region of the lid and because of the nature of eyeliner, which is sometimes waxy, these openings can become clogged, thereby, not allowing the lipids to come out and become incorporated into the tear film of the eye. Another reason is simply that the product will coat the contact lens and thereby make visual acuity reduced and the contact lens will be uncomfortable if not impossible to wear. It could also be a source of contamination resulting in infection as well as actually coating the conjunctiva and causing goblet cell dysfunction.

What happens when cosmetics coat the conjunctiva? It will cause goblet cell dysfunction and will not allow the tears to adhere to the cornea, causing dry spots on the cornea.

All of this can be avoided by educating your patients. You need to observe their cosmetic use and talk to them about their expectations. You should also explain what not-so-obvious cosmetics are, as well as the obvious. Lastly, let them know you want them to be successful contact lens wearers.

Prior to insertion of contact lenses, instruct your patients how to apply perfumes, cologne, deodorant and hair spray. If possible, especially if they are using sprays or mists, they should be in a different room from where they will be handling their lenses. The patient needs to wash their hands thoroughly with an oil-free, deodorant free, fragrance-free soap prior to inserting lenses.

Many practices also offer professional hand soap for contact lens wearers that are residue free. Hands should be rinsed thoroughly. Instruct them to dry their hands with a clean, lint-free towel or just a clean, dry washcloth.

It would be advisable to inform your patients to apply any spray deodorant in the same manner that hairspray is applied. Any deodorant that comes into contact with the hands is actually very difficult to remove, and will possibly get on the contact lenses, coating them and drying them out.

Extra caution should be used in applying deodorant, as it will cause the lens to not be 'wetable.' Deodorant residue will be on the outside of a container, so just handling it can get deodorant on a patient's hands, and be transferred to the contact lens.

Proper instruction is to tell your patients to insert their contact lenses before applying make-up. Teach them the proper insertion techniques.

Observe how they handle the lenses and guide them along, then instruct them to apply their cosmetics. Explain the importance of proper application, and not getting the cosmetics in their eye. Showing pictures of the eye, with the meibomian gland openings and explaining how they can get clogged with eyeliners and other cosmetics can have a dramatic impact on their ability to comprehend.

If patients cannot see themselves in the mirror without correction, explain that they may want to purchase a magnifying mirror, or you can demonstrate just how careful they would need to be to ensure not getting cosmetics directly in their eyes. The mirror is a much better option.

Since cosmetics should be applied after insertion of contact lenses, contacts should be removed before removal of any makeup for the same reason.

Before removing contact lenses, patients should wash their hands thoroughly with an oil-free, deodorant free, fragrance-free soap prior to removing the lenses. Again, observe, and teach proper removal techniques so that they don't injure their eye or damage their contact lenses. Then stress the need to remove cosmetics with an oil-free remover.

Eye cosmetics should be removed with a liquid cleanser and a lint-free cosmetic pad or simply the presoaked pads that are both oil-free and fragrance-free. Moisturizing eye makeup removers contain oils, which remain in the eye, even overnight, and clog openings to the meibomian glands and conjunctiva, as well as coating the lenses in the morning.

Moisturizing removers include baby oil, mineral oil, creams, and petroleum jelly. There are several eye makeup removal products on the market, easily available to patients, which are recommended for contact lens wearers. We have found that these products are also useful to patients who do not wear contact lenses but simply need to cleanse the eye area with oil-free products.

It is also advisable to inform your patients that cosmetics should be removed completely on a daily basis. When cosmetics are worn overnight, they will smear and get in the eye and can cause irritation and possibly infection.

Even though this is a course on cosmetics, remember that extra precautions should be used by patients in environments where chemicals are present. Chemicals may be airborne or through direct hand contact and can affect contact lens wear as well. Also, certain foods containing spices and oils can get on hands and can be transferred to contact lenses. Some of these foods include onions and peppers. Think of others and mention them to your contact lens patients as well.

Successful contact lens wear includes proper case care. Instruct your patients remove all contact lens solution and wash their cases by filling the case with sterile, fresh, clean contact lens solution and rubbing and finally giving it a final rinse of contact lens disinfecting solution and allow to air dry, upside down. Once a week, the case should be boiled for 5 minutes in water for disinfection purposes. The case should be replaced regularly, at least every three months. The FDA now says that tap water should never be used in rinsing contact lens cases.

Most contact lens solution kits now come with a new case, and you need to instruct your patients to dispose of the old one and use the new one. The case should also be replaced if it becomes contaminated.

These are good instructions for contact lens wearers, but they are also beneficial to non-contact lens wearers.

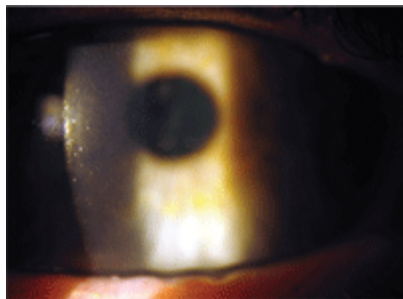
Explain types of cosmetics, lotions, soaps, hairspray, and deodorant use to your patients. Instruct your patients with proper application directions and removal processes.

Proper hygiene is necessary. The time that you take to properly instruct your patients in appropriate cosmetics and handling will save you a lot of problems in the long term.

Other rules include NEVER sharing contact lenses or their cosmetics. Remember to have them replace their cosmetics regularly and whenever they may become contaminated, such as when they have had an eye infection.

We want our patients to achieve is overall visual health and eye health.

Cosmetics producing oily deposits on contact lenses.



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