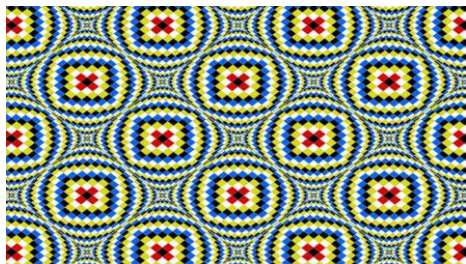


There's Something Wrong With My Eyes!



Dianna Graves, BS Ed, COMT has no financial relationships to disclose. She is an Independent Continuing Education Consultant.



Changes Systemic Medications Can Cause With The Eye or Vision

- Color Vision
- Pigmentary Changes
- Lens or Cornea Keratopathies
- Increased IOP
- Retinal Toxicity
- Nystagmus, EOM Palsy or Diplopia
- Visual Acuity
- Pupil Dilation
- Dry Eyes
- Hallucinations



springerimages.com

Color Vision: Bull's Eye Maculopathy

Ethambutol (TB medicine) can cause a decrease in vision, central visual field defects, and decreased color vision.

***Chloroquine** (Aralen phosphate) and **Hydroxychloroquine** (Plaquenil sulfate) were first used to treat malaria. It was then found to be effective for rheumatoid arthritis, lupus and other autoimmune diseases. Anti malarials can also cause whorl pattern opacities in the cornea, as well as retinal pigmentary degeneration. Early macular toxicity can cause a granular pigmentation to occur.



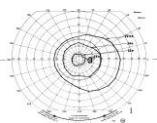
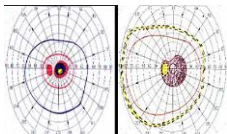
pesudovs.com

Chloroquine vs Hydroxychloroquine

Chloroquine (used to treat malaria, RA and Lupus) tends to be more toxic than **Hydroxychloroquine**.

The risk of irreversible retina damage is dose dependent. Toxic macular changes are seen as a Bull's Eye maculopathy starts with fine, pigmentary mottling at the macula.

The end result can range from reduced vision to possible blindness.

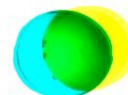


Viagra, Cialis or Levitra

Many users of Viagra find that they can't visually distinguish the differences between the colors blue and green.

Many more get what is known as "blue vision". This side effect causes the patient to see everything with a blue tint.

The side effects are short lived and generally peak within 1-2 hours after the drug is taken.



Visual disturbances can occur because they block the photoreceptors causing difficulties problems with seeing blue and green. Pilots & emergency drivers need to see yellow and green lights (and blue for runway lights) and need to be cautioned !!



Who will have color vision changes???

- 3 % of men taking doses of 25-50 mg
- 11 % taking 100 mg doses
- 50 % of men taking 200 mg
- 100% of men taking 600 to 800 mg

Digitalis

Digitalis (comes from a plant called *Foxglove*). It is an anti-arrhythmic medicine used to control heart rate, especially AFIB and Congestive Heart Failure (CHF). Another common heart med is Digoxin. Digitalis toxicity can cause: anorexia, nausea, vomiting /diarrhea, **xanthopsia** (yellow vision), and blurry halos.



Vision-simulator tripod

Lens Changes

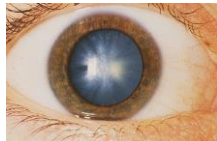
Cataracts can occur with phenothiazines and antipsychotic medicines.

Chlorpromazine HCL

(Thorazine) and **Thioridazine (Mellaril)** can cause also

cause pigmentary changes

in the cornea and conjunctiva as well as anterior subcapsular cataracts. Thorazine rarely affects the retina, but Mellaril may create pigment changes than can cause a decrease in vision and color vision.



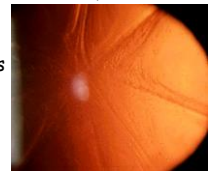
quizeit.com

Corticosteroids (Prednisone (Deltasone) and Aristocort (Triamcinolone))

Corticosteroids are used to treat inflammatory and allergic conditions. They are very effective for acute disease as well as chronic conditions (asthma and chronic obstructive pulmonary disease (COPD)).

Cataracts resulting from steroid use are well known and can occur with topical, systemic, and inhaled steroid use.

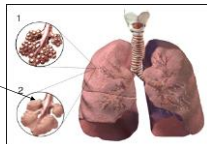
Posterior subcapsular (PSC) opacity is most frequently seen.



Prednisone

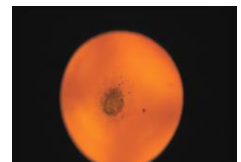
Oral, inhaled, eye drops or IV steroids are most commonly used for asthma or emphysema attacks. Emphysema is the gradual destruction of the alveoli in the lungs. Prednisone is also used as an anti-inflammatory for arthritis.

Chronic steroid use can lead to **glaucoma** and/or **cataracts**. The glaucoma is treatable with medication with the pressure usually returning to normal levels once the steroids are stopped.



activeforever.com

Cataracts are the other complication. The typical steroid induced cataract is a PSC cataract and develops on the back surface of the lens. These can occur rapidly and quickly become visually significant. Glare is the number one patient complaint.



old.eyenews.ru

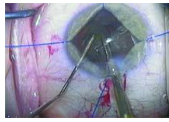


Tamsulosin (Flomax)

You need to ask your patients if they have **ever** used Flomax especially if the patient is being evaluated for cataracts. Flomax is used by men to treat prostate enlargement and improve urinary flow .

Women use Flomax when they have a problem with spontaneous urination. The most common side effect is **intra-operative floppy iris syndrome** (more prone to prolapse during surgery).

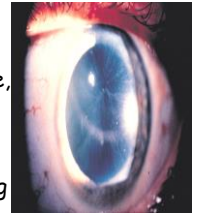
Even after the Flomax is discontinued, the patient is at a **lifetime** risk of IOFI syndrome.



Cornea Keratopathies & Keratitis

• Multiple drugs can cause corneal keratopathies, as well as lens deposits, including Chloroquine, Hydroxychloroquine, and **Amiodarone**.

• **Whorl patterns** occurs in the corneal epithelium. They appear in nearly 100% of patients taking Amiodarone for more than (6) months. The whorls disappear within months of discontinuing the medication.

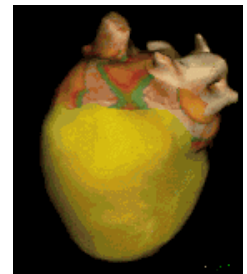
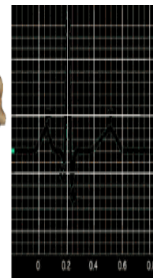


Amiodarone

Anti-arrhythmic drug suppress **abnormal** heart rhythms (*cardiac arrhythmias*) i.e atrial fibrillation, ventricular tachycardia, and ventricular fibrillation, that can cause an irregular and rapid heart rate (up to 350 to 600 times per minute !) Used when routine Digitalis therapy fails, and tends to cause whorl like corneal deposits in as early as (6) days of treatment, but more commonly in (1) to (2) months of treatment

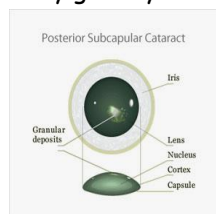


Afib



Amiodarone can also cause anterior and posterior subcapsular lens changes. Visual acuity (VA) is not usually grossly affected (20/25-20/30). Patient complaints may be :

- Glare
- Halos
- foggy vision



Retinal Toxicity "Talc Retinopathy"

Numerous drugs have been associated with retinal toxicity, including Chloroquine, Tamoxifen Hydroxychloroquine, and Mellaril.

Talc retinopathy, appears as multiple tiny, yellowish white, glistening particles. The extent of the talc usually corresponds with the amount and duration of illicit drug *abuse* and what the cocaine has been "cut" with !!



Retinal Toxicity: Tomoxifen

Tomoxifen is an anti-estrogen medication used to treat breast cancer.

Retina toxicity presents as multiple superficial yellow crystalline ring like deposits in/near the macula.

This can cause a decrease or loss of visual acuity .



quizlet.com

Cocaine & Retinal Artifacts

Cocaine can be inhaled or injected. It also causes dilated pupils and blurry vision. People using cocaine have a "high" feeling of supremacy, increased body temperature, increased heart rate/ blood pressure, restlessness, irritability, anxiety, paranoia, and aggression. It is considered a **Schedule II drug** - meaning it has high potential for abuse. It can also be used for legitimate medical reasons i.e. local anesthetic for some eye, ear, and throat surgeries.



Cocaine dealers generally dilute it with substances like: cornstarch, talcum powder, sugar, flour, and laxatives causing the retina to have a "talc" retinopathy appearance.



There are also reports of an increase risk for corneal ulcers. The reason is not fully understood, except that cocaine is a strong eye anesthetic thereby causing accidental ulceration due to injury, etc. Once the anesthetic effect wears off, the eye becomes painful and blurry. Scarring can cause eventual permanent vision loss.



vmcfl.com

Intravenous Drugs

Injecting drugs directly into the veins can also lead talc deposits to form in the retina.

This can cause loss of vision because the larger particles can block the retinal circulation when it gets lodged in a vessel. This can cause an artery occlusion resulting in rapid loss of vision.



Nature.com

Nystagmus, EOM palsy & Diplopia

Anticonvulsants:

Drugs prescribed not only for chronic epilepsy but also for Pain. Phenytoin (**Dilantin**) and Carbamazepine (**Tegretol**) are very commonly prescribed and can cause nystagmus and glare.

Hyperglycemics:

Glipizide and Glyburides are used to treat diabetes.

Excessive alcohol use



Wikipedia.com



Chlorohydrocarbons: Aerosols

Inhaling aerosols can cause: **double vision**, loss of coordination, weakness, severe headaches, nausea / vomiting, numbness, irregular heartbeat, and suffocation.

Commonly abused: paint thinners, gasoline, felt markers, nail polish remover, glue, and other household products.

Aerosol sprays containing "propellants" and solvents including: spray paint, deodorants, hair spray, amyl nitrates and lighter fluid.

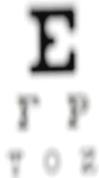


Medications To Treat Depression & Bipolar Disorders

Lithium, Depakote, Tegretol and **Neurontin** are all anticonvulsant medications used to treat bipolar affective disorders, such as manic depression.

Drugs in this class (manic depressives) can cause downbeat jerk nystagmus that may not reverse when the medication is stopped.

Blurred vision also can sometimes occur.



Visual Acuity Changes

Visual acuity may be decreased by transient changes in refractive error caused by

Sulfonamides (Sulfa), antifungal agents

Metronidazole (Flagyl),

Thiazide diuretics (HCTZ),

and Carbonic

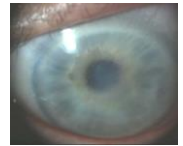
Anhydrase Inhibitors (**Acetazolamide** and **Dorzolamide**) for glaucoma.



Visual Acuity Changes: Oral Contraceptives

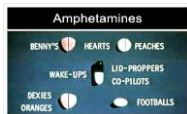
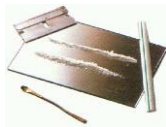
The exact cause has not been proven, but may be associated with steepening of the corneal, corneal edema from hypoxia, and decreased tear production.

Blurriness also can occur like when you are pregnant! A change in the hormones (due to the *artificial* hormones you are taking) can cause the lens to swell.



Pupil Dilation

Pupil dilation can be caused by anticholinergic drugs (**Atropine, Atrovent and Detrol**), antihistamines, antidepressants (Lexapro, Paxil), and CNS stimulants (cocaine and amphetamines).



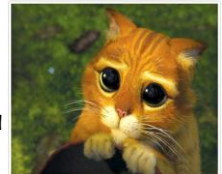
Thioridazine (Mellaril) & Chlorpromazine (Thorazine)

Thioridazine (**Mellaril**) has almost completely replaced Chlorpromazine (**Thorazine**) use.

They are both used to treat schizophrenia and are considered antipsychotic medications.

Both these drugs have *anticholinergic* properties (blurred vision, decreased accommodation and mydriasis). This is often transient and dose dependent.

Reduced tearing and dry eyes may also occur. Both of these drugs can cause cornea and lens changes as well.



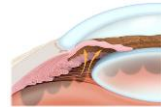
Atropine

Atropine, and its related drugs, also will cause pupil dilation. **Scopolamine** patches are often used to prevent motion sickness, and are frequently used on cruise ships. Passengers often dilate their eyes by mistake if they apply the patch and then touch their eye. This leads to anisocoria and/or mydriasis.



Amphetamines

Amphetamine are considered **stimulants**. Their use can lead to a reduced focusing ability and a dilated pupil. Because the pupil remains dilated, there is some risk of angle closure. The eye pressure suddenly elevates, causing eye pain, redness, blurry vision or loss of vision, "rainbows" around lights, nausea, and/or vomiting.



Stimulants

A stimulant is a name given to several groups of drugs that tend to increase alertness and activity.

The groups include amphetamines street drugs ("uppers" or "speed") and cocaine.

Amphetamines: increase heart and respiration rates, increase blood pressure, dilate the pupils, cause blurry vision, decreased appetite, anxiety, and dizziness.



Besides blurry vision, there can be additional hazards regarding driving. Using amphetamines interferes with concentration, as well as impaired vision.

It also increases the driver's tendencies to take risks!



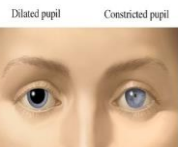
Amphetamines are a Class B drug, unless prepared for injection. Then it changes it to a class A drug.

Class B drugs carry a maximum jail sentence of 5 years and/or an unlimited fine. Class A fines are longer!



Pupil Constriction

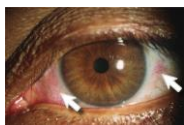
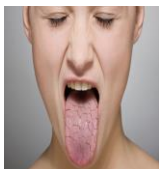
Heroin is an **opioid** analgesic synthesized from **morphine**, which is a derivative of the opium poppy. When used in medicine it is typically used to treat severe pain, such as that resulting from a heart attack.



Empower.com

Dry Eyes

Dry eye complaints may be caused by antihistamines, beta blockers prescribed for high blood pressure problems (**Atenolol, Tenormin**) and antidepressants (**Amitriptyline** and **Sinequan**).



Amitriptyline (Antidepressants)

Amitriptyline is used to treat symptoms of depression. It also can be used for post-herpetic neuralgia. They can cause a decrease in tearing, which can lead to dry eye problems, headaches and hallucinations. It also can lead to an inability to focus (decreased accommodation). This is a *temporary* side effect that can cause problems with reading and/or distance vision. There may also be a risk for acute angle closure glaucoma, in those persons who are already at risk for this type of glaucoma. COAG patients can take this medication .



Hormone Replacement

Hormone replacement therapy (HRT) with estrogens alone or in combination with progesterone is a commonly prescribed therapy for post-menopausal women. This use of estrogen replacements and/or contraceptive agents is commonly implicated in dry eye.



Hormone replacement therapy (HRT) is used by an estimated 38% of postmenopausal women.

In the study done by Schaumberg, et al, it was shown that the use of HRT was significantly related to the prevalence of dry eye syndrome.

Schaumberg. JAMA article/study 2001

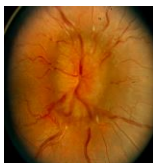
Headaches: Minocycline

Minocycline (brand names Minocin, Dynacin, Vectrin) is a broad spectrum tetracycline derivative also used to treat severe acne.

Relatively soon after starting this drug, some patients may develop increased intracranial pressure.

When detected early enough, stopping the drug will reverse the pressure. However, the optic nerves can be damaged by prolonged pressure elevation.

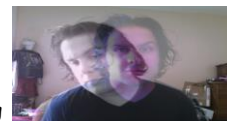
An increase in photo sensitivity is also very common.



antimicrobe.org

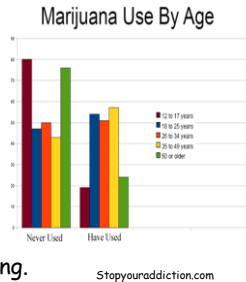
Hallucinations

Hallucinations are defined as a "perception of objects with no reality." They cause us to *believe* we are seeing or hearing something that isn't there. Besides medications, they can also be caused by head injuries or tumors, illegal drugs (LSD), dementia, sleep deprivation and even stress.



Marijuana

Using marijuana can cause your eyes to be bloodshot and your pupils to dilate. It also can cause hallucinations. Marijuana has numerous other side effects, including lung disease and impairment of reasoning.



Short-term Effects include:

- * Increased heart rate, body temperature, and appetite
- * Drowsiness
- * Dry mouth and throat
- * Red of the eyes and reduced IOP (?)

Marijuana has been linked a decreased ability to safely drive a vehicle due to decreased concentration, inability to adequately perceive time/distance, decreased reaction time, poor speed control, inability to accurately read signs, distraction (National Highway Traffic Safety Administration).



Nitrous Oxide

"Laughing gas"

Comes in small metal cylinders sold with a balloon or pipe propellant

It is used as an inhalant.

The effects it gives is a temporary loss of motor control, a "dissociative" psychological effect, mild hallucinations, and giddiness. Also headache, dizziness, impaired judgment. Nitrous may be psychologically addictive.



Mirapex (Parkinson's Disease)

Hallucinations in people that are taking **Mirapex** is not a rare side effect - some studies show up to 16.5 % of people taking it have experienced hallucinations. Commonly, patients report seeing "snakes crawling up the walls" and seeing "people in closets". Hallucinations can also occur when using: **Cimetidine** (Tagamet) and **Ranitidine** (Zantac).



Let's Not Forget The Herbal Medications

Chamomile has been used to treat eye disease as well as insomnia, migraines, headaches, bronchitis, fevers & colds, and burns.

Chamomile tea has been used topically in and around the eyes to treat styes and runny, irritated eyes. There are reported cases of severe conjunctivitis related to chamomile's **topical** use.



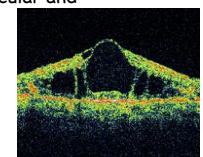
Niacin (B3) can cause some of the most severe eye reactions.

Shown to lower cholesterol, it is also successful in treating cardiovascular and cerebrovascular disease.

Also used to treat schizophrenia, diabetes, arthritis, hypertension, sexual dysfunction and migraines.

Ocular side effects show a *possible* relation to decreased vision, cystoid macular edema (CME), dry eyes,

Discoloration & edema of the eyelids, as well as loss of eyebrows/lashes. The ocular side effects appear to be **dose related**.



Vitamin A contributes to the overall health of the eyes, the skin and the mucous membranes. Also frequently referred to as **Retinol**, it can mostly be found in animal food sources, as well as a number of plants that supply **beta carotene**, which is converted into Vitamin A *inside* the body. **Vitamin A** can be used for the treatment of acne. It has been shown that high doses of **Vitamin A** can cause increased intracranial hypertension.



Ginseng is used to boost energy and improve concentration. It has been associated with episodes of hypertension and tachycardia, and hypoglycemic effects in diabetics. It also can cause insomnia, headaches and nervousness. Diabetics and heart patients should advise their doctor of use.



Bilberry are similar to blueberries, but smaller and darker, and have a more intense flavor. Often used to improve night vision. Bilberry extract is thought to support blood vessel elasticity/permeability, and to prevent leakage of vessels leading to the thought that bilberry may be effective at preventing capillary leakage in conditions such as diabetic macular edema. There are no controlled studies /reports that have shown this to be true.



St. John's Wort is commonly taken to reduce anxiety, depression, and sleep disturbances. It also may cause damage to the lens and retina. The active ingredient in St. John's Wort (hypericin) has shown a potential for **phototoxicity** due to its absorption spectrum of light in both the ultraviolet and visible light ranges leading to toxic retinal and lens effects, especially with outdoor sunlight exposure. People using St. John's Wort should avoid sun exposure (not just UV exposure) for at least 2 days after taking the medication.



UV INDEX	
0-2	No danger to the average person
3-5	Little risk of harm from unprotected sun exposure
6-7	High risk of harm from unprotected sun exposure
8-10	Very high risk of harm from unprotected sun exposure
11+	Extreme risk of harm from unprotected sun exposure

Allaboutvision.com

Ask for **ALL** the medications your patient is taking- they may be the cause of their eye problem !

