

Diabetic Retinopathy

WHAT IS DIABETIC RETINOPATHY?

Diabetic retinopathy affects 8 million Americans with diabetes. A leading cause of blindness in American adults, it is caused by damage to the small blood vessels of the retina. A person is more likely to develop diabetic retinopathy if they have had diabetes for a while, and the higher and less controlled the blood sugar levels are over time.

WHAT CAUSES DIABETIC RETINOPATHY?

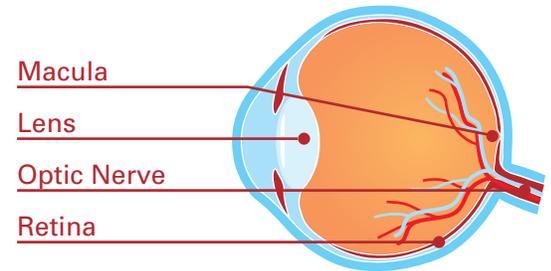
Diabetes can damage the small blood vessels in the retina. Retinal blood vessels can break down, leak, or become blocked – affecting oxygen and nutrient delivery to the retina – impairing vision over time. More damage to the retina can occur when abnormal new blood vessels grow on the surface of the retina and leak fluid or bleed. This can result in blurring of vision initially and in late stages, retinal detachment and/or glaucoma may develop.

WHAT ARE THE STAGES OF DIABETIC RETINOPATHY?

High blood sugar damages retinal vessels and leads to decrease in oxygen and nutrients to the retina. Untreated diabetic retinopathy progresses through four stages:

- Mild non-proliferative diabetic retinopathy
- Moderate non-proliferative diabetic retinopathy
- Severe non-proliferative diabetic retinopathy
- Proliferative diabetic retinopathy

Any of these stages can have no or few symptoms, therefore getting comprehensive dilated eye examinations annually, or as advised by the eye care professional for detection of diabetic retinopathy at the earliest possible stage is very important. Diabetic macular edema can develop at any of these stages due to damaged, leaky blood vessels. Diabetic macular edema may cause blurry vision that is not correctable with glasses alone.



Retinal detachment: Vitreous fluid, the gel-like material that fills the eyeball, is attached to the retina around the back of the eye. If the vitreous changes shape, it may pull away a piece of the retina with it and vitreous fluid can seep between the retina and the back wall of the eye, causing the retina to pull away or detach.

Glaucoma: Glaucoma causes optic nerve damage and possible loss of peripheral (side) vision, usually caused by increase in fluid pressure inside the eye.

Diabetic macular edema (DME): A complication of diabetes caused by leaking blood vessels, which leads to fluid accumulation in the macula, the center of the retina used for central vision. DME can cause central vision to become blurry.

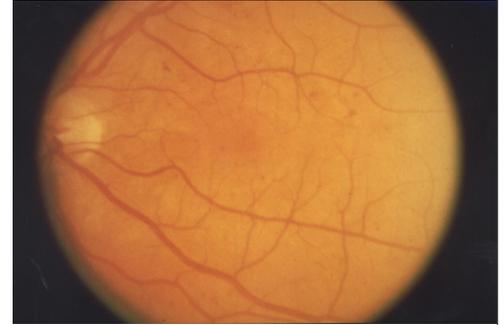
Diabetic Retinopathy—Continued

Non-proliferative diabetic retinopathy (NPDR): Non-proliferative diabetic retinopathy (NPDR) is the early stage of this disease. Small blood vessels bulge in mild NPDR, followed by blood vessel blockage in moderate NPDR, and greater vessel blockage and loss of blood supply in severe NPDR.

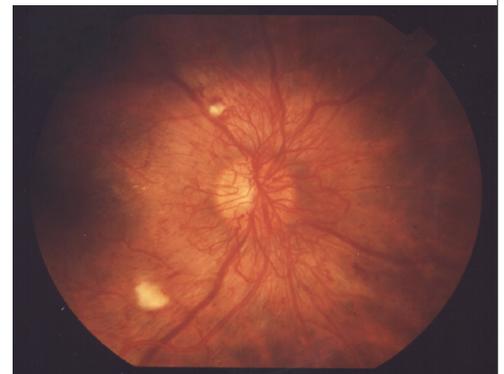
Proliferative diabetic retinopathy (PDR): The most advanced stage of diabetic retinopathy is proliferative diabetic retinopathy (PDR). It is marked by the growth of new, fragile, abnormal blood vessels on the retina or optic nerve. These blood vessels can leak blood into the eye and lead to severely blurred vision. This bleeding may cause dark spots (floaters), strands that look like cobwebs, or clouded vision.

The abnormal blood vessels can scar and contract, sometimes pulling the retina away from the back of the eye, causing a retinal detachment. This may result in loss of vision or even blindness if it is not treated in a timely manner.

If abnormal new blood vessels block the normal flow of fluid out of the eye, pressure may build up in the eye. This can damage the nerve that carries information from the eye to the brain (optic nerve), resulting in glaucoma and possible vision loss.



Non-proliferative diabetic retinopathy
(Credit: National Eye Institute, National Institutes of Health)



Proliferative diabetic retinopathy
(Credit: National Eye Institute, National Institutes of Health)

WHAT ARE THE SYMPTOMS OF DIABETIC RETINOPATHY?

People who have diabetes are at risk of developing diabetic retinopathy over time. There are usually no symptoms in the early stages of diabetic retinopathy. A person with diabetes should have a comprehensive dilated eye examination yearly, or as directed by their eye doctor. Vision changes due to diabetic retinopathy usually affect both eyes. The most common symptoms include:

- Sudden increase in eye floaters (spots and/or dark cobweb-like strands)
- Blurred vision
- Fluctuating vision
- Dark spots
- Sudden loss of vision in one eye
- Halos around lights
- Flashing lights

WHAT INCREASES RISK FOR DIABETIC RETINOPATHY?

Anyone with diabetes is at risk for developing diabetic retinopathy. Risk factors include:

Duration of the Disease: The longer a person has diabetes, the greater the risk of developing diabetic retinopathy. Nearly all people with type 1 diabetes and more than 60% of people with type 2 diabetes develop retinopathy in the first 20 years of living with the disease.

Diabetic Retinopathy—Continued

Blood Sugar Control: Poor blood sugar control is one of the main risk factors of diabetic retinopathy. If you have diabetes, you can lower the risk of vision loss by carefully keeping track of and controlling blood sugar levels.

Race: African Americans, Hispanics, American Indians, Asian Americans and Pacific Islanders are at increased risk at developing diabetic retinopathy.

Smoking: Quitting smoking can reduce risk of developing diabetic retinopathy.

High blood pressure and high cholesterol: High blood pressure and high cholesterol increase the risk of eye disease. Improvements to diet, exercising and/or taking medication to keep blood pressure and cholesterol levels under control can all reduce your risk of diabetic retinopathy.

Pregnancy: Pregnant women with diabetes prior to pregnancy have an increased risk of accelerating diabetic retinopathy, and should see their eye doctor regularly during their pregnancy. Women who develop gestational diabetes do not require an eye examination during pregnancy and do not appear to be at increased risk of developing diabetic retinopathy during pregnancy.

Kidney Disease: Kidney disease is a major complication of diabetes and can worsen diabetic retinopathy.

HOW TO PREVENT DIABETIC RETINOPATHY?

- Maintaining good blood sugar, blood pressure, and cholesterol control.
- Getting a comprehensive dilated eye exam and/or obtaining retinal photographs that are examined by an eye doctor, at least once a year, or more often as recommended by the eye doctor.
- Pregnant woman with diabetes prior to pregnancy should have a comprehensive dilated eye exam early in their pregnancy. The eye doctor may recommend additional exams during pregnancy.
- Keeping a healthy lifestyle that includes exercising regularly, not smoking and following a healthy diet. Talk to a dietician about your eating habits and a doctor before starting an exercise program.

Retinal photographs:
Pictures taken of the retina in the back of the eye.

HOW IS DIABETIC RETINOPATHY DIAGNOSED?

Timely treatment of diabetic retinopathy can improve the chance of saving your sight. For some people, diabetic retinopathy may be one of the first signs that they have diabetes. People living with diabetes are advised to have a comprehensive dilated eye exam or retinal photographs at least once a year, or more often as recommended by the eye doctor. This helps the doctor monitor the disease and determine the best treatment options.

Diabetic Retinopathy—Continued

During a comprehensive dilated eye exam, the eye doctor will conduct the following tests (the dilated exam may not be part of an eye exam for a new pair of eyeglasses or contact lenses):

Visual acuity: This will determine how well a person can see through his or her central vision and if there is a decrease in visual acuity.

Dilation: The eye doctor will widen the pupil of the eye with eye drops to allow a closer look of the retina inside of the eye. The pupil may remain this way for several hours.

The following additional tests may be conducted if severe diabetic retinopathy or diabetic macular edema is suspected:

Optical coherence tomography (OCT): The OCT examination provides a cross sectional image of the retina which can show if the retina is thickened or if fluid is leaking.



Credit: National Eye Institute, National Institutes of Health

Fluorescein angiography: During this test, a dye called fluorescein is injected into a vein in the arm that lights up the blood vessels in the eye while multiple photos are taken of the back of the eye. These images will show if there are new blood vessels in the retina and/or if there is leaking of dye, to determine if an individual has diabetic retinopathy that needs to be treated. It can also show if there are small retinal vessels that have been closed off.

Primary care office: Retinal photographs are pictures taken of the back of the eye. They can be taken in the primary care office and be sent to an eye doctor to determine whether there is any diabetic retinopathy seen in the photos. The eye doctor will then communicate back to the primary care provider who will follow up with you. This safe exchange of information electronically between medical providers is called telemedicine and is offered in some clinics.

HOW IS DIABETIC RETINOPATHY TREATED?

In the early stages of non-proliferative diabetic retinopathy, treatment may not be needed but regular comprehensive dilated eye exams (or more often as recommended by the eye doctor) are important for monitoring the disease.

In more advanced stages, there are a range of options for treating individuals who have been diagnosed with proliferative diabetic retinopathy. Consultation and discussion with the eye doctor is needed to determine the best treatment for each individual.

Anti-vascular endothelial growth factor (anti-VEGF) drugs: These drugs block the development of new blood vessels and limit the leakage from the abnormal blood vessels in the retina. They are delivered through an injection into the eye by an ophthalmologist, usually a retinal specialist. While slight pressure may be felt during the injection, the eye is first numbed to minimize any discomfort. Several injections over time are needed in this treatment. Frequency of injections vary based on the drug selected and the eye doctor's judgment.

Diabetic Retinopathy—Continued

Focal photocoagulation: In this procedure, a laser targeting the retina is used to close off leaking or bleeding abnormal blood vessels.

Pan-retinal (scatter) photocoagulation: A laser beam is used to treat many places on the retina with hundreds of laser burns around the peripheral retina. This technique helps prevent the growth of new, abnormal blood vessels. There may be some loss of peripheral or night vision after the procedure.

Vitrectomy: In the operating room under general or local anesthesia, an eye doctor makes small incisions in the eye and removes the vitreous along with the blood and scar tissue in the vitreous and replaces it with a clear fluid.

Treatment research: Scientists are always working toward a better understanding of diabetic retinopathy, and new treatment options are being developed. As research continues, the most important way to prevent diabetic retinopathy is getting regular medical care to help control diabetes and early detection and treatment of retinopathy by an eye doctor.

People with diabetes need to know that damage in the retina often happens before they notice changes in their vision. All people with diabetes should have a comprehensive dilated eye exam at least once a year or retinal photographs evaluated by an eye doctor. The eye doctor can decide if you need more frequent exams and/or treatment.

LOW VISION

If you or someone you know has lost some vision to diabetic retinopathy, low vision aids can help you stay independent. Special training, called vision rehabilitation, can provide skills for living with low vision. A low vision specialist can provide skills and aids for living with low vision. Ask your eye doctor about the possibility of seeing a low vision specialist.

Low vision aids include:

- Magnifying glasses, screens and stands
- Telescopic lenses
- High-intensity reading lamps
- Large-print newspapers, magazines and books
- Close-circuit TVs that magnify a printed page on screen
- Computers and tablets

Living Well with Low Vision

Living Well with Low Vision is an online resource to educate those with loss of vision on how maintain their independence and quality of life. Learn more at lowvision.preventblindness.org.