

Diabetes Research &
Wellness Foundation



How can **DIABETES** affect my **EYES**?

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What is diabetic retinopathy?

This leaflet explains how diabetes can affect your eyes, what diabetic retinopathy is, how diabetic retinopathy develops, how it can be treated, how its progress can be slowed and why it is important for people with diabetes to attend regularly for screening.

Diabetic retinopathy is a sight-threatening long term complication of diabetes. The retina lines the inside of the eye and acts rather like the film in a camera. The macula is the small central part of the retina you use to see things clearly and is the part you are using now to read this leaflet. The rest of your retina is used to view the world around you and to see in the dark.

Specific changes in the eye develop as a direct effect of raised glucose levels on the small blood vessels in the part of your eye called the retina and are known collectively as 'diabetic retinopathy'. Changes to these retinal blood vessels can damage your sight.

Let's look at how these changes might affect your vision in more detail.

Background retinopathy

These are earliest changes. Small swellings develop on the blood vessels and appear as tiny red dots. These are called microaneurysms. Larger red dots are called retinal haemorrhages. They lie within the retina and are rather like a bruise on your skin. Background retinopathy will not affect your vision and does not need treatment (**figure 1**).

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Figure 1 Background retinopathy - microaneurysms and haemorrhages

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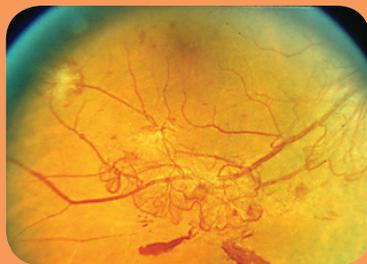


Figure 2 Proliferative diabetic retinopathy - new vessels develop on the retina and start to bleed

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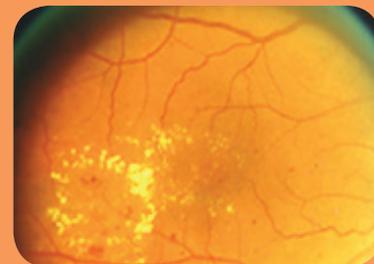


Figure 3 Diabetic maculopathy - leakage from damaged blood vessels

Proliferative diabetic retinopathy

With time, the blood vessels may become constricted, starving the retina of oxygen and nutrition. Different signs can be seen in the retina during this progression. These changes are called 'pre-proliferative retinopathy'.

Eventually new blood vessels may develop on the surface of the retina. This is called 'proliferative diabetic retinopathy' (**figure 2**). If this happens your sight will be at risk as these new blood vessels may bleed or may develop into scar tissue.

If the new vessels bleed into the jelly (vitreous) inside the eye you may see a sudden shower of floaters or cobwebs, or your sight may become completely blurred. This is called a 'vitreous haemorrhage'. You should contact your GP or an eye department **immediately** for advice if you experience these symptoms.

The scar tissue can pull the retina away from the underlying nourishing layers of the eye — a 'traction retinal detachment'. If this occurs at the macula, it will cause a drop in vision and will require an operation on the eye called a vitrectomy.

Diabetic maculopathy

A more frequent effect of diabetes on your vision is if damage occurs to the blood vessels in the macular region of the retina. This is called 'diabetic maculopathy'.

The commonest change is that the blood vessels become leaky (**figure 3**). Fats and fluid that are normally carried along in the bloodstream leak into the macular region. Fluid leakage causes water-logging in the retina and is called 'oedema'. Because the macula is used for detailed vision, if you develop maculopathy you may notice progressive blurring of your vision, particularly when reading.

It is now recognised that there is a particular type of maculopathy which is due to traction between the retina and the vitreous (vitreomacular traction) in the absence of scar tissue. This can be seen using an imaging technique known as Optical Coherence Tomography (OCT).

Occasionally, the blood vessels in the macula itself may become so constricted that the macula becomes starved of oxygen and nutrition. This is called 'ischaemic maculopathy' and it does not usually respond to any type of treatment.

Diagnosis and treatment

If the changes are not treated, it is likely that some, or all, of your sight may be lost. It is likely that treatment will need to be repeated at intervals during a person's lifetime.

Laser treatment was the only treatment for sight threatening diabetic retinopathy (STDR) for many years. The aim of laser treatment is to stabilise the changes in your eyes caused by diabetes. Laser treatment does not generally improve your sight, although in some cases it might.

These days, newer treatments for diabetic retinopathy are being used. Various substances can be injected into the vitreous of your eye (intravitreal injections), particularly for maculopathy. The most encouraging results are from intravitreal injections of drugs which reduce the production of vascular endothelial growth factor (VEGF) in the eye. VEGF promotes both the development of new vessels and leakage. Intravitreal injections of anti-VEGF agents have been shown to be superior to laser at improving the vision in patients with maculopathy. They are usually given monthly for a number of months and then as needed.

The National Institute for Health and Clinical Excellence (NICE) has approved the use of certain anti-VEGF agents as the first line of treatment for patients with visual impairment due to moderate or severe macular oedema affecting the centre of the vision. If your vision is good and the oedema is not so severe, laser treatment can still be considered. Steroid injections are effective but they can cause cataracts and glaucoma. If you have had a cataract operation, NICE has also approved the use of steroid injections if anti-VEGF agents have been ineffective. They are usually repeated every 4-6 months. In vitreomacular traction a vitrectomy may be the first line of treatment.

Laser treatment largely remains the treatment of choice for proliferative retinopathy. If you have proliferative retinopathy, or your eye specialist thinks you soon may, a large number of laser burns will be applied to the outer part of the retina, the part of the retina that allows you to see to the sides and in the dark. If given early this treatment is very successful (9 out of 10 people). There have been a number of studies recently comparing the use of anti-VEGF agents in combination with laser, or instead of laser, for proliferative retinopathy. Anti-VEGF injections have been shown to be as effective as laser for proliferative retinopathy but it is too early to say whether this is a long term option. They are also sometimes given as an adjunctive treatment prior to vitrectomy for patients with advanced retinopathy.

The importance of screening

Untreated diabetic retinopathy is a common cause of blindness in the working-age population. Treatment is effective at reducing sight loss but only if given at the appropriate stage in the progression of changes. Unfortunately diabetic retinopathy may not affect your sight until the changes are quite advanced. At this stage treatment may be much less effective. Every person with diabetes aged 12 years or older should be invited for screening on a regular basis. You should contact your GP if this doesn't happen.

At your screening appointment drops will be used to dilate your pupils and then photographs will be taken of your retinas.

If problems are detected you will be referred to an eye specialist for treatment and follow up. You should also visit your optician every 1-2 years to get your eyes tested for glasses. **However, this does not replace a screening test.**

Other effects of diabetes on the eye

- People with diabetes may occasionally develop double vision due to paralysis of the muscles that control eye movement. This is usually temporary and resolves by itself.
- There is a relationship between diabetes and the development of open angle glaucoma. Glaucoma is a condition causing a rise in the pressure within the eye leading to damage to the delicate nerves at the back of the eye. If untreated this results in loss of vision. Glaucoma is usually treated with eye drops.
- People with diabetes are also at increased risk of developing blocked blood vessels in the eyes. This is rather like having a stroke in the eye. In some circumstances this causes a sudden and dramatic drop in vision. In other cases the vision is not affected. The risk is higher if the blood pressure is also high. Blood thinning drugs, such as aspirin and clopidogrel, reduce the chance of further attacks.
- Probably the most common eye condition that people with diabetes develop is cataract. A cataract is cloudiness of the lens of the eye and leads to progressive blurring of vision. As we get older it is common for all of us, with and without diabetes, to develop cataract. If a cataract affects your quality of life or prevents a good view of the retina it can be treated by simple keyhole surgery.

Top tips for healthy eyes

The following measures can help to reduce your risk of developing diabetic retinopathy and to slow the progress of sight-threatening changes if they do develop.

- See your doctor regularly to check, and treat, your blood pressure.
- Control your blood glucose as effectively as possible.
- Keep your regular screening appointment.
- For your eyes and general health, you should also have your cholesterol levels checked regularly.
- You are advised not to smoke.

Remember: Always get advice if you have a problem with your sight.

More information

If you are worried about retinopathy speak to your diabetes healthcare professional or your ophthalmologist. More information is also available from NHS Choices: www.nhs.uk and from the NHS Diabetic Eye Screening Programme:

<https://www.gov.uk/topic/population-screening-programmes/diabetic-eye>



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