

THE LITTLE GUIDE TO MACULAR DEGENERATION

What to Watch Out For and How to Prevent It



Written by Optometrists from
www.ecplus.com.au

Hi there!

We're pleased to know you care about your macula.

Your macula is the part of your eye that's responsible for central detailed vision. You read, drive, appreciate colours and recognise faces with it. A person with macular degeneration may have portions of their maculas no longer functioning, leaving a blind spot or distorted vision in a part of their visual field. When visual acuity is lost, quality of life is significantly decreased.

Needless to say, our macula is a very important part of our eye and we must protect it in order to preserve good vision as years go by. Don't allow macular degeneration to rob you of a fulfilling, independent life—we're here to help.

From your Eyecare Plus Optometrists.



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WHAT IS THE MACULA?

The innermost layer of the eye is called the retina, with the macula being the central part of the retina that is responsible for detailed central vision such as for reading, driving and most colour vision. The rest of the retina, or peripheral retina, detects movement and is used to help one get around.

WHAT IS MACULAR DEGENERATION?

It is a painless degenerative disease of the central retina that causes progressive loss of central vision, while the peripheral vision remains unaffected. Consequently a person with macular degeneration may have difficulty with reading, recognising faces and colour recognition.

Although it is more frequent in people above the age of 50, certain forms of the disease can also affect younger people.



Figure 1: An example of what a person with macular degeneration sees

WHAT HAPPENS IN MACULAR DEGENERATION?

The lining of the eyeball is made up of many layers, one being the retina, and behind it is the retinal pigment epithelial layer (see figure 2). The retinal pigment epithelium (RPE) plays a crucial role in nourishing the retina, eliminating waste from the retina as well as protecting the eye from possible leaky blood vessels behind the retinal pigment epithelium.

Early-stage macular degeneration

In early stage macular degeneration, waste products from the retina build up underneath the retinal pigment epithelium. They appear as yellow spots on the retina called drusen (see figure 3). Build-up of drusen may have no effect on vision in the early stages. In the later stages, as more drusen accumulate and become confluent, vision can become distorted. It is therefore important that an optometrist has a good look at the macula for drusen even though vision is still very good.

Late-stage macular degeneration

In the later stage of macular degeneration, the retinal pigment epithelium dies. In some cases, leaky blood vessels from behind the retinal pigment epithelium then grow into the retina.

How common is MD?

- One in seven people over the age of 50 are affected by macular degeneration (MD), and the incidence increases with age.
- One in three people over the age of 80 are affected by the disease.
- 35,000 Australians aged over 50 fit into the legal definition of blindness, and in over 50% of cases macular degeneration is to blame.

HUMAN EYE ANATOMY

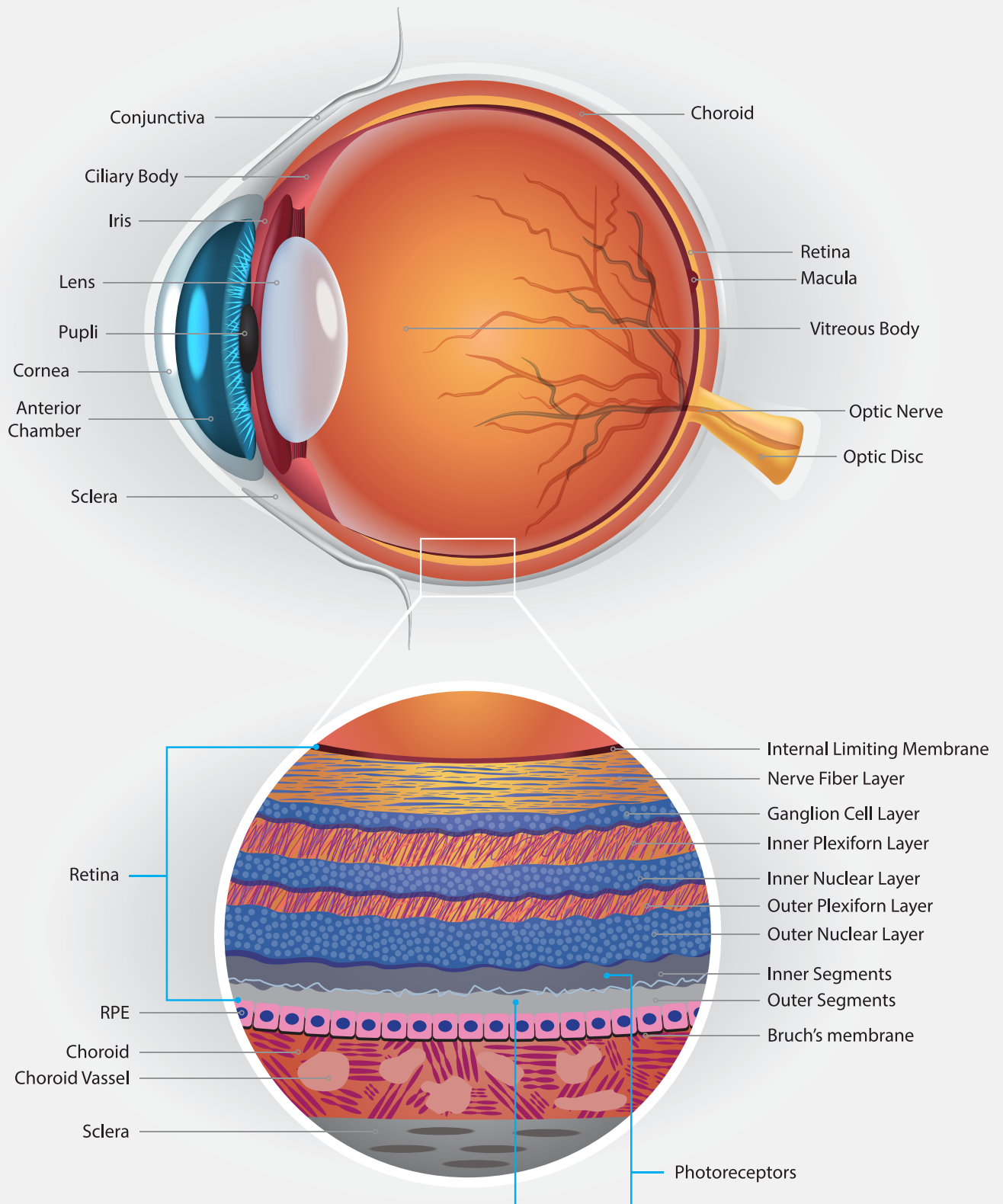


Figure 2

Dry Macular Degeneration

When RPE cells die, the retinal cells above them also die causing gradual central vision loss. There are no leaky blood vessels involved, therefore the term dry macular degeneration. Dry macular degeneration can later develop into the more aggressive wet macular degeneration. Dry macular degeneration accounts for 33% of all cases of late-stage macular degeneration.

Vision loss may take years and there is currently no cure, therefore early diagnosis is crucial. Evidence suggests supplementation from the AREDS 2 study may slow down progression in moderate stages of macular degeneration.

Wet Macular Degeneration

When RPE cells die, it fails to stop leaky blood vessels from the choroid growing into the retina. This is called choroidal neovascularisation. Once the blood vessels leak fluid and blood, scarring occurs and vision loss ensues.

Approximately 21,000 new cases of wet macular degeneration are diagnosed annually in Australia. Unlike dry macular degeneration, the vision changes are often sudden and severe.

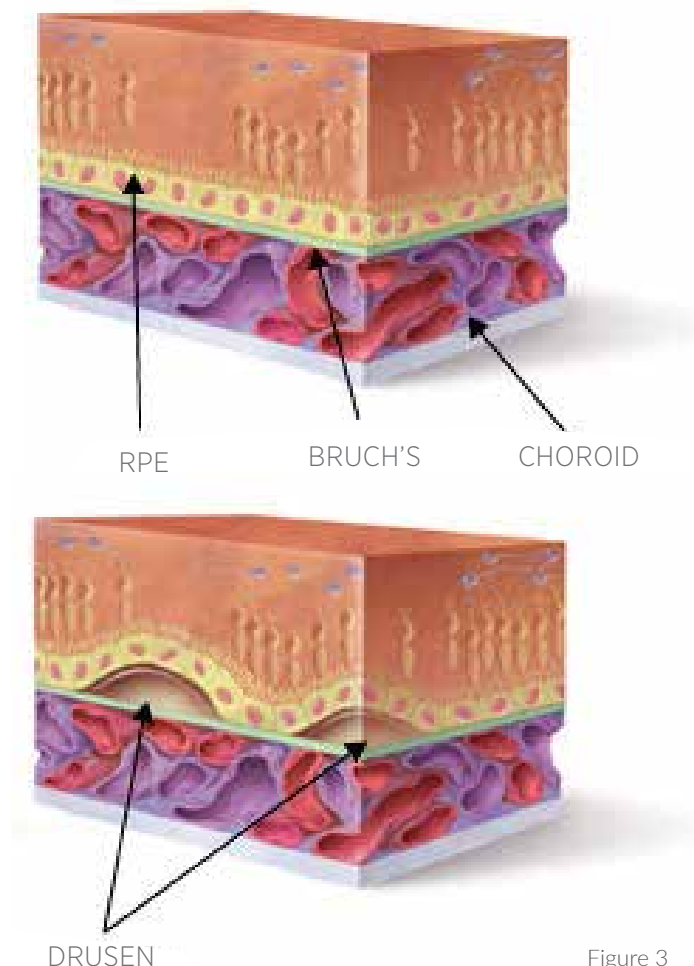


Figure 3

WHAT CAUSES MACULAR DEGENERATION?

Approximately 70% of cases have a genetic link. There is a 50% chance of developing macular degeneration if there is a direct family history.

OTHER RISK FACTORS INCLUDE

50+**Age**

1 in 7 people over the age of 50 develop MD with the incidence increasing with age

**Smoking**

Smokers are at 3 times the risk of developing MD and is the single biggest risk factor you can change

**Diet and Lifestyle**

Diets low in antioxidants and green vegetables as well as minimal exercise are believed to increase the risk of MD

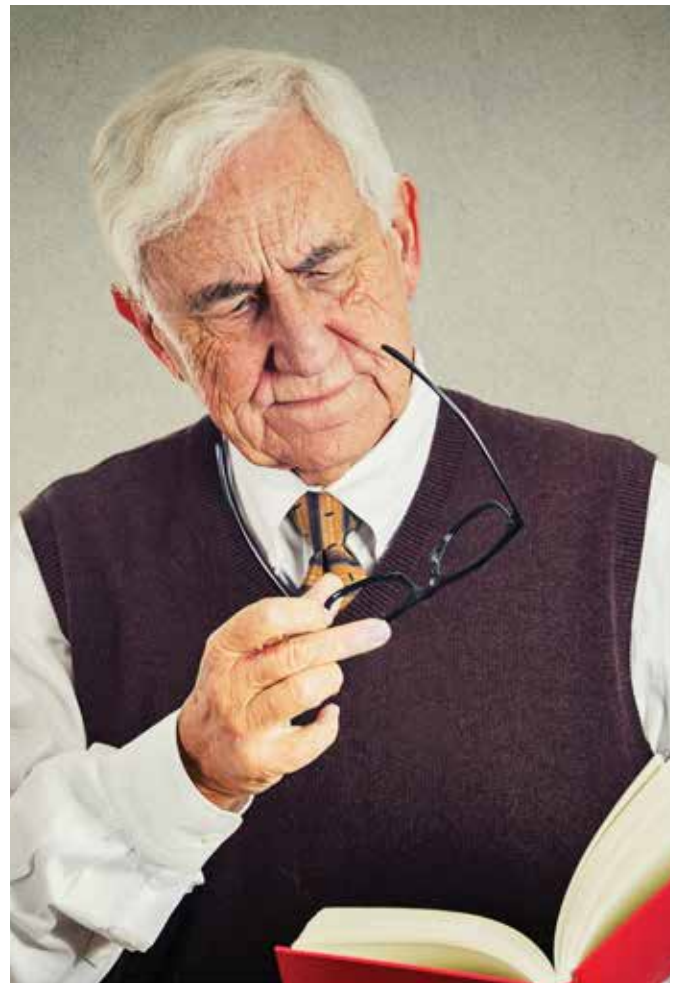


WHAT SIGNS SHOULD I LOOK OUT FOR?

As mentioned earlier, early stage macular degeneration causes no symptoms. It is therefore important to have a routine eye test at least every two years and more frequently if you have a family history of macular degeneration.

However, symptoms that can suggest macular degeneration include but are not limited to:

- Difficulty with reading or anything that requires fine vision and is no longer correctable with spectacles
- Distortions, where straight lines appear wavy or bent
- Difficulty distinguishing faces
- Dark patches or empty spaces appearing in the centre of your vision
- Need for increased illumination, sensitivity to glare, decreased night vision and poor colour sensitivity
- A sudden drop in vision. You will need to see your optometrist immediately if this develops



WHAT CAN YOUR OPTOMETRIST DO?

Pupil Dilation

Your optometrist may dilate (enlarge) your pupils by instilling eyedrops to help achieve a better view of the retina and macula. Your vision may be blurry for a couple of hours after pupil dilation, therefore driving is not recommended while the eyes are still dilated.



Digital Retinal Imaging

This is commonly used to provide a detailed image of your retina and allows for comparison for future eye examinations.

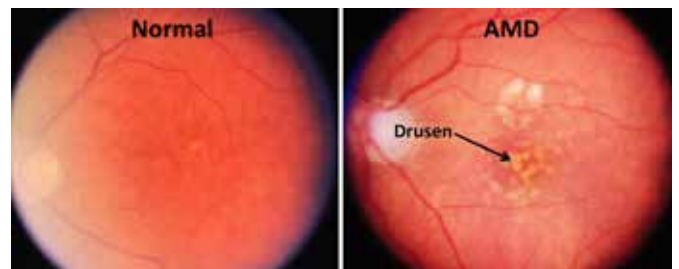


Figure 4

Optical Coherence Tomography

This is now routinely performed in patients with AMD, especially the wet form. It produces cross-sectional images of the retina to allow us to look behind the visible nerve layer and detect subtle changes/progression in early to late AMD.

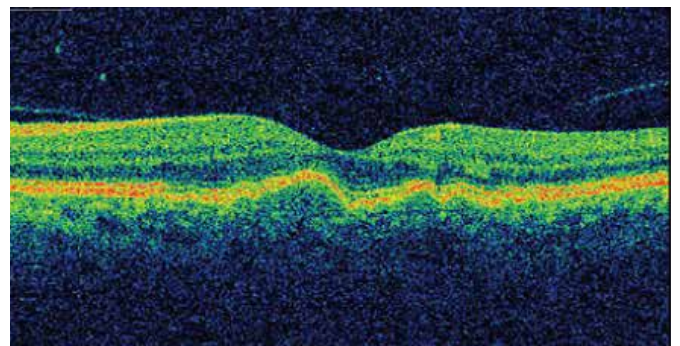


Figure 5: OCT of someone with macular degeneration

WHAT CAN YOU DO?

Family history cannot be changed but lifestyle changes can be implemented to reduce the risk of macular degeneration.

- **Exercise** regularly and maintain a healthy weight
- **Don't smoke**
- **Diet**

Simple modifications in your diet can positively affect your macular health. (See figure 6)

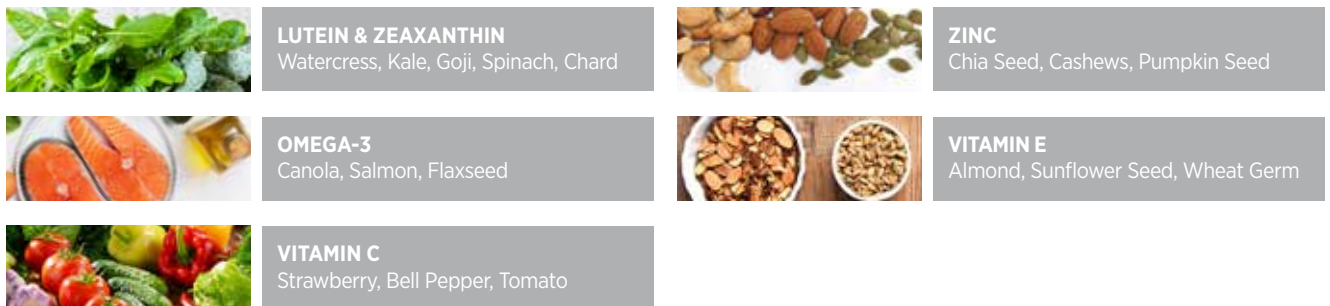


Figure 6: Foods that protect the health of your eyes which are rich in nutrients and antioxidants.

- **Sun Protection**
Provide adequate protection for your eyes from sunlight exposure. This may come in the form of sunglasses OR clip-ons
- **Blue Light Protection**
Some studies have indicated that blue light hazard (excitation peak 440 nm) have been shown to have a major impact on photoreceptor and RPE function in the retina. Although no study is yet to confirm that blue light filter in glasses have a protective effect on the macula, certain blue light filter such as Essilor's Crizal Prevencia blocks out blue light with wavelengths between 415 to 455 nanometers.



Figure 7: Protect your eyes during screen time with special lenses that block blue light.

- **Monitor your macula with an Amsler Grid**

Your optometrist may provide you an Amsler grid. This is an essential tool to self-monitor for possible changes to your vision due to macular degeneration. Your optometrist may advise you on how to carry out this test and what to look out for.

It is important to do the Amsler grid daily to notice sudden changes in vision. Always test one eye at a time and while keeping your eye as still as possible at the centre fixation dot, look out for wavy lines, missing squares or dark empty spaces. *For more information on how to perform the test, please refer to the attached Amsler grid on the last page of this booklet.*

Early macular degeneration may not cause any distortion. The Amsler grid should therefore not be relied upon for medical diagnosis and is not a substitute for regular eye examinations.



Please see Appendix for a printable copy of the Amsler grid.



NUTRITIONAL SUPPLEMENTS

Studies have shown that a diet rich in antioxidants and zinc lowers the risk of macular degeneration and slows down the progression of the disease. The Age Related Eye Disease Study 2 (AREDS2) found that adding lutein and zeaxanthin into the diet reduces the progression of macular degeneration further. Omega-3 fatty acids also decrease the risk of developing advanced macular degeneration, but increase in the dose of Omega-3 fatty acids did not reduce the progression further.

What is Lutein, Zeaxanthin and Omega-3?

Lutein and zeaxanthin are carotenoids which give plants their vibrant red, orange, yellow and green colour. In plants, lutein and zeaxanthin appear to absorb excess light energy to prevent damage to plants from too much sunlight. Lutein and zeaxanthin have antioxidant properties and it is believed that they help increase the concentration of pigment at the macula. This property is important for filtering dangerous short-wavelength light and reducing the generation of free radicals in the retinal pigment epithelium and choroid. In other words, they provide antioxidant properties for the macula.

Omega-3 fatty acids are polyunsaturated fatty acids, which are essential for metabolism, normal growth and development.



Where are Lutein, Zeaxanthin and Omega-3 found?

Lutein can be found in cooked kale and cooked spinach and yellow carrot. Zeaxanthin can be found in paprika, corn and saffron.

Adding Omega-3 to your diet is also important. These can be found in plant sources such as walnut, edible seeds, flaxseed oil and hemp oil. Animal sources of omega-3 include fish, fish and krill oil and certain chicken eggs containing EPA and DHA.

If I don't eat these vegetables, what supplements can I take?

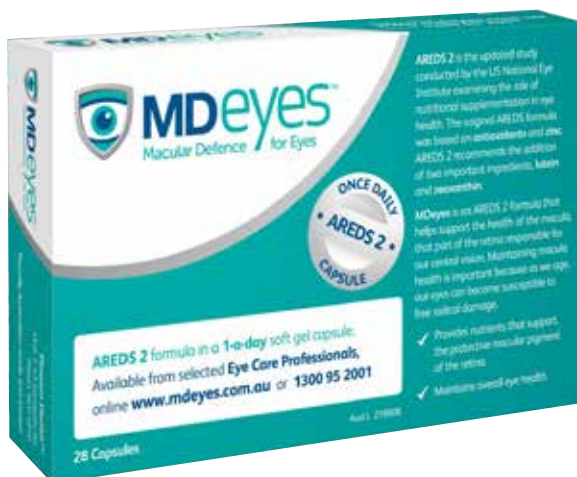
Where appropriate, your optometrist may place you on a supplement to slow the progression of the disease. SUPPLEMENTS ARE NOT A CURE FOR MACULAR DEGENERATION. Though not indicated in early AMD, AREDS2 multivitamins have been shown to reduce progression in intermediate to late AMD. You can find this supplementation at our practices or at your local pharmacy although the dosages need to be monitored accurately.



Supplements should contain the following ingredients and dosage. Different brands may have different concentration of zinc to the AREDS2 formulation and exceed the recommend daily limit of zinc for an adult (40mg a day). Signs of zinc overdose can include nausea, vomiting, loss of appetite, stomach cramps, diarrhea, and headaches. Over a prolonged time, zinc can cause lower immunity. The amount of zinc has not been found to affect outcome on slowing down progression of macula degeneration.

AREDS2 formulation

500 mg vitamin C	2 mg copper
400 iu vitamin E	10 mg lutein
25 mg zinc	2 mg zeaxanthin



MD Eyes

Tablets per day: 

Comes in blister packs with the days of the week written at the back for ease of consumption.

TREATMENT FOR MACULAR DEGENERATION

There is no current cure for early to intermediate macula degeneration. Dry macular degeneration also has no treatment. However, a few treatments for wet macular degeneration are available, which aim to stabilise and maintain the best vision for as long as possible.

Anti-VEGF

In wet macular degeneration, blood vessels leak into the retina, which causes scarring and vision loss. A protein called Vascular Endothelial Growth Factor (VEGF) is predominantly responsible for the leaking and growth of the new blood vessels.

Anti VEGF is often injected into the eye in wet macula degeneration to slow or stop the growth of new blood vessels and leaking of blood into the macula. The aim of Anti VEGF injection is to halt progression and not to improve vision, although in some cases vision may improve slightly.

REFERENCES:

Figure 2 - Source: <http://101proofsforgod.blogspot.com.au/2013/11/45-eye.html>

Figure 3 - Source: http://www.chu.ulg.ac.be/jcms/c_146317/dmla

Figure 4 - Source: <https://medicalxpress.com/news/2012-02-genetic-basis-age-related-macular-degeneration.html>

Figure 5 - Source: <http://www.prescriber.co.uk/article/prevention-treatment-age-related-macular-degeneration/>

WHERE TO GET ADDITIONAL SUPPORT

If you or a loved one has macular degeneration, the Macular Disease Foundation Australia (MDFA) is committed to providing people living with macular disease and their family and carers with access to relevant support and advice services. Aside from our eyecare professionals, you

may reach out to them for more information, guidance, understanding and support. They also have a National Helpline which provides in-depth conversations about macular disease and its potential impact on quality of life.



Visit their Support Services page here:

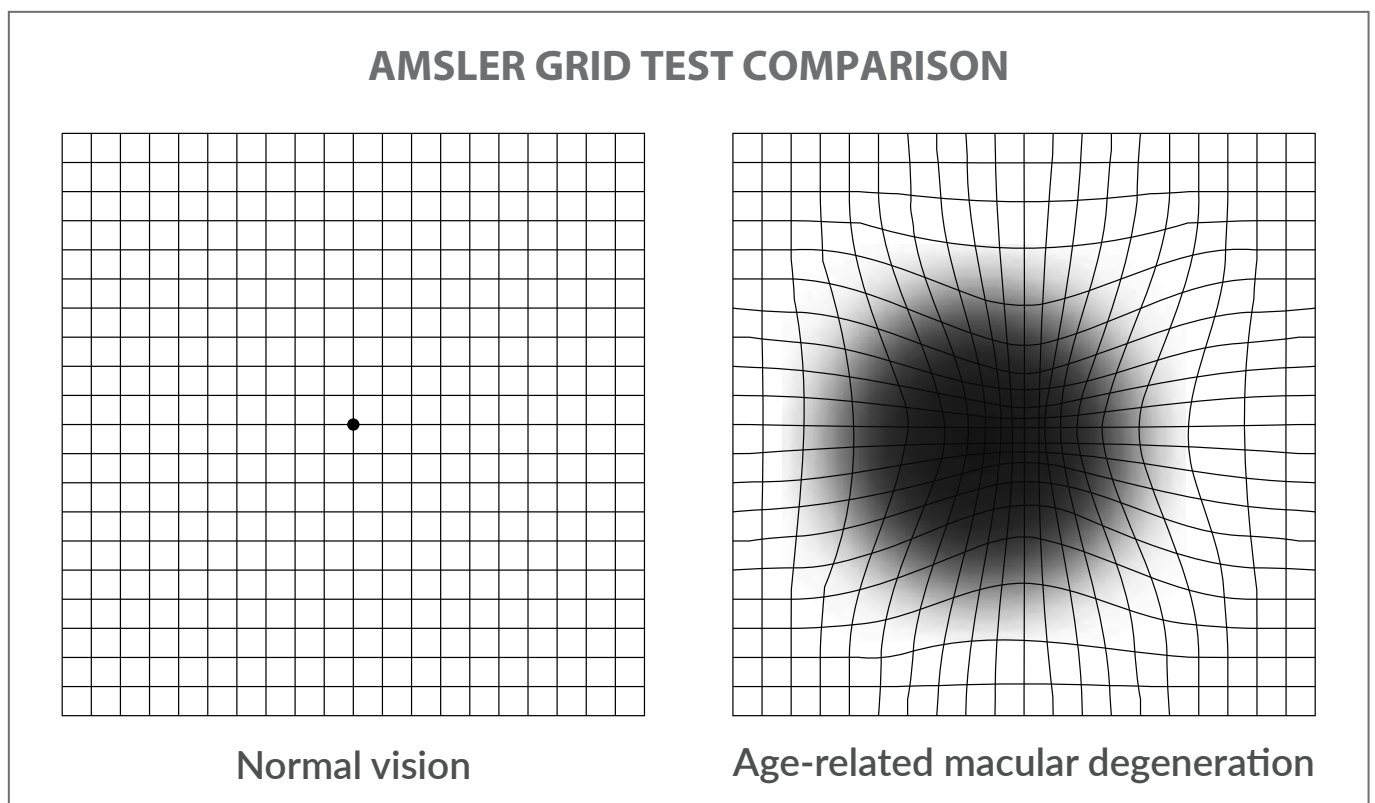
www.mdffoundation.com.au/content/services-macular-disease-community

APPENDIX

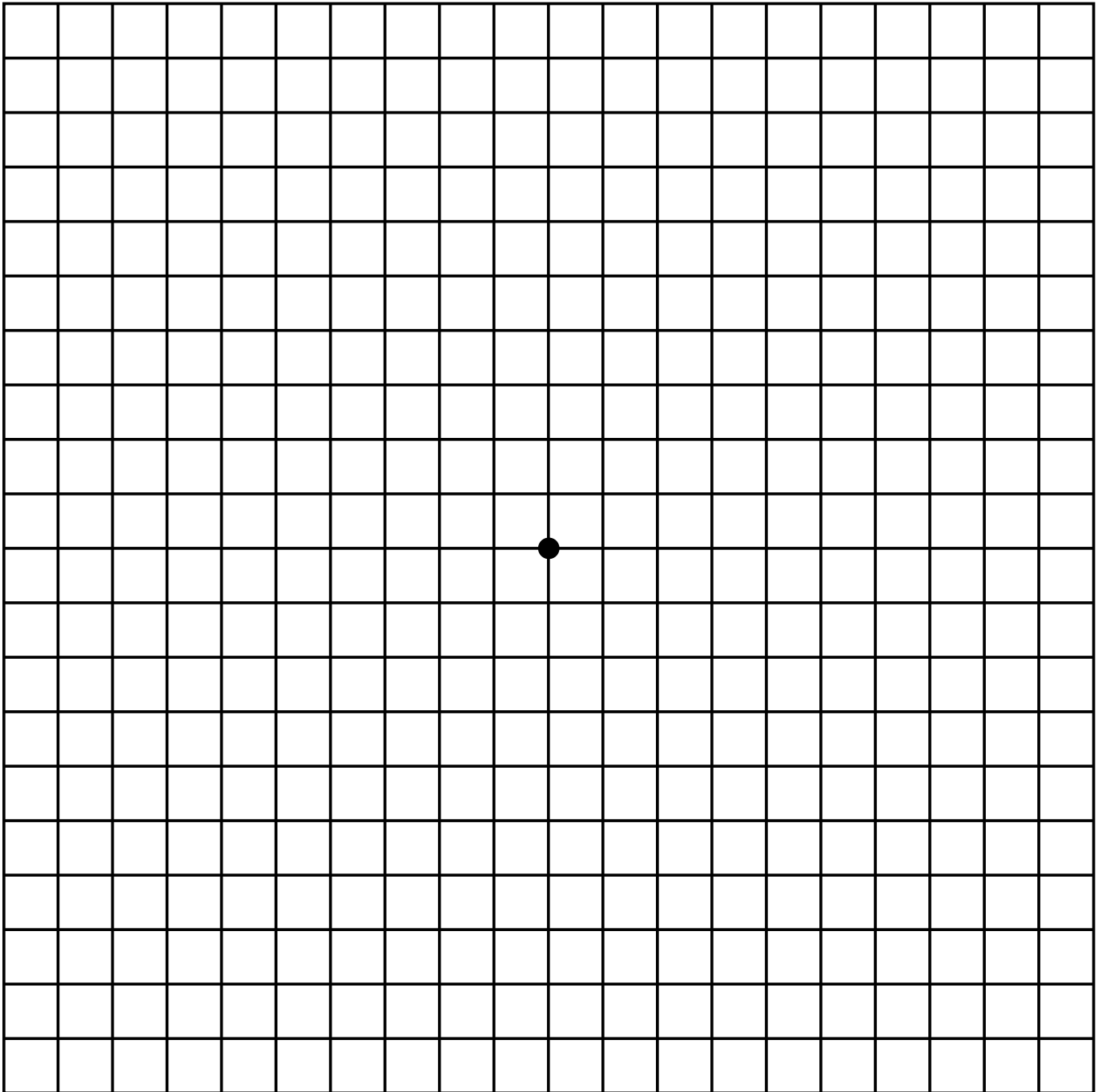
How To Test Your Eyes With This Amsler Grid

- Print this page on bright white paper (heavy stock if possible).
- Test your eyes under normal room lighting used for reading.
- Wear the glasses you normally wear for reading.
- Hold the grid approximately 30cm from your eyes.
- Test each eye separately: Cup your hand over one eye while testing the other eye.
- Keep your eye focused on the dot in the center of the grid and answer these questions:
 1. Do any of the lines in the grid appear wavy, blurred or distorted?
 2. Do all the boxes in the grid look square and the same size?
 3. Are there any “holes” (missing areas) or dark areas in the grid?
 4. Can you see all corners and sides of the grid (while keeping your eye on the central dot)?
- Switch to the other eye and repeat.

Please see next page for a larger printable version of the Amsler grid.



30 SECOND MACULA TEST



To know more about your macular test,
contact our optometrists or book an appointment today at

www.ecplus.com.au