

**“A MAN IS ONLY AS OLD AS HIS ARTERIES”**

**Thomas Sydenham (1624-1689)**

GTcardio's mission is to reduce arterial aging and related chronic illnesses  
(heart attacks, strokes, dementia, erectile dysfunction and more)

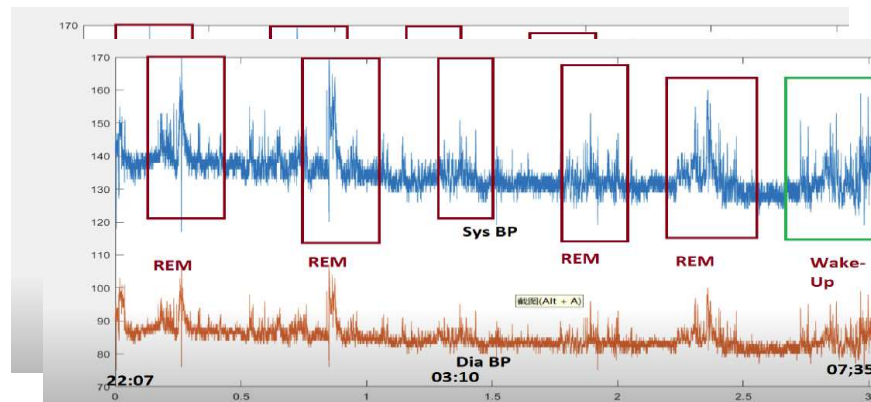
**New Paradigm in diagnosis and treatment assessment**

**Preventing Cardiovascular Diseases  
through**

**Continuous Heart and Arteries Monitoring during Sleep**



 **xcardio group**  
**BodiMetrics**

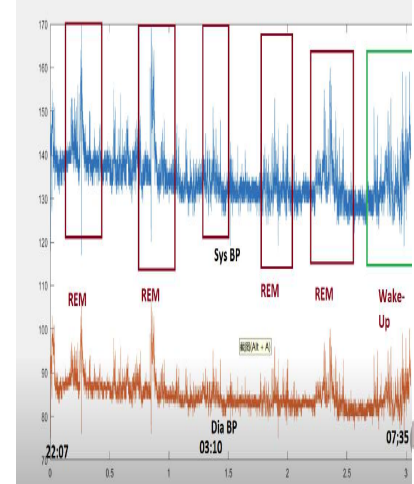


## Continuous Hemodynamics and SpO2 Monitoring

CIRCUL VS : BP watch + Circul Ring = Vital Signs Monitoring

# Unmet Problem: Early diagnosis and treatment assessment of CVD

- Xcardio/ BodiMetrics developed the only Continuous Hemodynamic & SpO2 monitoring system that is both FDA cleared and accurate during sleep.
- This leads to a new paradigm in diagnosis and treatment of Heart diseases and strokes, where we failed in 100 years of measuring Blood Pressure to cure it.
- **Unmet Problem:**
  1. CardioVascular diseases (CVD - heart attacks, strokes, Heart failure, COPD..) are the #1 cause of death worldwide. CVD kills twice as many people as all kinds of cancer together. About 1:5 people are hypertensive (Around 1.4 Bn worldwide)
  2. Most CVD cases are preventable if detected in the early stage.
  3. Today, big percentage are not diagnosed. Existing spot BP cannot detect BP fluctuation that are the major risk factor.
  4. When you detect the first symptoms like hypertension, it is too late.
  5. Our mission is to detect CVD in the early stage , before it become incurable.
  6. **Need for screening all people 45years or more every year like Mammography.**
  7. **This will generate huge amount of data that will need AI and big DBs**



# Solution – Detections of BP & SpO2 fluctuations during sleep

- **SOLUTION:**
  1. Adding Continuous Hemodynamics + SpO2 monitoring to Sleep recording.
  2. Analysis of all parameters simultaneously with zooming in to Apnea events.
  3. The main risk from Sleep Apnea is not the hypoxemic event but the CardioVascular effects that can cause Heart Attacks, Strokes, and even damage to the brain, eye capillaries, kidney etc.
  4. That is, focusing on fluctuations rather than only on average BP.
- Two mechanisms of controlling Blood Pressure Hormonal and Endothelial.
  - While medicine lowers BP by treating the Renin-Angiotensin-Aldosterone System (RAAS) it doesn't provide satisfactory diagnosis or treatment for the Endothelial Mechanism that causes BP sharp fluctuations and failure of the microcirculation



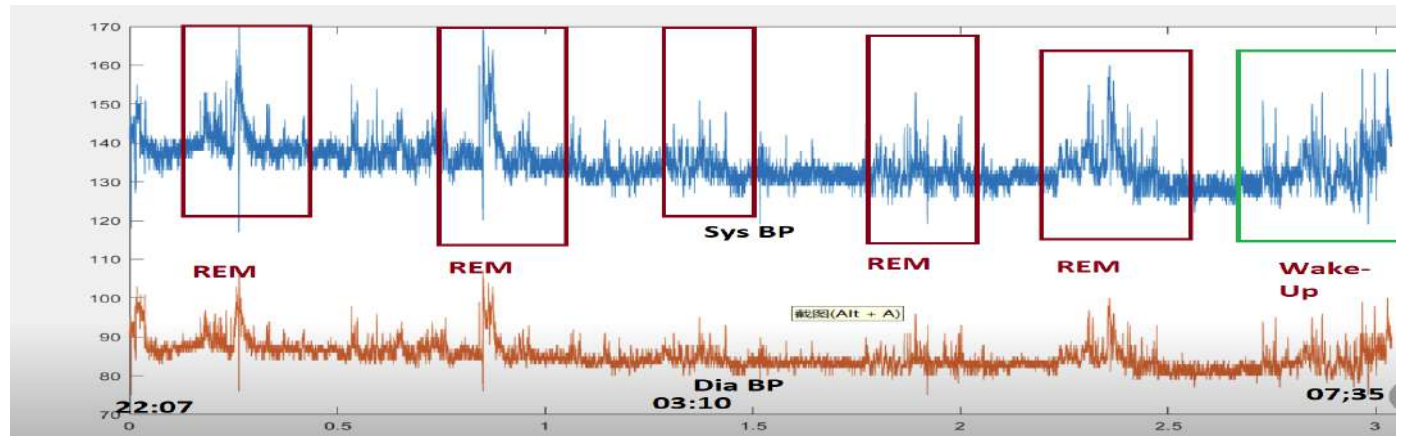
# Blood Pressure Fluctuation are major risk factor

Blood Pressure Fluctuation, especially during REM sleep, can dislodge vulnerable plaque and cause heart attacks and strokes

Epidemiological studies show that adverse cardiovascular events, like Heart Attacks and Strokes peak in the morning when people are asleep.



CVD develops over 20-30 years. Early detection of vital signs with continuous monitoring during sleep is critical.



# Most Accurate "Auscultatory" BP by Watch bladder and ring

Existing BP monitors use Oscillometric method that is inaccurate for Obese people, that need it mostly. We use "Auscultatory" most accurate BP.

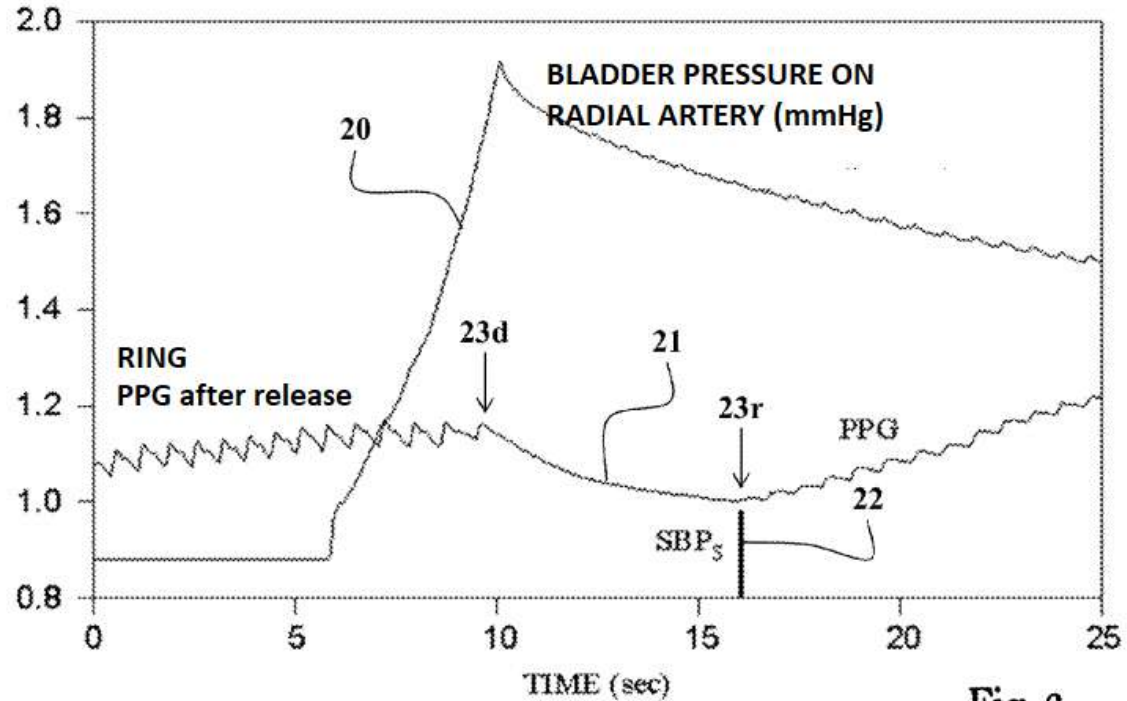
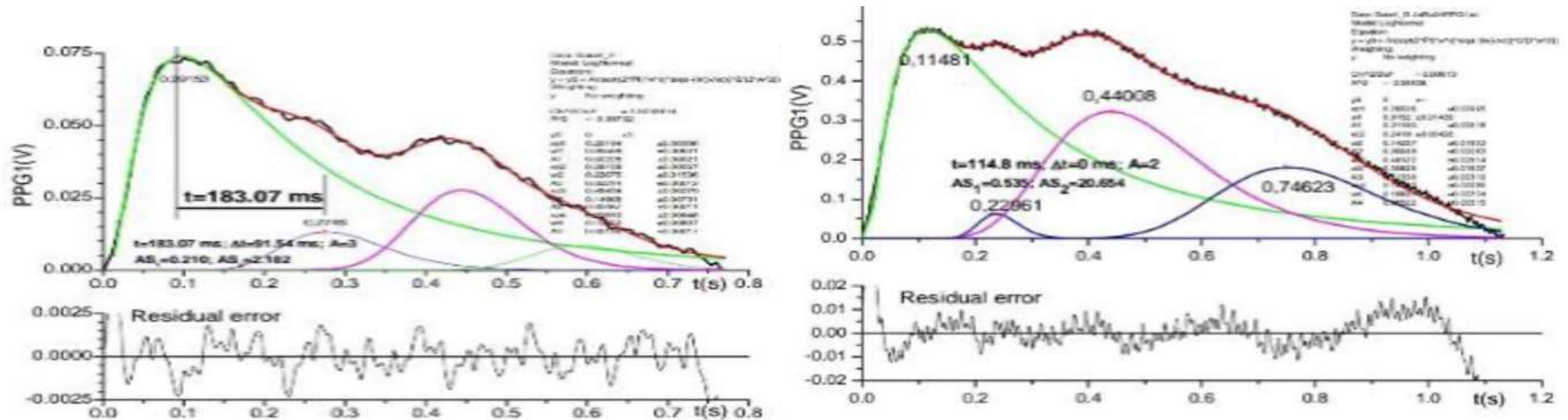


Fig. 2

# Continuous Analysis of Blood Pressure pulse shape provides predictive prevention for Hypertension and CVD

Therefore, it is not enough to measure BP, need to analyze the pulse shape  
Left Pulse is of healthy person while right pulse show hypertension and high CVD risk, although both have same BP

Early detection can prevent CVD through CALM, and save billions of USD and many lives



# Two BP regulation by RAAS and Endothelial mechanisms

**The blood pressure regulation by the Renin-Angiotensin-Aldosterone System (RAAS) and endothelial mechanisms involves different processes and factors:**

**KiBP – Kidney BP regulation** - This system primarily controls blood pressure by managing blood volume and systemic vascular resistance over the long term.

It operates through a series of hormones and enzymes that lead to the retention of sodium and water, and the constriction of blood vessels, thus increasing blood pressure

[https://my.clevelandclinic.org/health/articles/24175-renin-angiotensin-aldosterone-system-raas.](https://my.clevelandclinic.org/health/articles/24175-renin-angiotensin-aldosterone-system-raas)

<https://www.bing.com/search?form=SKPBOT&q=Endothelial%20Mechanisms:>

**EnBP – Endothelial BP regulation** -The endothelium, the inner lining of blood vessels, regulates blood pressure through the production of substances like nitric oxide (NO) and endothelin. NO is a vasodilator that relaxes blood vessels, reducing blood pressure, while endothelin has the opposite effect.

The balance between these and other factors produced by the endothelium determines the tone of the blood vessels and thus influences blood pressure.

**In summary, while RAAS affects blood pressure through hormonal control of blood volume and vessel constriction, endothelial mechanisms do so through the local release of substances that directly affect the vascular tone. Both systems are essential for the overall regulation of blood pressure, but they operate through different pathways and mechanisms and therefore need different diagnosis and treatment**



## Endothelial Function as key for CVD and Diabetes – Especially for Women

- Endothelial dysfunction is a type of non-obstructive coronary artery disease (CAD) in which there are no heart artery blockages, but the large blood vessels on the heart's surface constrict (narrow) instead of dilating (opening).
- This condition tends to affect **more women than men** and causes chronic chest pain. Because most clinics do not diagnose or treat endothelial dysfunction, people with this condition may feel frustrated and hopeless.
- Our Monitoring System is the **ONLY** system that detects Endothelial BP control and **Endothelial dysfunction** and other hard-to-detect non-obstructive coronary artery diseases. We use whole night diagnostic tests to confirm an accurate diagnosis that can lead treatment approaches, including suggesting new medications and lifestyle interventions to ease symptoms and reduce future cardiac issues. By that help live longer and healthier.
- **Our paradigm and products enable replacing of the current system and prevent most CVD**

# Replacing spot BP with Continuous BP for early detection of CVD and Alzheimer's Disease

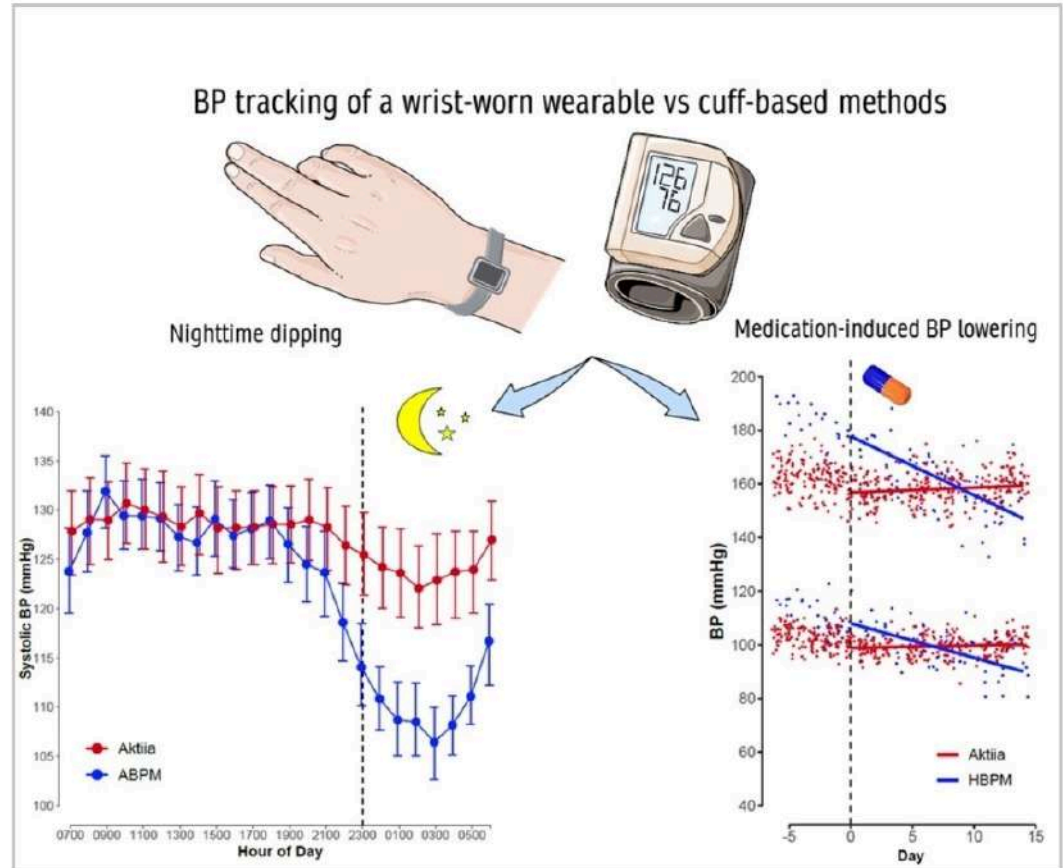
- Most CVD and Alzheimer Disease progression would benefit from early detection. By continuous monitoring and AI analysis CALM can detect deviation from baseline at inception of the problem, before symptoms appear.
- The cost to fix the deviation increases exponentially: the wider the deviation the higher the cost in money and lives. **Extreme deviation can lead to heart attack, stroke, heart failure and death.**
- E.g. Early treatment of hypertension can be achieved by simple lifestyle interventions with very low cost. After Blood Pressure goes out of range, there is a sharp increase in cost and CVD risk: need for Anti-Hypertensive drugs or more drastic interventions.
- By continuous monitoring and AI interpretation we assist in selecting optimal treatment and modify treatment continuously for most cost effective and safer outcomes.

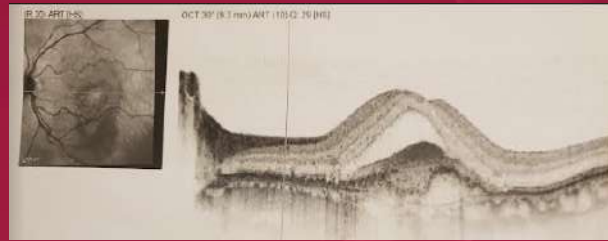
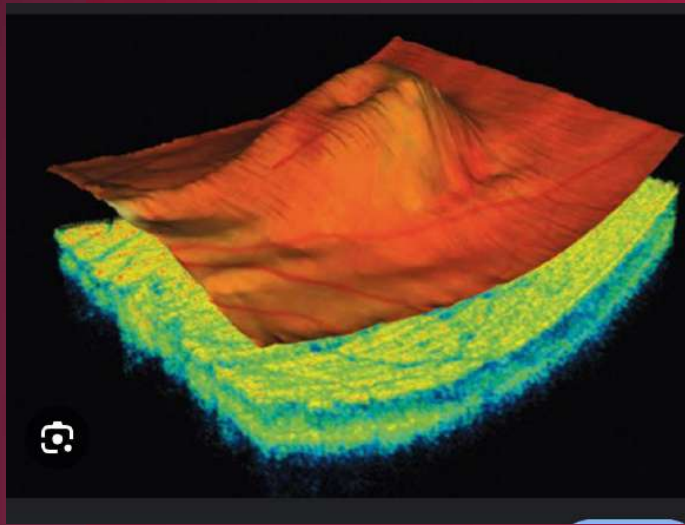
# Competitive Landscape

All other Competitors, like Aktia, ignore the fast fluctuation caused by the endothelial layer and changes in vascular tone:

In a big study by objective researchers Aktia bracelet could NOT detect big drop in BP caused by Hypertensive medication.

**All other competitors need periodical external calibration**



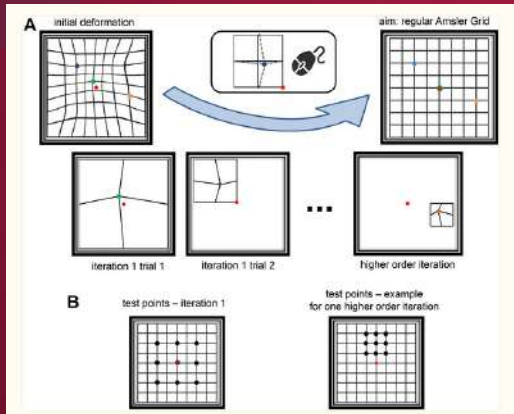


# GTcardio

BP Spikes damage retinal blood vessels:

Smart Eyeglasses for AMD treatment assessment

New approach based on monitoring visual distortion



# Smart Eyeglasses Executive Summary

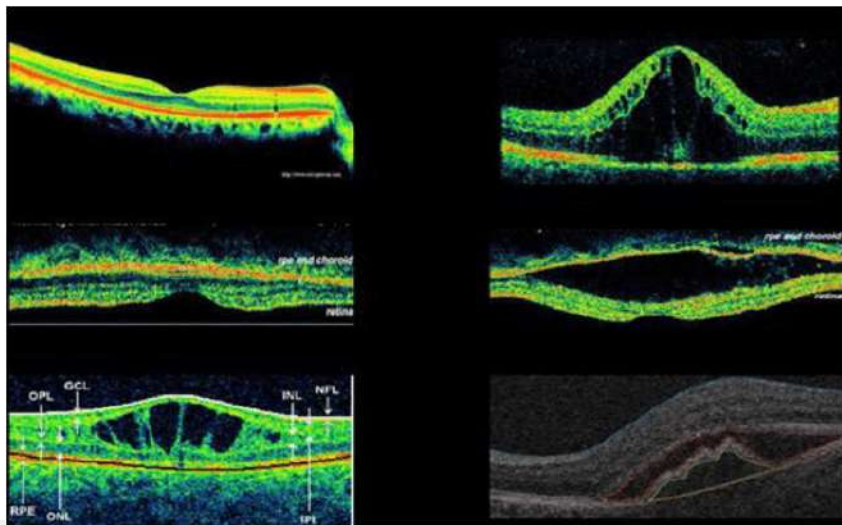
1. AMD is the most common causes of vision loss. Research on AMD treatments, like ROCHE Vabysmo, focuses on RPE deficits as this leads to vision loss, but the mechanism of Choroidal neovascularization remains elusive. Also, objective measurement of distorted vision are missing.
2. The suggested study has 2 purposes: Monitoring visual acuity of AMD patients by smart Eyeglasses and restore visual distortion for QOL purposes.
3. Complement current AMD treatment like Vabysmo, by monitoring visual distortion and monitoring side effects of Vabysmo intravitreal injections and help titration. Also, assessing vision loss by Eyeglasses as well as helping the AMD patients.
4. Compared to other solutions like Arges glasses, we add also the objective vision measurements and cardiovascular major risk factor monitoring and assessing as well as providing comfortable and affordable solution.
5. X-Cardio glasses allows the wearer to customize the image processing that fixes the distorted macular vision. Both cardiovascular monitoring results and progress in vision from glasses will be sent to EHR



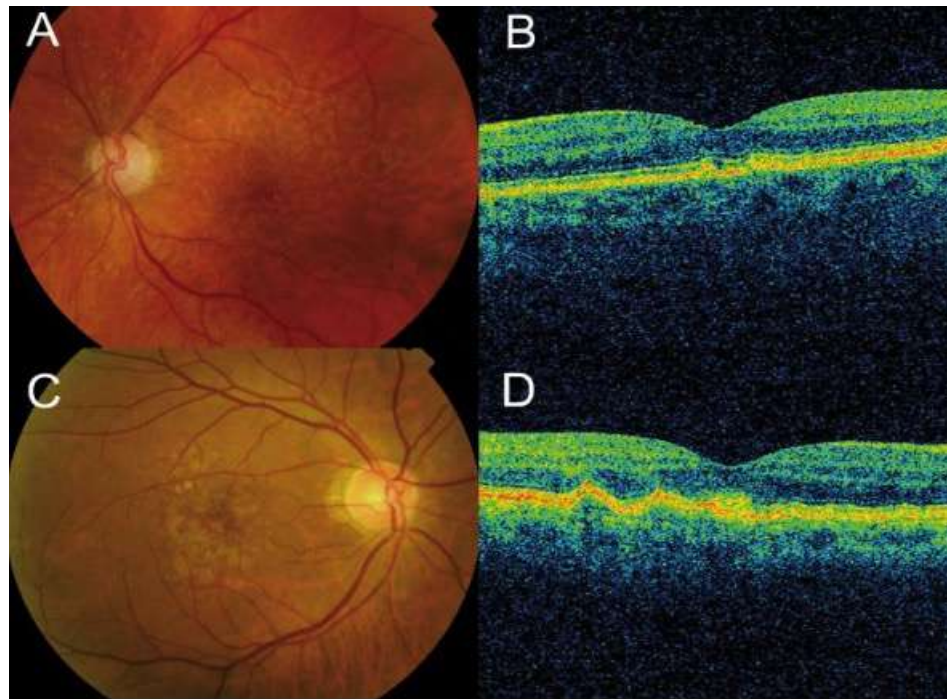
# X-Cardio glasses for AMD

X-Cardio glasses that help AMD patient and help assess progress of vision

As can be seen in OCT of normal and AMD patients, the Macula layers are deformed leading to distorted vision



Normal and Abnormal Images of OCT [13][21][31].



# Competitive landscape - glasses for AMD

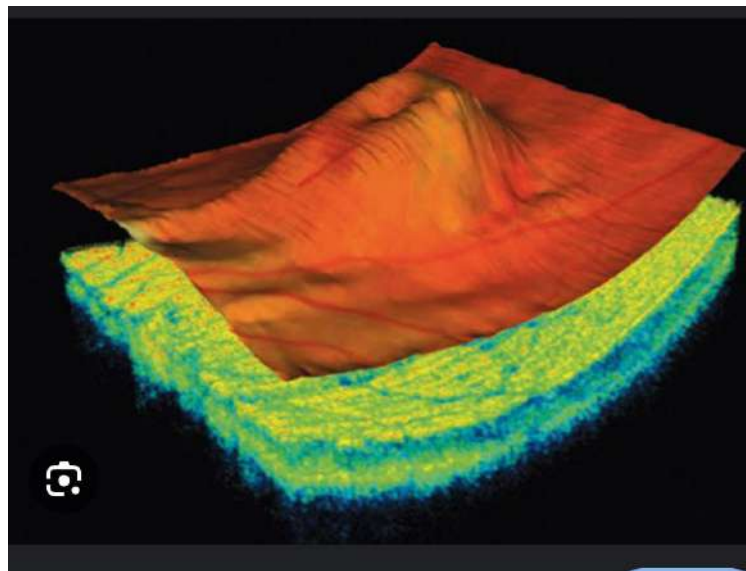
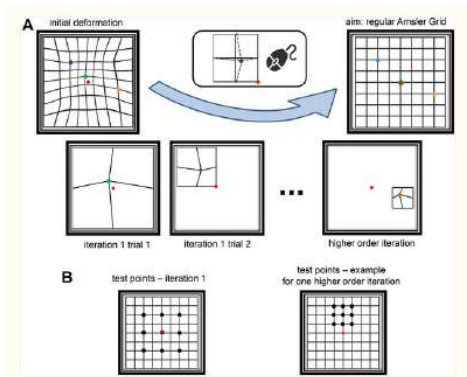
## Existing AMD glasses Displace macular spot to peripheral vision

While this fulfills very important function, enabling late-stage AMD patients to read and recognize faces, this solution is bulky and is not optimal for patients at earlier stages, especially, one eye AMD  
It also does not help to assess progress



# Undistorting distorted images

1. Our glasses does not target the heavy cases of AMD that have only black spot where the macula vision field, but earlier cases where macular vision still exists but is distorted as judged by Amsler Grid patients at earlier stages, especially, one eye AMD. It also does not help to assess progress.
2. The Amsler grid is used by the user to modify on touch screen the grid until it looks right.
3. Their corrections are used to assess progress. Also to fix distortion.
4. Algorithms for projecting on curved surfaces are used to generate for user flat undistorted image.





## Solution to visual impairment by using xcardio smart glasses

- Patients with Wet AMD suffer from distorted visual image due to deformation of the retina due to accumulated blood from damaged retinal blood vessels.
- Image quality gets even worse with distance.
- Xcardio patented Smart eyeglasses solution is doing several things to solve this problem:
  - a. Camera image is displayed for each eye on a video display
  - b. The image can zoom into the desired objects bringing it near to the eye
- Eyeglasses have a mechanism to solve the need for prescription optics (myopia)
- Distorted images can be corrected by image processing and AI to provide corrected images for each eye
- The Eyeglasses can use the OCT 3D surface to correct the distortion or do it manually by using a touch screen.
- The Eyeglasses can perform regular visual acuity tests to assess visual distortion and assess medical treatment

