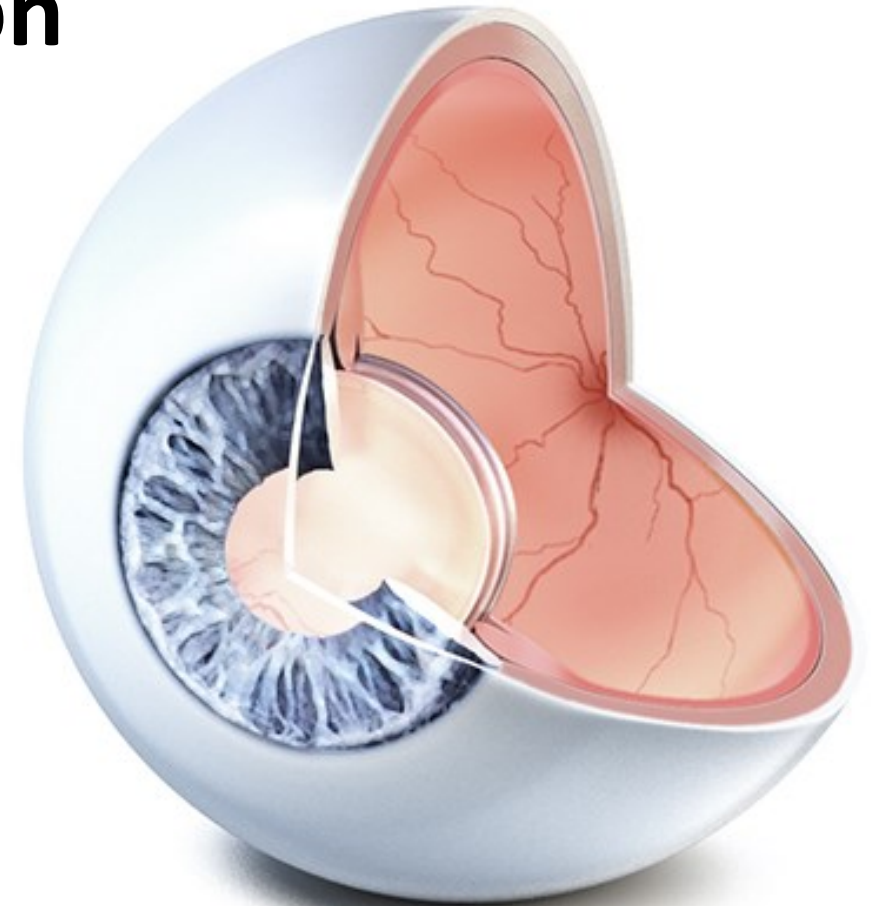


Age-related Macular Degeneration

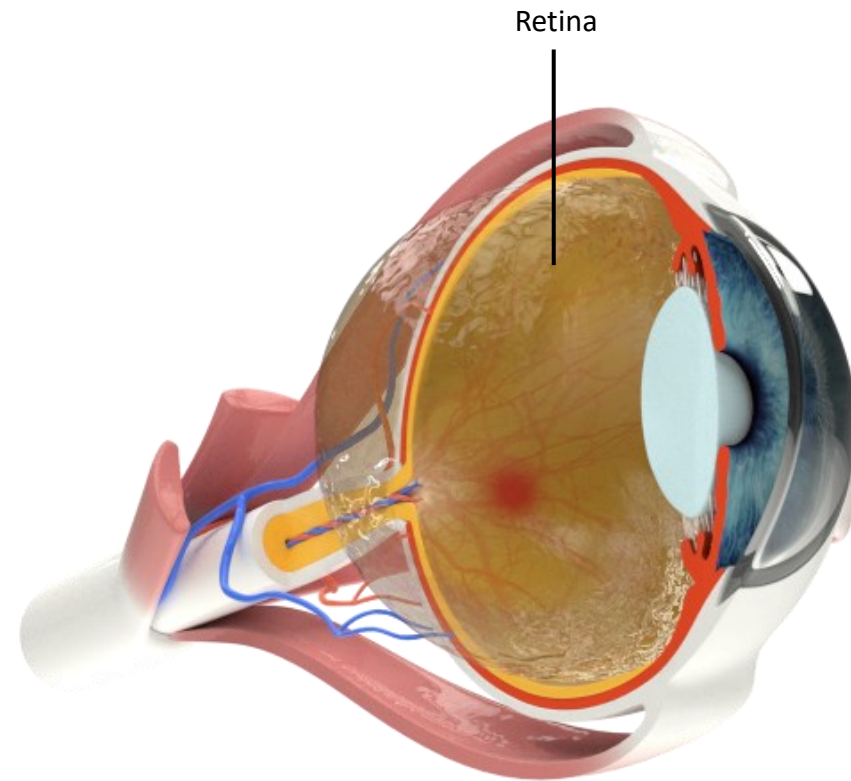
Anatomy and pathology



The macula, what about the retina?

Inside lining

The retina is the nerve layer that lines the back of the eye. The retina senses light and sends signals through the optic nerve to the brain.



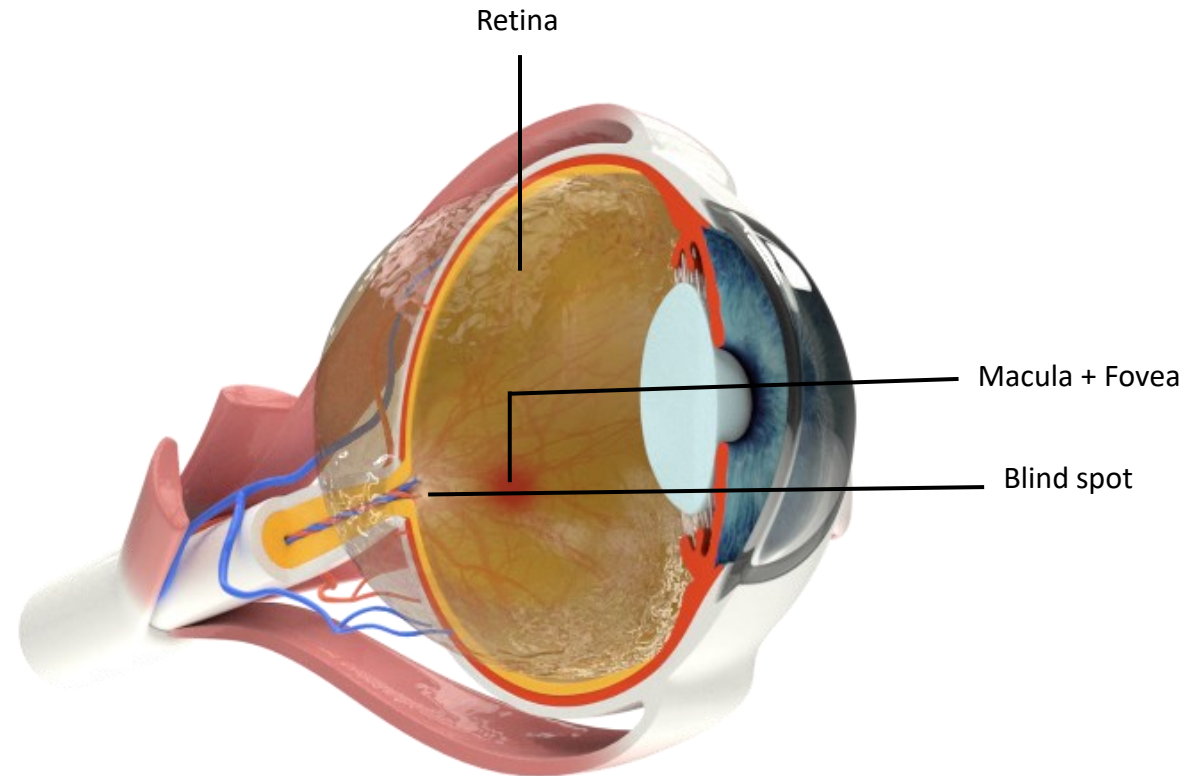
The macula

Where is it?

Macula and fovea are a small part of an amazing organ!

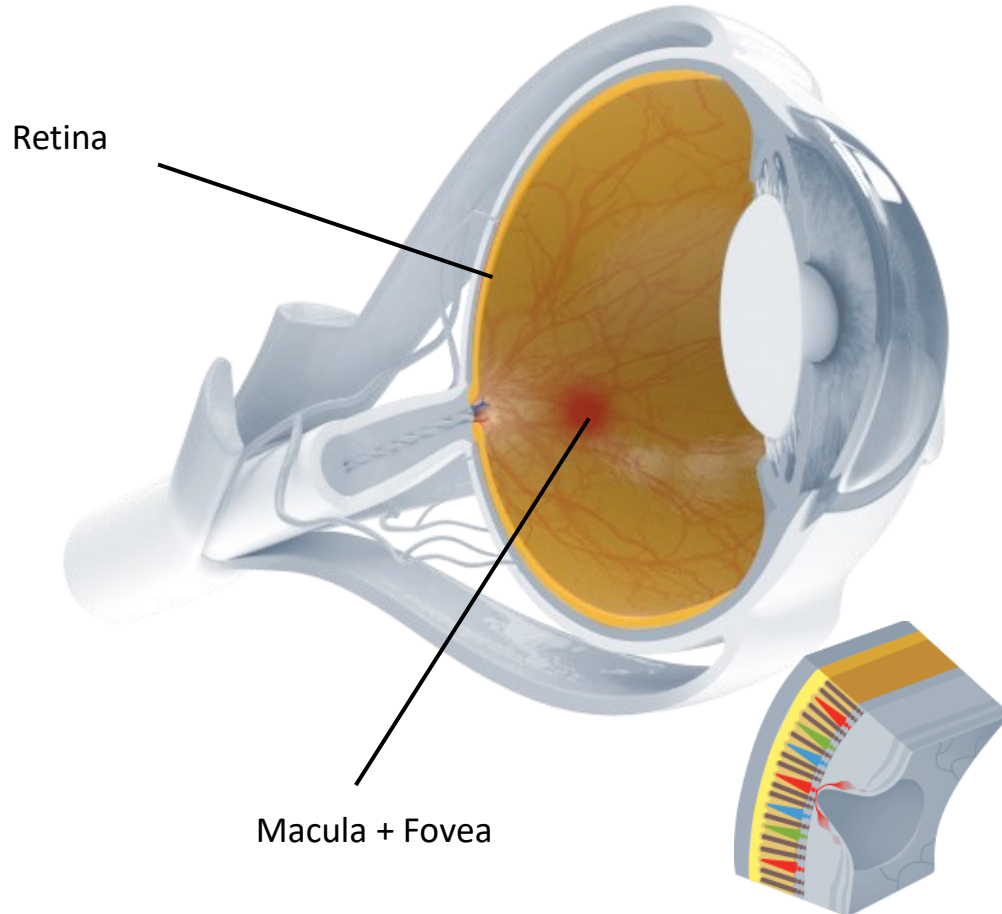
The macula is 5.5mm in diameter

The fovea is 1.5mm in diameter



Macula and fovea

Jam donut vs donut - same, same but different



The macula is an area of the retina, with the fovea in the center.

The macula has the highest density of light receptors and is free of major blood vessels.

The fovea in the center of the macula is responsible for sharp, detailed vision, e. g. when doing activities such as reading, watching TV or driving a car.

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Light receptors in the fovea – we call them cones

Colour, depth perception, reading – all the good stuff!!

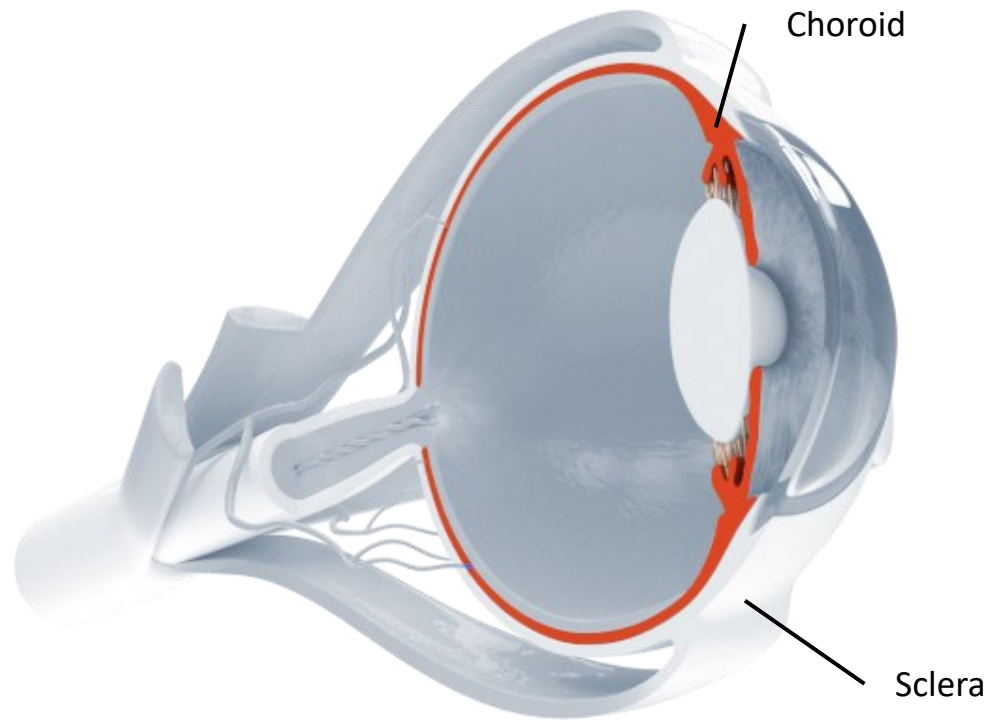
Humans usually have three kinds of cones – specialized in the perception of three basic colors.

- Red
- Green
- Blue



Macula and fovea

Nourished and protected



The choroid provides oxygen and nourishment to the retina. The sclera, also known as the white of the eye, is the protective outer layer of the eye. In humans, the whole sclera is white, contrasting with the colored iris.

Age Related Macular Degeneration (AMD)

How can it affect my eyes

- As the name implies, age is the major risk factor.
- A disease that progressively damages the sensitive centre of the retina - the fovea - and hence the center of the visual field.
- AMD is the leading cause of severe and irreversible vision loss in elderly people throughout the western world.
- Between the ages 65 and 75 about 10 % of people have some impairment of vision due to AMD, and over 75 years about 30% are affected.
- In late stages people usually maintain peripheral vision and can see to walk around (often with difficulty), but it is the loss of central vision that has the most devastating effect on lifestyle.

Age Related Macular Degeneration (AMD)

Different types

1. Non-exudative (“dry”) 90%

2. Exudative (“wet”) 10%

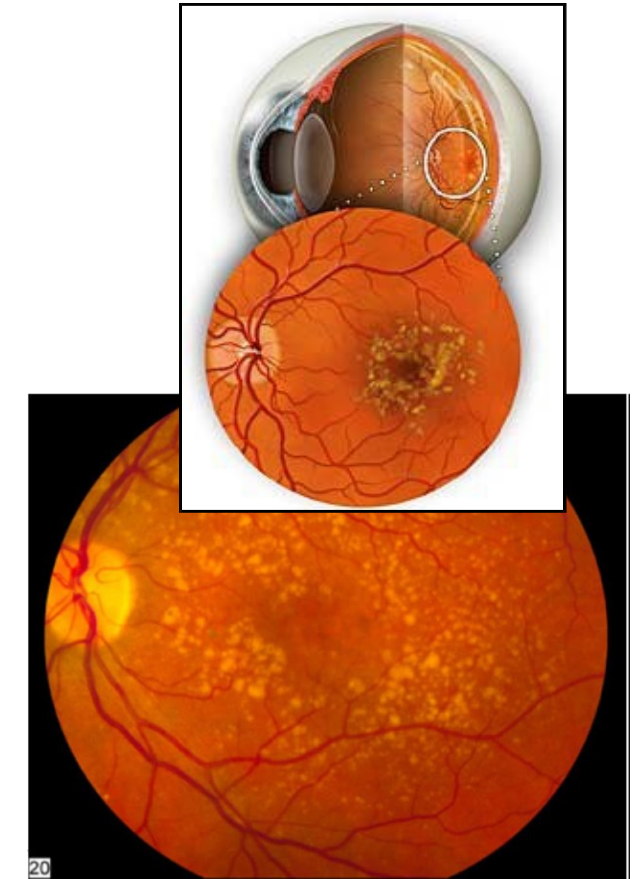
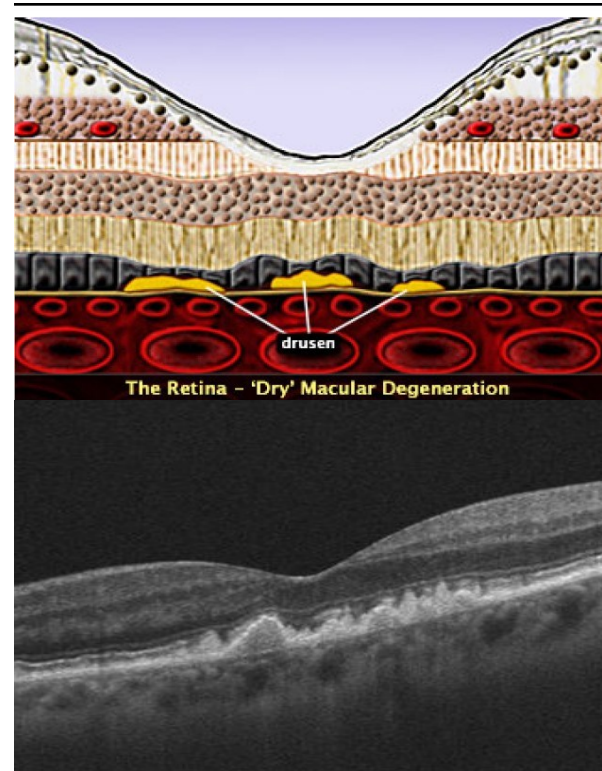
Exudative = relating to leaking of fluid and other materials from cells and tissues, usually as a result of inflammation or injury.

Age Related Macular Degeneration (AMD)

Dry

Drusen – fat bumps

- Drusen are made up of lipids, a fatty protein
- Appear as yellow deposits
- Can be hard or soft in appearance
- Change in vision yes, it may cause gradual central vision loss as they are underneath your macula

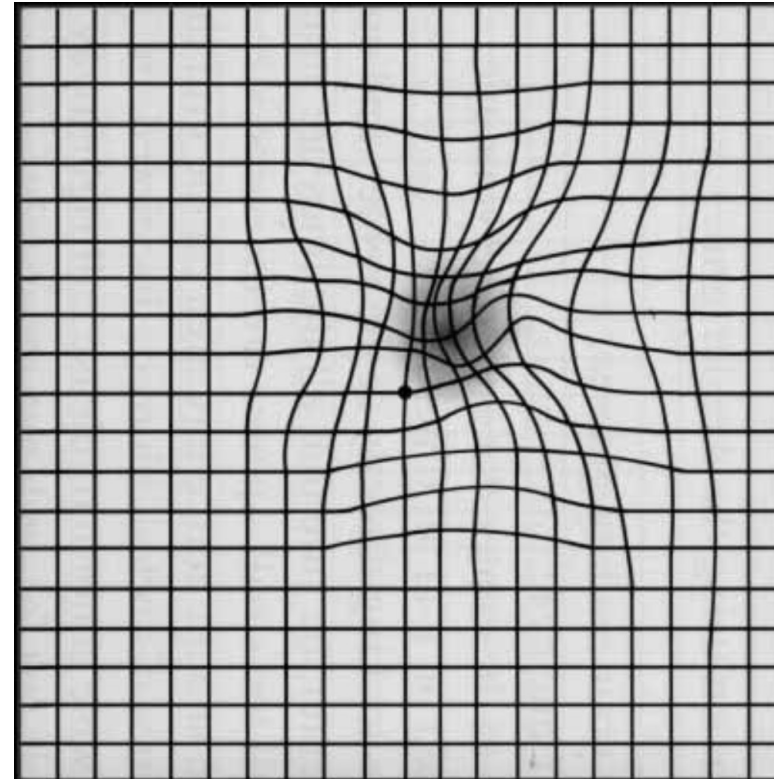


Age Related Macular Degeneration (AMD)

Amsler Grid – monitor your own eyes when you get your milk from the fridge for your coffee

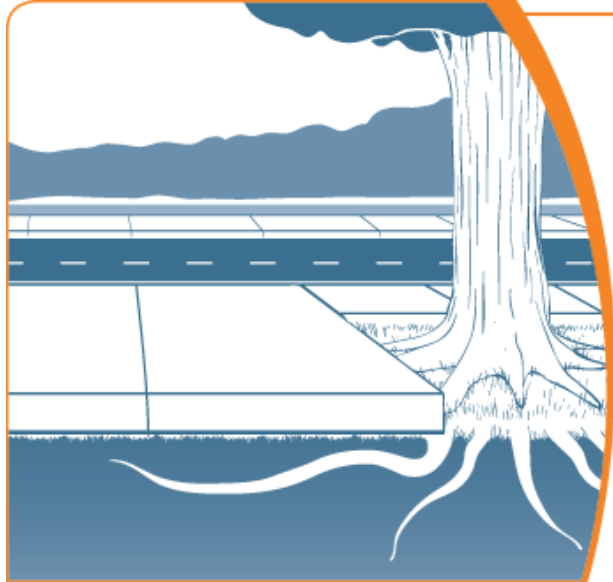
Consisting of grid lines with a central fixation dot, the Amsler chart was developed to detect abnormalities in the central 20 degrees of vision.

Excellent self screening tool for early symptoms of AMD



Age Related Macular Degeneration (AMD)

How does wet happen?



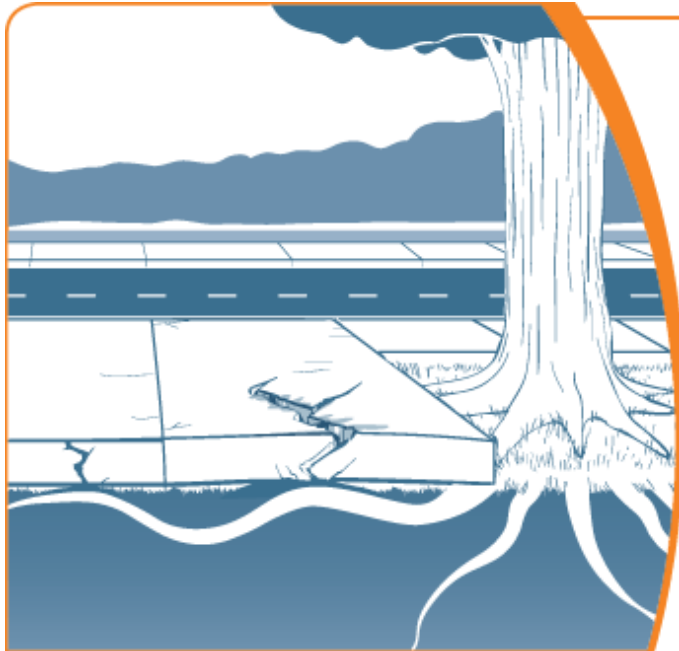
Picture blood vessels as the roots of a tree growing and spreading under concrete.

Concrete represents the macula.

In a healthy eye, vessels stay in place and vision is normal

Age Related Macular Degeneration (AMD)

How does wet happen?



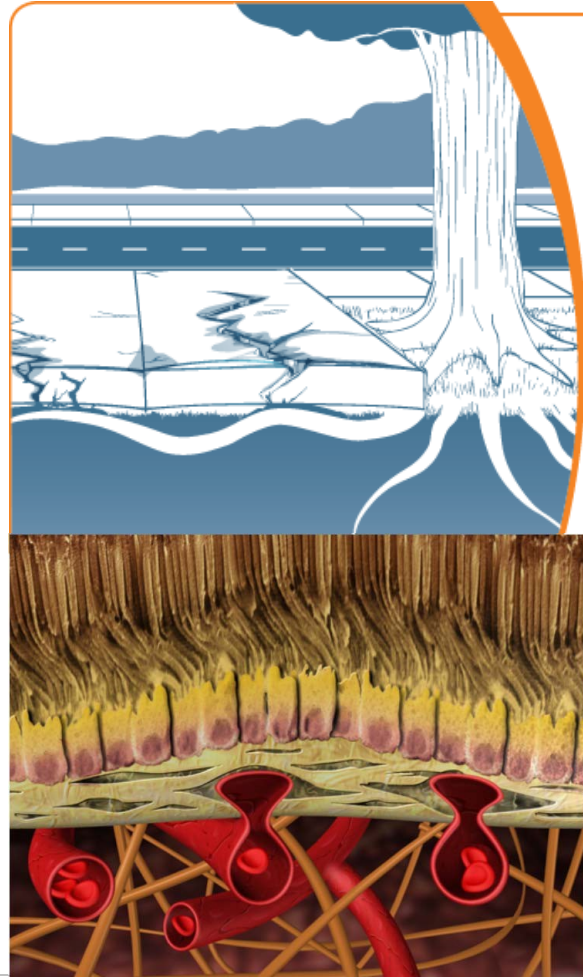
Abnormal blood vessels (“roots”) push up through the concrete, cracks in the sidewalk.

These vessels tend to be fragile and can start leaking or bleeding.

Subtle change in vision can occur at this stage.

Age Related Macular Degeneration (AMD)

How does wet happen?



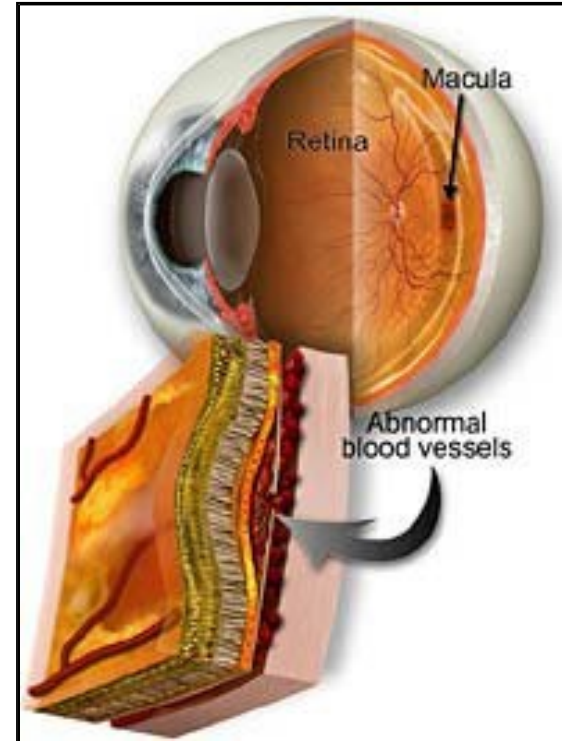
Leaking or bleeding vessels lead to swelling and bleeding in the macula, causing visual distortions or decreased vision.

Over time, this can lead to scarring in the macula & create damage that may result in the loss of central vision

Age Related Macular Degeneration (AMD)

How does wet happen?

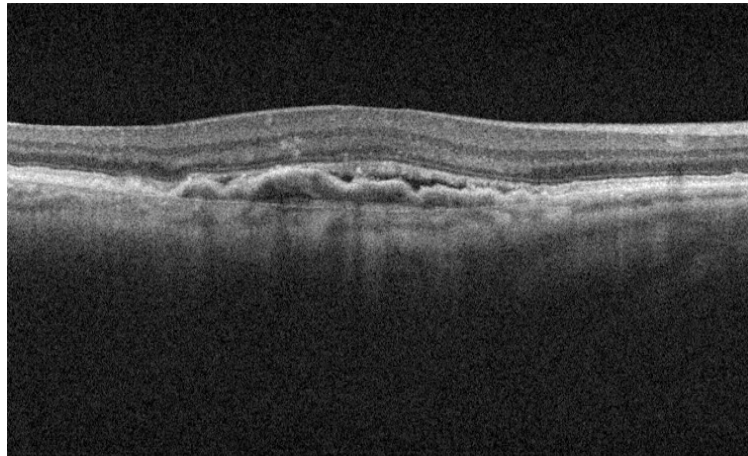
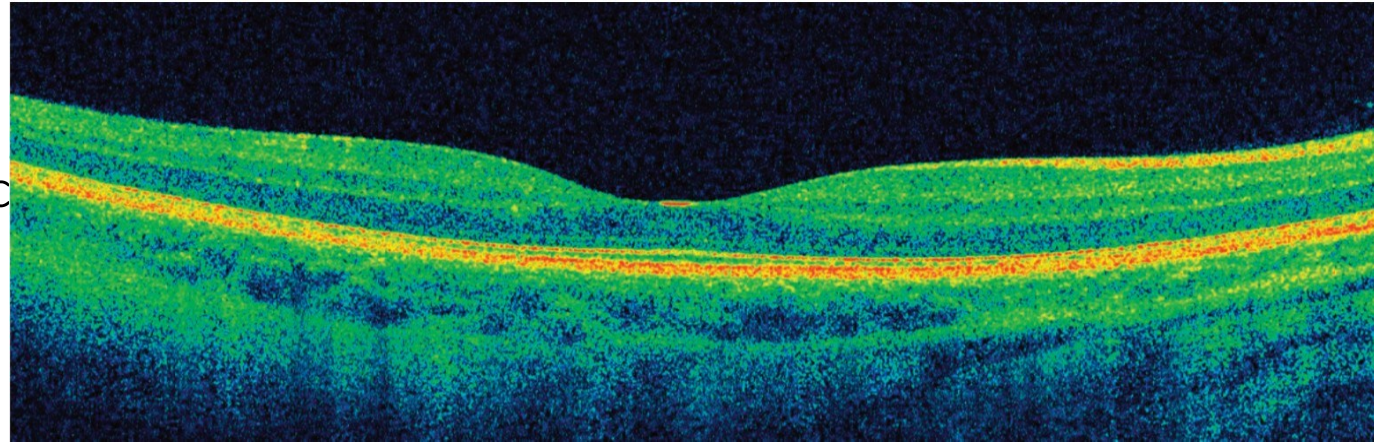
- About 10% of dry AMD cases progresses to more advanced, damaging form of disease
- New blood vessels grow beneath retina
- Leak blood and fluid
- Leakage causes permanent damage to light-sensitive retinal cells
- Cells die & create blind spots in central vision.



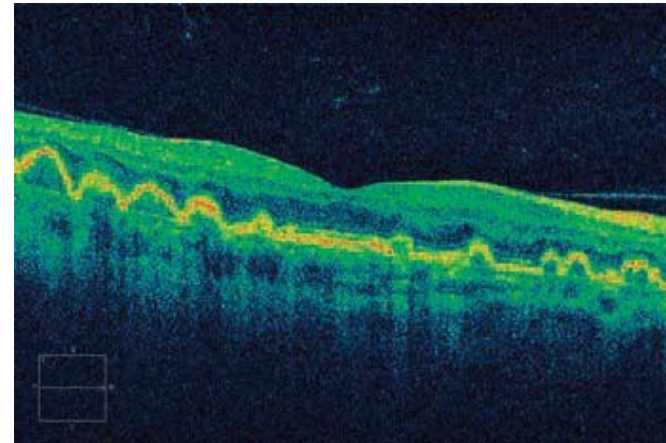
Age Related Macular Degeneration (AMD)

OCT scan – the best way to screen for AMD or distinguish which kind you have

Normal Mac



Wet AMD



Dry AMD

Age-related Macular Degeneration (AMD)

- OCT has a new friend called OCTA or angioplex

•OCTA has led to the identification of a new subtype of AMD – dry with new vessel growth (wait a minute dry but also wet???)

- Called quiescent CNV which does not leak on traditional methods of photographing leaks (fluorescein angiograms)
- Changes are so subtle that it can only be detected by OCTA
- 80% of the new type of AMD will turn wet within 2 years – better indication if your eye is turning wet before you see a change in vision!!
- Keep in mind we cannot stop wet AMD from forming but we can treat earlier and mitigate vision loss

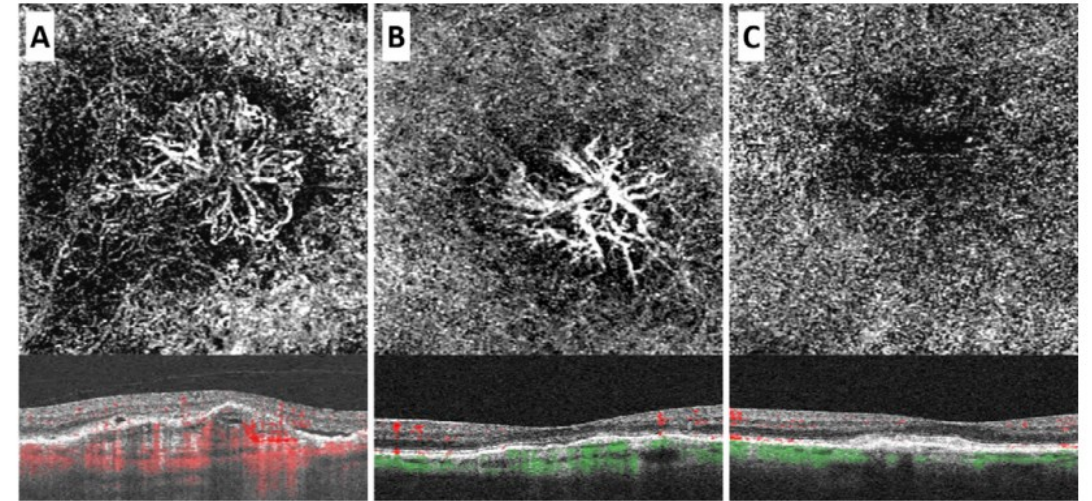


Figure 11: Active CNV (A), nonexudative CNV (B), and a disciform scar (C). Pigment epithelial detachments are visualized with structural OCT in all three cases, but OCT-A reveals a choroidal neovascularization in A and B only. Note the similarity of the shallow pigment epithelial detachment in B and C.

Age Related Macular Degeneration (AMD)

Treatment

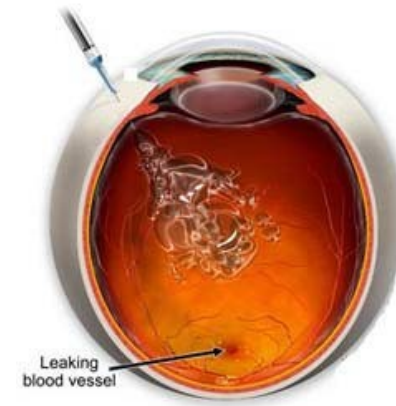
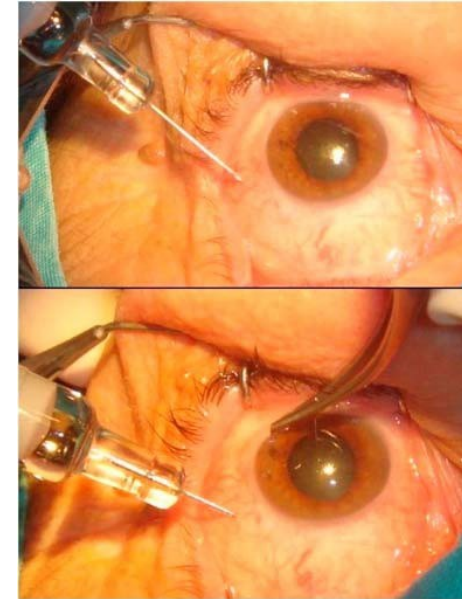
Since around 2006, a breakthrough occurred with treatment. The advent of the use of anti-VEGf drugs to treat “wet”

Anti-VEGf has helped halt the aggressive effects of CNV on macula and its role for fine central vision.

Administered via an intravitreal injection.

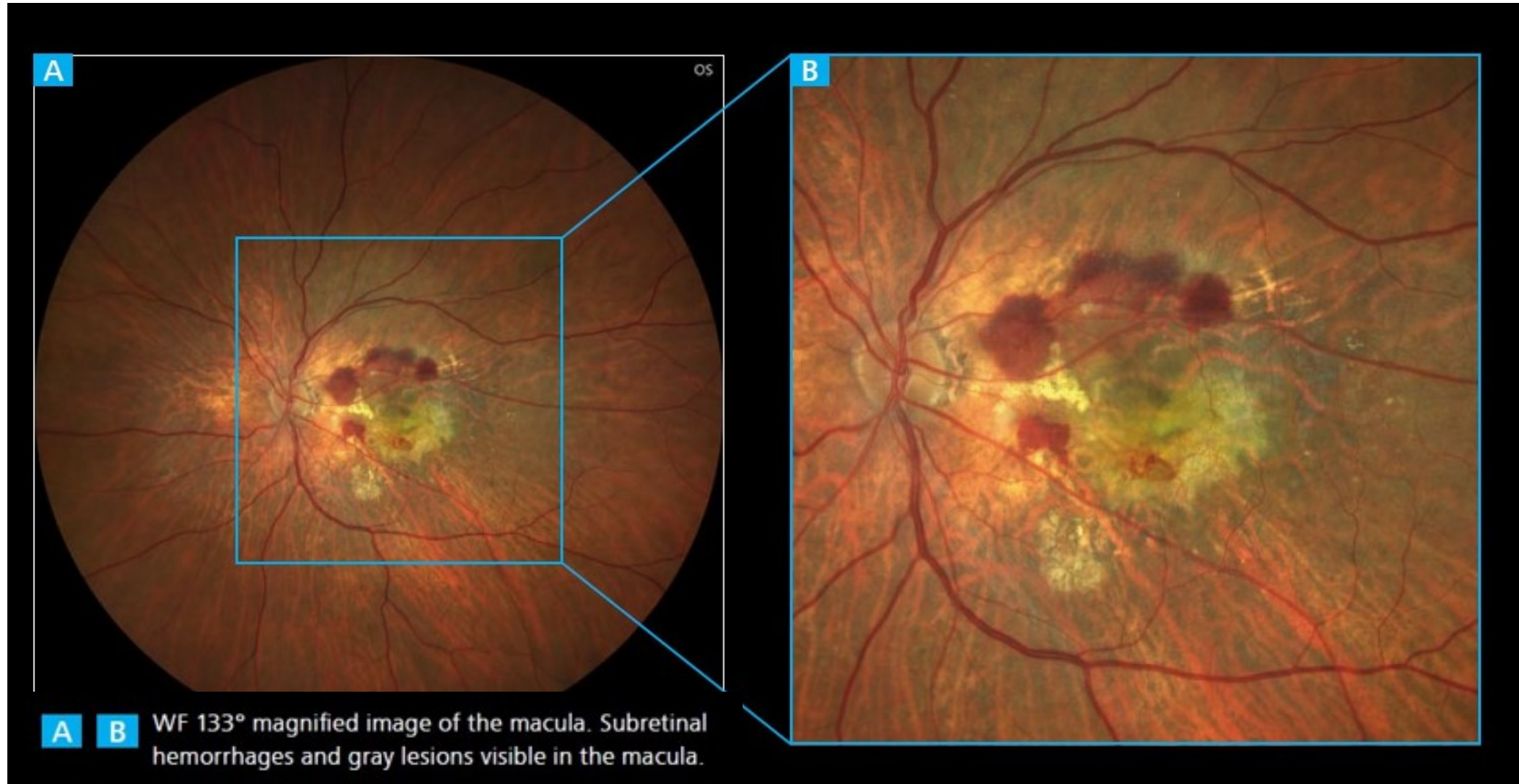
Anti-VEGf drugs:

- **Lucentis (Novartis)**
- **Eyelea (Bayer)**



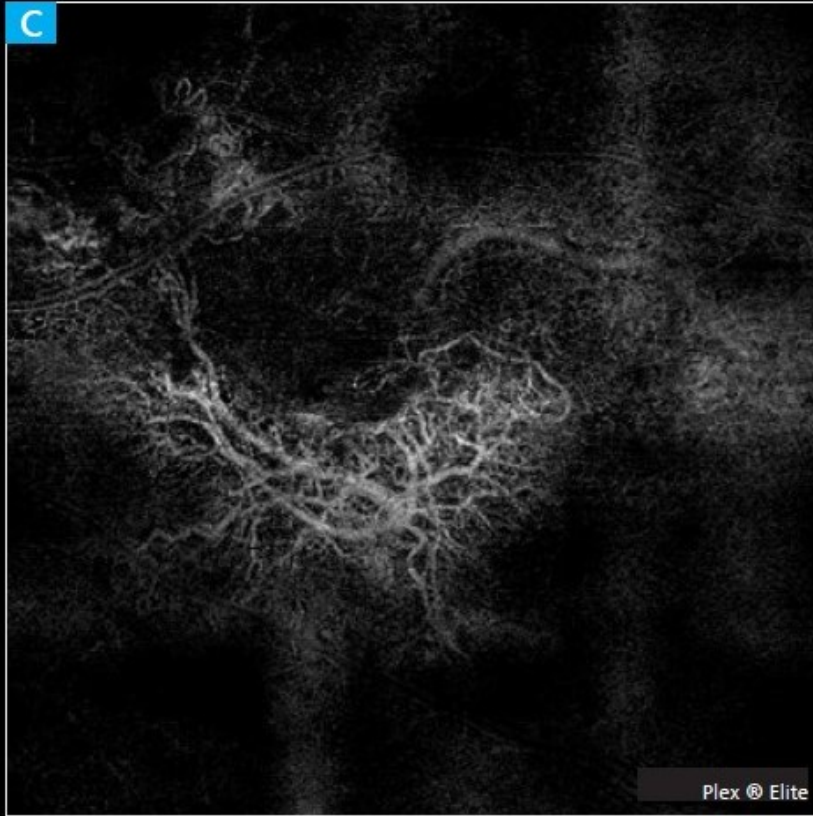
Age-related Macular Degeneration (AMD)

- Wet AMD – 87 year old male

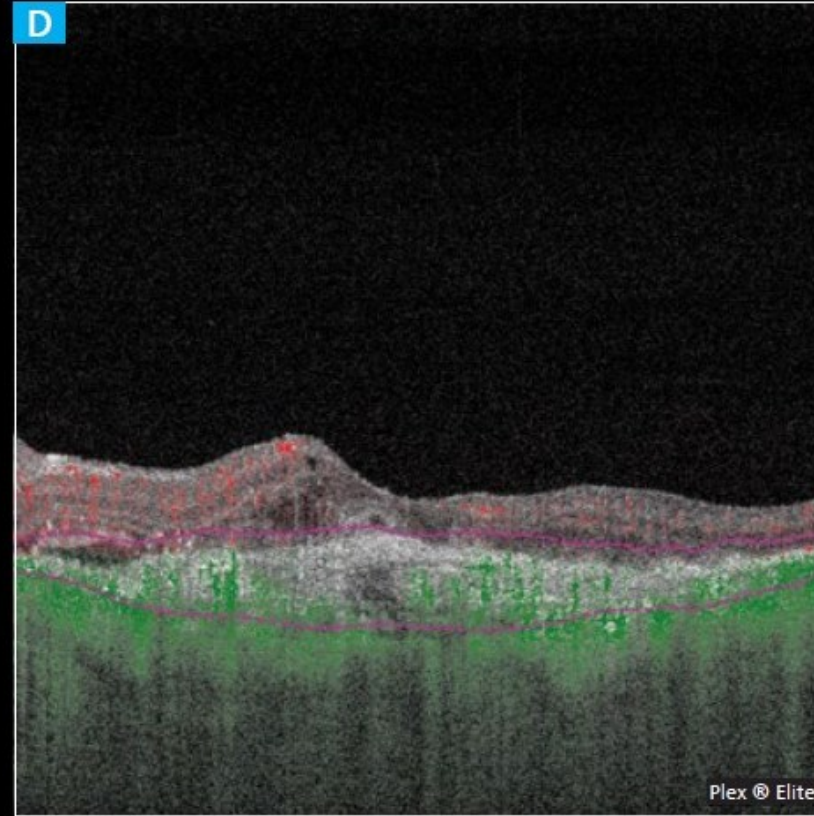


Age-related Macular Degeneration (AMD)

- Wet AMD – 87 year old male



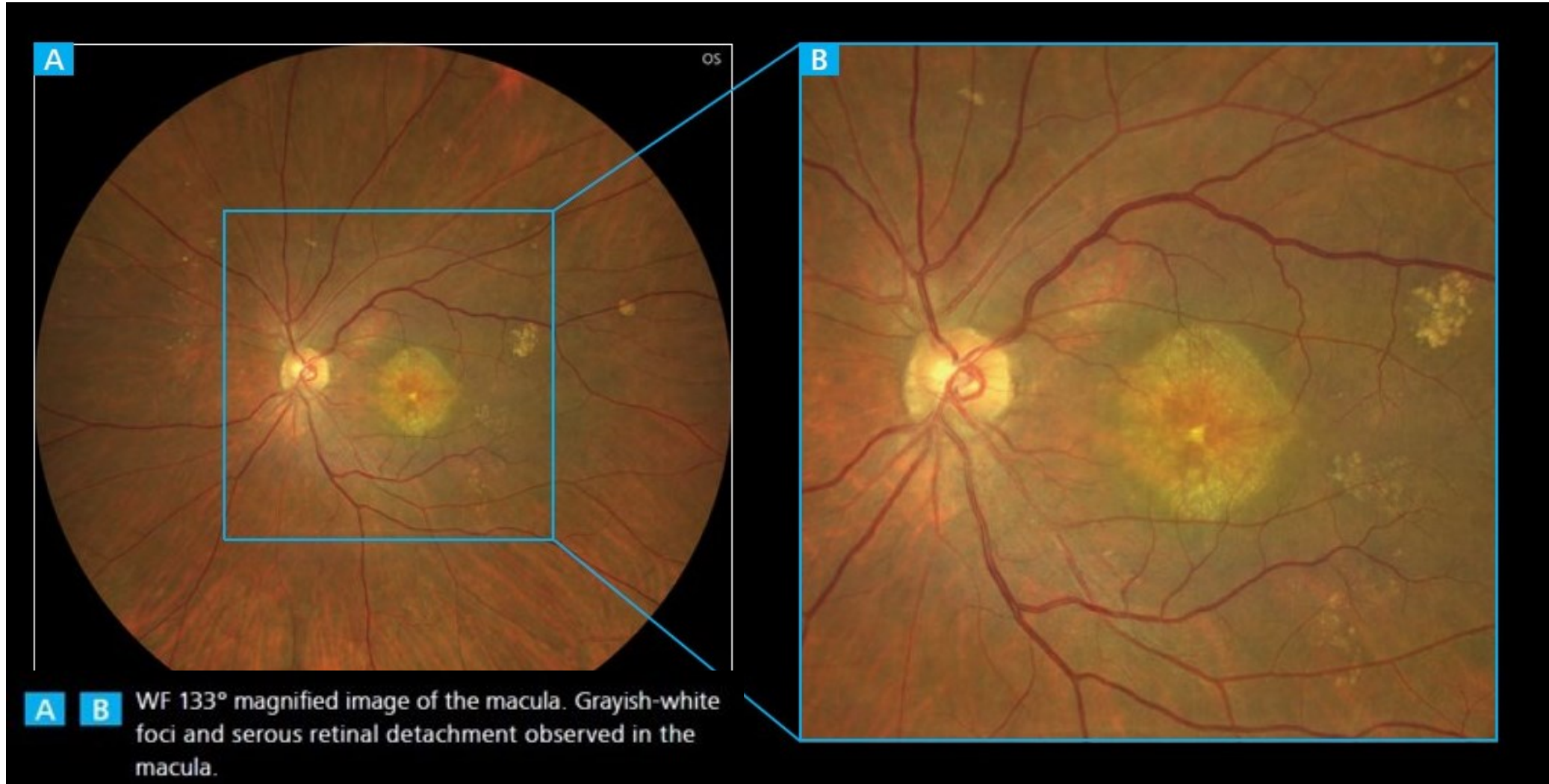
- A** **B** WF 133° magnified image of the macula. Subretinal hemorrhages and gray lesions visible in the macula.
- C** OCT angiography of macula 6 x 6 mm, ORCC slab image. CNV is widespread under the retina.



- D** OCT image matching the "C" location. The red area indicates blood flow information above the RPE, and the green area indicates blood flow information below the RPE. The CNV extending below the RPE can also be seen on the tomography (green area).

Age-related Macular Degeneration (AMD)

- Wet AMD – 82 year old male



Age-related Macular Degeneration (AMD)

- Wet AMD – 82 year old male

The figure consists of four panels labeled A, B, C, and D, illustrating the diagnosis of Wet AMD. Panel A is a color fundus photograph showing grayish-white foci and serous retinal detachment. Panel B is a magnified view of the macula. Panel C is a 6x6 mm OCT angiography image showing a wheel-like CNV. Panel D is an OCT cross-section showing CNV under the RPE and serous retinal detachment.

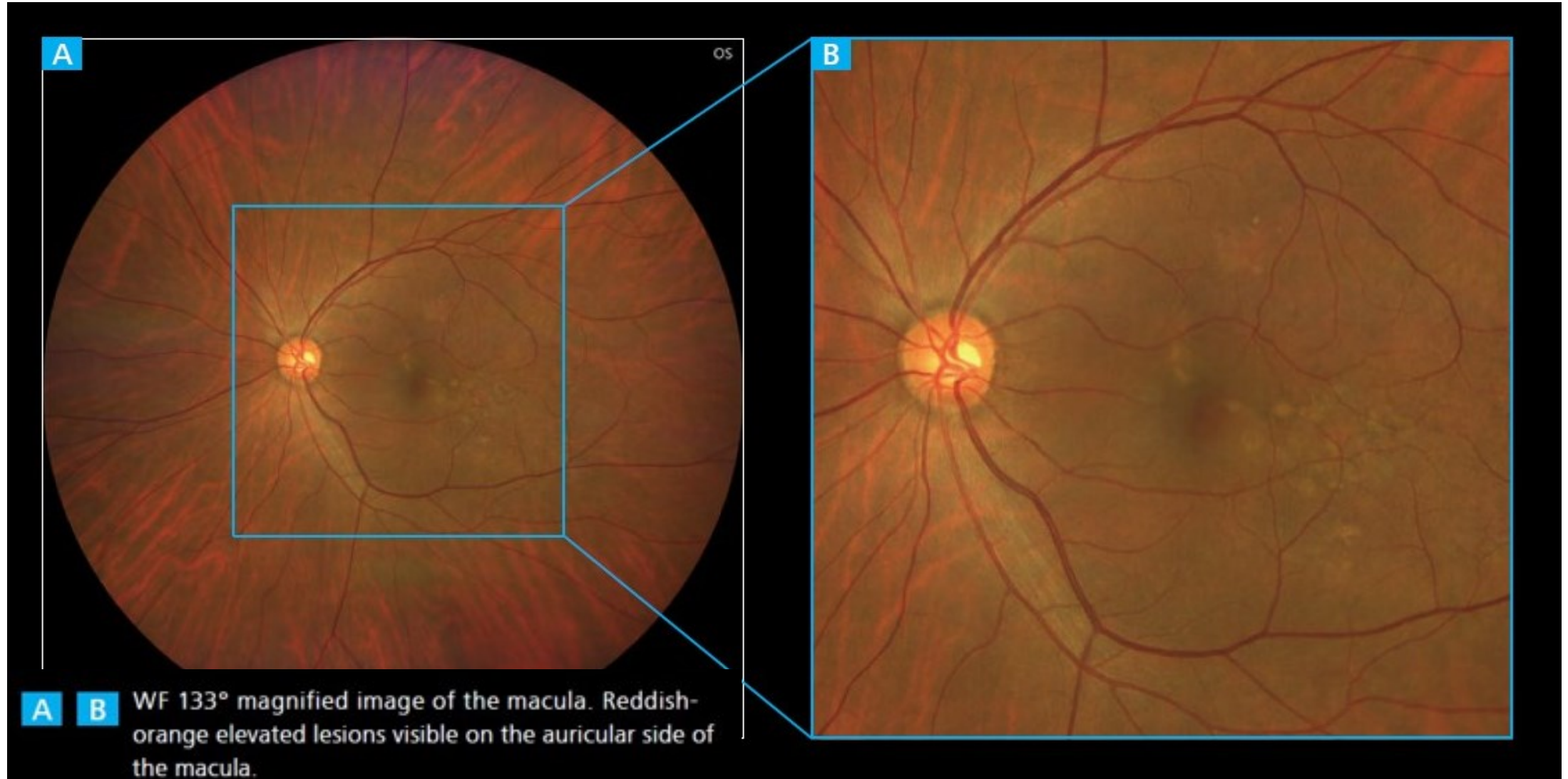
A **B** WF 133° magnified image of the macula. Grayish-white foci and serous retinal detachment observed in the macula.

C A 6 × 6 mm OCT angiography of the macula, avascular slab image. Consistent with the color image location, a wheel-like CNV is depicted.

D OCT image matching the “C” location. CNV can be seen under the RPE in the central fovea region (green area). At the same time, serous retinal detachment is also observed.

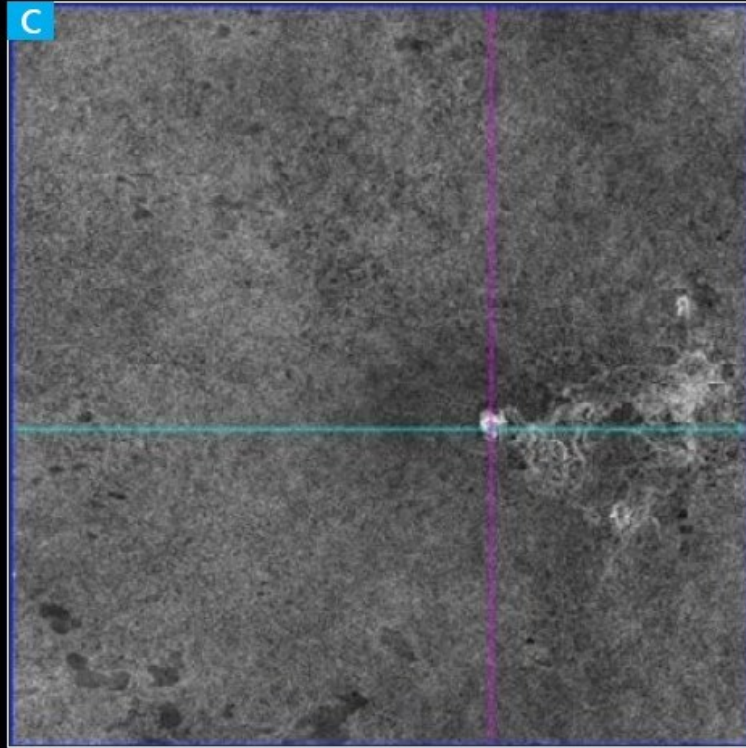
Age-related Macular Degeneration (AMD)

- PCV – 69 year old male



Age-related Macular Degeneration (AMD)

- PCV – 69 year old male



A B WF 133° magnified image of the macula. Reddish-orange elevated lesions visible on the auricular side of the macula.

C A 6 × 6 mm OCT angiography of the macula, choroid slab image. Polypoid lesions (horizontal and vertical line intersections) and an abnormal vascular network are depicted to the right of said polypoid lesions.



D Vertical B-Scan image matching the location of the polypoid lesions on the OCT A image. You can see the RPE is bulging.