

Age-related Macular Degeneration

According to the World Health Organization (WHO), age-related macular degeneration (AMD) is the third cause of irreversible blindness or visual impairment globally, with profound consequences on the quality of life. Age-related macular degeneration accounts for almost 9% of all blindness worldwide and is the most common cause of blindness in people older than 60 years in developed countries. Almost 170 million people have been affected by AMD globally.

Anatomy of the human eye

The human eye is not entirely round. It consists of an anterior section—the front part you can see when looking in a mirror—and the posterior section—the area behind the front part that is not visible to the naked eye.

The anterior segment of the eye includes the following:

- Iris – the coloured part of the eye
- Cornea – a transparent, protective layer over the iris
- Pupil – the round opening that is visible as the black circle and allows light to enter the eye
- Sclera – the white part of the eye
- Conjunctiva – a thin layer of tissue that covers the entire anterior area except for the corner of the eye
- Behind the iris lies the lens responsible for focusing light on the back of the eye.

The posterior segment of the eye starts behind the lens and consists of the vitreous gel. The entire inside of the eye is covered by light-sensing cells. This layer is called the retina.

The macula is entirely found at the back of the posterior segment. It is a tiny area that is an extra-sensitive part of the eye needed for sharp, central vision and the ability to see straight ahead. This article focuses on the degeneration of this specific area in the eye.

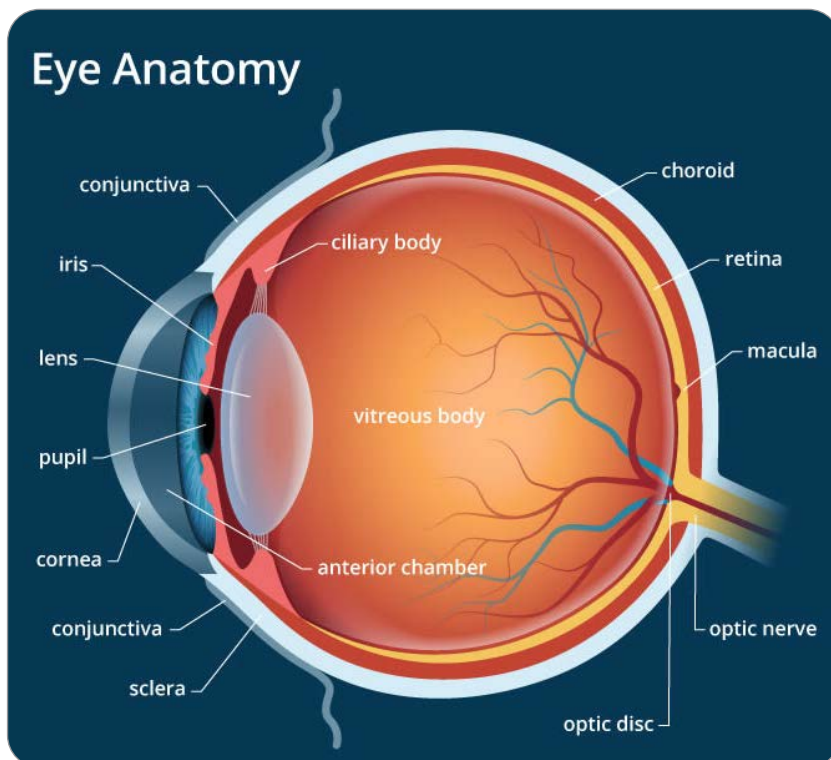


Figure 1: The Anatomy of a human eye

What is AMD?

Age-related macular degeneration (AMD) is a common eye condition affecting the middle part of the vision, primarily in people older than 50 years. The condition causes damage to the macula resulting in progressive visual loss.

Causes

The exact cause of the condition is not known. It is not inherited in a specific manner, although there are genes

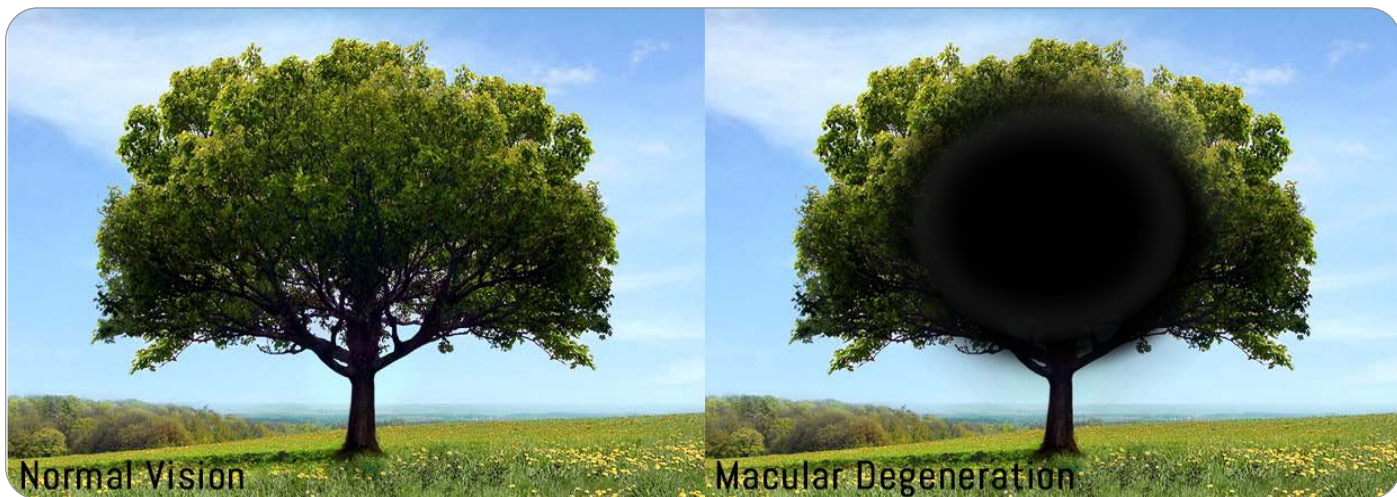


Figure 2: Normal vision versus one with Macular Degeneration

associated with the condition and family members have a very high risk of developing the condition. Scientific literature, however, confirms a strong relationship between age and AMD due to the multifaceted interaction of factors such as metabolic, environmental, functional, and genetic factors. These factors contribute to changes in the macular structure resulting in the condition's manifestation.

Risk factors

Specific factors that may increase the risk of developing the condition have been identified and include:

- Age - One-third of adults over the age of 75 are affected by AMD.
- Smoking - The retina has a high oxygen consumption rate, and anything that affects oxygen delivery to the retina may affect vision. Smoking causes oxidative damage, which may contribute to the development and progression of this disease.
- Gender - Females are more likely to develop AMD than males.
- Race - Caucasians are more likely to develop AMD than other races. This factor may be related to differences in genetic background or pigmentation.
- Diet - People with diets high in fat, cholesterol and high glycaemic index foods and low in antioxidants and green leafy vegetables may be more likely to develop AMD.
- Exposure to high levels of ultraviolet light - evidence is not conclusive yet. Still, some studies suggest an association between AMD and cumulative eye damage from ultraviolet (UV) and other light since the light may damage the retina.
- Eye colour - Light-pigmented eyes offer less protection from damaging UV light and are more likely to develop the dry type of AMD.
- Obesity - A person with a BMI (body mass index, a

measure of body fat) of greater than 30 is 2.5 times more likely to develop the disease.

- High Blood Pressure – The disease leads to a constriction (narrowing) of the blood vessels that nourish the retina, restricting the oxygen flow.
- Family history - there is an increased risk in individuals with a positive family history of AMD. Siblings of an affected individual have a three to sixfold higher risk than those of the general population.
- Aspirin use - There is inconsistent evidence linking aspirin use and AMD.
- Presence of AMD in one eye – A person is more likely to develop AMD in the other eye if one eye is affected.

Symptoms

AMD may advance very slowly in certain people, and vision loss does not occur long. In others, the condition progresses faster and may cause vision loss in one or both eyes. As the disease progresses, a blurred area near the centre of vision is a common symptom. Straight lines may appear wavy or distorted. The blurred area may grow more extensive, or blank spots develop in the central vision. Objects may not be as bright as they used to be and may look smaller than usual.

Types of AMD

There are two types of AMD, namely “dry” or atrophic (destroying or decrease of an organ or tissue in the body) AMD and “wet” AMD. In this article, we are only focusing on “wet” AMD.

Wet macular degeneration (Neovascular AMD) is caused by abnormal blood vessels that leak fluid or blood into the macula.

Prevention

The recommendations include modifying the risk factors to and may help to protect vision and improve a person's overall health, thus lowering the risk of developing AMD,

- Maintain a healthy weight.
- Eat a nutritious diet that includes green leafy vegetables, yellow and orange fruit, fish and whole grains.
- Do not smoke.
- Maintain normal blood pressure and control other medical conditions.
- Exercise regularly.
- Wear sunglasses and hats outdoors.
- Get regular eye exams and consult a doctor if there are vision changes.
- Add antioxidative supplementation

Complications

- Retinal detachment - When the retina detaches from the eye, the retinal tissues separate from the blood vessels that provide nourishment to those cells, potentially damaging them and causing vision loss. Symptoms of retinal detachment can include seeing "floaters" or spots in vision, flashes of light in one or both eyes, blurry vision, and reduced peripheral vision. If symptoms of retinal detachment occur, see an eye specialist immediately.
- Depression - Losing vision, independence, and the ability to perform enjoyable activities can cause sadness and feelings of isolation, and in some cases, even depression. The overall quality of life is affected by macular degeneration, and without adequate support systems, depression can result.
- Falls and fractures - Due to low vision, there is a higher risk of falling, resulting in a head injury, bone fractures, and trauma to other parts of the body. Particularly in low light, it might be hard to see contrasting objects such as steps or landings, electrical cords, or an upturned carpet.

AMD and Prescribed Minimum Benefits

Age-Related Macular Degeneration (the formal diagnosis is H35.3 - Degeneration of macula and posterior pole) is a Prescribed Minimum Benefits (PMB) condition under the Diagnostic Treatment Pair (DTP) code 904B - Retinal detachment, tear and other retinal disorders.

The PMB Regulations explains that the diagnosis, treatment, and care of PMBs must be funded irrespective of the member's plan type.

Diagnosis

AMD may be symptom-free in the early and intermediate stages; therefore, annual eye examinations are crucial to detecting the disease. An optometrist may suspect the condition and refer the person to an eye specialist (ophthalmologist).

The eye specialist may perform the following tests as part of the diagnosis. Although all the listed tests are included in the PMB level of care, only clinically necessary tests should be performed.

- Visual acuity test is a test where an eye chart is used to measure how well you see at distances.
- Fundus contact lens or 90 D lens examination / Peripheral fundus examination – the test involves widening the pupil by placing specific eye drops in the eye to provide a better view of the back of the eye, specifically the retina and the optical nerves.
- Keratometry – the test measures the anterior corneal curvature of the eye.
- Fundus photography – the test takes a retina photograph to document the condition's diagnosis, progress, and treatment.
- Optical Coherent Tomography (OCT) of Optic nerve or macula – the test uses light waves to achieve high-resolution, three-dimensional images of the eye tissue.
- Fluorescein Angiography - a fluorescent dye is injected into the arm. Pictures are taken as the dye passes through the blood vessels in your eye. This makes it possible to see leaking blood vessels in a severe, rapidly progressive type of AMD.

Treatment

According to the PMB regulations, the current treatment component specified for this condition is Vitrectomy, laser treatment, other surgery.

Wet AMD is treated with anti-vascular endothelial growth factor (anti-VEGF) injections into the retina, stopping blood vessels' growth and reducing swelling. An anti-VEGF injection is a surgical procedure where a substance is injected into the jelly-like material (vitreous) that fills the back part of the eye. Injecting into this area of the eye means medication can be provided right where needed, usually the retina. These injections are most effective when administered early in the condition. Treatment with anti-VEGF injections into the retina is currently the national standard of care in the State sector and, therefore, is included in the PMB level of care.

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The Communications Unit would like to thank the Clinical Unit for assisting with this edition of CMScript

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