



DR. PAUL KRAWITZ'S
ULTIMATE
INSIDER'S GUIDE
TO EYE HEALTH

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INTRODUCTION

I'm a Board Certified Ophthalmologist with a busy clinical practice in New York. I perform hundreds of eye surgeries every year and treat thousands of patients with problems ranging from the simple to the complex.

In medical school, doctors-to-be are taught how to listen. And in my training at Columbia-Presbyterian Medical Center and Mount Sinai Medical Center in New York City, ophthalmologists-to-be are taught how to diagnose.

But one thing that medical school, ophthalmology residency or glaucoma fellowship didn't teach me, but something that I've had a knack for since I was a teenager, was how to teach people. And teaching patients about complex eye diseases is harder than you think.

Doctors learn an entirely new vocabulary for not only medicine, but their own specialty. And these new words include not only the diagnosis, but the details about the diagnosis. There are lots of advanced mathematics, tons of biology (the structure of the body) and pharmacology (the science of drugs), and physiology (how the body works). Diseases, when they occur, play havoc with these normal systems. In short, there is a reason that the average ophthalmologist spends twelve long years learning the field of study after high school graduation. I did an extra year of fellowship specialization in glaucoma, so for me, it was thirteen years.





“As an ophthalmologist, and more generally as a physician, I see myself not only as being in charge of providing the best possible care that is based upon the most up-to-date research, I also make sure that my patients are as educated as they can be.”

Discussing their health can be intimidating to patients. Sometimes, they are afraid to ask questions for fear of being seen as stupid. In other circumstances, they trust the doctor implicitly and don't take an active role in their own health. Very frequently, the burden falls on the patient to coordinate his or her care among various medical specialists, something they should not be expected to do.

As an ophthalmologist, and more generally as a physician, I see myself not only as being in charge of providing the best possible care that is based upon the most up-to-date research, I also make sure that my patients are as educated as they can be about their condition, not only so that they are informed, but more importantly, so that they can help to guide the path toward their own health, with

me as their adviser.

When I founded VisiVite.Com in 2001, I took the same approach. Sure, we've grown into one of the leading eye vitamin manufacturers for the treatment of macular degeneration and dry eye syndrome. But along the way, we've also published hundreds of pages of information that are sought a thousand times a day merely for their information value.

In these pages, you're getting the most inside information about common eye problems, not only macular degeneration and dry eye syndrome, but also cataract surgery, diabetic retinopathy, and contact lenses. If you're considering cataract surgery, for example, you'll want to know whether your doctor uses a no-stitch phacoemulsification technique and which types of intra-ocular lens implants that he or she is certified to use.

Here's to your good learning.

Paul L. Krawitz, M.D., F.A.A.O., President
Vitamin Science Inc.
Huntington, New York
www.VisiVite.com



CHAPTER 1

Macular Degeneration Overview

Perhaps no condition causes the panic and concern as when I tell a patient, for the first time, that he or she has macular degeneration. The term conjures blindness, loss of independence, concern about becoming a burden to the family, and hopelessness.

But while the concern is valid, the panic is not, as the treatments for age-related macular degeneration seems to expand exponentially with each passing year. At the beginning of the century, people with a particularly aggressive form of macular degeneration were doomed to lose the ability to read. Now there are treatments that are effective in helping them to maintain vision.

What is The Macula?

In grade school, you were taught that the eye is like a camera. And although you may have forgotten which parts of the camera related to the eye, it turns out that analogy was an accurate way of explaining things.

Light and images enter the eye, traveling through the clear cornea in the very front, traveling through the natural lens in the middle, and finally reaching the inside layer in the back, which is

Introduction

What is the Macula?

What Is Macular Degeneration?

How Does Wet Macular Degeneration Occur?

How to Test Your Vision With An Amsler Grid?

Why Did I Get It?

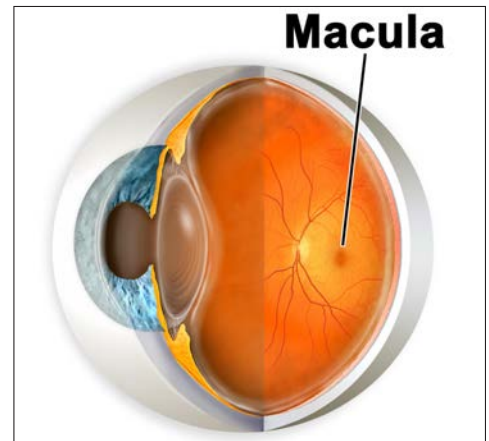
How Do I Know If It's Getting Worse?



called the retina. The light doesn't scatter equally throughout the inside the eye, however; instead, most of it focuses on the center of the retina, which is known as the foveola. Surrounding this single tiny foveola is a target area, known as the macula.

This central target macular area is the part of the retina that provides us with our straight ahead vision, which is the sight that we use to read and to see fine details such as our children's faces, examine photographs, sew a button on a shirt, write a dollar amount on a check, or see a bird in a tree.

We also have peripheral, or side vision. This gives us the ability to avoid bumping into a pedestrian walking to our right or reacting to a car coming too close to our left while driving. Peripheral vision directs our attention to turn our heads and eyes to see greater detail. Peripheral vision is important, and can be compromised in diseases such as glaucoma. But we cannot read a book placed to our right while looking straight ahead. This is because in humans, detailed vision is only available to us in our straight-ahead gaze.



What is Macular Degeneration?

Macular Degeneration, also referred to as Age-Related Macular Degeneration because of its preponderance in elderly people, is a disease of the central macular target area.

In response to increasing age, exposure to oxidative stress, smoking, high cholesterol, heart disease, ultraviolet light, a diet high in sugar and fat, being Caucasian, and genetic vulnerability, the delicate structures in the macular area undergo degenerative changes.

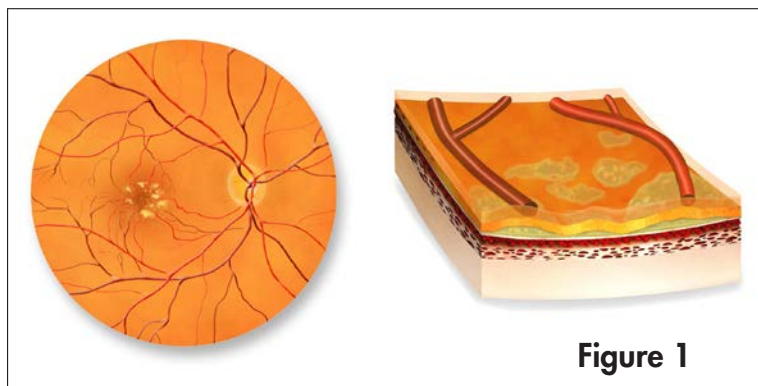


Figure 1

These early changes include thinning (atrophy) and the accumulation of small areas of incomplete waste product removal, known as drusen (Figure 1). Drusen can be seen on examination by an ophthalmologist or optometrist and appear as white or yellow

deposits in the macula. In actuality, the drusen are just beneath the transparent retinal layer.

This phase of macular atrophy and drusen formation is known as Dry Macular Degeneration. It is the dry form of macular degeneration that benefits from nutritional supplements such as VisiVite, both as treatment and as prevention.



Most cases of Dry Macular Degeneration are mild. Eye doctors can predict the likelihood of worsening of the macular degeneration by examining the number and size of the drusen, the area of atrophy and by noting the family history and age of diagnosis.

Ninety percent of cases of Dry Macular Degeneration do not progress to severe vision loss. But there are two exceptions.

A particularly severe form of Dry Macular Degeneration is known as Geographic Atrophy (GA). Geographic Atrophy involves a large area of severe retinal thinning and loss of normal retinal pigment. Although Geographic Atrophy is a form of Dry Macular Degeneration, which classically does not cause severe vision loss, in fact the vision loss can be severe, frequently in the range of 20/70 to 20/400.

Approximately one in ten patients with Dry Macular Degeneration will progress to a form of macular degeneration that requires more urgent treatment, known as Wet Macular Degeneration.

How Does Wet Macular Degeneration Occur?

The retina is not a single layer, but actually several layers. And on the outside of the retina is a layer known as the choriocapillaris.

In a healthy eye, the choriocapillaris provides nourishment to the retina via its intricate network of blood vessels. But in macular degeneration the thin dividing membrane between the retina and choriocapillaris, known as Bruch's membrane, can develop gaps or holes. For reasons that are not completely understood, this new window between the two layers triggers the normal blood vessels in the choriocapillaris to grow through the hole in Bruch's membrane and underneath the retina. However,

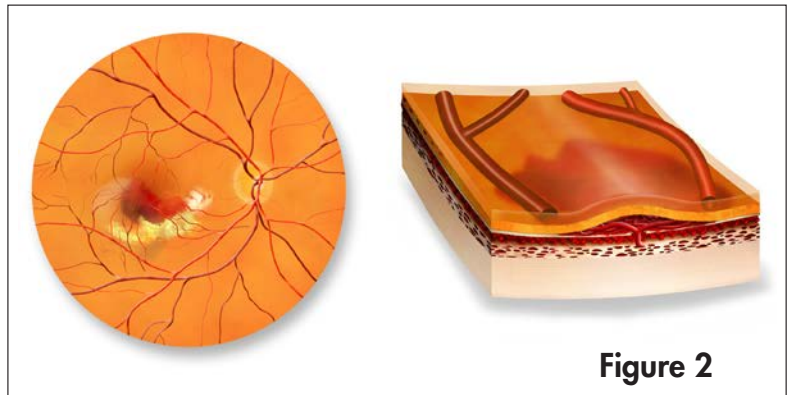


Figure 2

these are not normal blood vessels that grow, but rather a chaotic tangle of fragile tiny blood vessels that are prone to bleeding and leaking fluid. They are known as neovascular vessels. One of the chemical triggers for their growth is Vascular Endothelial Growth Factor.

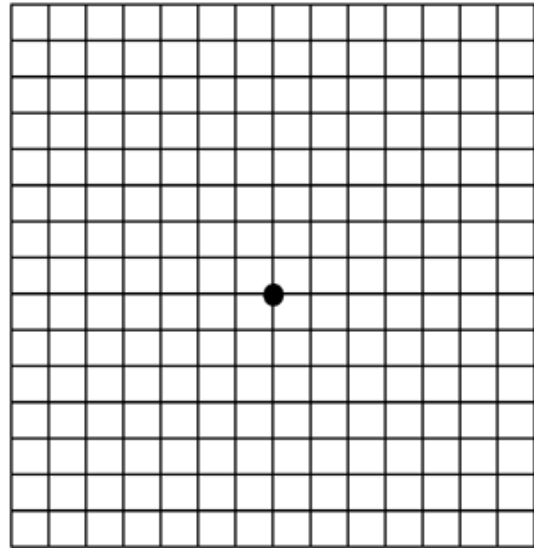
The bleeding and leakage that occurs can cause sudden and severe damage to the retina in the macular area, resulting in visual symptoms that include blurring, distortion or bending of straight lines, and a gray or black spot in the central vision. This is known as Wet Macular Degeneration (Figure 2) In fact, the Amsler Grid, a frequent at-home test to detect the development of wet macular degeneration, takes advantage of the fact that visual distortion is one of the earliest recognized symptoms.



How to Test Your Vision With An Amsler Grid

Instructions

1. Wear your reading glasses
2. Hold the Amsler grid at a normal reading distance
3. Cover one eye.
4. Look at the dot in the center of the grid
5. Note how the lines and squares appear
6. Test the other eye in the same manner



Interpretation

- All of the lines should be straight and the squares of a uniform size.
- If you note any changes in the appearance of the grid, such as distortion, blurring, discoloration, dark or missing areas of the grid, or any other changes, call and see your eye doctor immediately.
- Do not wait to see if the changes will clear on their own. Timely treatment is vital to safeguarding your vision.

Why Did I Get It?

Increasing age is the most important risk factor for the development of macular degeneration. But some people seem to escape it while others experience severe incapacitation. And there is now scientific evidence which points to several factors that increase your likelihood of developing macular degeneration.

- **Genetics** – Formerly believed to be a minor contributing factor, the Human Genome Project and newer research now points to a person's DNA as being an important risk factor. Elsewhere in this book is a separate chapter devoted entirely to the genetics and genetic testing for macular degeneration.

- **Systemic Disease** – Macular Degeneration has now been shown to be related to several systemic diseases, including heart disease, high cholesterol and other diseases that involve inflammation within the body and elevate a blood component called C-Reactive Protein.



- **Race** – Macular degeneration is predominantly a disease of white or Caucasian people.
- **Smoking** – It should come as no surprise to anyone who understands that smoking causes increased health risks, including heart disease and stroke, that it would also increase the risk for other degenerative diseases such as macular degeneration. It is not known whether smoking increases the risk to vision by damaging the delicate blood vessels in the eye or whether it creates free radicals, which in turn cause damage through a process called oxidative stress.
- **Sunlight** – Ultraviolet light causes free radical formation and oxidative damage.
- **Diet** – There are much higher rates of macular degeneration in developed Western countries with a diet that is high in sugar, fat and processed foods and a paucity of dark vegetables. Furthermore, as the society develops greater degrees of obesity with higher Body Mass Indexes (BMI), the rate of macular degeneration continues to increase.

How Do I Know If It's Getting Worse?

Other than using an Amsler Grid at home to help to detect the development of wet macular degeneration, you cannot follow your progress at home.

Once you have been diagnosed with macular degeneration, it is imperative that you seek the care of a qualified eye doctor on a regular basis.

If your eye care specialist has seen the hallmarks of macular degeneration in one or both eyes, he or she will periodically perform the following assessments:

Visual Acuity — also known as vision, this is the first step in any eye exam. But in order to measure it properly, the vision measured must be your BEST CORRECTED VISION, and not necessarily your vision without glasses.

Visual acuity needs to be measured in each eye separately, at distance. Because Medicare no longer pays for the measurement of best spectacles, known as refraction, you must consent to pay for the eye doctor to perform this measurement. Normal vision is considered to be 20/20, and most states require a minimum vision of 20/40 in order to be a legal driver.

Legal blindness is defined as best corrected vision of 20/200 or worse in both eyes. Unfortunately, declining visual acuity is not specific to macular degeneration, since vision can also decline due to Dry Eye Syndrome, cataracts, glaucoma, corneal swelling and other retinal conditions.

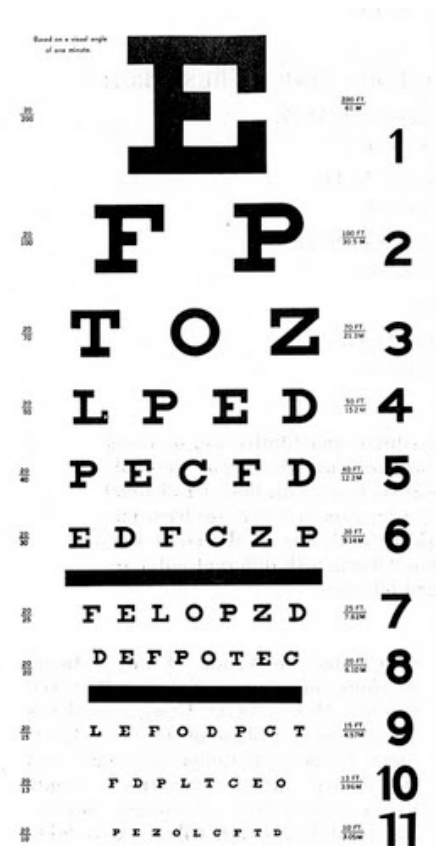




Figure 3

Fundus Examination — The doctor examines the retina, also known as the fundus. There are different ways to do this. When the doctor holds up a handheld instrument and brings it closely to your face, this is known as direct ophthalmoscopy. In contrast, when the doctor puts either a small or large lens in front of your eye, and looks through either the slit lamp microscope or through a lighted headpiece, this is known as indirect ophthalmoscopy.

This latter method allows the eye doctor to see your retina in 3-D and in greater detail. While the method of direct ophthalmoscopy is the method commonly performed by most internists and family practitioners, we recommend that you seek an eye care professional who performs indirect ophthalmoscopy due to the greater detail seen.

Fundus Photography — Even the best eye doctors cannot remember, nor can they accurately draw, the details of your

previous examination to determine if there has been a change to your macular degeneration status. Therefore, following pupil dilation, the best eye specialists will objectively document the status of your retina.

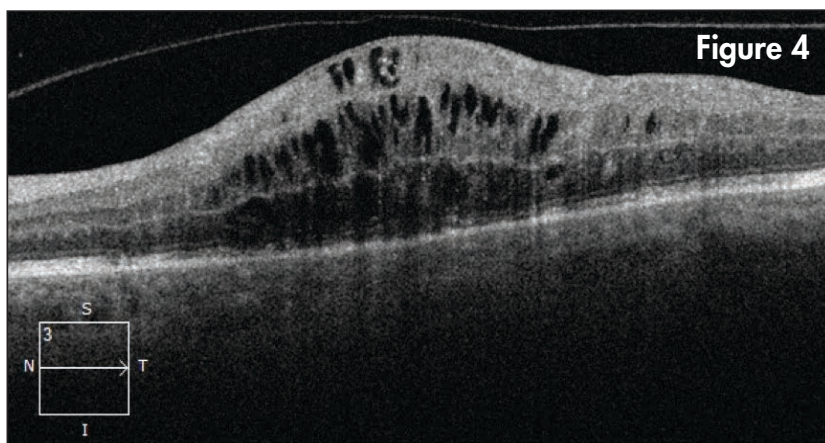
One of the ways to do this is by photographing the details of the central retina, or macula (Figure 3). By doing this, the doctor can then compare whether areas of drusen and atrophy are increasing in size or number, and whether there is improvement of pigmentation seen with your taking high potency nutritional supplements, such as VisiVite.

For example, studies have shown that lutein and zeaxanthin can improve macular pigmentation in some patients.



OCT — OCT stands for Optical Coherence Tomography and is among the most valuable new ways in which your eye doctor can evaluate your retina. Because the machine is expensive, only the top eye care specialists have this technology available in their offices.

What OCT (Figure 4) allows the doctor to see are the individual layers of the retina, highlighting when the retina may be thinned due to progressive Dry Macular Degeneration, or thickened due to fluid or blood in Wet Macular Degeneration.



Fluorescein Angiography — This is actually two tests in one, since it also includes fundus photography mentioned above. Fluorescein is a benign, water-soluble orange dye. It gets injected into a vein in the arm or hand. The dye then circulates to both eyes, where photographs of the dye can be taken.

Fluorescein angiography is usually performed to look for leakage or bleeding. Therefore, it is an excellent method to exclude Wet Macular Degeneration if the doctor does not already have an OCT. A related test uses a different dye called ICG.

What Can I Do About It Now?

People with Wet Macular Degeneration need to seek the care of an eye specialist who injects the eye with a drug such as Avastin or Lucentis to stop the neovascular blood vessel growth beneath the retina. A separate chapter in this book is devoted to a discussion of Avastin and Lucentis.

People with Dry Macular Degeneration in one or both eyes, or who are at high risk to develop macular degeneration should take high dose nutritional supplements specifically indicated for this condition.

Western medicine has been slow to finally adopt these recommendations, even after the National Eye Institute published the Age Related Eye Disease Study (AREDS) in 2001. Many doctors have been flooded with the belief that only prescription medications have merit in the treatment of disease.

The United States National Eye Institute, and a mountain of research subsequent to AREDS, has unequivocally proven the benefit on eye vitamins.



Unfortunately, patients discover a confusing array of vitamins at the drugstore, and doctors in the United States have played a passive role in assuring that their patients are obtaining the proper vitamin supplement.

Patients often take once daily multivitamins in the mistaken belief that they will be effective. And some people continue to take eye vitamins with high levels of beta-carotene, which is not only dangerous for smokers, but was also shown in the latest AREDS2 study to not be of any benefit.

Most worrisome is that up to 40% of people who are actually taking a vitamin with benefits are taking it in incorrect dosage or sporadically, thus negating any benefit.

VisiVite Vitamins are not the only macular degeneration vitamins available. But we believe that there are several benefits to VisiVite that don't exist with other manufacturer's products:

- **VisiVite advanced formulas include Lutein and Zeaxanthin, cutting edge compounds that have been shown to be of benefit in the newest AREDS2 research by the National Eye Institute.**

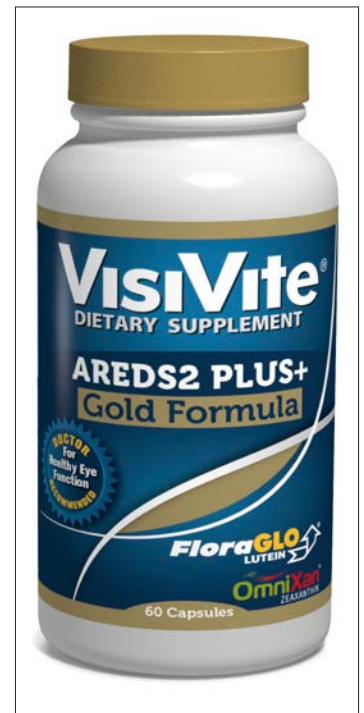
- **VisiVite offers a greater variety of nutritional supplements for macular degeneration than any other company in the world.**

- **VisiVite specializes in the manufacture of eye vitamins. It is the only thing we do.**

- **VisiVite uses Natural Vitamin E and other nature-sourced ingredients for the greatest biological effect and least number of side effects. Most eye vitamins from the large pharmaceutical companies use Synthetic Vitamin E.**

- **VisiVite formulas are named to avoid product confusion, including color-coding for simplicity.**

- **VisiVite vitamins meet the strictest pharmaceutical grade. Our manufacturing laboratory is one of a select number that has attained GMP Certification. Additionally, each individual lot is independently tested by an outside laboratory for purity and potency.**





CHAPTER 2

Myopic Macular Degeneration

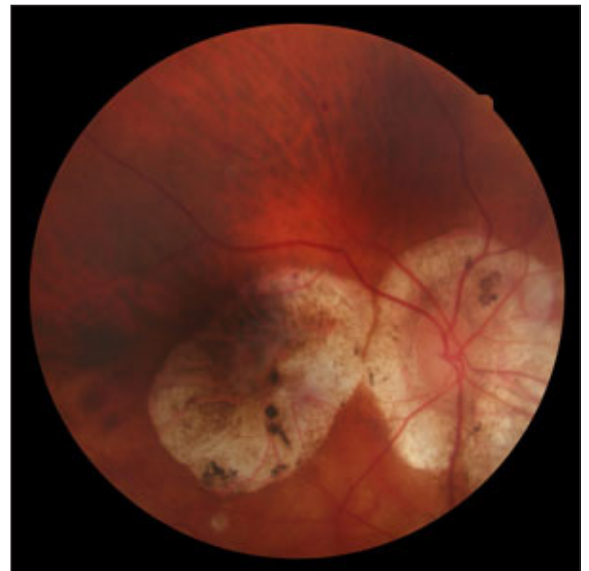
Myopia, also commonly known as near-sightedness, occurs because the eye is longer than average, causing a blurry image on the retina. In healthy myopic people, vision can be corrected using eyeglasses, contact lenses or laser vision correction.

But myopic people, and especially those with a prescription greater than -6.00, have a higher risk of permanent vision loss due to:

- **Glaucoma**
- **Retinal Detachment**
- **Myopic Macular Degeneration**

While glaucoma and retinal detachment are normally treatable by an eye care professional, myopic macular degeneration is not always so. Therefore, prevention of this condition is important.

Unlike age-related macular degeneration, myopic macular degeneration can occur at ages as young as 30 years old. Although treatment for the “dry” form of myopic macular degeneration does not exist, most experts agree that ingestion of high dose nutritional supplements for ocular health may prevent progression of this disease with consequent loss of central vision.





Symptoms of myopic macular degeneration include:

- Blurred vision: Those with nonexudative macular degeneration may be asymptomatic or notice a gradual loss of central vision, whereas those with exudative macular degeneration often notice a rapid onset of vision loss.
- Central scotomas (shadows or missing areas of vision) Distorted vision (i.e. metamorphopsia) — A grid of straight lines appears wavy and parts of the grid may appear blank. Patients often first notice this when looking at mini-blinds in their home.
- Trouble discerning colors; specifically dark ones from dark ones and light ones from light ones.
- Slow recovery of visual function after exposure to bright light.

Forms of Myopic Macular Degeneration

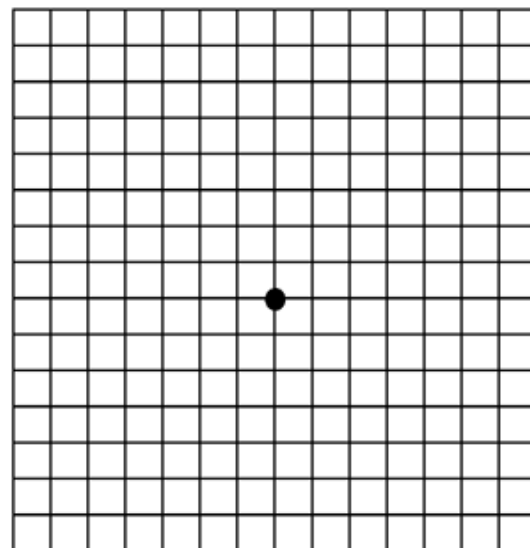
Myopic Macular Degeneration may be either Dry (atrophic) or Wet (Exudative). These two forms of macular degeneration are described in other chapters.

What makes myopic macular degeneration more aggressive and more difficult to treat are not only the younger age at onset, but also the thinner retina and supporting tissues that occur with longer myopic eyes.

The Amsler Grid

The Amsler Grid Test is one of the simplest and most effective methods for patients to monitor the health of the macula. The Amsler Grid is essentially a pattern of intersecting lines (identical to graph paper) with a black dot in the middle. The central black dot is used for fixation (a place for the eye to stare at). With normal vision, all lines surrounding the black dot will look straight and evenly spaced with no missing or odd-looking areas when fixating on the grid's central black dot. When there is disease affecting the macula, as in macular degeneration, the lines can look bent, distorted and/or missing.

Vision loss or blindness in macular degeneration refers to the loss of central vision only. The peripheral vision is preserved. Blindness in macular degeneration does not mean inability to see light and even with far advanced macular degeneration; the peripheral retina normally allows for useful vision.





CHAPTER 3

Lutein, Zeaxanthin and AREDS2



Lutein and Zeaxanthin are compounds that are known as carotenoids. These molecules have immense protective effects for retinal health.

And yet the original 2001 National Eye Institute's Age Related Eye Disease Study (AREDS) failed to include them in the list of ingredients used to treat macular degeneration for the simple reason that they were not commercially available.

Therefore, that original study included only beta carotene, a precursor form of Vitamin A. And two large studies demonstrated that high doses of beta carotene were unsafe for smokers.

One study called the 'Alpha Tocopherol, Beta Carotene Cancer Prevention Study', looked at whether taking alpha tocopherol (a form of vitamin E) and 20 mg of beta carotene daily reduced the risk of lung cancer. The study recruited 29,133 male smokers. They took the pills daily for between 5 and 8 years. In this study 18% more lung cancers developed in the people taking the alpha tocopherol and beta carotene pills. This was the opposite of what the researchers expected. Vitamin E did not seem to have any ef-



fect on lung cancer risk in this trial.

Another study called the 'Beta Carotene and Retinol Efficacy Trial'(CARET), looked at whether beta carotene and retinol (vitamin A) could prevent cancer in men and women smokers and ex-smokers. After an average of 4 years of taking the pills, there were 28% more cases of lung cancer diagnosed in people taking the supplements.

As a result, the National Eye Institute's information page about the Age Related Eye Disease Study (<http://tinyurl.com/areds1>) now contains

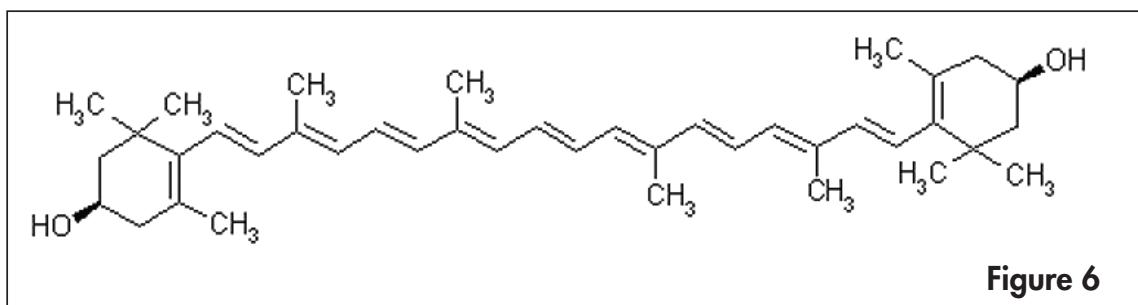
specific guidelines for smokers and former heavy smokers to avoid high doses of beta carotene.

This meant that that smokers and former heavy smokers could not take the AREDS formulation.

Soon after AREDS was published in late 2001, first Lutein and then Zeaxanthin became commercially available to add to nutritional supplements. Naturally derived from Marigold flowers (Figure 5), both were considered safe for human consumption.

Dr. Paul Krawitz, our President and Founder, was immensely interested in both Lutein and Zeaxanthin. In early 2002, he created the world's first modified macular degeneration formula for smokers, called VisiVite Smokers Formula. It substituted Lutein for beta-carotene, and his initiatives were widely copied by other companies. Although a small amount of Zeaxanthin is present in the Lutein extract from Marigold's (in micrograms), prior studies including AREDS had shown that nutritional ingredients had to be given in very high dosages in order to penetrate into the delicate retinal tissues.

This required separately adding Zeaxanthin (Figure 6) extract. Dr. Krawitz subsequently



created two groundbreaking supplements, which contained 4.75 milligrams of Zeaxanthin, an amount that was nearly ten times what was available

in Lutein-only supplements. Zeaxanthin was a very expensive ingredient, and these supplements were more expensive than the mass-marketed vitamins on drugstore and grocery store



shelves. But when pushing the envelope, one sometimes encounters unexpected hurdles. The two new formulations had unintentionally violated a patent for high levels of Zeaxanthin held by a St. Louis company called Zeavision.

Zeavision's chief scientist and CEO, Dennis Gierhardt, was both flattered that we had discovered the benefits of Zeaxanthin. But he was also protective of Zeavision's intellectual property. Fortunately, Vitamin Science and Zeavision soon became quick allies in the battle against macular degeneration, resulting in a product license in which the VisiVite products became the first mixed macular degeneration supplements to offer high dose Zeaxanthin.

The Lutein Antioxidant Supplementation Trial (LAST)

In April 2004, *Optometry: Journal of the American Optometric Association* found that taking the right combination of lutein, vitamins and antioxidants could not only counter but reverse some of the effects of Age Related Macular Degeneration.

Lutein is one of the two primary carotenoids present in the macula that prevents sunlight from damaging the retina over time. It can be found in spinach and other dark, leafy-green vegetables. In prior studies, its antioxidant power has appeared to shield the retina from much of the harmful light that gets through to the eye, making the consumption of lutein-rich vegetables one of the best ways to prevent macular degeneration.

In March 2003, the U.S. Government's Veteran's Administration Hospital in Chicago completed a new study that offers hope for reversing vision loss. This nearly two-year-long study expanded upon previous studies on lutein by comparing the effects of lutein with and without additional carotenoids and antioxidants on patients who suffered from the "dry" (atrophic) form of macular degeneration.

The study involved a high level of a special form of lutein (FloraGLO) along with a multivitamin that contained antioxidants and minerals. The study included three groups: Lutein only, Lutein plus Vitamins and placebo. Both Lutein groups showed improvement in near visual acuity and in contrast sensitivity function (CSF), which identifies retinal problems at an earlier stage than conventional testing. In fact, according to the study, the vitamin plus Lutein Group showed greater recovery in their quality of vision.





Compared to the Placebo and Lutein-only Groups, the Vitamin Plus Lutein Group experienced faster glare recovery, a known measure of macular function and retinal health. In macular pigment optical density (MPOD), considered to be a signal for macular degeneration risk, the Vitamin Plus Lutein Group increased by 43%, as compared to the 36% improvement of the Lutein-only Group, and a decrease in the group taking a placebo.

AREDS2

Published in 2013 and including over 4200 patients studied at multiple centers throughout the United States, the National Eye Institute published their long-awaited AREDS2 research. This powerful study not only confirmed the benefits of lutein and zeaxanthin in treating patients with macular degeneration, it found that beta carotene was detrimental to lutein and zeaxanthin absorption in all patients. Therefore, the National Eye Institute now recommends that patients with macular degeneration do not take beta carotene. Also of interest, AREDS2 found no significant benefit of 80 mg rather than 25 mg zinc - both were similarly effective. During the presentation of the results, and based upon the Selenium and Vitamin E Cancer Prevential Trial, Dr. Emily Chew, the Deputy Clinical Director of the National Eye Institute, recommended that men who take the high doses of Vitamin E in the AREDS2 Formulation also take 200 mcg of Selenium to lower their risk of prostate cancer. **VisiVite AREDS2 PLUS+ Formula contains the AREDS2 ingredients, 200 mcg of Selenium and many additional antioxidants.**

A Double Benefit

Lutein and Zeaxanthin protect the eye in two important ways. First they each absorb short wavelength blue light, which has the highest energy of any visible light and is therefore poses the greatest threat to the retina. Second, Lutein and Zeaxanthin are potent antioxidants that suppress the formation of free radical molecules. Within the central macula, zeaxanthin is the dominant component, whereas in the peripheral retina, lutein predominates.

Additional Benefits of Zeaxanthin on Mental Performance

A study from France provided the first proof that increased intake of the carotenoids lycopene and zeaxanthin may improve the mental performance of elderly people.

The study was published in the highly regarded Journal of Gerontology: Medical Sciences by researchers from the University of Montpellier, University of Paris, and CHU Grenoble. The authors report that low levels of the carotenoids were linked to the lowest levels of cognitive function amongst 589 healthy older people.

“To our knowledge, this study is the first that investigated, in a healthy elderly population, the



relationship between cognitive performance measured by five neuropsychological tests and the different plasma carotenoids: xanthophylls (lutein, zeaxanthin, beta-cryptoxanthin) and carotenes (lycopene, alpha-carotene, trans-beta-carotene, and cis-beta-carotene),” wrote lead author Tasnime Akbaraly.

“In this present study, low levels of specific plasma carotenoids - lycopene and zeaxanthin - were associated to poor cognitive functioning in a highly educated, community-dwelling elderly population,” added Akbaraly.

Although cognitive performance declines naturally with age, the new research reports that this decline may be slowed by increased intake of certain carotenoids, and especially zeaxanthin.

Blood samples for the participants (average age 73.5, 361 women) were taken and carotenoid levels calculated. Cognitive function was measured using a battery of cognitive tests, including the Mini-Mental State Examination (MMSE), Trail Making Test Part B (TMTB), Digit Symbol Substitution (DSS), Finger Tapping Test (FTT), and Word Fluency Test (WFT).

Participants with the lowest cognitive performance scores were more likely to have low levels of some carotenoids. Significant associations were reported between zeaxanthin and all cognitive tests except the MMSE, while low levels of lycopene were associated with poor performance on the TMTB and the DSS.

Continuing research continues to confirm the benefits of Lutein and Zeaxanthin. The compounds, called carotenoids, are found in high concentration in healthy eyes, and give the macula its deep yellow hue. Within the central macula, zeaxanthin is the dominant component, whereas in the peripheral retina, lutein predominates.





CHAPTER 4

Can Macular Degeneration be Prevented?

Omega fatty acids were shown by the AREDS2 research to not have benefit in the treatment of macular degeneration. In contrast, other studies show that it might help to prevent macular degeneration in healthy patients and to reduce vision loss in the geographic form of macular degeneration. In fact, one of the most frequent questions that we are asked is whether taking macular degeneration vitamins is beneficial in the prevention of macular degeneration.



Figure 7

My official response has been that studying whether people develop macular degeneration over several years has not been studied. So my unofficial response was to suggest, but not recommend supplementation if you are concerned that you might develop macular degeneration because you are in a high risk group, for example if you have multiple family members with the disease.

But a study in the June 2008 issue of the professional journal, *Archives of Ophthalmology* has finally shown the benefit to previously healthy people in the prevention of both mild and severe forms of macular degeneration.

Researchers from Australia and Singapore published a study entitled, “Dietary Omega-3 Fatty Acid and Fish Intake in the Primary Prevention of Age-Related Macular Degeneration: A Sys-



tematic Review and Meta-analysis.”

This meta-analysis consisted of a mathematical evaluation of the results from nine previous studies of nearly 89,000 people, of which more than 3000 developed macular degeneration. The authors found that high dietary intake of Omega-3 fatty acids was associated with a 38% reduction in the risk of late macular degeneration (exudative AMD, wet macular degeneration or geographic atrophy). Furthermore, people who ate fish twice weekly not only reduced their risk of late AMD, but also early AMD (soft drusen or retinal pigmentary changes).

How do Omega-3 Fatty Acids Help Prevent Macular Degeneration?

Omega-3 Fatty acids are called “essential” fatty acids, because humans don’t have the ability to synthesize them in their bodies. Therefore, they must get these essential fatty acids from diet, like salmon (Figure 7), flaxseed, walnuts or nutritional supplements.

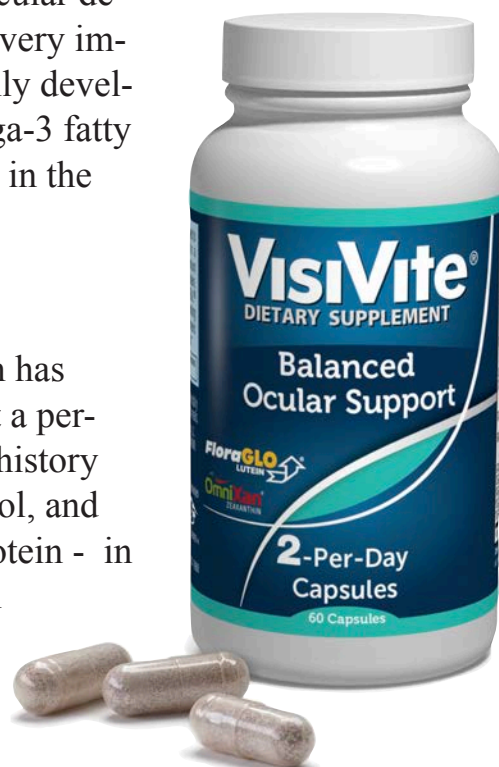
Omega-3 fatty acids include alpha-linolenic acid (ALA), docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA). Both DHA and EPA are long-chain omega-3 fatty acids that protect against oxidative, inflammatory and age-related degenerative changes. These three damaging processes result in the development of age-related macular degeneration. Furthermore, long-chain omega-3 fatty acids, and especially DHA, form a critical part of the healthy retina.

Who Should Take Omega-3 Fatty Acids based on the current study?

The current study found benefit in the prevention of macular degeneration in people that were 49 years or older. This is a very important fact. Because macular degeneration most commonly develops after age 60, this study informs us that ingesting omega-3 fatty acids at least 10 years before that has an important benefit in the prevention of a potentially blinding eye disease.

What About Lutein and Zeaxanthin?

Our understanding of what causes macular degeneration has evolved. We now know that major risk factors that predict a person’s likelihood of developing the disease include family history of macular degeneration, smoking, obesity, high cholesterol, and levels of inflammatory mediators - such as C-Reactive Protein - in the blood. Testing of blood levels of lutein and zeaxanthin are usually low in those with macular disease, which





can also be measured by macular pigment optical density (MPOD). Most eye specialists therefore recommend supplementation with lutein and zeaxanthin for those high risk factors. VisiVite's popular Balanced Ocular Support Formula is a favorite of many eye specialists because of its naturally-sourced lutein, zeaxanthin, and inclusion of several other potent antioxidants that promote macular health.



CHAPTER 5

Avastin, Lucentis & Eyelea Injection Treatment for Macular Degeneration

Poor Genentech. The company continues to make the news frequently these days. And it's not about new drug discoveries or other scientific breakthroughs that is earning the company such press, but rumors of the company being bought out, as well as the controversy that just won't go away – namely, the Lucentis versus Avastin argument.

Avastin is a chemotherapeutic drug that works against colon cancer by shrinking the new blood supply feeding the tumor. It does this by working as an antibody against vascular endothelial growth factor, also known as VEGF.

Responsibly, Genentech thought that a similar mechanism would work against the new blood vessels in wet macular degeneration, but if the drug were to be injected directly into the eye, it would have to be a smaller molecule to be able to pass through the delicate retinal tissues.

Unlike Macugen before it, Lucentis really reversed wet macular degeneration, and the United States Food and Drug Administration approved it for that purpose.

The problem? Genentech priced each injection at \$2000 U.S. Dollars per dose, and many patients with wet macular degeneration were found to need injections every one to two months.

Enter Phil Rosenfeld, a savvy fellow with a combined Ph.D. and M.D. from the world-renowned Bascom Palmer Eye Institute in Miami, Florida. Phil wondered quite curiously whether Avastin, at only \$40 per dose, might work as well as its more expensive cousin.

Although Dr. Rosenfeld's subsequent discovery that Avastin was effective versus wet macular degeneration seems like a choice of simple math, it hasn't proven to be that at all.



First of all, the FDA only approved Lucentis for AMD, not Avastin. If and when doctors want to use the latter medication, they have to inform their patients that it is an “off-label” use.

Secondly, Genentech tried to block sales of Avastin to ophthalmologists in late 2007 and early 2008. Can you blame them? Doctors were using Avastin rather than the \$2000 jewel that they spent the bank developing. And Lucentis worked! So why shouldn't they get rewarded?

The United States government, with a vested interest in the costs of health care, threatened a full senate investigation of the issue. Genentech backed down.

Of course, there are always new wrinkles in the argument. And Genentech must have been jumping for joy when discrete instances of ocular inflammation occurred in some western Canadian patients treated with Avastin. Not surprisingly, the information was rapidly spread by a myriad of news releases. But the quiet tagline on all the news releases was that Lucentis too causes internal eye inflammation in approximately 2% of patients.

I met Dr. Rosenfeld between bagels and coffee at the December 2008 Bascom Palmer Ocular Imaging conference. Phil is a small and slender man with wire rimmed eyeglasses. He has a wry smile, a terse wit, and a brilliant understanding of the medical literature and political landscape. We had a long discussion about the Pandora's Box that he opened, and where we think treatment of wet macular degeneration (Figure 8) is heading.

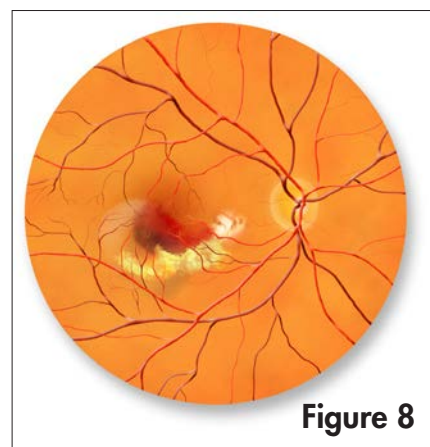


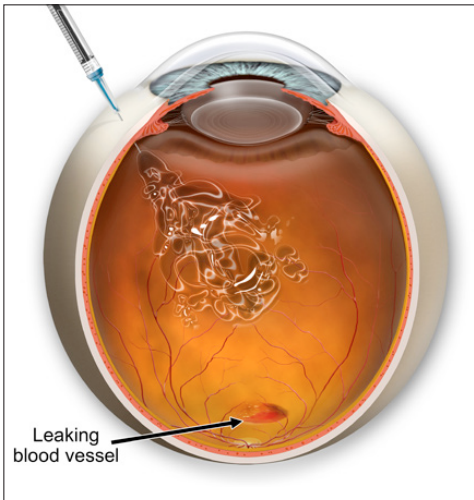
Figure 8

The bottom line is that this is not the end of the story. New compounds will surely be developed that inhibit the growth of the abnormal neovascular blood vessels that bleed into the retina with wet macular degeneration. In addition to Anti-VEGF compounds such as Avastin, Lucentis, and Eyelea, the newest compounds are known as VEGF-traps.

The idea of a “needle in the eye” sounds horrifying to people who do not have wet macular degeneration. But the reality is that the needle is tiny, the eye is numbed completely prior to injection, and most people feel little or no discomfort. The amount of medication injected is little more than a couple drops. And once someone is faced with the prospect of permanently losing the ability to read or recognize faces, they are much more amenable to these treatments.

I recommend that intraocular medication injections be performed by a retinal specialist or retinal surgeon to reduce the likelihood of infrequent complications, including vitreous hemorrhage, retinal detachment and infection.

The item that is most debated is how frequently these injections need to occur. Scientific studies are debating whether it is best to inject patients every 4-8 weeks regardless of the



amount of bleeding or fluid in the retina versus only injecting on an as-needed basis.

With the advent of medications that are actually successful against wet macular degeneration, many retinal surgeons' practices have been transformed from primarily focused on surgery to now spending more than half of their days diagnosing and injecting patients with macular degeneration.

The change in the treatment of wet macular degeneration is one of the most dramatic improvements in medicine. Only a few years ago, no treatments existed to prevent central blindness.

For patients with wet macular degeneration, who are spared this devastating consequence, the inconvenience of these treatments is an insignificant obstruction. The costs, however, currently borne by Medicare and some ethical health insurance companies, are one of the major obstacles to reducing health care costs.



CHAPTER 6

The Genetics of Macular Degeneration



Inflammation and Oxidation — the very two processes that are already known to increase the development and progression of age-related macular degeneration — have now been shown to be of much greater risk in people with genetic abnormalities, smoking and increased weight.

Stopping smoking and losing weight can be changed. But not so your genes. And until now, people have been in the dark about their real risk for developing macular degeneration.

Not any more. ArcticDx, a Canadian company, has brought to market a simple test of saliva that Greg Hines, President and CEO has stated, “will uncover 70% of people that are going to get the disease.” Greg’s hope is that armed with this new knowledge, patients will be able to more aggressively seek early treatment, and furthermore, that future treatments will be more effective in aiming toward this select genetic group.

I interviewed Greg on March 12, 2009, and he helped to clarify for me what has been discovered so far, and how the company plans to use that knowledge in the testing of patients.

Where It Started

After 13 years, the Human Genome Project was completed in 2003. Exactly 50 years after the discovery of the structure



Figure 9



of DNA by James Watson and Francis Crick (Figure 9), the HGP micro-analyzed the 25,000 genes in human DNA and provided the tools for the private sector to analyze this mountain of data.

Don't Know Genes? Here's a Simple Explanation

Everyone has heard of DNA, chromosomes and genes, but most people don't know the difference. So we're going to make it simple.

A (deoxyribonucleic acid) is the coiled molecule found in every single cell inside your body. Each DNA molecule (also known as a chromosome) contains thousands of building blocks called 'base pairs' that are linked together like a train. But unlike most trains, DNA is linked with its mirror-image buddy. Scientists refer to this as being "double stranded."

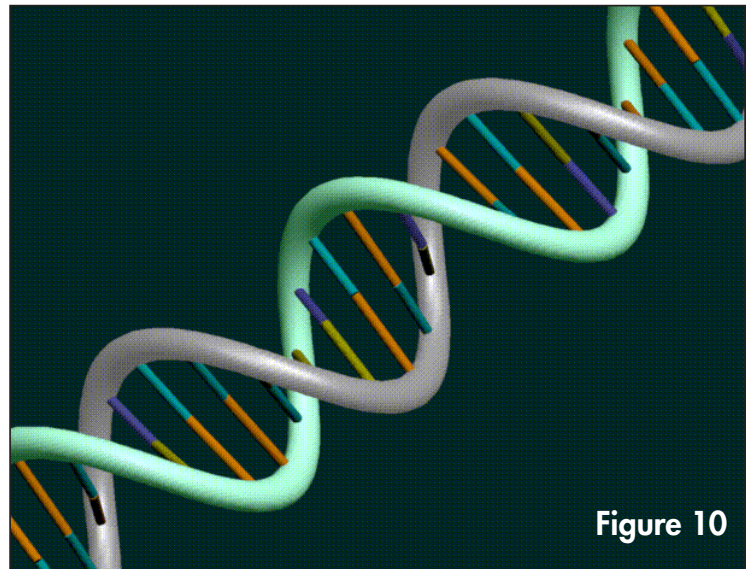


Figure 10

There isn't just one DNA molecule (Figure 10, chromosomes) in each cell, but rather 22 identical pairs of each unique DNA molecule and one pair of gender (X & Y) chromosomes.

Now it turns out that the base pair building blocks in the chromosomes are not entirely random, but rather tend to run in clusters. It's as if there is a sequence of BLUE-GREEN-GREEN-RED cars making up the first class section of every train. And this cluster, known as a gene, is what determines whether you have brown hair or red, whether you are tall or short, and whether you're going to get macular degeneration. Of course, not everyone has the same genes, so scientists refer to variations of each of these genes as 'haplotypes.'

Genes not only determine body characteristics; many of them send messages to create important molecules, including proteins, that enable the body to work efficiently and guard against diseases. Unfortunately, some people don't have the best version (haplotype) of every gene.

The First Big Breakthrough

In the spring of 2005, no fewer than four scientific studies (see Science Magazine and Proceedings Of The National Academy of Sciences) simultaneously discovered that a gene that sent a message for the body to make a protein called Complement Factor H (CFH) was highly pre-



dictive of the development of drusen and age-related macular degeneration.

The Alternative Complement Pathway is one of the body's primitive defense systems, more primitive than antibodies, that fights against disease. It consists of a cascading series of proteins that deliver activated enzymes, which in turn rupture foreign cells by damaging their protective membranes. Complement Factor H (CFH) helps this system to avoid getting out of control, making sure that the Alternative Complement Pathway fights only against pathogens and does not damage healthy body tissue.

In short, the job of Complement Factor H is to regulate the inflammation. Like a traffic cop with a blindfold, a defective CFH could allow too much inflammation, which in turn causes unintended damage to the retina and surrounding tissues.

Point proven.

Each of the four studies showed that CFH accumulated inside retinal drusen, the hallmark lesion of dry macular degeneration, and that specific variations of the CFH molecule could either confer protectiveness or increased susceptibility to macular degeneration. The researchers all found that the Y402H haplotype, which involves a single amino acid pair change on the gene region for CFH on chromosome 1, was highly associated with an increased risk of age-related macular degeneration. People with this genetic variant are two to four times more likely to get AMD.

Subsequent work by Dr. Anand Swaroop, formerly from my alma mater, the University of Michigan in Ann Arbor, and now with the National Eye Institute, showed that there were at least 80 variants (haplotypes) to the CFH gene, some protective and some harmful. The worst haplotype, worse even than Y402H, increased the risk of developing AMD by nearly 40-fold!

Other Important Information

Similar to the findings with the CFH gene, variations in the HTRA-1 (ARMS2) gene have been shown to increase the odds of developing AMD by as much as eight-fold. Unlike the complement system, these variants appear to increase oxidative stress and the likelihood of developing wet macular degeneration.

There is also a mitochondrial marker gene. The mitochondria is the structure inside our cells that generates chemical energy and performs other important tasks to maintain the health of the cell.

Smoking, an independent risk factor responsible for perhaps 10% of all cases of AMD, poses an even greater risk if the person also has the ARMS2 gene - according to Greg Hines at ArcticDx, the odds increase by 3.5 fold.



What The Macular Risk Test Can and Cannot Do

The Macula Risk cannot tell you with 100% certainty if you are going to get the disease. Rather, by assessing multiple genetic risks and other modifiable risks such as smoking and obesity (Body Mass Index), the test will tell you how your risk compares with the general population. According to Mr. Hines, the average Caucasian has a 9.8% chance of developing AMD in his or her lifetime. And ArcticDx states that Macula Risk will uncover almost 4 out of 5 people destined to get the condition.

I asked Greg whether people would really want to know this information.

“95% of people want to know,” he said, “but only if something can be done.”

And the early research supports the fact that not only will people potentially receive treatment earlier in their disease, but that some of the treatments are actually more successful in patients carrying the very genetic variation that puts them at risk.

“Presence of the CFH gene variant,” Greg said, “is related to the success of injectable Anti-VEGF therapies, such as Lucentis and Avastin.”

Our Recommendations

Many in our society are not yet ready for the powerful information that will come from the Macula Risk test. Doctors are rightfully concerned about how patients will handle this information emotionally, despite the efforts being taken to thoroughly counsel those with results of higher risk.

But despite a 2006 editorial in the professional journal, *Ophthalmology* (Volume 113, pp 509-10) which advised against testing because of unnecessarily frightening some people who might test as higher risk, but never develop the disease, we feel that the testing is much more precise than it was three years ago, and that such thinking is merely burying our heads in the sand.

We predict in the next 5 to 10 years, that people will routinely accept tests such as the Macula Risk to better educate themselves about their risks of developing diseases and conditions. We also predict that future research will focus on these select groups with genetic variations that place them at risk, thus providing greater hope for successful prevention and treatments.

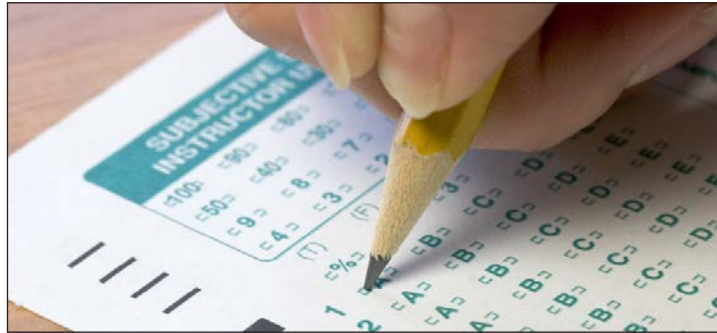
The Pandora's Box of discovering genetic risk for breast cancer, colon cancer, macular degeneration, and more, can no longer be closed. But unlike Pandora, inside the box are not evils but information, information that will serve to guide the speed and accuracy of intervention.

The biggest downside is that the information, once obtained, might fall into the hands of companies that provide medical, disability and life insurance. Armed with this information, the companies might refuse to provide coverage, or might do so only at a higher cost. Thus, similar to the accident-prone driver, the risks would not be spread equally over the entire population.



CHAPTER 7 Macular Degeneration Quiz

Do you think you know the important facts about macular degeneration? Take the following QUIZ and check your score!



- 1** Taking half the dosage of VisiVite macular degeneration supplements per day has some benefit, but not as much as taking the full dose.
TRUE OR FALSE?
- 2** Centrum Silver has many more vitamins in it than VisiVite supplements and so is probably more effective against eye disease.
TRUE OR FALSE?
- 3** The benefits of taking VisiVite nutritional supplementation for macular degeneration are usually seen by one month.
TRUE OR FALSE?
- 4** Only the “wet” form of macular degeneration can cause severe vision loss.
TRUE OR FALSE?
- 5** The carotenoids Lutein and Zeaxanthin were not included in the National Eye Institute’s Age-Related Eye Disease Study because they were not shown to be beneficial.
TRUE OR FALSE?
- 6** High doses of beta-carotene can cause osteoporosis and has been linked to increased frequency of hip fractures in women.
TRUE OR FALSE?
- 7** While the high level of Vitamin E in VisiVite macular degeneration supplements was found to be beneficial to ocular health, it was also shown to increase cardiac events and reduce lifespan.
TRUE OR FALSE?
- 8** There is no successful treatment for wet macular degeneration.
TRUE OR FALSE?

See the answers on page 33



Macular Degeneration Quiz Answers

QUESTION 1

FALSE. Many studies prior the National Eye Institute's Age Related Eye Disease Study (AREDS), which was published in 2001, looked at nutritional supplementation in preventing the progression of macular degeneration. Prior to AREDS, no study was able to show benefit. What made AREDS unique was that the DOSAGES of antioxidants and zinc were significantly higher than had been previously used. AREDS therefore showed that there is a CRITICAL MINIMUM AMOUNT of nutrients required to positively impact eye disease. There is NO DATA to support the fact that taking half the recommended regimen of VisiVite is effective.

QUESTION 2

FALSE. Centrum Silver has many nutrients in each tablet. However, the AMOUNT of each element is too low to be effective. In patients in the National Eye Institute's AREDS study, those patients that took Centrum Silver with a placebo rather than a powerful antioxidant and mineral supplement did not experience any benefit for their macular degeneration.

QUESTION 3

FALSE. The National Eye Institute's Age Related Eye Disease Study was carried on for several years before benefits were proven. Our current recommendation is to take your VisiVite macular degeneration formula for a minimum of six months before making any conclusions as to its success. If your macular degeneration stabilizes or your vision improves, you should continue to take VisiVite indefinitely.

QUESTION 4

FALSE. Certain forms of dry macular degeneration, including geographic atrophy and central drusen, can cause severe central vision loss. Dry macular degeneration can be slowed down and vision can sometimes even be improved with VisiVite macular degeneration supplements. Because there are no current treatments for dry macular degeneration, it is vitally important to take preventive nutritional supplementation.

QUESTION 5

FALSE. Carotenoids include the beta-carotene form of Vitamin A, Lutein and Zeaxanthin, among others. The National Eye Institute did not include Lutein or Zeaxanthin in the Age Related Eye Disease Study because neither of them was available in commercial form. However, the benefits of each of these compounds have since been proven in many scientific studies.



Therefore, the National Eye Institute is including both compounds in the AREDS2 Study, which will run for several years. Current VisiVite formulas that include therapeutic amounts of both of these compounds are VisiVite i-Defense Gold and Green Formulas, VisiVite E-Free Formula and VisiVite Premier Ocular Formula No. 2.

QUESTION 6

FALSE. Harvard researchers found an increased rate of hip fractures in post-menopausal women with increased RETINOL, or Vitamin A ingestion. However, beta-carotene is not Vitamin A itself, but rather a precursor form of the molecule. Harvard explicitly states that beta-carotene is SAFE for non-smokers and to seek out vitamin supplements that use this safe form rather than RETINOL. All VisiVite formulas contain beta-carotene and no retinol. More information is available at <http://www.health.harvard.edu/fhg/updates/update0303c.shtml>.

QUESTION 7

FALSE. There are many studies on the effects of Vitamin E. But the study that matters most is the National Eye Institute's Age Related Eye Disease Study, which found a LOWER incidence of cardiac related death in patients receiving the AREDS supplements which included 400 IU of Vitamin E. Importantly, not all Vitamin E is created equally. Many large manufacturers use the less expensive synthetic Vitamin E, which will be identified on the label as "DL-ALPHA" tocopherol. Natural Vitamin E, which is identified as "D-ALPHA" tocopherol, is derived from natural vegetable oils, and is generally regarded as both safer and more effective. All VisiVite formulas use only NATURAL Vitamin E.

QUESTION 8

FALSE. Previously untreatable except by direct laser burns which treated the wet macular degeneration lesion but caused an immediate loss of vision, wet macular degeneration is now a treatable disease, thanks to the efforts of pharmacologic research. Most of the promising work is focusing on medications that are injected directly into the eye, including Macugen, Avastin and Lucentis. Only Macugen and Lucentis are approved by the FDA. However, both Avastin and Lucentis have been shown to improve vision in patients with wet macular degeneration injected directly into the eye.



CHAPTER 8

Dry Eye Syndrome

Dry eye syndrome also known as keratoconjunctivitis sicca, is one of the most common problems treated by eye physicians. In the U.S., about six million women and three million men have moderate or severe symptoms of dry eye syndrome, and it is estimated that an additional 20 to 30 million people have mild cases of dry eye syndrome. Dry eye's prevalence increases with age, so that it is extremely common in older people, especially women.



Dry eye syndrome is a chronic lack of sufficient lubrication and moisture in the eye. To help keep the eyes comfortable and vision optimal, a normal, thin film of tears coats the eyes. This tear film is made up of three main layers, which are critical to a normal tear film. The tear film consists of an inner mucous layer against the eye, a middle aqueous (water) layer, and an outer lipid (oily) layer. If any of the three layers of the tear film are deficient, the eye may suffer symptoms of dry eye.



Dry Eye Syndrome Symptoms and Signs

In cases of dry eye, the following symptoms may be experienced:

- **Eye pain**
- **Excessive tearing**
- **Dry, gritty, scratchy feeling**
- **Blurred vision**
- **Burning or itching**
- **Redness**
- **Foreign body sensation**
- **Light sensitivity**

If you routinely experience any of the above symptoms, I recommend that you see your ophthalmologist or optometrist.

Causes of Dry Eye

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.

There are certain factors that contribute to Dry Eye Syndrome, although both men and women of any age may experience it :

- **Ageing** — Advancing age is the single most important risk factor for Dry Eye. Dry Eye Syndrome affects 75% of the population over the age of sixty-five years.

- **Women** — Hormonal changes brought on by pregnancy, lactation, oral contraceptives, menstruation, and post-menopause can cause Dry Eye conditions.

- **Disease** — Several diseases result in side effects of Dry Eye Syndrome: Rheumatoid Arthritis,

Diabetes, Thyroid Abnormalities, Asthma, Cataracts, Glaucoma, Lupus.

- **Medication** — Certain medications can decrease the body's ability to produce lubricating tears: Antidepressants, decongestants, antihistamines, blood pressure medication, oral contraceptives, diuretics, ulcer medication, tranquilizers, beta blockers.



- **Contact Lenses** — Dry Eye is the leading cause of contact lens discomfort or intolerance. Soft contacts, in particular, rapidly evaporate the tears from the eye, causing irritation, protein deposits, infection, and pain.
- **Environmental Conditions** — Exposure to smoke, fluorescent lights, air pollution, wind, heat, air conditioning, and dry climates can increase tear evaporation.
- **Computer Users** — Computer users spend hours staring at their terminal ignoring their normal blinking process, which is a vital function of tear production.
- **Refractive Surgery** — Candidates considering refractive surgery (i.e. RK, PRK, LASIK, LTK) should consult their Eye Care Professional regarding any dry eye risks associated with the procedure.

Diagnosis of Dry Eye Syndrome

An ophthalmologist or optometrist is usually able to diagnose dry eye by examining the eyes. Sometimes tests that measure tear production are necessary.

One test, called the Schirmer tear test, involves placing filter-paper strips under the lower eyelids to measure the rate of tear production under various conditions. Another test uses diagnostic drops to look for certain patterns of dryness on the surface of the eye.

New Treatments Bring More Comfort to Dry Eyes

The first line of treatment is usually artificial tears.

Eyedrops called artificial tears are similar to tears. They lubricate the eyes and help maintain moisture.

Preservative-free eyedrops are available for people who are sensitive to the preservatives in artificial tears. If you need to use artificial tears more than every two hours, preservative-free brands may be better for you. You can use the artificial tears as often as necessary — once or twice a day or as often as several times an hour.

Restasis eyedrops (cyclosporine in a castor oil base) go one step further: they help your eyes to increase tear production. Restasis treatment is the first of its kind. Unfortunately, a high percentage of people fail to respond to this medication.

Conserving Your Tears

Conserving your eyes' own tears is another approach to keeping the eyes moist. Tears drain out of the eye through a small channel into the nose (which is why your nose runs when you cry). Your ophthalmologist may close these channels either temporarily or permanently. The closure conserves your own tears and makes artificial tears last longer.



A new type of punctal plug made of acrylic is a small rod that becomes a soft gel when exposed to your body heat after insertion. It is designed to accommodate to the size of any punctum canal. Advantages of this type of plug are that one size fits all so measurement is unnecessary, and nothing protrudes from the tear duct that could potentially cause irritation.

Another new kind is made of a hydrogel that expands into a soft, pliable gel in the punctum canal. It has no cap, and should it need to be removed, the eyecare practitioner can simply flush it out with saline solution.

Nutritional Support

Dry Eye Relief Tear Stabilization Formula is a patented nutritional oral supplement that has been shown in ongoing studies to relieve the signs and symptoms of dry eye in 75% of affected patients. It works by improving the formation of the central aqueous layer of tears, while strengthening the outer lipid layer for reduced tear evaporation and the inner mucus layer, resulting in better tear film stability.





CHAPTER 9

Laser Cataract Surgery

Cataracts always require the use of an ultrasonic probe to vacuum the particles from the eye. What has changed since 2012 is that femtosecond laser is being used to perform the early steps of breaking up the cataract into smaller pieces. I remove cataracts by both methods. Will the laser be better or easier than the modern current purely ultrasonic methods? Not necessarily.

Cataract surgery is the most frequent surgery performed annually in the United States. Why then, with the preponderance of lasers in modern medicine, can't it be done without the need for surgery? To understand the answer to this question, you must first understand what a cataract is. First, let's dispel a couple of common myths. A cataract is not a veil that grows over the eye. Nor is it a new growth inside the eye.

Every eye has a lens (Figure 11) in its center that helps to focus light and images on the retina, the inner lining of the eye. When we are born, that lens is perfectly clear and soft like gelatin. As we age, the lens becomes harder and less clear. Exposure to ultraviolet light and diseases such as diabetes may hasten that process.

When the lens is sufficiently opaque to obstruct vision, the lens is then said to be cataractous, or more simply, a cataract. The trick to cataract surgery, then, is how to get a lens that is slightly

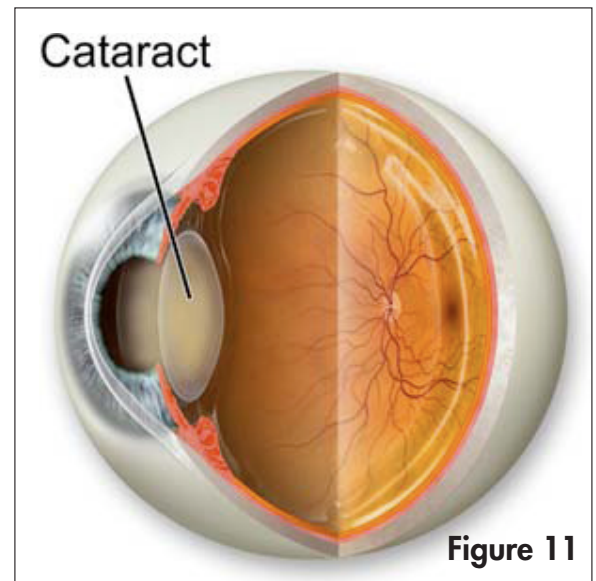


Figure 11



less than one-half inch wide out of the eye and still allow the patient to see well.

When cataract surgery was first being developed, a large surgical opening was made, the cataract was taken out in one piece, and the wound was sewn shut. The problem with these early surgeries was that when the cataract lens was removed, nothing was put back into the eye to take its place. And without a lens inside the eye, even a cataractous lens, the vision was blurred. In order to make the vision clear, patients required thick eyeglasses or contact lenses after the surgery, to replace the function of their previous lens.

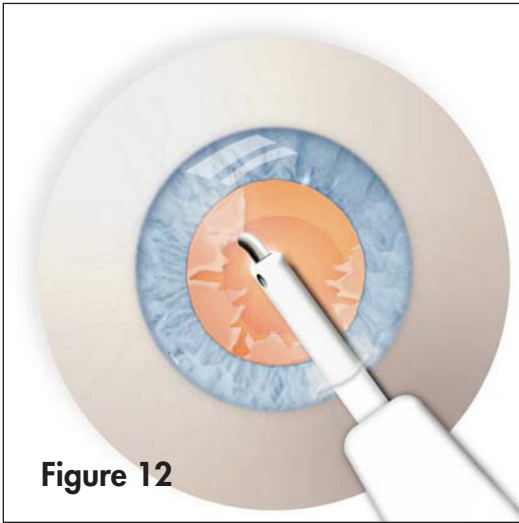


Figure 12

Eye surgery made a great advance when, after removing the cataract lens, a replacement lens was put back into the eye where the cataract previously resided. This is called a lens implant, and early intraocular lenses were made from hard acrylics.

The most recent advance in cataract surgery is “no-stitch” or small incision cataract surgery. In this procedure, a small probe (Figure 12) is placed inside the eye through a wound that is only one-eighth of an inch in diameter. Using high-energy sound waves, called ultrasound, the lens is dissolved into many small pieces, which are then vacuumed up using the same probe. Because the lens is being dissolved, or emulsified, this procedure is known as phacoemulsification.

The lens implants that are then put in are foldable, enabling them to fit through the one-eighth inch wound, but then unfolding inside the eye to their full half-inch size.

Laser cataract surgery uses invisible laser light rather than ultrasound to dissolve the cataract. But it still requires a surgical opening in the eye, just like phacoemulsification surgery. The magic to modern cataract surgery is that it allows removal of a half-inch lens through a one-eighth inch opening. But no surgery currently exists, or is anticipated, that can remove this lens without a surgical opening.

Phacoemulsification surgery of cataracts through a small incision offers patients many benefits. Because the wound is exceedingly small, often there are no stitches that can cause irritation. The small wound is strong and water tight, allowing for participation in full activities immediately after the surgery. And lastly, because the small wound doesn't drastically alter the shape of the eye, the vision often is perfectly clear much sooner than surgeries with large surgical wounds.

The next great technological advance in the treatment of cataracts is yet to come. Perhaps smaller instruments will allow for smaller wounds. Maybe a new medication will prevent the natural tendency of the lens to become opaque. But one thing is certain: modern cataract surgery has already evolved into a state-of-the-art procedure that improves the quality of life for patients worldwide.



CHAPTER 10

Intraocular Lens Choices

As you get older, the natural lens inside your eye becomes firm and opaque, reducing visual clarity, decreasing contrast details, and causing glare. When the lens begins to reduce vision, it is known as a cataractous lens, or a “cataract,” for short.

During cataract surgery, the lens is dissolved using ultrasound and vacuumed out of the eye. In its place, your eye surgeon places an intraocular lens implant.

Cataract surgery using a no-stitch technique represents a wonderful opportunity for you to both improve vision AND become less dependent upon glasses.

This article explains the advantages, disadvantages, and costs of the basic and premium intraocular lens implants available to you. Based upon your examination findings, your eye surgeon will make a recommendation of which lens or lenses are most appropriate for you.

Basic Monofocal Lens

The prefix, “mono” means one, and a monofocal intraocular lens (Figure 14) works best at one distance. In most cases, the lens is calculated to give good distance vision so that the patient will need eyeglasses to see objects that are close. With a monofocal lens, it is possible that you will need eyeglasses for both near (reading, needlepoint) and intermediate (computer, seeing prices in a store, viewing a picture on a wall) distances.

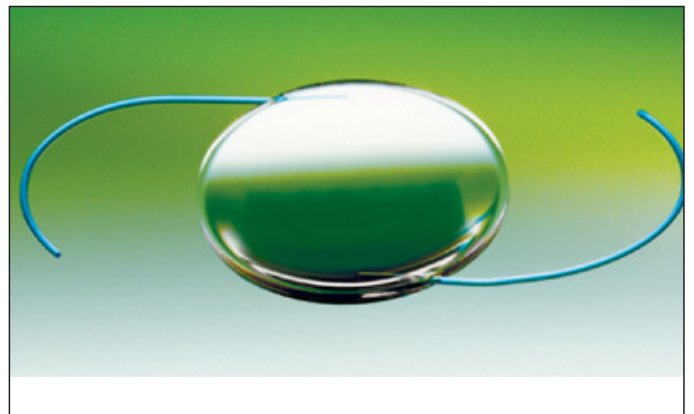


Figure 14



The monofocal lens is the only intraocular lens implant that is completely paid for by Medicare and other insurance companies.

Patients who choose this lens do so either because they are cost-conscious or because the eye surgeon recommends it due to other ocular health issues.

In addition, not all surgeons are certified to perform the premium lens technologies listed below.

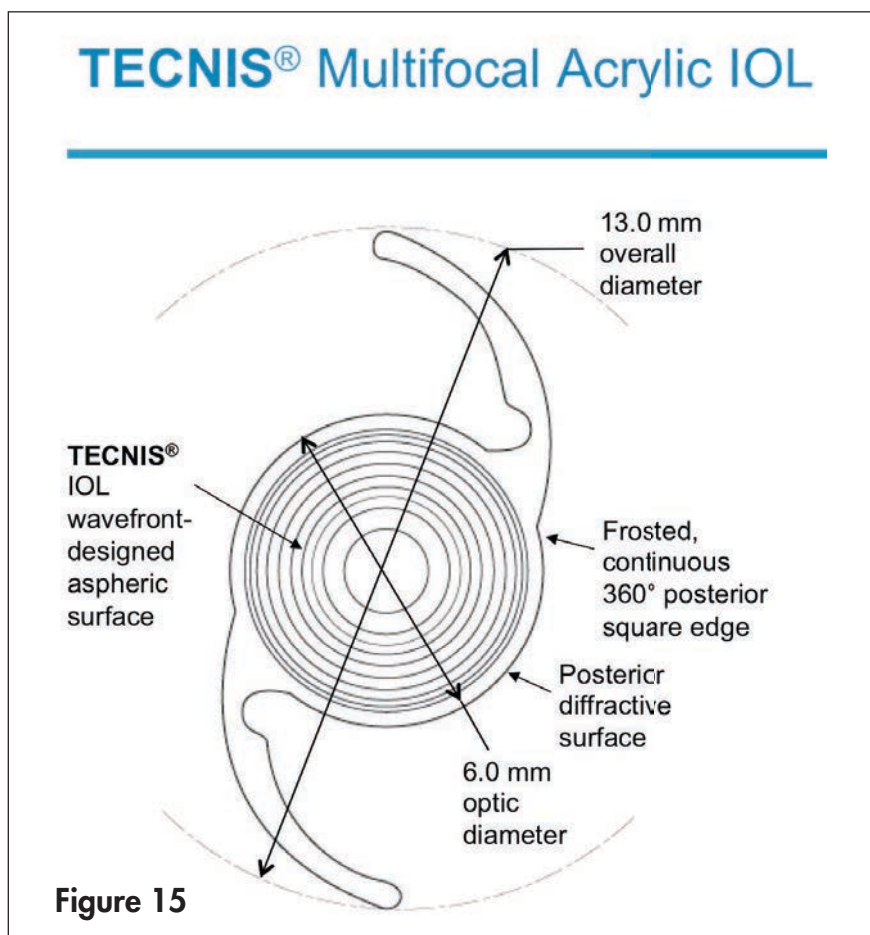
Multifocal Lenses

The prefix, “multi” means many, and a multifocal lens works at many different distances. There are two popular models of multifocal lenses, the Tecnis Multifocal and the Alcon ReSTOR. Both lenses have a series of rings in the lens that create different points of focus in the back of the eye.

Tecnis and ReSTOR multifocal intraocular lens implants

Patients who have Tecnis multifocal lenses (Figure 15) implanted are less dependent upon glasses than patients with monofocal lenses. Because of the ring design, patients sometimes have increased glare at night that cannot be predicted before surgery.

Patients who have ReSTOR lenses (Figure 16) implanted are also less dependent upon glasses than patients with monofocal lenses. The ReSTOR lens works best for distance and near vision. Some patients who have ReSTOR lenses implanted often require an eyeglass for intermediate vision, such as seeing prices on a store shelf. Additionally because of the ring design, patients sometimes complain about reduced contrast on bright days, when their pupils are small.





Medicare and supplemental insurers and other insurance companies pay for a portion of the cataract surgery. However, they do not pay for the additional costs associated with implanting the Tecnis or ReSTOR lens.

Flexible Accommodating Crystalens

Accommodation is the ability to focus on near and intermediate distances due to the actions of the focusing muscle of the eye. And Crystalens is the only FDA approved intraocular lens that provides patients with the ability to focus naturally. Despite marketing to the contrary, several studies show that the lens does not move or accommodate.



Figure 16

Patients who have Crystalenses (Figure 17) implanted are also less dependent upon glasses than patients with monofocal lenses. The smooth, clear optic of the Crystalens provides clear and undistorted vision, with excellent contrast and outstanding clarity of color and details.

Approximately 50% of Crystalens patients never use glasses, and over 95% percent of Crystalens patients rarely use glasses. Crystalens does not provide very close vision, such as reading very fine print on medicine bottles. But for many near and intermediate tasks, vision is superb.

Crystalens is a deluxe lens implant technology favored by many patients. Posterior capsule opacification, which can cause blurring after surgery that requires treatment with laser light, frequently occurs with Crystalens.

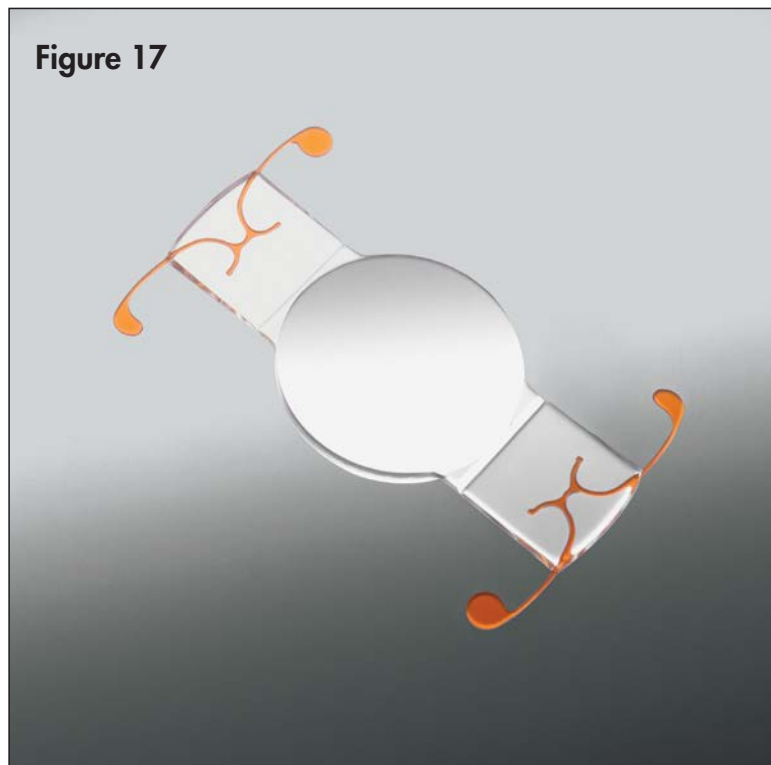


Figure 17

Medicare and supplemental insurers and other insurance companies pay for a portion of the cataract surgery. However, they do not pay for the additional costs associated with implanting the Crystalens.

Toric Intraocular Lens Implant — For Patients with High Astigmatism

Toric intraocular lenses (Figure 18) correct astigmatism, which is the oval shape of the eye that causes visual blurring.

While wearing strong eyeglasses after



cataract surgery to correct your astigmatism is an option, cataract surgery with the toric intraocular lens implant provides you with an opportunity to be more independent of eyeglasses after surgery.

Most patients with astigmatism who have the toric lens implanted do not require eyeglasses for distance vision. However, eyeglasses will be required for close vision.

Medicare and supplemental insurers and other insurance companies pay for a portion of the cataract surgery. However, they do not pay for the additional costs associated with implanting the toric lens implant.



Figure 18



CHAPTER 11

Clear Lensectomy: The Lasik Alternative

Each week, two to three baby boomers over the age of fifty years old ask me about surgical alternatives to wearing glasses. And typically, their questions center on Lasik (laser vision correction).

I don't recommend that the over-50 crowd undergo that procedure. Fortunately, there is a different surgical alternative that has even greater benefits.

It is called Clear Lensectomy.

Lasik and PRK are wonderful procedures for adults aged 21 to 50 in order to reduce or eliminate their dependence on eyeglasses and contact lenses. The computerized laser re-shapes the cornea on the surface of the eye, and can correct near-sightedness, far-sightedness, and astigmatism. Both Lasik and PRK take only a few minutes per eye and are painless. Some patients are better candidates for one or the other procedure. Both use a computer-controlled laser light, making their predictability nearly as close to grinding an eyeglass lens.





But Baby Boomers are another story.

Because the natural lens inside their eyes is slowly developing into a cataract which will require surgery in subsequent years, they'll need two surgeries within a relatively short time. And while Lasik and PRK help distance vision, it's at the expense of reading vision. Near-sighted adults, who are able to read without glasses before surgery, are frequently bothered by the loss of near vision post-operatively.

Clear Lensectomy is the removal of the natural lens before it becomes a cataract, and then replacement of the natural lens with an artificial lens implant.

There are several benefits to Clear Lensectomy.

1. Technologically Advanced Cataract Surgery is now widely available, in which new lens implant technologies (Figure 19) can correct near-sightedness, far-sightedness, astigmatism, and age-related difficulties with close vision. Dependence on eyeglasses or contact lenses is usually reduced, and often eliminated with these techniques.

2. Unlike having Laser Vision Correction now and Cataract Surgery later, Clear Lensectomy requires only one surgical procedure.

3. Clear Lensectomy gently removes your natural lens. Thus, future cataract surgery is unnecessary.

4. Because your natural lens is soft and easily dissolved with ultrasound, Clear Lensectomy is an especially fast and easy procedure.

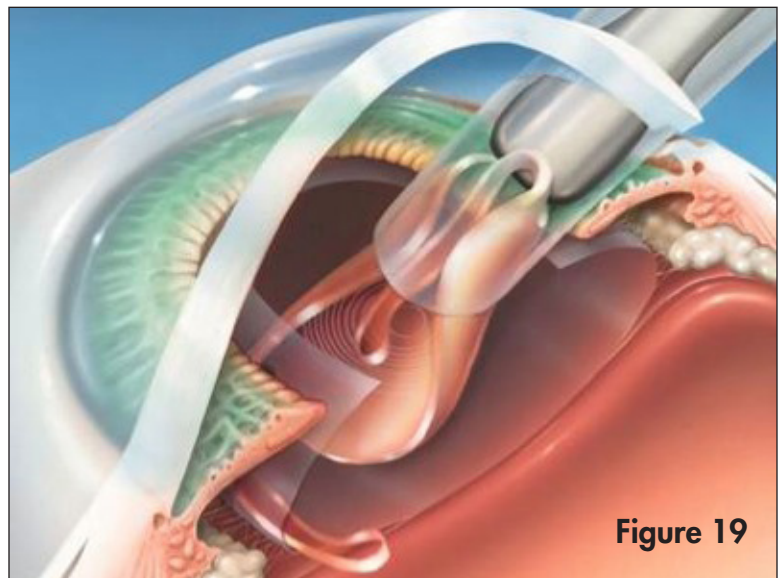


Figure 19



CHAPTER 12

Why do Flomax commercials contain a warning about Cataract Surgery?

There is a drug side effect that is adversely affecting the treatment of cataracts by making the surgery more difficult and increasing the likelihood of surgical complications.

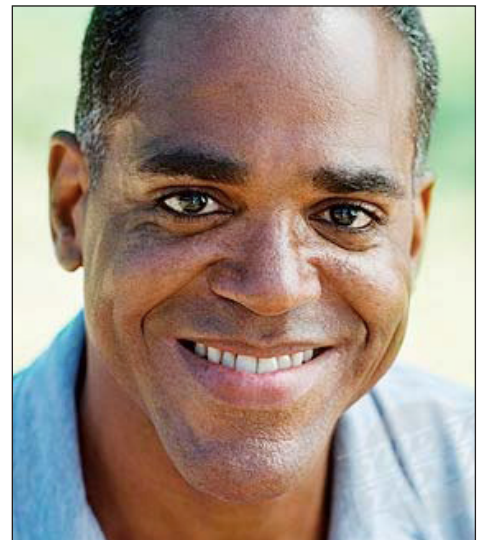
The drug causing this ubiquitous problem is FLOMAX.

FLOMAX works to relieve the symptoms of benign prostatic hypertrophy by relaxing smooth muscle. It's an alpha-1 adrenergic antagonist, and has a particular affinity for the sub-type alpha-1A receptors.

But as a side effect, it reduces the function of the radial iris dilator muscle, which is also specifically sensitive to alpha-1A adrenergic receptors.

Most of the tasks of cataract surgery are performed behind the pupil. As a rule, cataract surgery is safer with a large, dilated pupil because it improves the surgical exposure.

Unfortunately, the deleterious effects related to FLOMAX and eye surgery are often irreversible. It not only reduces pupil dilation, but there is a loss of dilator tone combined with tissue atrophy of the iris, resulting in INTRAOPERATIVE FLOPPY IRIS SYNDROME, also known by the acro-





nym of IFIS (Cataract & Refractive Surgery Today, April 2005, pp 64-68).

Until just 2007, this was an unrecognized syndrome. It was fortuitously discovered by an eye surgeon in California, David Chang, at the University of California at San Diego.

Since that time, eye surgeons have had to make drastic modifications in technique to compensate for tiny pupils while at the same time preventing iris tissue from prolapsing through even the tiniest surgical incisions. The result is a longer and often more traumatic surgery, with an increased rate of complications.

Other oral medications for prostate hypertrophy can have a similar effect, but because they are not specific to alpha-1A adrenergic receptors, their effect is less severe. These include HYTRIN, CARDURA AND UROXATRAL. Another medication for BPH that has a different mechanism of action is AVODART.

Male patients who are being treated for benign prostatic hypertrophy but who have not yet undergone cataract surgery may wish to discuss these issues with their urologists. Specifically, the doctor might wish to consider an alternative therapy to Flomax if other medications without specific activity against alpha-adrenergic-1A receptors are deemed safe and effective.



CHAPTER 13

Diabetes Mellitus and The Eye

Insulin, a hormone manufactured by the islet cells in the Pancreas, is critical to good health. Insulin doesn't dissolve glucose; rather, it moves glucose (simple sugar) out of the bloodstream and into the cells in muscle and the liver, where it is converted into glycogen, an energy storage molecule.

There are two forms of Diabetes, which adversely affect the action of Insulin:

Type I, or Insulin Dependent Diabetes Mellitus: 80% of these cases are in children with no family history. Believed to be viral in origin or possibly related to not enough exposure to bacterial antigens due to an overly sterile childhood, the pancreas in Type I Diabetes mellitus makes very little or no insulin.

Without insulin, the glucose fails to be stored as fat, and can not only rise to very high levels, but be converted to dangerous acidic compounds, resulting in a dangerous condition called metabolic acidosis.

Insulin Dependent Diabetes mellitus requires insulin be brought in externally to the body, either via periodic injections, an insulin pump, or inhalation.





Type II or Non-Insulin Dependent Diabetes mellitus occurs most commonly in adults with a family history of the disease, obesity, or both. Unlike Type I Diabetes mellitus, Type II Diabetes can usually be controlled with oral medications and diet. Although metabolic acidosis is not usually a complication of Type II Diabetes, glucose levels can be much higher, especially on initial diagnosis. It is not unusual to have glucose levels of several hundred milligrams per deciliter (normal glucose levels are 70-120 mg/dl).

Both Type I and Type II Diabetes mellitus can damage the eye, particularly if glucose is routinely uncontrolled. The most common complications that can occur are cataracts and diabetic retinopathy. Less common are traction retinal detachments and neovascular glaucoma.

What is Diabetic Retinopathy?

Diabetes, when uncontrolled, damages the delicate inner lining of the smallest arteries and capillaries (blood vessels) in the body. These small blood vessels are found in the distal extremities (toes), kidney, heart and eyes.

In the early stages of diabetic retinopathy, the small blood vessels become weak, forming tiny balloons along their walls called microaneurysms. Later, the weak blood vessels can weaken further, leaking plasma, protein and blood which can dramatically worsen central vision. This early stage is known as Background Diabetic Retinopathy (Figure 20).

Treatment for Background Diabetic retinopathy is performed using laser cauterization (Figure 21) if the leaks are threatening or reducing central vision, and sometime injection of steroids or Anti-VEGF inhibitors into the vitreous gel if the leaks are unresponsive to laser or are too close to the center of the retina to treat.

Diagnosis of diabetic retinopathy is best performed by an ophthalmologist (M.D.) or optometrist (O.D.) using direct visualization, optical coherence tomography (OCT) or fluorescein angiography.

Fluorescein angiography is a simple and highly informative test. A water soluble dye is injected into a vein in one of the patient's arms. The dye circulates everywhere (Figure 22), includ-

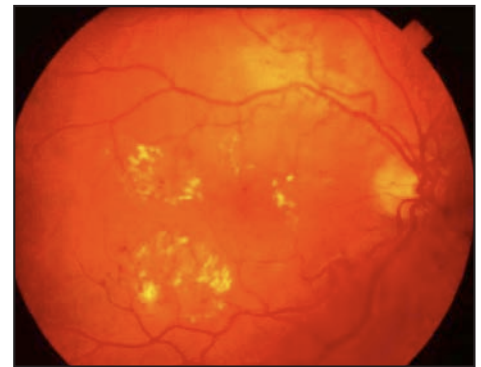


Figure 20

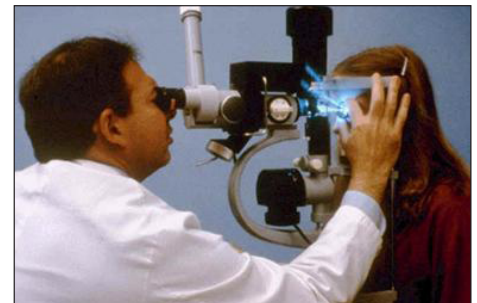


Figure 21

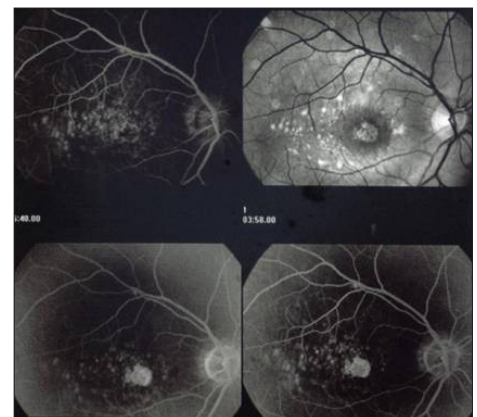


Figure 22



ing into the eye. A precise microscopic camera creates a flash using a blue filter. This excites the dye, which causes it to glow green. Photographs are then taken of the green-glowing dye as it circulates throughout the retina. If there is a small leak from a tiny blood vessel, it will be readily seen and can then be treated accurately using laser by the eye doctor.

Background diabetic retinopathy does not occur immediately, but rather 5-10 years after the onset of disease, if the glucose levels fail to be controlled. Damage to the small blood vessels is permanent; therefore it is not uncommon to require repeated laser treatments over several years once background diabetic retinopathy has begun.

Proliferative Diabetic Retinopathy (PDR)

The more aggressive form of diabetic retinopathy is the proliferative form (Figure 23). This occurs due to the tiny blood vessels closing off, creating small areas of the retina that are not obtaining enough oxygen. In response, there is formation of abnormal new and very fragile blood vessels, which is called neovascular growth. Rather than being helpful in bringing oxygen to the retina, these neovascular vessels form a disorganized tangle that not only leak large amounts of blood and plasma, but can contract, lifting off the retina and creating a traction retinal detachment.

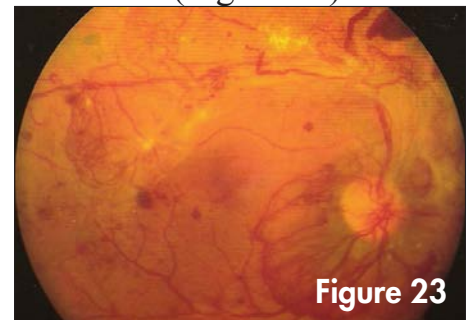


Figure 23

Treatment of PDR is aimed at reducing the oxygen need of the non-critical areas of the retina using hundreds of peripheral laser burns (PRP, or pan-retinal photocoagulation) and in reducing the chemical signal to form these blood vessels by injecting Avastin or Lucentis into the vitreous gel.

In advanced cases of proliferative diabetic retinopathy, a retinal surgeon may be required to evacuate blood inside the vitreous or to repair the traction retinal detachment.

In Summary

Because the consequences of diabetic retinopathy are so severe if the disease remains uncontrolled, it is my recommendation that you take the following measures if you have diabetes mellitus:

1. Obtain Hemoglobin A1c levels every three months.

This tracks your overall glucose control. Non-diabetics have Hemoglobin A1c levels less than 6%. The American Diabetes Association recommends a Hemoglobin A1c level of less than 7%, while the American Association of Clinical Endocrinologists recommends a level of less than 6.5%. The following table is instructive in correlating Hemoglobin A1c levels with average



glucose levels:

A1c (%)	Mean blood sugar (mg/dl)
6	135
7	170
8	205
9	240
10	275
11	310
12	345

2. Watch Your Diet and Your Weight

The percentage of Americans who are obese, as measured by Body Mass Index (BMI) is over 30%. Twenty years ago it was only 18%. This is a direct effect of our changing diet, and not just the convenience of fast food, but additionally the preponderance of processed carbohydrates and high caloric fat products that populate the grocery store aisles.

David Kessler, the former head of the Food and Drug Administration has written a book entitled, *The End of Overeating: Taking Control of the Insatiable American Appetite*. His premise is that the food scientists that work for the companies that manufacture processed and cooked foods have mastered the science of combining fat, sugar and salt into a concoction that creates food cravings with resultant overeating.

Do what I did to lose 30 pounds – join Weight Watchers and do most of your shopping along the perimeter of the grocery stores where the food scientists can't hurt you – fish, chicken, skim milk, fruits and vegetables and fat free cheeses.

3. See an endocrinologist

Primary doctors cannot be entirely blamed for wanting to care for your every illness. But if your Hemoglobin A1c is more than 6.5%, you need to gently suggest to him or her that it is time to put the treatment of your diabetes in the hands of a good endocrinologist.

Diabetes mellitus is the bread-and-butter illness for endocrinologists. They will help you to reign in your diet, instruct you when and how many times to measure your blood sugar, and are more likely to be obsessive about following your laboratory results and less inhibited about telling you when you're not doing as well as you could.



A good endocrinologist takes a personal interest in your diabetes control and administers “tough love.”

4. Get regular eye examinations

If you do not yet have diabetic retinopathy, examinations should be performed annually at least. If you do have diabetic retinopathy, examinations and treatments can range between every month to every six months.

Seek an ophthalmologist or optometrist who sees a lot of diabetics and performs Optical Coherence Tomography, Digital Retinal Photography and Fluorescein Angiograms, since these are frequent diagnostic tests required for this condition.

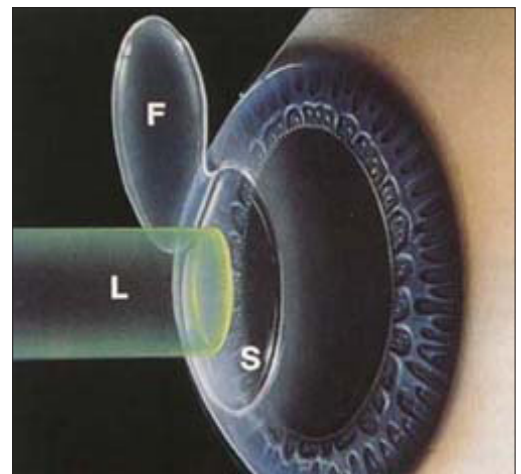


CHAPTER 14

Lasik and Laser Refractive Surgery

Laser treatment to treat near-sightedness, far-sightedness and astigmatism, is not benign. All of the available treatments for this condition have the potential to dramatically improve vision at distance. Worldwide, there is a 95% satisfaction with these treatments.

But considering that the treatment is being performed on healthy eyes, the 5% of patients who are dissatisfied is a high number. And most alarming, most of these people have excellent visual acuity as measured by an eye chart.



You Can't Have It All

In young people between age 21 and 40 who still maintain their ability to see up close, even while wearing their eyeglasses or contact lenses, Laser Vision Correction can improve distance vision without adversely affecting near vision.

But beginning at age 40, and continuing until age 70, there is progressive hardening of the natural lens inside the eye. This makes the lens less capable of changing shape during focusing, resulting in decreased ability to read with increasing age. This process is known as presbyopia (Figure 24), and Benjamin Franklin invented bifocals in 1760 to cope with this condition.

Nearsighted or myopic people who take off their glasses to read also develop presbyopia.

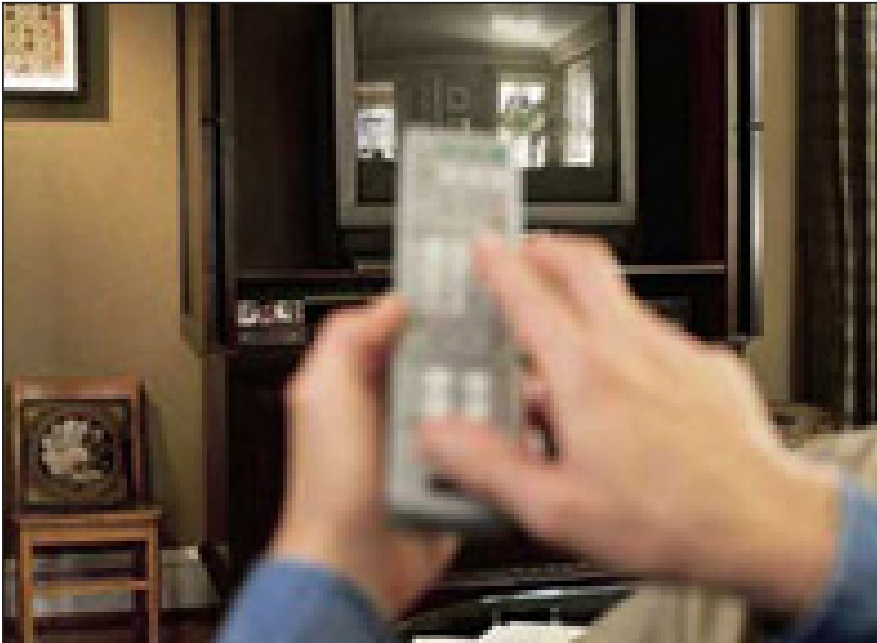


Figure 24

But the symptoms are hidden from them until they wear their contact lenses or distance eyeglasses. This is because their natural focal point is close to the eye and they don't require their focusing muscles to work to make this distance clear to them. Unfortunately, nearsighted people often poorly understand the consequences of Lasik, believing that they will obtain distance vision while having little effect on their near vision.

Because Laser Vision Correction is primarily designed to correct distance vision, in nearsighted people,

there is a tradeoff between gaining distance vision and losing near vision, especially after age 40. In essence, Laser Vision Correction makes the nearsighted person a "normal sighted" person. And since normal sighted (emmetropic) people require reading glasses or bifocals beginning around age 40-45, the same will be true for myopic people after Laser Vision Correction.

The use of contact lenses to the prospective myope what his or her vision will be like following laser vision correction is a very good idea if the doctor is not convinced that the patient understands this future handicap. The loss of the ability to read in bed or see near vision details, such as text on a cellular phone without the aid of reading glasses, can be upsetting for people who have enjoyed this capability for many years.

Some doctors will purposely under-correct one of the eyes with laser, leaving the eye slightly nearsighted so that some near and intermediate vision is possible without the use of glasses. This is called "monovision" (one eye corrected for distance, the other for near work). However, it is not always well tolerated, and even in patients who do tolerate it, there is a tradeoff in distance clarity compared with having both eyes corrected for distance vision.

Patients who are treated using a monovision technique have to be exquisitely careful when driving a car to make sure that the rear view mirrors are aligned with the distance corrected eye. And patients who are symptomatically blurry with monovision, but who don't want to give up the ability to read without glasses, should wear eyeglasses when driving, with a clear lens in front of the distance corrected eye and a prescription lens in front of the near corrected eye.



Different Types of Laser Vision Correction

Lasik

Lasik, or laser in-situ keratomileusis, is a two-step procedure in which a sliver of the cornea is angled backward while the laser is applied underneath. The thin sliver of cornea is then placed back onto the surface.

The sliver of cornea can be created using a metal oscillating blade (Figure 25, microkeratome) or a separate laser known as Intralase (Figure 26). The latter is, in my opinion, more precise and creates a better-fitting flap. However, a minority of eye surgeons are certified in its use.

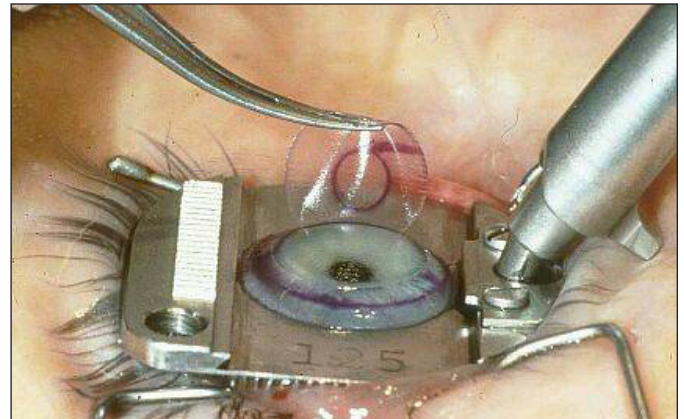


Figure 25

The actual laser reshaping of the cornea underneath the flap is performed with an Excimer laser using a computer controlled ultraviolet beam of light that reshapes the cornea, or outer window of the eye, in an effort to allow light to focus more directly on the retina. The Excimer has been used since the early 1980's and underwent numerous clinical trials since that time to refine its use and determine its safety and effectiveness. Now in its third decade of use, the Excimer laser is routinely used to treat nearsightedness, farsightedness and astigmatism.

Each pulse of the laser disrupts the molecular bonds between the corneal cells with accuracy up to 0.00004 of an inch, which makes it extremely accurate. Often, tissue measuring about 1/2 the thickness of a human hair is removed to achieve the proper amount of correction.

The Excimer laser produces a cool or non-thermal light beam. This makes it ideal for corneal surgery because it eliminates the possibility of thermal damage to surrounding tissue. Its accuracy provides surgeons with a tool that can deliver highly predictable results.

Epi-Lasik

Epi-Lasik is similar to Lasik, but creates a much thinner flap of tissue compared with Lasik. The recovery from this procedure is similar to PRK, listed below.

PRK

In PRK (photorefractive keratectomy), the Excimer layer is used exclusively to reshape the cornea. To accomplish this, the surface layer of the cornea, known as epithelium, is also removed. Although the PRK procedure itself is painless, patients may experience blurry or hazy



Figure 26



vision for one to five days afterward and variable discomfort until the epithelium heals and covers the treated area. Final visual results may be realized anywhere from several days to a month or more. Anti-inflammatory eyedrops are taken for one to three months. Like Lasik, PRK is often used to treat low to moderate amounts of nearsightedness, farsightedness and astigmatism, but because it spares more cornea tissue than Lasik, it is often used to treat higher refractive errors as well.

My Recommendations:

Laser vision correction is a fabulous procedure for a large majority of patients. And even in those patients in whom the outcome is less than perfect, the advantages of not having to deal with strong glasses and uncomfortable contact lenses can be dramatic.

Glare, a frequent published side effect of laser vision correction, is less pronounced than in previous years with the advent of custom computer algorithms. But glare is a universal occurrence in all natural optical systems. Patients who wear strong glasses or contact lenses have glare. And glare exists, to some extent, in all patients who undergo laser vision correction, even when it is perfectly performed.

It is not necessarily true that the highest volume Lasik surgeons have the best results. In fact, in many of these practices, there is a lack of contact with the surgeon both before and after the procedure. Measurements are often performed by ancillary staff, and the post-operative care often does not involve a physician. Because laser vision correction is largely an automated procedure, I recommend that you seek the care of a physician who is actively involved in the pre and post-operative care.



CHAPTER 15

Why a Proper Contact Lens Fitting Isn't Free



The most common reason people fail in contact lenses due to discomfort or poor vision is an improper contact lens fit or prescription.

Unlike eyeglasses, contact lenses are considered a medical device that rests upon the surface of the eye. And because each person's eyes has a unique shape and prescription, proper contact lens prescribing by an ophthalmologist or optometrist involves selecting from the universe of thousands of contact lenses to find the contact lenses that are best for you.

Unfortunately, due to the plethora of advertising in beauty magazines and television, many patients are under the mistaken impression that they can walk into a doctor's office and a few minutes later be handed a contact lens prescription. And one of the painful aspects of a good contact lens fit is that most health insurance companies do not consider contact lenses to be a medical necessity, thus the patient often has to pay out of his or her pocket.

But my advice is to not skimp on a good contact lens fitting by going to a discount store that hands you boxes of lenses without adequate time and attention spent to fitting you and educating you in the correct use of contact lenses.



CHAPTER 16.

Why Pro Athletes Wear Contact Lenses



The latest technological advances have made contact lenses a good choice for anyone who wants to wear them. There are many benefits to contact lenses, including:

- **Contacts move with your eye, allowing a natural field of view.**
- **There are no frames to block your vision, and they reduce distortions that you get with eyeglasses.**
- **They don't fog up, or get splattered by mud or rain.**
- **Contact lenses don't get in the way of your activities.**
- **Many people prefer the way they look in contacts.**
- **Because there is no visual distortion with contact lenses, they have the ability to provide clearer vision than eyeglasses.**



It should come as no surprise then, that most professional athletes choose contact lenses rather than eyeglasses.

First, contact lenses must correct your vision problem. If you are near-sighted, far-sighted, or have astigmatism, contacts will allow you to see clearly and comfortably. Second, each lens must properly fit your cornea, so contact lenses come in thousands of sizes, shapes, and powers. A good contact lens specialist will evaluate your eyes to determine which lens is right for you, and will take into account your special needs such as dry eyes, or problems with focusing at near, called presbyopia, which usually starts in your forties.

Presbyopia is a vision condition in which the crystalline lens of your eye loses its flexibility. That makes it difficult to focus on close objects. It may seem to occur suddenly, but the loss of focusing actually takes place gradually over a period of time. It is a natural part of aging, and occurs in everyone. It is not a disease, and it cannot be prevented. Some signs of presbyopia include the need to hold reading material further away, blurry vision at your normal reading distance, and eyestrain or headaches after doing a lot of close or computer work.

To help you compensate for presbyopia, you may be prescribed reading glasses, bifocals, progressive eyeglasses, or contact lenses. If you already wear contact lenses, the options include wearing reading glasses over your lenses, or trying monovision or multifocal contacts. Monovision means wearing a contact lens for near vision in one eye and, if needed, a distance lens in the other eye. Multifocal contacts are also very popular and many people prefer these for both distance and reading.

Many contact lens types are available, including:

- **Bifocal (Multifocal) Contact Lenses-provide both good near and distance vision**
- **Colored Contact Lenses-enhance your natural color or completely change your eye color**
- **Disposable Contact Lenses-a healthier lens option, especially for young wearers**
- **Extended Wear Contact Lenses-for safer overnight wear or naps**
- **Gas Permeable Contact Lenses-for the ultimate in crisp vision**
- **Monovision-might work if bifocal contact lenses don't**
- **Prosthetic Contact Lenses-mask eye injury or disfigurements**
- **Silicone Hydrogel Contacts-transmit more oxygen to your eyes**
- **Specialty Lenses-when good vision is not possible with glasses**
- **Toric Contact Lenses-clearer vision if you have astigmatism**

Final Advice

When getting fit for contact lenses, seek the care of an eye care professional who keeps up with the latest technology in contact lenses. Like all other health care issues, contact lens materials and designs change frequently, with improvements in comfort, vision and ocular health.