

Diabetic Retinopathy

Retinopathy : Damage to the retina of the eye which may cause eye impairment

Mainly caused by abnormal blood flow

Mainly observed in people above 40 years

Main Causes :

1 Diabetes

2 Hypertension

- People suffering from diabetes for more than 20 years 80% more likely to get retinopathy
- Retinopathy caused by Diabetes is called Diabetic Retinopathy
- Diabetic retinopathy is a complication of diabetes that affects eyes
- Diabetic retinopathy causes due to the damage to the blood vessels in the tissues of retina
- Retina is a crucial part of the eye whose function is to convert the light into vision

In the early stages of diabetic Retinopathy there are no symptoms

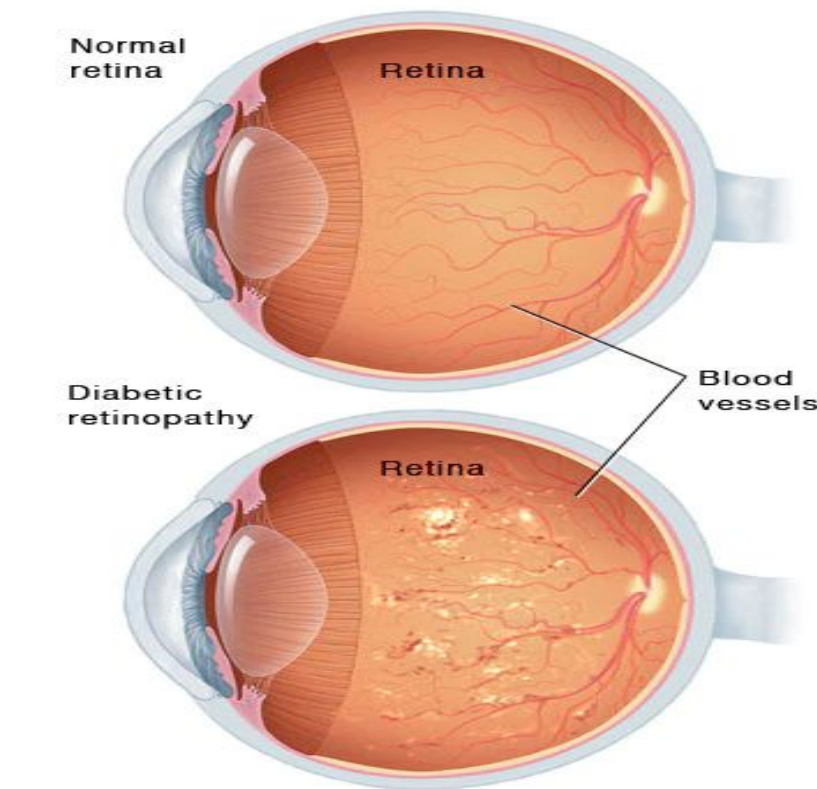
Symptoms start in the moderate stage :

- Floaters
- Blurriness
- Dark areas of vision
- Difficulty in predicting colors
- Blindness may occur
- Fluctuating vision

The Diabetic retinopathy in early stages can be cured with diabetic control but Moderate and above needs laser treatment and surgery

The below picture shows the difference between normal retina and Diabetic retina

Diabetic Retinopathy



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Macular Degeneration : (also called as “Age Related Macular Degeneration”)

Macula : Macula is the centre part of the retina which gives the ability to see 20/20 vision and Provides best colour vision

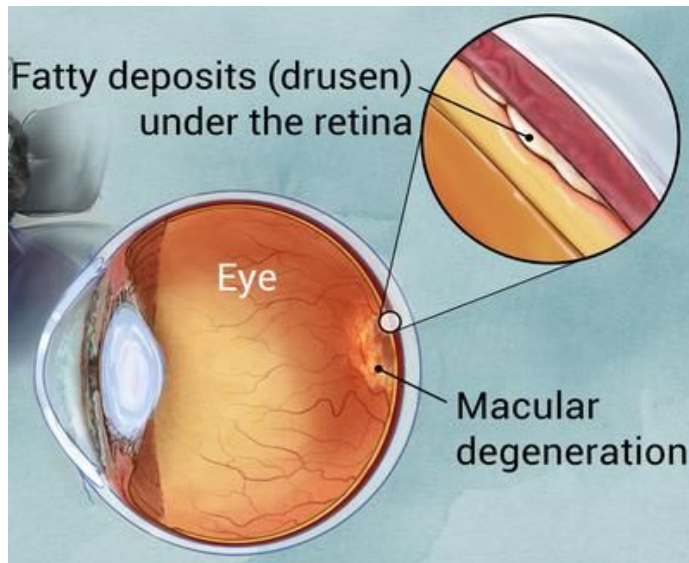
Macular degeneration, also known as age-related **macular degeneration** (AMD or ARMD), is a medical condition which may result in blurred or no vision in the center of the visual field. Early on there are often no symptoms. ... It is due to damage to the **macula** of the retina.

Symptoms : Blurred or no vision in the centre of the eye

ARMD is of 2 types

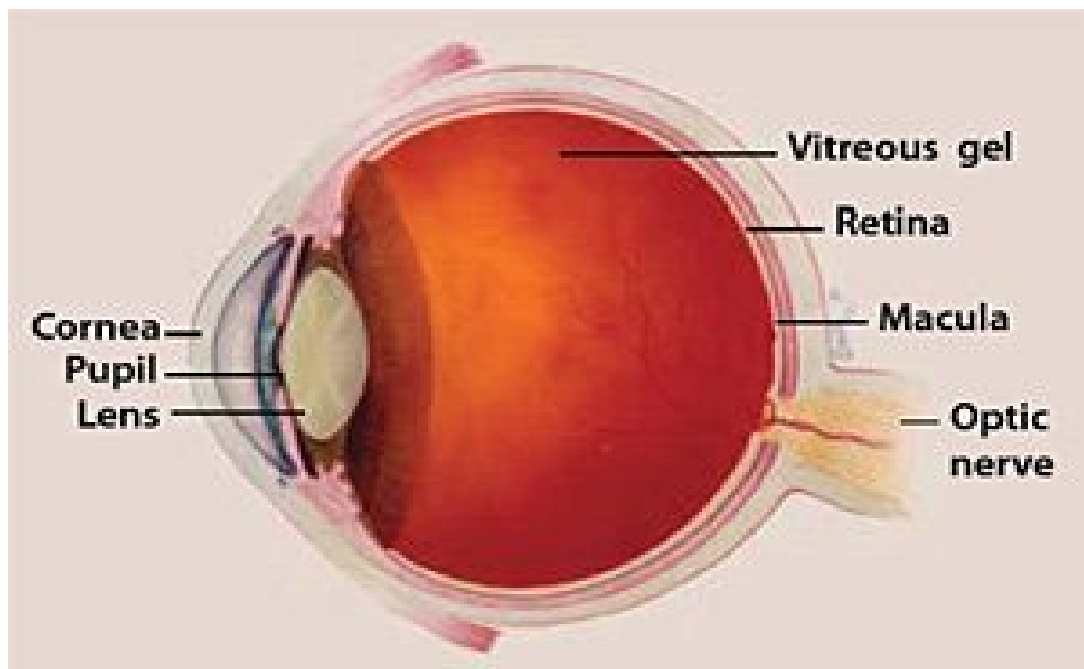
- DRY ARMD : Macula deteriorates
- WET ARMD : New blood vessels grow under middle of the retina

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Macular edema :

Macular edema is the buildup of fluid in the **macula**, an area in the center of the retina. The retina is the light-sensitive tissue at the back of the eye and the **macula** is the part of the retina responsible for sharp, straight-ahead vision. Fluid buildup causes the **macula** to swell and thicken, wh



vision

ich distorts

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Macular edema gradings :

Grade	Impact	Result
0	No visible exudates	Normal
1	Shortest distance between macula and exudates is more than one optic diameter	Non - CSME [CSME-Clinically non significant macular edema]
2	Shortest distance between macula and exudates is less than one optic diameter	CSME [clinically significant macular edema]

- The size of the normal optic disc is 1.77mm x 1.88mm (horizontal x vertical)

Retinopathy Grades :

Grade	Result
0	Normal
1	Mild retinopathy
2	Moderate retinopathy
3	Malignant retinopathy

Exploration of grades :

Grade 1 (Mild retinopathy) :

- Arteriolar narrowing
- AV nicking
- and/or arteriolar wall opacity

Grade 2 (Moderate retinopathy) :

- Hemorrhage
- Microaneurysm

Diabetic Retinopathy

- Cotton wool spots
- And /or hard exudates

Grade 3 (Malignant retinopathy) :

- All grade 2 symptoms + Optic disc swelling

Arteriolar narrowing :

Arteriolar is the small diameter blood vessel in the microcirculation, That extends the branches out from the artery and leads to capillaries.

Arteriolar narrowing is the reduction in the diameter as the white coloured bulges blocks the walls.

It's size decreases with age and exposure to the pollution



Diagram : Arteriolar narrowing

AV NICKING :

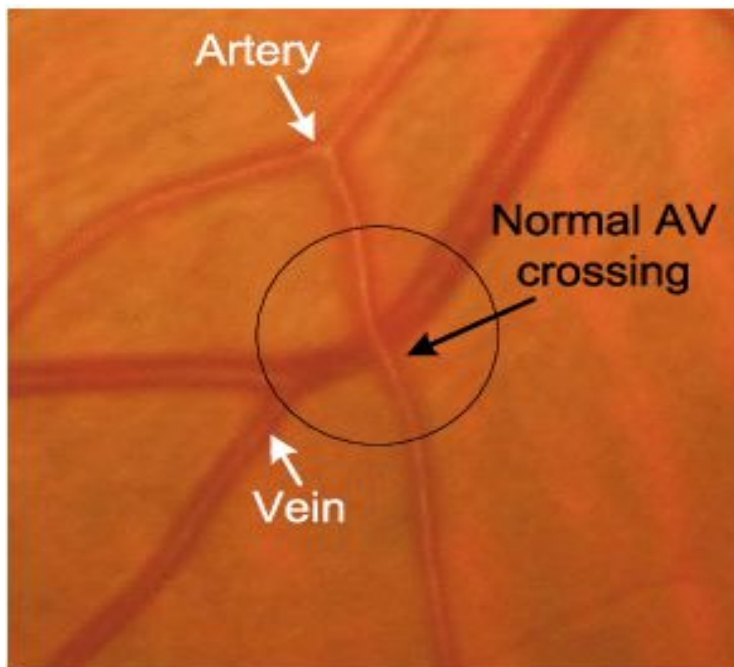
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Arteriovenous nicking is the phenomenon where on examination of the eye a small artery is seen crossing a small vein. Which results in the compression of the vein with bulging on either side of the crossing.

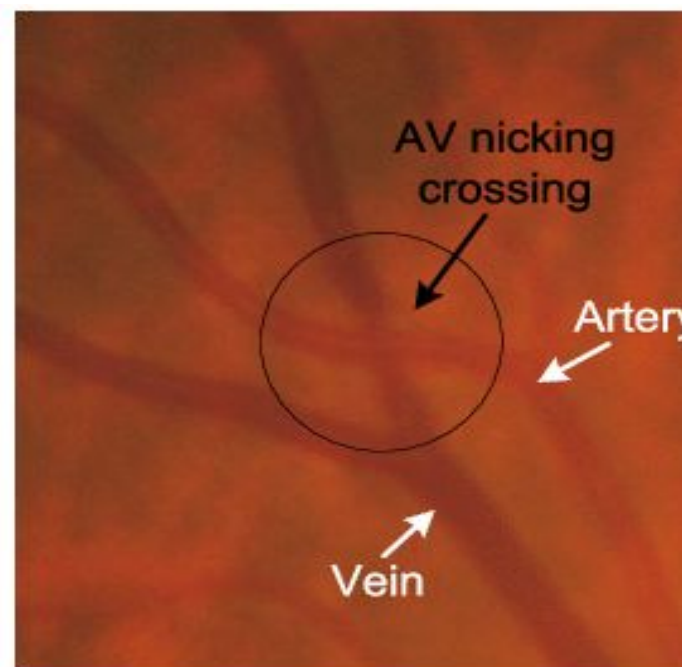


Diagram : AV nicking

Normal vs 'av nicking'



(a)



(b)

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Av nicking more commonly causes due to hypertension

Hemorrhage :

Retinal haemorrhage is a disorder of the eye in which bleeding occurs in the retina, the light sensitive tissue, located on the back wall of the eye. ... However, some retinal hemorrhages can cause severe impairment of vision. They may occur in connection with posterior vitreous detachment or retinal detachment



Microaneurysms :

- Secular in shape (round)
- Appears as small red dots which are often in clusters
- Do not affect vision

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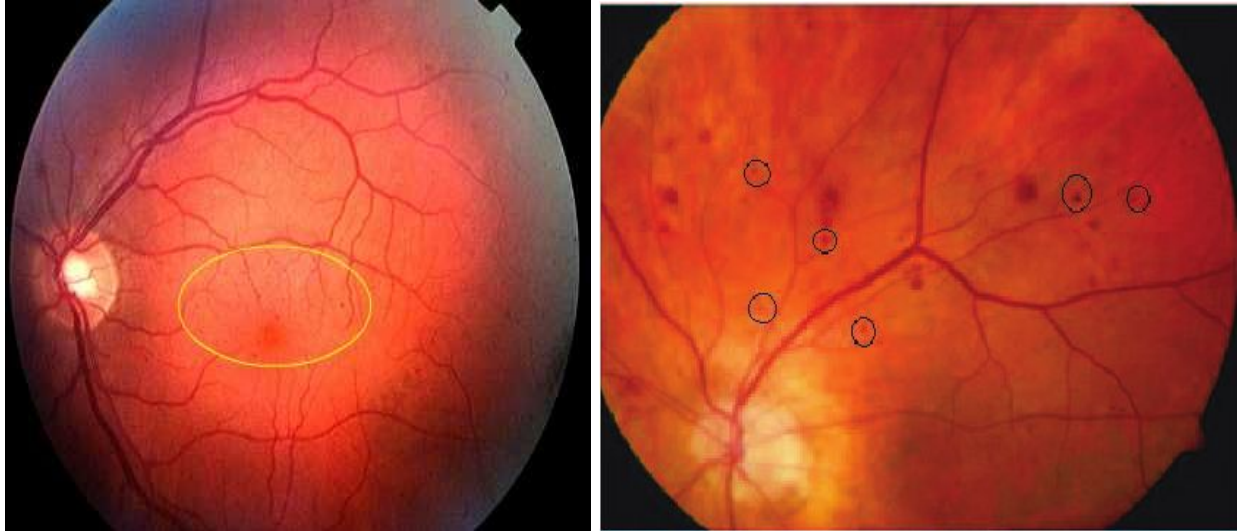
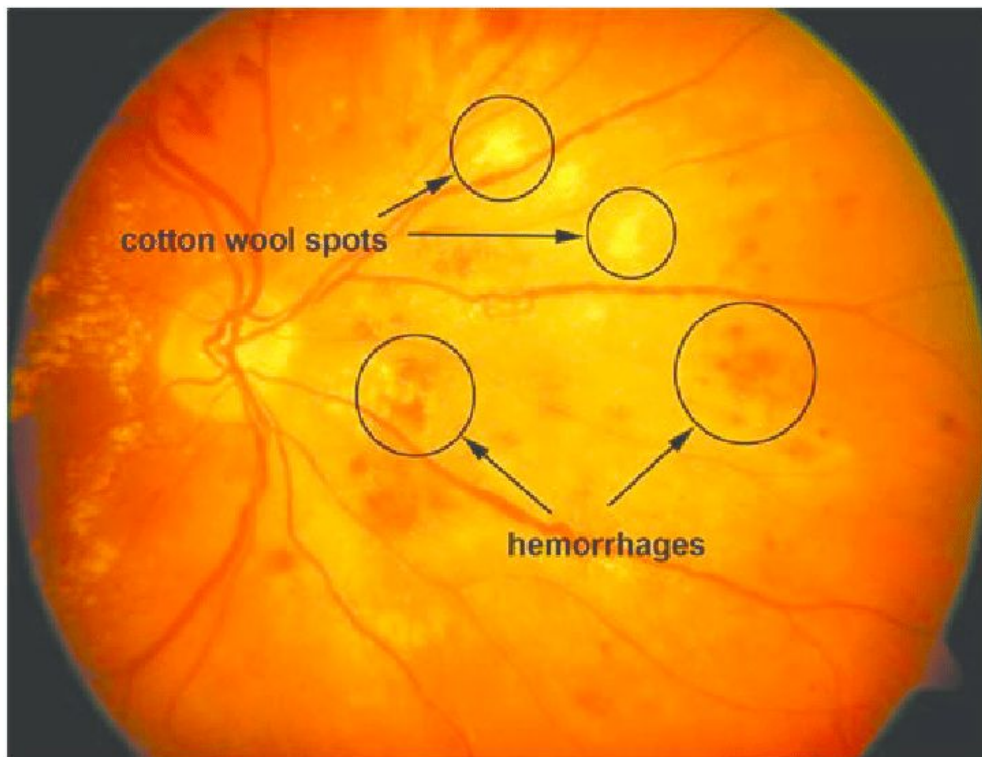


Diagram : Microaneurysms

Cotton wool spots :

Cotton wool spots are an abnormal finding on funduscopy exam of the retina of the eye. They appear as fluffy white patches on the retina. They are caused by damage to nerve fibers and are a result of accumulations of axoplasmic material within the nerve fiber layer.



Diabetic Retinopathy

Hard exudates :

Hard exudates (lipid) Hard exudates are small white or yellowish white deposits with sharp margins. Often, they appear waxy, shiny, or glistening. They are located in the outer layers of the retina, deep to the retinal vessels

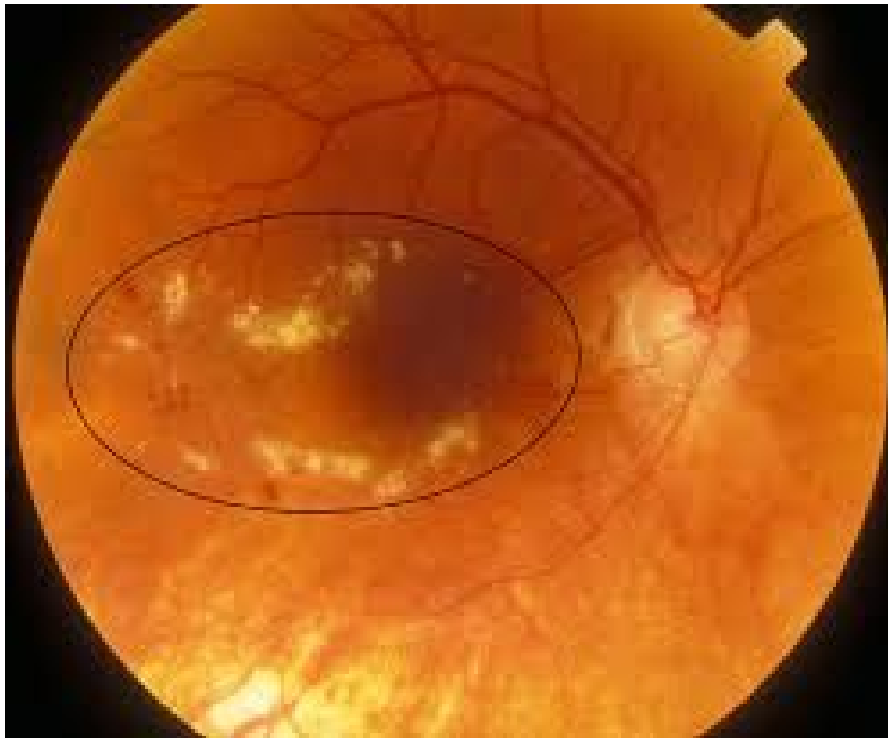
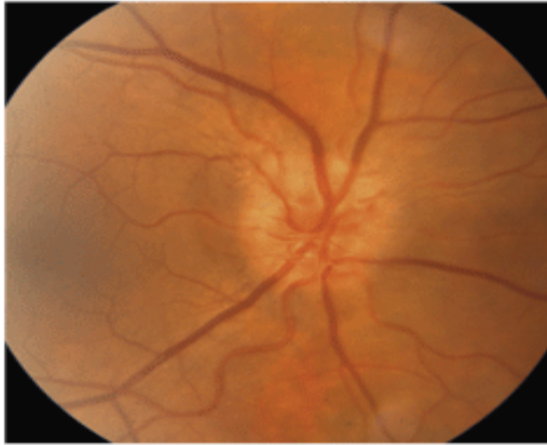


Image : Hard exudates

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Papilledema : Papilledema is optic disc swelling caused by intracranial pressure due to any cause.



1. Optic nerve edema, O.D.

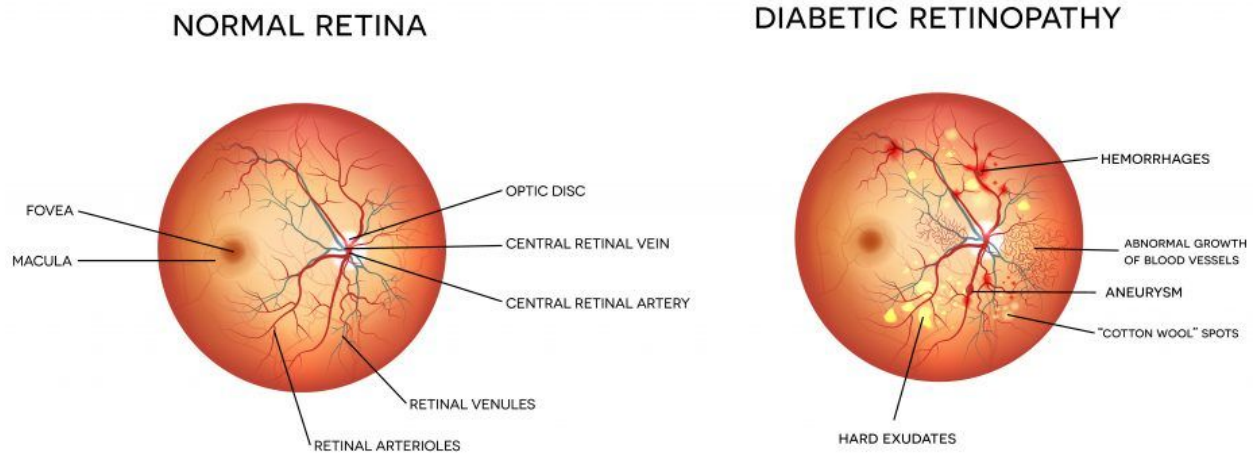


2. Normal optic nerve with 0.2 cupping, O.S.



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Normal vs Diabetic retinopathy :



There are 2 ways in which images of retina can be captured :

- 1 Fundus photography
- 2 Optical coherence tomography

Fundus photography : It involves capturing a photograph of the back of the eye i.e fundus

Specialized fundus cameras that consists of an intricate microscope attached to a flash enabled camera are used for fundus photography

Images captured by fundus photography are called **fundus images**

Optical coherence tomography :OCT uses a low coherence light to capture micrometer resolution.

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