

Common Optical Disorders

A Basic Field Guide for Opticians

(Optical Seminars Course # HS-08)

by

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I Introduction:

This is a one-hour, home study course for Licensed Dispensing Opticians. Although at first glance many of the topics discussed in this class seem to be out of the scope of the practice of opticianry, front-line ECPs (eye care professionals) are inundated daily with questions regarding them. This course has been designed to familiarize, and in some cases, reintroduce opticians with the causes, symptoms, and standard treatment regarding the most common optical maladies facing eye care consumers today.

II Course Objectives:

Upon completion of this course, a participating optician should be able to:

- Have a more comprehensive understanding of the causes of...
- More easily recognize the common symptoms of...
- Discuss more accurately with patients the standard treatment of...

1. Acanthamoeba Keratitis
2. ARMD – Age-Related Macular Degeneration
3. Allergies
4. Amblyopia
5. Anisocoria -
6. Astigmatism
7. Blepharitis
8. Cataracts
9. Color Blindness
10. Conjunctivitis
11. CVS – Computer Vision Syndrome
12. DES – Digital Eye Strain
13. Diabetic Retinopathy
14. Dry-Eye Syndrome
15. Floaters/Spots
16. Hyperopia
17. Myopia
18. Photophobia
19. Pinguecula and Pterygium
20. Presbyopia
21. Ptosis
22. Retinal Detachment
23. Retinitis Pigmentosa

24. Strabismus

25. Styes

26. Uveitis

- Identify certain parts of our basic ocular anatomy.
- Understand the basic function of identified structures.
- Be reminded of the nature of licensing with regard to patient safety.
- Achieve the aims of this course without exceeding his or her practice of opticianry.
- Reference and access several outside resources (including websites) for further study.
- Receive a minimum score of 70% upon completion of the 20-question assessment that appears at the end of this module.

III Course Material

Introduction

When they first join the profession of opticianry, many opticians operate under a huge misconception. That misconception centers around their belief that the Florida Board of Opticianry exists to be their representative, advocate, or liaison to the state legislature. Nothing could be further from the truth.

If you doubt the veracity of that previous statement, I direct your attention to the very first sentence of the very first section of the law which governs the practice of opticianry in the state of Florida. I am referring to FS Chapter 484.001. Herein we can find the first words written regarding the regulation of opticianry. In part, it reads, “The Legislature finds that the practice of opticianry by unskilled and incompetent practitioners presents a danger to the public health and safety.” The section ends by reiterating their intent. It reads, “The sole purpose of enacting this part is for the protection of the public health, safety, and welfare.” So, everything that follows – every amendment, every time the Board changes or supplements a rule, everything – should be a means to that end - namely, protecting the public safety, health, and welfare.

It is with that philosophy as a premise, that this course is presented to you – a Florida Licensed Dispensing Optician. The information presented here is intended to better help you achieve that goal of informing and educating the patients who cross your path, in order ensure their health, safety, and welfare, to more effectively motivate them to have eye examinations on a regular basis, and to seek appropriate medical attention as necessary. After all, according to a report issued by the CDC is 2021, “An estimated 93 million adults in the United States are at high risk for vision loss, but only half visited an eye doctor in the last 12 months.”

And while you should be concerned about the health and safety of your clientele, at the same time you must guard yourself against violation of FS Chapter 484.013.3. On the outside chance you are not familiar with this section of the rules and regulations that govern opticianry, in its entirety it reads, “It is unlawful for any optician to engage in the diagnosis of the human eyes, attempt to determine the refractive power of the human eyes, or in any manner, attempt to prescribe for or treat diseases or ailments in human beings.”

That is why as you share the information contained here with your patients, you ought to end your conversation with a statement such as the following, “...but diagnosing or treating something like this is beyond the scope of my expertise. I would advise you to consult an optometrist or ophthalmologist to take care of it as soon as possible.” So, remember, this course is NOT designed to encourage you to diagnose, etc., rather, it is intended to make you more effective and believable regarding your referrals - to be more APT opticians: skilled, appropriate, capable, and competent. So that your patients are more likely to heed your advice and seek medical attention.

Acanthamoeba Keratitis

Acanthamoeba Keratitis is not a *common* optical disorder. It is rare. In fact, in 2021 in the United States it affected only one or two people per million contact lens wearers. Since about 45 million Americans wear contact lenses, that means fewer than 100 patients were affected. Acanthamoeba Keratitis was included in this module because of its serious nature. Left unchecked, it could lead to permanent vision loss. According to the CDC (Centers for Disease Control), “Acanthamoeba is a microscopic, free-living organism that can cause rare, but severe infections of the eye, skin, and central nervous system.” The organism is found worldwide in the environment, especially in water and soil. The rare but serious condition becomes problematic usually because of improper lens handling and/or poor hygiene. The best way to avoid Acanthamoeba is to follow the contact lens handling and care instructions provided by the lens prescriber, and avoid wearing contact lenses in and around pools, spas, hot tubs, lakes, and rivers, and even salt-water oceans. Prevention is always the best approach because at its worst, a corneal transplant is the only alternative to permanent vision loss.

ARMD (Age-Related Macular Degeneration)

Macular degeneration is sometimes referred to as ARMD or AMD, which are both acronyms for Age-Related Macular Degeneration (or at least they used to be). Nowadays, ARMD is usually used to mean Age-Related Macular Degeneration, and AMD stands for Advanced macular Degeneration. Either way, it is altogether fitting to refer to this malady as age-related, because it is the leading cause of vision loss in people 65 years of age and older. ARMD continues to be more of a problem in our country because the elderly segment of our population represents the largest growing group in terms of numbers. In fact, according to the Bright Focus Foundation, the number of Americans struggling with some form of macular degeneration is greater than the number of Americans who suffer from all types of invasive cancer!

As its name implies, ARMD degenerates the macula, which is the part of the retina most responsible for the critical central vision used to perform activities such as reading or driving. Because the macula is most affected by ARMD, central vision loss usually occurs. According to *Archives of Ophthalmology*, it is estimated that nearly 11 million Americans suffer with serious symptoms of AMD, and according to the Bright Focus Foundation that number is expected to increase to over 23 million by the year 2050. There are two types of ARMD: dry and wet.

Dry or non-neovascular ARMD is usually an early stage of the disease that is usually caused by thinning of the macula. Dry macular degeneration is diagnosed when yellowish spots known as drusen begin to accumulate from deposits or debris from deteriorating tissue primarily in the macula. Gradual central vision loss may occur with dry macular degeneration, but it is not nearly as severe as symptoms associated with the wet form of AMD. While there is no FDA-approved treatment for dry ARMD, there is some credible evidence that certain vitamins (A, C, and E) may help prevent or slow the development of dry macular degeneration. In fact, two large, five-year clinical trials (the Age-Related Eye Disease Study 2001 and a follow-up study called AREDS2-2013) have shown nutritional supplements containing antioxidant vitamins and multivitamins that also contain lutein and zeaxanthin can reduce the risk of dry ARMD progressing to the more ominous wet AMD. Eye care professionals also agree that high quality, UV (ultraviolet) protective sunglasses are an absolute necessity.

According to an article written by researcher Troy Bedinghaus, OD in January 2020, in about 15% of cases, dry ARMD progresses to a more advanced and damaging form of the eye disease known as wet macular degeneration. With wet AMD, new blood vessels grow (neovascularization) beneath the retina and leak blood and fluid. This leakage causes permanent damage to light-sensitive retinal cells, which die off and create blind spots in central vision. This underlying process causing wet AMD and abnormal blood vessel growth is the body's misguided way of attempting to create a new network of blood vessels to supply more nutrients and oxygen to the retina. However, the process instead creates scarring, leading to sometimes severe central vision loss.

While many ECPs believe that over-exposure to UV is the major cause of macular degeneration, an article in the *British Journal of Ophthalmology* claims that there is no credible evidence to show a link between UV exposure and ARMD. More recent evidence contributed by studies performed at Duke and Columbia Universities, strongly suggest that other factors such as aging, smoking (a major risk factor), heredity, hypertension, obesity and inactivity, light eye color, and side effects from certain drugs, especially anti-psychotic medications are greater risk factors than UV.

Although much research is still being done, complete recovery of vision lost to ARMD is probably unlikely. Many low-vision devices employing bright lights and strong magnifiers are the best practical help an ECP can offer to people who suffer from age-related macular degeneration. One of the more interesting devices is the OrCam MyEye, which is a wearable device for blind or visually impaired patients. Visit their website, orcam.com for more information.

Allergies

Common signs of ocular allergies include tearing eyes, itchy eyes, redness, swelling, and runny nose. There are over-the-counter medications that may relieve these symptoms, and an optometrist or ophthalmologist may prescribe even stronger, more effective decongestants and antihistamines. However, the best “treatment” for ocular allergies is avoidance – avoiding those things that caused the allergy to begin with. Of course, discovering what is causing the allergy is sometimes a difficult task. Advise patients to keep their home as free of pet dander and dust as possible. Avoiding the outdoors (especially on days when the pollen count is high) and staying indoors with air conditioning may help. In severe cases, doctors may use immunotherapy, where small amounts of the allergen are injected into the body, in the hope of building up immunity to the offensive substance. Ocular allergies may also be exacerbated by contact lens wear.

Amblyopia

Also more commonly referred to as lazy eye, amblyopia affects fewer than three percent of the population, but if left uncorrected it can have a devastating effect on their vision. For someone who suffers from amblyopia, central vision usually remains undeveloped in one eye (referred to as the amblyopic eye). Sometimes a related condition called strabismus (see below) can cause amblyopia. Untreated amblyopia may lead to functional blindness in the affected eye. Although the amblyopic eye has the capability to see, the brain "turns off" this eye because vision is very blurred. The brain elects to see only with the stronger eye.

Amblyopia usually develops in children under age seven. The two most prominent signs and symptoms may include squinting and closing one eye to see. Some of the less obvious symptoms might include overall poor acuity, headaches, and eyestrain.

Lazy eye can be caused at any time (regardless of age) if the eye suffers severe trauma. Severe uncorrected refractive errors (e.g. myopia, hyperopia, or astigmatism) may also cause a lazy eye to develop. ECPs should counsel patients that time is of the essence if these symptoms begin to manifest themselves, because if the brain “shuts off” the amblyopic eye, it may be too late to reverse the condition.

The most common treatment for amblyopia is patching the stronger eye for certain periods of time, to force the weaker (lazy eye) to work. Sometimes if a child is non-compliant with the patch, a doctor will prescribe a prosthetic contact lens to block the vision in the dominant eye. Other treatments include atropine eye drops, strong spectacle correction, and even surgery. Because we truly are on the front lines of eye care, opticians are uniquely positioned to recognize and discuss these symptoms with the parents and guardians of these most vulnerable members of our optical clientele.



(Many ‘fun’ patches encourage compliance in amblyopic children.)

Anisocoria

Anisocoria simply means the patient has pupils of unequal size. One may be bigger than normal, or one may be smaller than normal. Most cases of anisocoria are mild and have no underlying pathology. This “simple anisocoria” manifests with a difference in pupil size of 1 mm or less. If the difference is greater than 1 mm, cause might include trauma, inflammation of the iris, neurological disorders, or a reaction to certain eye medications. If someone notices a difference in pupil size, he or she should immediately see an eye doctor, especially if they experience double vision, drooping eyelid, loss of vision, neck pain, headache, or if they have experienced a recent eye or head injury.

Due to the trauma of a fistfight when he was a young man, the late pop singer, David Bowie (1947-2016), had anisocoria.



Astigmatism

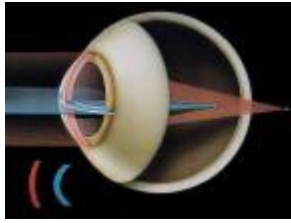
I wish I had a dollar for every time a patient said to me, “The doctor said I have a stigmatism.” Throw in another dollar for every time they have said, “I have a new subscription.” Just as we know the latter is really a “prescription,” the former is really “an astigmatism.” Even though astigmatism is the most common vision disorder, it is probably the least understood. Although astigmatism is sometimes caused by an irregularly shaped lens (lenticular astigmatism), most commonly it is caused by an irregularly shaped cornea (corneal astigmatism). Regardless of which kind of astigmatism is present, both can be corrected with eyeglasses, contact lenses, or refractive surgery. Astigmatism may be the only refractive error in an eye, but more commonly, it is accompanied with myopia or hyperopia. According to an article published by ophthalmologists from the Mayo Clinic on October 5, 2021, “Astigmatism is often present at birth.”

If the astigmatism is not severe, a patient may have no symptoms, or a very slightly blurred vision, that may not be noticeable. However, uncorrected, or more severe astigmatism, may cause headaches, eyestrain, and blurred vision at both distance and near.

Astigmatism occurs when the cornea is shaped more like an oblong football than a spherical basketball, which is its normal shape. In most astigmatic eyes, the oblong or oval shape causes light rays to focus on two points in the back of your eye, rather than on just one. This is because, like a football, an astigmatic cornea has a steeper curve and a flatter one.

In regular astigmatism, the meridians in which the two different curves lie are located 180 degrees apart. In irregular astigmatism, the two meridians may be located at something other than 180 degrees apart; or there are more than two meridians. Regular astigmatism is usually easy to correct with eyeglasses or contacts, but irregular astigmatism can be complicated and more difficult to correct, depending on the extent of the irregularity and its cause.

Usually astigmatism is hereditary: many people are born with an oblong cornea, and the resulting vision problem may get worse over time. However, astigmatism may also result from an eye injury that has caused scarring on the cornea, from certain types of eye surgery, or from kerataconus, a disease that causes a gradual thinning of the cornea.



(An astigmatic eye is shaped more like a football, than a basketball)

Blepharitis

Blepharitis is another one of those conditions easily recognizable by an optician. It is simply an inflammation of the eyelids, most commonly occurring near the lid margins. It is usually caused by a disorder in the meibomian glands of the eyelid, related to the oil that it secretes, scalp dandruff, bacteria, or some combination of the three.

A patient suffering from blepharitis may feel burning, irritation, excessive tearing, the sensation of a foreign body in the eye, and usually an excessive crusty debris in the corner of the eye and in the lashes. If an optician suspects his or her customer is suffering from blepharitis, a prompt referral to the doctor is called for. If the Blepharitis is bacterial in nature, untreated it may lead to more serious conditions such as dilated and visible capillaries, ingrown or outgrown lashes, loss of lashes, or an eventual erosion of the cornea.

Blepharitis can be difficult to manage because it tends to recur. Treatment depends on the type of blepharitis you have. It may include applying warm compresses to the eyelids, cleansing them, using an antibiotic, and/or massaging the lids. If your blepharitis makes your eyes feel dry, the doctor may also prescribe artificial tears or lubricating ointments. She may also suggest silicone punctal plugs. Sometimes steroids are used to control inflammation, but the potential side effects speak against long-term use.

The warm compress portion of treatment is designed to loosen crusts on your eyes before you cleanse them; it can also warm up and loosen the plugs blocking the meibomian gland's output. Wash your hands, then dampen a clean washcloth with warm water and place it over your closed eyes. When you first begin treatment, your doctor will probably suggest that you do this four times a day, for about five minutes each time. Later on, you might apply the compress once a day, for a few minutes. Your doctor will tell you the specific treatment needed for your eyes.



(Blepharitis in its advanced stages)

Cataracts

A cataract is a clouding of the eye's natural lens, which lies behind the iris and the pupil. The lens works much like a camera lens, focusing light onto the retina at the back of the eye. The lens also adjusts the eye's focus, letting us see things clearly both up close and far away.

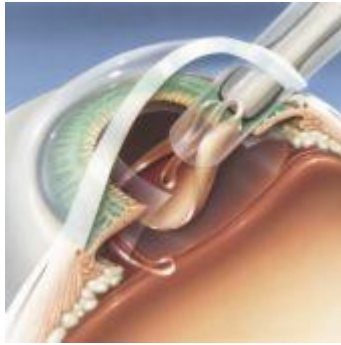
The lens is mostly made of water and protein. The protein is arranged in a precise way that keeps the lens clear and allows light to pass through it. However, as we age, some of the protein may clump together and start to cloud a small area of the lens. This is a cataract, and over time, it may grow larger and cloud more of the lens, making it harder to see.

A cataract starts out small, and at first has little effect on your vision. You may notice that your vision is blurred a little, like looking through a cloudy piece of glass or viewing an impressionist painting. A cataract may make light from the sun or lamp seem too bright or glaring. Alternatively, you may notice when you drive at night that the oncoming headlights cause more glare than before. Colors may not appear as bright as they once did.

Many studies suggest that exposure to UV light is associated with cataract development, so ECPs recommend wearing sunglasses and a wide-brimmed hat to lessen your exposure. Other types of radiation may also be causes. For example, a 2005 study conducted in Iceland suggests that airline pilots have a higher risk of developing nuclear cataracts than non-pilots do, and that the cause may be exposure to cosmic radiation. A similar theory suggests that astronauts, too, are at risk from cosmic radiation.

Other studies suggest people with diabetes are at risk for developing a cataract. The same goes for users of steroids, diuretics, and major tranquilizers, but more studies are needed to distinguish the effect of the disease from the consequences of the drugs themselves. Some doctors believe that a diet high in antioxidants, such as beta-carotene (vitamin A), selenium and vitamins C and E, may forestall cataract development. Meanwhile, eating a lot of salt may increase your risk.

When symptoms begin to appear, you may be able to improve your vision for a while using new glasses, strong bifocals, magnification, appropriate lighting, or other visual aids. As a patient, you will have to think about surgery when your cataracts have progressed enough to seriously impair your vision and affect your daily life, and glasses can no longer correct the problem. Many people consider poor vision an inevitable fact of aging, but cataract surgery is a simple, relatively painless procedure to regain vision. Cataract surgery is very successful in restoring vision. In fact, it is the most frequently performed surgery in the United States, with over 1.5 million cataract surgeries done each year. Nine out of 10 people who have cataract surgery regain very good vision, somewhere between 20/20 and 20/40. During surgery, the ophthalmologist will remove the clouded lens, and in most cases replace it with a clear, plastic intraocular lens (IOL). New IOLs are being developed all the time to make the surgery less complicated for surgeons and the lenses more helpful to patients. According to eyeops.com (an Ophthalmology Physicians and Surgeons website), as of 2021, cataracts affect more than 24.4 million Americans aged 40 and older. Moreover, as our population ages, the incidence of cataracts is expected to double to 50 million Americans by the year 2050, according to the National Institutes of Health.



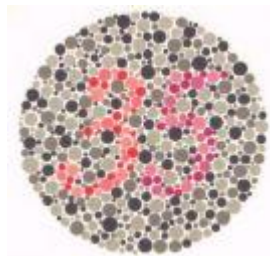
(A surgeon carefully implants an IOL)

Color Blindness

Not really blindness at all, color “blindness” is merely the inability to distinguish between reds and greens (common deficiency), yellows and blues (less common). In the rarest form of color blindness, a person will see in neutral grays.

The signs and symptoms of color blindness are simply the inability to distinguish color. It is caused by certain retinal cells not performing properly. Color blindness is usually hereditary and occurs more often in males.

If you refer a patient to an eye doctor to check for color blindness, the doctor will most likely use an Ishihara test to determine the type and severity of the disorder. While there is no “cure” for color blindness, people can be trained to function “around” the malady.



(A typical Ishihara plate used to determine color blindness. Can you see the number 35?)

Conjunctivitis

The thin, clear covering of the eye is the conjunctiva. Conjunctivitis, as its name implies, is the inflammation of the conjunctiva. It is also commonly referred to as “pink eye.” Conjunctivitis may be caused by a virus; bacteria; allergic reaction to things like smoke, dust, dirt, or pollen; or in the case of giant papillary conjunctivitis (GPC) a reaction to a foreign body, most commonly a contact lens. The first signs of conjunctivitis are, most obviously, a pink eye, along with hurting or itching eyes. As with many things, avoidance is the best “cure,” but frequent hand washing, good hygiene, and not sharing things like towels, cosmetics, and contact lenses should prevent its spread. Once infected, depending on its cause, a doctor may or may not prescribe medication. With viral pink eye, nothing will probably be prescribed, as the problem should go away on its own in a few days. If the problem is bacterial in nature, antibiotic drops will probably be indicated. For GPC, additional medications will probably be used to reduce the swelling and inflammation.



(Viral conjunctivitis)

Diabetic Retinopathy

If you have diabetes, your body cannot use or store sugar properly. When your blood sugar gets too high, it can damage the blood vessels in your eyes. This damage may lead to diabetic retinopathy. The longer you are diabetic, the greater your chances of developing diabetic retinopathy. Everyone who has diabetes is at risk for developing diabetic retinopathy, but not all diabetics actually develop it. In its early stages, you may not notice any change in your vision, but it can lead to the later, sight-threatening form of the disease.

Floaters (see below) can be a sign of diabetic retinopathy. Sometimes difficulty reading or doing close work can indicate that fluid is collecting in the macula, the most light-sensitive part of the retina. This fluid build-up is called macular edema. Another sign is double vision, which occurs when the nerves controlling the eye muscles are affected. If you experience any of these signs, see your eye doctor immediately. Otherwise, diabetics should see their eye doctor at least once a year for a dilated eye exam. Your eye doctor may diagnose retinopathy using a special test called fluorescein angiography. In this test, dye is injected into the body and then gradually appears within the retina due to blood flow. Your eye care practitioner will photograph the retina with the illuminated dye. Evaluating these pictures tells your doctor how far the disease has progressed.

According to the American Academy of Ophthalmology, 95% of those patients with significant diabetic retinopathy can avoid substantial vision loss if they are treated in time. The possibility of early detection is why it is so important for diabetics to have a dilated eye exam at least once a year. Diabetic retinopathy can be treated with laser photocoagulation to seal off leaking blood vessels and destroy new growth. Laser photocoagulation does not cause pain, because the retina does not contain nerve endings.

In some patients, blood leaks into the vitreous humor and clouds vision. The eye doctor may choose to simply wait to see if the clouding will dissipate on its own. If it does not dissipate, a procedure called a vitrectomy removes blood that has leaked into the vitreous humor. The body gradually replaces lost vitreous humor, and vision usually improves.

Digital Eye Strain (DES), aka Computer Vision Syndrome (CVS)

Computer Vision Syndrome (CVS) was first identified by the AOA (American Optometric Association) in 1995 and was assigned the clinical name asthenopia. It is characterized by “the dry eye,

eye fatigue, and blurring caused by looking at computer monitors.” Additionally, symptoms may manifest themselves in the back, neck, and brow, caused by computer users constantly having to shift positions to find a clear viewing area. Opticians need to pay close attention to this syndrome, as most patients do not realize they are suffering from it, what causes it, and that there are optical solutions available to deal with it. The most successful solution is to suggest what are becoming known in the industry as “Near Vision Focus” lenses, formerly referred to as “Office Progressives.” These are lenses that are of the same basic design as conventional progressive lenses, but the *intermediate* focal length is the primary focus of the lens design. While they do offer limited distance (up to 8-10 feet) and limited near vision, they are, indeed, computer lenses only.

Some patients would do just as well with a flat-top computer spectacle, where half of the add power is algebraically added to the distance prescription and half of the add power is used in the segment. Additionally, depending on the nature of the refractive error, a single-vision spectacle would be adequate.

Most ECPs recommend that their patients follow the 20-20-20 rule to reduce the symptoms of CVS. Basically, that means that every 20 minutes the computer user should focus on something 20 feet away, for about 20 seconds. Additionally, according to the editors of allaboutvision.com, there are seven things your patients are doing that contribute to CVS. They are:

1. Wearing glasses with an old prescription
2. Excessive lighting
3. Turtling (sitting with back rounded and chin jutting forward)
4. Old monitors
5. Sitting too close to the screen
6. Mouse too far away
7. Sitting in a “bad” chair

For the most up-to-date information on CVS, check out the extensive articles on webMD.com.

Digital Eye Strain (DES) is the physical discomfort that is experienced after prolonged exposure to digital screens such as cell phones, tablets, computers, and TVs. According to the Vision Council of America (VICA, 2015) nearly 90% of all Americans report spending more than two hours every day using a digital device. The overuse of these devices is the main reason why nearly 70% of all Americans report one or more symptoms of DES. These symptoms include irritated, dry, or tired eyes; blurred vision; fatigue; neck pain, back pain, and headaches. In addition to these symptoms, digital devices emit a high level of high-energy visible (HEV) blue light. The latest research suggests that the blue light (which penetrates all the way to the retina) may be the biggest contributor to retinal cell degeneration and Age-Related Macular Degeneration. Many optical products have been released to address this problem. For example, Hoya Recharge, VSP’s Sharper Image TechShield, and Essilor’s Crizal Prevencia are anti-reflective treatments that deflect or block harmful blue light. VSP’s BluTech lenses were developed and block nearly 100% of all blue light. BluTech is not an anti-reflective treatment. It is an actual lens material. Zeiss, Essilor, and most other lens manufacturers produce lenses and coatings that repel harmful blue light.

While the jury may still be out on just how harmful over exposure to blue light may be, anyone who spends a significant amount of time on digital devices should consider protecting their eyes from

potentially harmful blue light. Especially vulnerable are children, who generally spend more time on digital devices, have undeveloped corneas, and hold the devices much closer to their eyes, which greatly increase the blue light exposure. Remember too, that any harm caused by blue light (and ultraviolet light for that matter) is cumulative, so it is important to start protecting eyes at an early age. It should be noted, however, that the greatest source of blue light is the sun, and most people are exposed to 100 times more blue light from the sun than from all their hand-held devices combined.

Dry Eye Syndrome

Insufficient lubrication or moisture of the eye may result in dry eye syndrome. Its symptoms range from mild irritation to ocular inflammation of the anterior tissues of the eye. Persistent dryness, scratching, and burning are sure signs of dry eye syndrome.

Tears bathe the eye, washing out dust and debris and keeping the eye moist. They also contain enzymes that neutralize the microorganisms that colonize the eye. Tears are essential for good eye health. In dry eye syndrome, the eye does not produce enough tears, or the tears have a chemical composition that causes them to evaporate too quickly. Dry eye syndrome has several causes. It occurs as a part of the natural aging process, especially during menopause; as a side effect of many medications, such as antihistamines, antidepressants, certain hypertension medicines, Parkinson's medications, and birth control pills; or because you live in a dry, dusty or windy climate. If your home or office has air-conditioning or a dry heating system, that too can dry out your eyes. Another cause is insufficient blinking, such as when you are staring at a computer screen all day. Over-wearing contact lenses will also surely cause dry eye.

Your ECP may prescribe artificial tears, which are lubricating eye drops that may alleviate the dry, scratching feeling. Restasis eye drops go one step further: they help your eyes to increase tear production. Restasis treatment is the first of its kind. Sometimes people use the eye drops that "get the red out" to treat their dry eyes. This will not work unless the eye drops also contain artificial tears, and the original "get-the-red-out" formulation does not. These drops can reduce or eliminate the redness temporarily, but they do not treat the cause of the redness, whether it is dryness, environmental irritation, or some other problem. Not only that, but the vasoconstrictors in those formulas that reduce redness by contracting the eye's blood vessels are addictive, in the sense that over time, more and more is needed to achieve the same effect. In addition, with frequent use, the effect diminishes after a while, anyway — the blood vessels simply will not constrict as much as they did when you first used the drops.

If you wear contact lenses, be aware that many eye drops, especially artificial tears, cannot be used while your contacts are in your eyes. You will need to remove them before using drops and wait 15 minutes or even longer (check the label) before reinserting the lenses. If your eye dryness is mild, then contact lens rewetting drops may be sufficient to make your eyes feel better, but the effect is usually only temporary. Check the label, but better yet, check with your optometrist or ophthalmologist before buying any over-the-counter eye drops. It will probably save you a lot of money, because he or she will know which formulas are effective, long-lasting, and which ones are not, as well as which eye drops will work with your contact lenses.

Floaters/Spots

If a patient complains to you about floaters, seeing spots, or seeing stars, it probably is nothing serious. For most people, floaters occur as they grow older. The vitreous humor thickens and as we age, floaters result from the clumped vitreous gel. Sometimes pregnant women see spots caused by little bits of protein trapped within the eye. Eye injury or breakdown of the vitreous humor may also cause spots and floaters. While there is no real treatment for floaters, in some rare instances, a doctor might be willing to perform surgery to remove them. While usually nothing serious, floaters can be a sign of retinal detachment, so as always, you should refer a complaining patient to an ophthalmologist. If “new” floaters appear or are accompanied by flashes of light or loss of peripheral vision, it could be a sign of diabetic retinopathy, retinal bleeding, or an impending detachment.



(Annoying floaters are more noticeable against a white or blue-sky background)

Hyperopia

Hyperopia, more commonly referred to as farsightedness, affects about 25% of the population of the United States. People with hyperopia generally can view objects at a distance more effectively than objects at near. Signs and symptoms include blurred near vision, headaches or fatigue, and strain and squinting when attempting to work on near tasks. Hyperopia is caused by light rays entering the eye focusing behind the retina, rather than directly upon it. The eyeball of a hyperope is shorter than a normal eyeball. Many babies are born with hyperopia but outgrow it as their eyeballs mature and lengthen. Hyperopia is usually easily corrected with eyeglasses or contact lenses, which alter the light rays entering the eye, causing them to come into focus directly upon the cornea.

Myopia

Myopia, more commonly referred to as nearsightedness, affects about 35% of the population of the United States. People with myopia generally can view objects at near more effectively than objects at a distance. Signs and symptoms include blurred distance vision, and strain and squinting when attempting to work on tasks such as driving or athletics. Myopia is caused by light rays entering the eye focusing in front of the retina, rather than directly upon it. The eyeball of a myope is longer than a normal eyeball. This condition usually runs in families and appears in early childhood. Myopia is usually easily corrected with eyeglasses or contact lenses, which alter the light rays entering the eye, causing them to come into focus directly upon the cornea. Some myopes choose refractive surgery as a “permanent” solution to their myopia.

Interestingly, over the past 20 years, the number of children with myopia has significantly increased. In Asia up to 90 percent of children are now myopic, and in the United States the number of children with myopia is expected to increase from 39 million in 2020 to 45 million by 2050. It is such a problem, that contact lenses have been developed to slow the progression of myopia in children. Most notably, MiSight 1-day contacts by CooperVision were approved by the FDA in 2019. The results of slowing the progression of myopia in children aged 8-12 years has been remarkable. I encourage you to research it further on your own.

Photophobia

Photophobia is simply an aversion (phobia) to light, or light sensitivity. The only symptom of photophobia is a severe discomfort when exposed to either natural or synthetic, bright light, accompanied by an overwhelming need to squint or close the eyes to escape it. In extreme, rare cases, any light (not just bright light) may cause the same symptoms.

People with lighter-colored eyes, cataracts, and those who suffer from migraine headaches are more likely to notice sensitivity to light and glare. Sometimes, photophobia is a symptom of another underlying problem, such as a corneal abrasion, uveitis, or a central nervous system disorder such as meningitis. Light sensitivity may also be associated with retinal detachment, contact lens irritations, sunburn and refractive surgery.

The best treatment for light sensitivity is to treat the underlying cause. In many cases, once the cause is dealt with, photophobia disappears. For example, if you are taking a medication that causes light sensitivity, talk to the prescribing physician about discontinuing it or replacing it with another drug. If you are simply sensitive to light, avoid bright sunlight and other bright lights. Wear wide-brimmed hats and sunglasses with UV protection.



(Sometimes, simply avoiding the cause of the photophobia is the best advice)

Pinguecula / Pterygium

Pingueculae are slightly yellowish lesions that form on the sclera, usually close to the cornea's edge. While found mostly in middle-aged and older people, children may sometimes develop them as well. They are usually benign and are caused by prolonged, unprotected exposure to sunlight. The usual treatment includes sun protection and lubricating eye drops, though in some more severe cases where the pinguecula is interfering with vision, surgical removal is indicated.

Pterygia are benign, usually wedge-shaped growths of fibrovascular tissue, typically located on the surface of the sclera. As with a pinguecula, prolonged UV exposure is usually the cause of a pterygium. Treatment depends on the pterygium's size and the symptoms caused by the pterygium. If a pterygium is small but becomes inflamed, your eye doctor may prescribe lubricants or possibly mild steroid eye drops to reduce swelling and redness. In some cases, surgical removal of the pterygium is necessary.



(An example of a typical pinguecula)

Presbyopia

It happens to the best of us. Even if no vision correction has ever been needed, you wake up one morning and it has become difficult to read the morning newspaper. While your first thought may be, “Damn, they made the newsprint smaller,” chances are they did not. You, like 99% of the rest of the human race, have begun to show signs of presbyopia (literally, “old eye”). At any given time, more than 1 billion people in the world are presbyopic. The most common signs or symptoms include having to hold reading material farther away (sometimes presbyopes complain that their arms are too short), and eyestrain or fatigue when working on tasks at near.

Unlike astigmatism, hyperopia, or myopia – which are caused by physiological abnormalities – presbyopia is caused by the natural aging process (usually around age 40). The eye’s lens gradually loses its flexibility, making it harder for the eye to focus when attempting to work at close distances. Eyeglasses or contact lenses with conventional or progressively designed bifocals are the easiest and most effective treatment for presbyopia. Occasionally, presbyopia is corrected with monovision contacts or IOLs (intraocular lens implants), post cataract surgery. With monovision, one eye (usually the dominant eye) is corrected for distance vision, while the other is corrected for near vision. Eventually, the two eyes begin to work independently and usually, the monovision is successful.

Ptosis

Ptosis is the drooping of one, or both, of the upper eyelids. The severity of a ptosis may range from barely noticeable to extending over the entire pupil. While ptosis may occur in children or adults, mostly it occurs due to aging. The most obvious sign of ptosis is the drooping eyelid. Depending on how severely the lid droops, people with ptosis may have difficulty seeing. Sometimes people tilt their heads back to try to see under the lid or raise their eyebrows repeatedly to try to lift the eyelids.

While ptosis may sometimes be present at birth (congenital), it is mostly caused by age, injury, or a post-surgery side effect. Surgery is usually the best treatment for drooping eyelids. The surgeon tightens the levator muscles, and you come away with improved vision and appearance. In very severe cases involving weakened levator muscles, the surgeon attaches the eyelid under the eyebrow to allow the forehead muscles to substitute for the levator muscles in lifting the eyelid. Eyelid surgery is also known as blepharoplasty. After surgery, the eyelids may not appear symmetrical, even though the lids are higher than before surgery. Very rarely, eyelid movement may be lost.



(A ptosis of the left eye)

Retinal Detachment

A retinal detachment is a serious and sight-threatening event, occurring when the retina becomes separated from its underlying supportive tissue. The retina cannot function when these layers are detached, and unless it is reattached soon, permanent vision loss may result. If you suddenly notice spots, floaters and flashes of light, you may be experiencing the warning signs of retinal detachment. Your vision might become blurry, or you might have poor vision. Another sign is seeing a shadow or a curtain coming down from the top of the eye or across from the side. These signs can occur gradually as the retina pulls away from the supportive tissue, or they may occur suddenly if the retina detaches immediately. There is no pain associated with retinal detachment. If you experience any of the signs, consult your eye doctor right away. Immediate treatment increases your odds of regaining lost vision.

An injury to the eye or face can cause a detached retina, as can very high levels of nearsightedness. Extremely nearsighted people have longer eyeballs with thinner retinas that are more prone to detaching. Detachment may also occur as a side effect of LASIK surgery, although that is a rare occurrence. An eye surgeon must reattach a detached retina. Laser photocoagulation, a method of sealing off leaking blood vessels and destroying new blood vessel growth with a laser beam, is another way to reattach the retina.

Retinitis Pigmentosa

Retinitis pigmentosa is a rare, inherited disease in which the light-sensitive retina of the eye slowly and progressively degenerates. Eventually, blindness results. Usually, the first signs of this disease occur in early childhood. Vision at night is poor and becomes worse; also, there is a narrowing

of the field of vision. During later stages of retinitis pigmentosa, only a small area of central vision remains, along with slight peripheral vision.

Not much is known about the cause of retinitis pigmentosa, except that it is inherited. If neither of your parents have retinitis pigmentosa, at least one of them must be a carrier of the gene. Rods — the light-sensing retinal cells that are responsible for vision in dim light — gradually deteriorate so seeing at night becomes more difficult. There is no treatment for retinitis pigmentosa, although some practitioners believe that vitamin A may slightly delay vision loss. Occupational therapy may be wise before much of vision is lost. It may be easier to learn how to work around vision loss while vision is still available.

Strabismus

Strabismus is a condition where your eyes do not look toward the same object together. One eye moves normally, while the other points in a different direction. Strabismus may manifest itself as: esotropia (the eye turns inward), exotropia (the eye turns outward), hypertropia (the eye turns upward) or hypotropia (the eye turns downward). Strabismus can lead to amblyopia. Strabismus is the physical disorder, and amblyopia is the visual consequence of it.

Strabismus is usually caused by an unequal pulling of the ocular muscles on one side of the eye, or by paralysis of the ocular muscles. Treatment for strabismus is similar to amblyopia treatment: vision therapy including patching or visual exercises, glasses with the correct prescription or bifocal or prism correction to aid in proper focusing, eye drops to help focus, or surgery. Surgery will correct the misaligned eyes but cannot resolve amblyopia caused by strabismus.

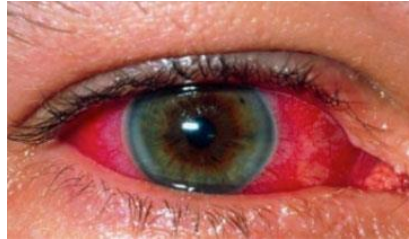
Stye

A stye (or sty) develops when a gland at the edge of the eyelid becomes inflamed or infected. It resembles a small pimple and may form on the inside or outside of the lid. Styes do not affect vision and may occur at any age. Styes are caused by a staphylococcal bacterium. This bacterium is commonly found in the nose, and it is believed that styes are mostly caused by rubbing the nose first, and then transferring it by rubbing the eye.

Most styes heal on their own within a few days. You can encourage this process by applying hot compresses for a few minutes, three times a day, over the course of several days. This will relieve the pain and bring the stye to a head, much like a pimple. The stye ruptures and drains, then heals. Never "pop" a stye like a pimple; allow it to rupture on its own. If you have frequent styes, your eye doctor may prescribe an antibiotic ointment to prevent a recurrence. Styes formed inside the eyelid either disappear completely or rarely they may rupture on their own, and they can be more serious. These styes may need to be opened and drained by your eye care practitioner.

Uveitis

Uveitis is an inflammation of the uvea. The uvea is a layer of pigment that lies between the inner retina and the outer layer of the sclera and cornea. Uveitis is an emergency condition that should be immediately treated by an optometrist or ophthalmologist. Symptoms of uveitis can include redness, blurred vision, photophobia (extreme sensitivity to light), irregular pupil, eye pain, floaters, and headaches. Uveitis is typically treated with steroids, either topical or systemic. The prognosis is usually good for those who receive early treatment. Left untreated, serious complications such as cataracts, glaucoma, or macula edema can occur.



Uveitis

Outside Resources for Further Study:

- www.webmd.com
- www.alcon.com
- www.allaboutvision.com
- www.orcam.com
- *Dictionary of Eye Terminology* (6th Edition), by Barbara Cassin and Dr. Melvin L. Rubin
- *The Eye Book: A Complete Guide to Eye Disorders and Health* by Gary Cassel, MD, et al (Johns Hopkins University Press, 1998)

IV Final Assessment

1. The Florida State Board of Opticianry was primarily instituted in order to:
 - a. Represent the interests of licensed opticians in the legislature
 - b. Promulgate information and keep opticians informed of rule changes
 - c. Help ensure the safety, health and welfare of the state's population
 - d. Collect fines and fees.

2. When it comes to styes, good advice might be to:
 - a. "Pop" it like you would a common pimple
 - b. Seek immediate medical attention
 - c. The sty will probably go away on its own in about 90 days
 - d. Most styes "heal themselves" within a few days

3. If light rays come to a focus behind the retina, causing blurred vision, the person is probably:
 - a. Amblyopic
 - b. Hyperopic
 - c. Myopic
 - d. Astigmatic

4. If light rays come to a focus in front of the retina, causing blurred vision, the person is probably:
 - a. Amblyopic
 - b. Hyperopic
 - c. Myopic
 - d. Astigmatic

5. Sometimes photophobia may be a symptom of the more serious condition of:
 - a. Pinguecula
 - b. Retinitis Pigmentosa
 - c. Uveitis
 - d. Amblyopia

6. Which of the following is true about a Pinguecula?
 - a. They are usually benign
 - b. They are usually hereditary
 - c. They usually require surgical removal
 - d. They usually lead to the development of a pterygium

7. As a person approaches 40 years of age, he or she will most likely develop:
 - a. Pinguecula
 - b. Presbyopia
 - c. Macular Degeneration
 - d. Uveitis

8. An injury or a breakdown in the vitreous humor will probably result in:
 - a. Floaters or Spots
 - b. Pterygium
 - c. Pinguecula
 - d. Amblyopia

9. The leading cause of vision loss in people 65 years of age or older is:
 - a. Retinitis Pigmentosa
 - b. Cataracts
 - c. Macular Degeneration
 - d. Diabetic Retinopathy

10. What percent of dry ARMD progresses to the more serious wet ARMD?
 - a. 14%
 - b. 24%
 - c. 34%
 - d. 44%

11. It is estimated that how many million Americans suffer from serious side effects due to ARMD?
 - a. 1 million
 - b. 2 million
 - c. 5 million
 - d. 11 million

12. For most people, the most effective treatment for ocular allergies is:
- Antihistamines
 - Decongestants
 - Immunotherapy
 - Avoidance
13. One specific cause of amblyopia is:
- Strabismus
 - Hyperopia
 - Myopia
 - Astigmatism
14. Which of the following might be symptoms of lazy eye?
- Myopia, hyperopia, and astigmatism
 - Prism required in the spectacle correction
 - Vertigo
 - Eye strain, squinting, headaches, and closing one eye to see
15. The most common treatment for amblyopia is:
- Surgery
 - Vitamin A
 - Patching the lazy eye
 - Patching the other eye
16. When it comes to astigmatism, which of the following is not true:
- Light rays focus on more than one part of the retina
 - It is the most common vision disorder in America
 - It is usually hereditary
 - Contact lenses are out of the question
17. If an optician suspects a patient is suffering from blepharitis, what should an optician do?
- Refer the patient to an optometrist or ophthalmologist
 - Refer the patient to the nearest emergency room
 - Prescribe lid scrubs
 - Demonstrate lid scrubs

18. Which of the following statements is true about blepharitis?
- a. It is fairly easy to manage because it rarely reoccurs
 - b. Lid scrubs are not a common treatment
 - c. Long-term steroidal treatments are usually necessary
 - d. It is difficult to manage because it is usually chronic
19. An Ishihara test would be used to check for:
- a. Myopia
 - b. ARMD
 - c. Blepharitis
 - d. Color Blindness
20. Cataract surgery is the most common surgery in the Unites States, with nearly how many operations performed annually?
- a. 1 million
 - b. 1.5 million
 - c. 2 million
 - d. 5 million