



INNOVATION PAST PRESENT FUTURE

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I CAN MAKE A
DIFFERENCE

By Mary Spickelmier

STUDENT ASKED

GARAGE INVENTIONS



Appeal to creative mind

- Isolation, Functional nature

Disneyland!

- Brothers Walt and Roy Disney set up a workshop for drawing cartoons in their uncle's workshop in 1923

Apple computer

- Created by Steve Woznia

Yankee Candle

- Michael Kittredge

Post it notes Scotch tape

- Robert Nepper, 82, and Bill Stevenson, 91, are lifelong inventors

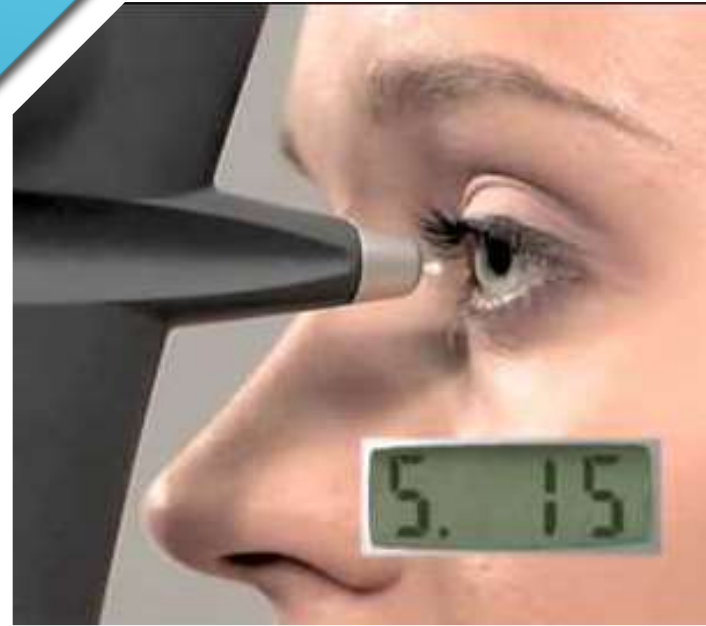
OtterBox

- Kurt and Nancy Richardson
- BVI

K9

- Mobile OCT Angiography





INNOVATIVE

Touch Typing at 5 Years old

Early adopter Of Computers / IT - Digital brain

Early Adopter of Phaco 1992

Saturday OPD/Surgery Drives

Early adopter of Toric IOL, Aspheric IOL

RobMarker – Gyroscopic Corneal marker

Alcon Centrion

First Site PDT in UK, Intravitreal injections

Mobile OCT
•OCT
•Angiography,
•Wide Field OCTA

Swept Source Biometry – IOL Master 700

Digisight

IOL Warmer

10p Walking Stick holder

Tesla X, S, Ampere

BVI Itortola12

Icare Tonometer

NSAID Post op
•Cataracts

Reports
•Optoms
•images

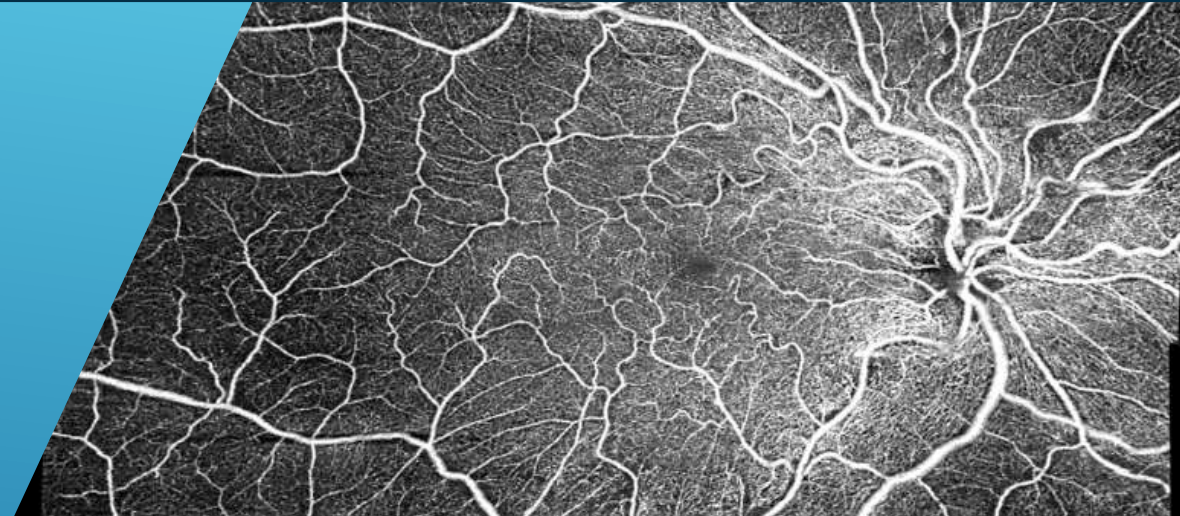
Home Clinic



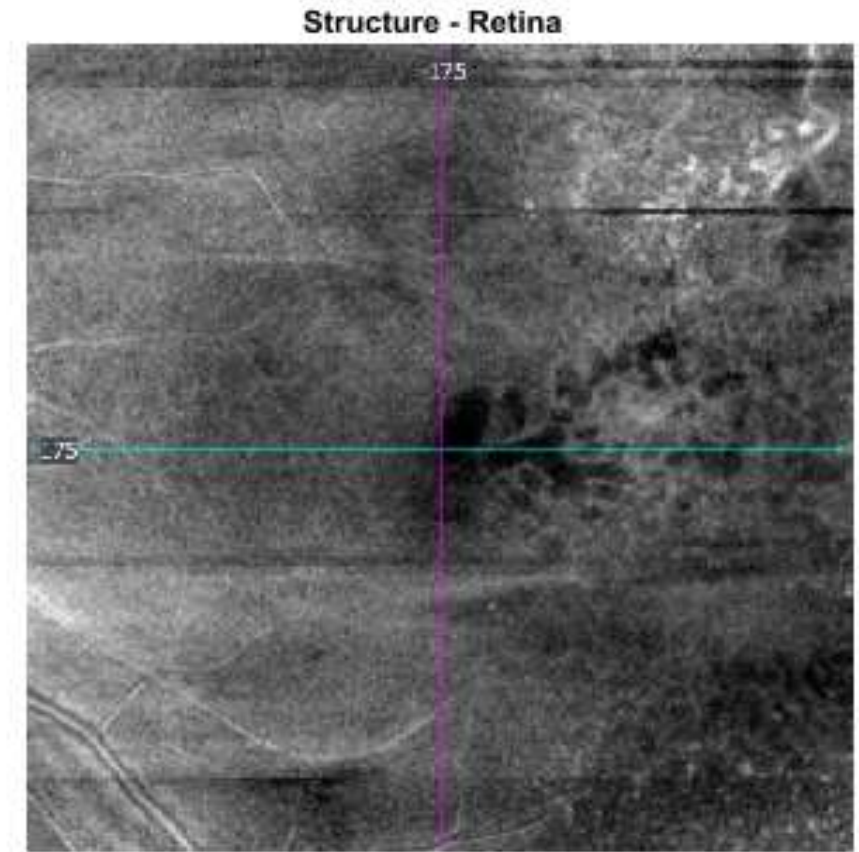
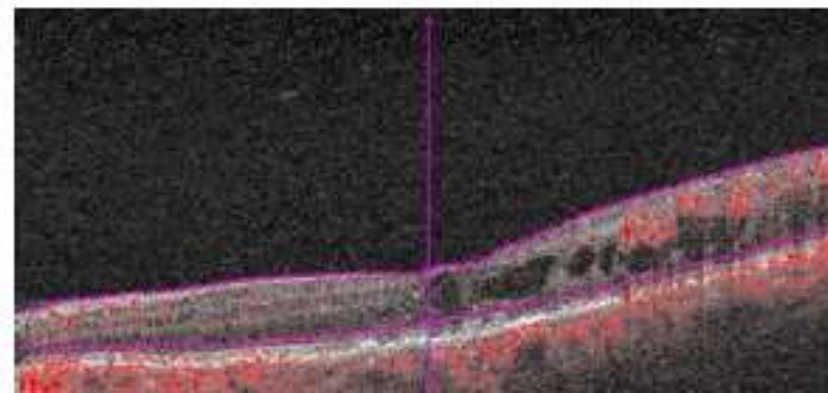
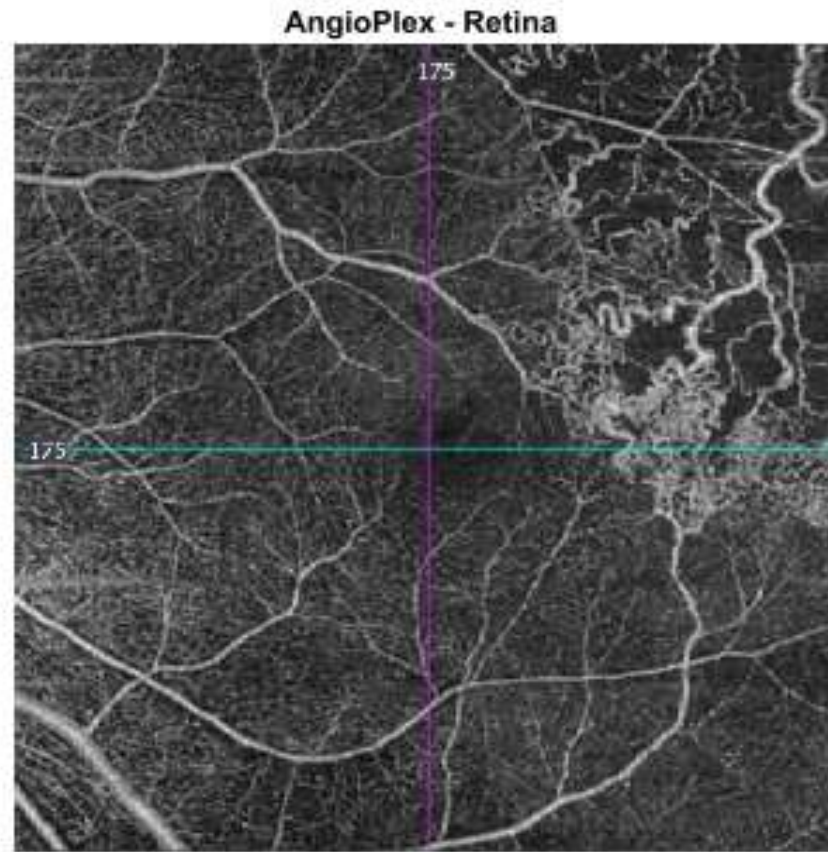
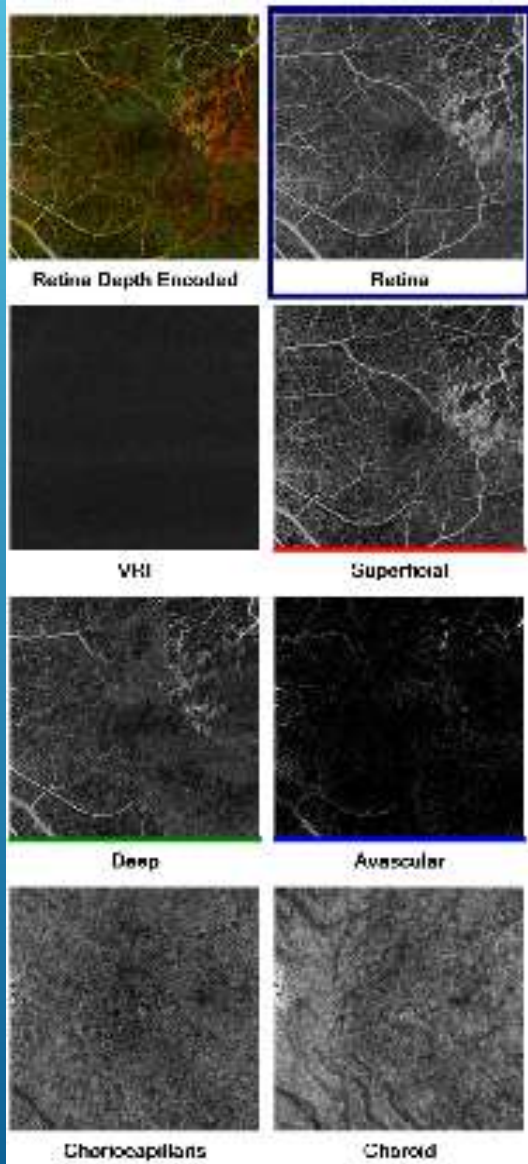


Dawn of a New Era in Imaging is here

- New Clinic Diagnostic pathway
 - Spectral Domain/Swept OCT
 - Wide Field
 - OCT-A
 - Colour Photograph
 - FFA
 - ICG
 - Auto fluorescence

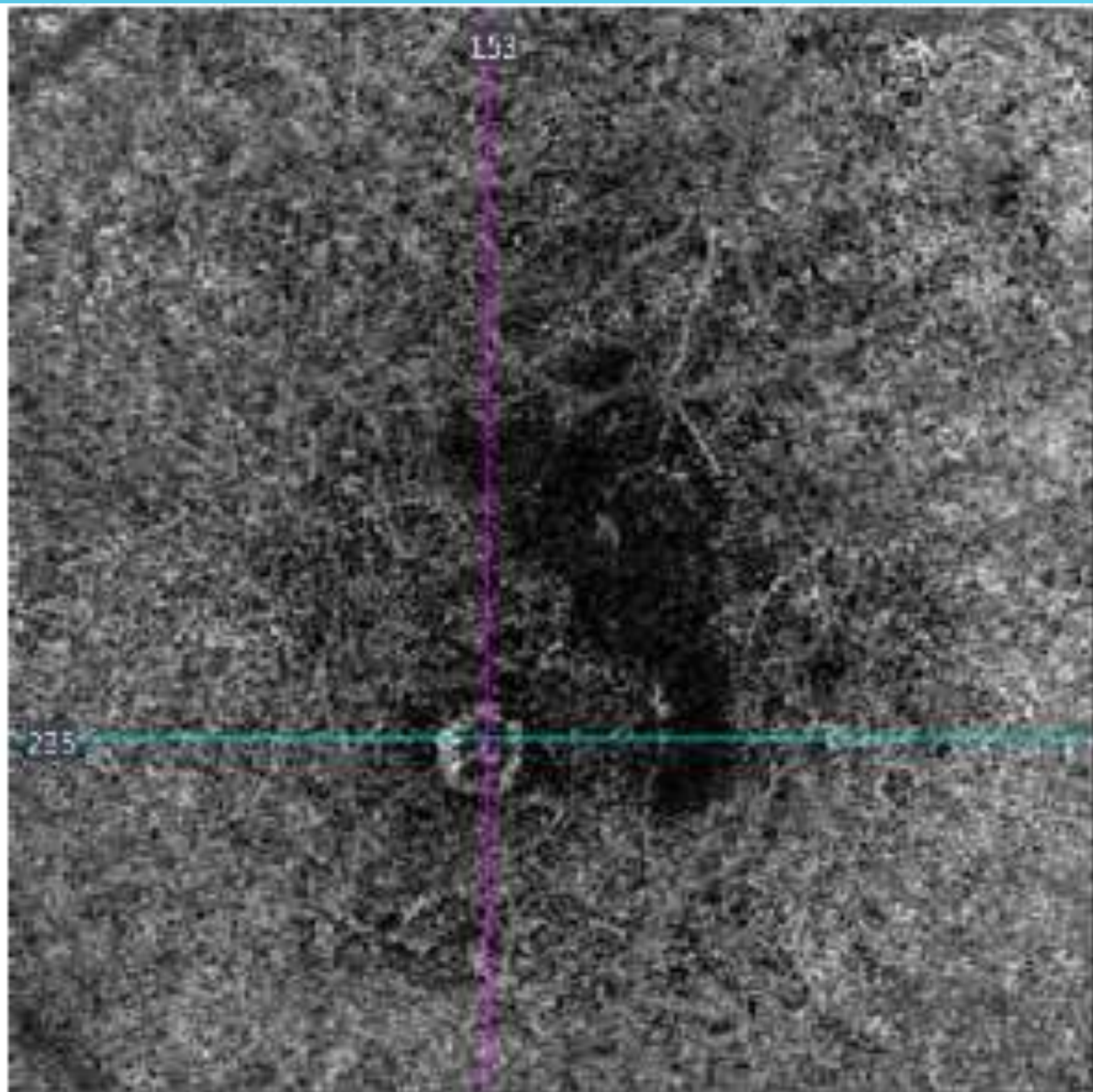


BRANCH RETINAL VEIN OCCLUSION - COLLATERALS



Instant differentiation

Choroidal vs
Retinal disease



Overlay: ILM-RPE Difference Transparency: 0 %

Extracted B-Scan



ANGIOPLEX METRIX V10™

New Vascular Metrics for Diabetic Retinopathy Management
Advanced Analytics not AI - Yet

▶ Clinical Value

- Retinal vascular density is known to be affected by the presence of Diabetic Retinopathy (DR)..
- DR is also characterized by an irregular, large foveal avascular zone (FAZ)

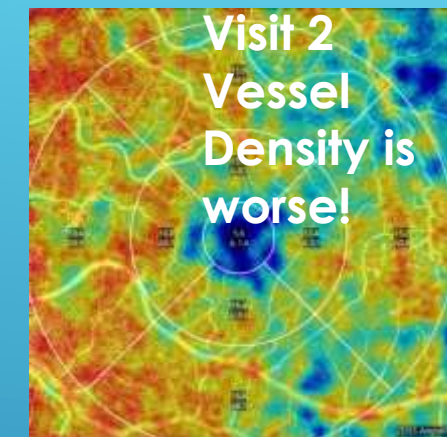
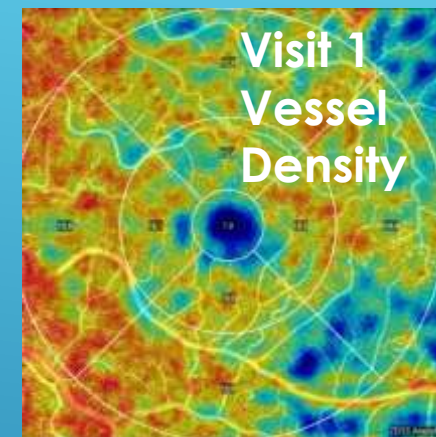
▶ AngioPlex Metrix

▶ Objectively assess change over time

- Vascular density
- Perfusion density

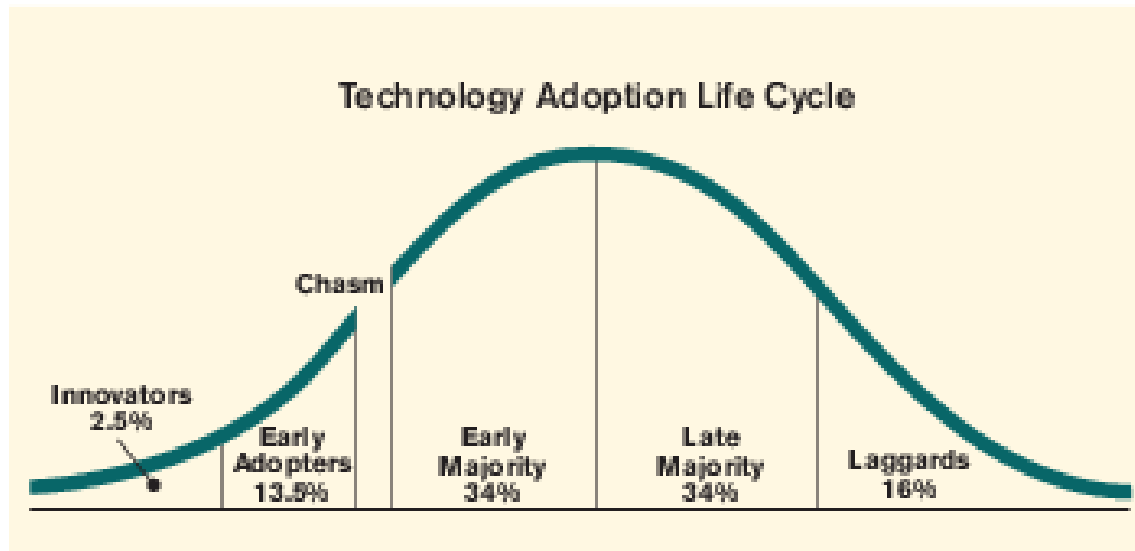
▶ Help flag patients with early diabetic retinopathy changes.

- Automatic detection of FAZ Area and Circularity



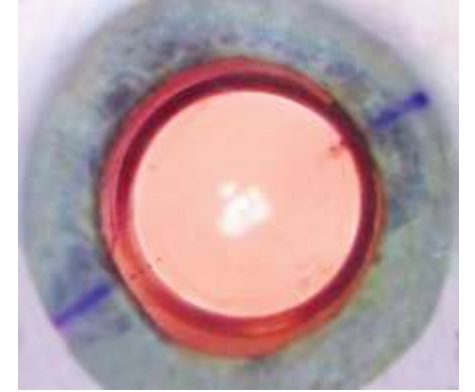
Change is the mechanism by which progress is Made

Figure 3: Technology Adoption: Segmenting Different Customer Buying Behavior
(Source: Geoffrey Moore, *Crossing the Chasm*)



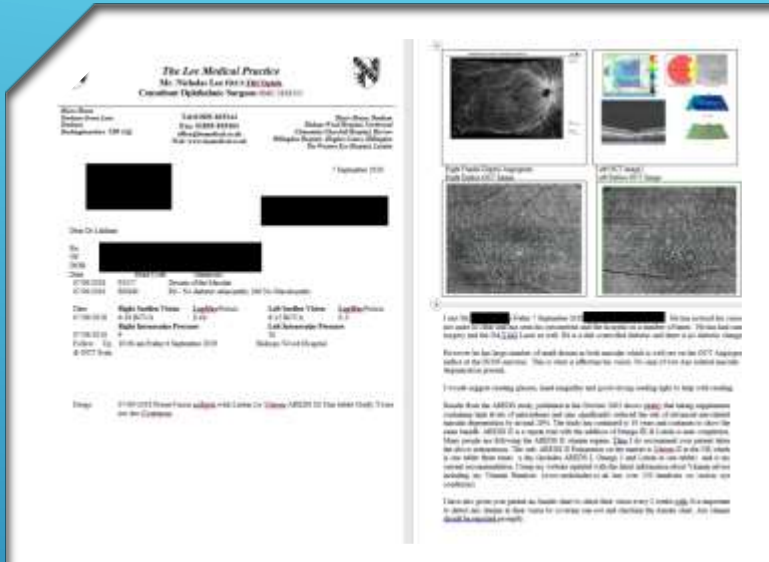
- Nicks Key Philosophy
- Be the first and the best
- Do the best for my patients
- Never be afraid to try – Experiment think out of the box, brain storm
- Be honest, truthful and speak up
- Past experience predicts future experience
- Taurean – stubborn and persistent so I Never give up!
- Every Day ask “What have I achieved?”
- Dyspraxia
- Dyslexia
- Ideas person, not detail
- Change is painful

- ▶ Accurate Corneal Marking
- ▶ Bedside, Pre Op room or at slit lamp
- ▶ Speeds lens implant



ROBO-MARKER

COMMUNICATION – OLD TO NEW



<p>GP</p>	<p>Essential – Medication continuation Electronic – Therefore must be accurate and informative One way street - largely IT for health Failed Unification – Future Web based - MH</p>
<p>Optometrist</p>	<p>Much appreciated – Far too few units do this routinely Educational feedback Prevents re referrals Not included routinely in hospital IT systems</p>
<p>Other Consultants</p>	<p>Continuation of care Reduce duplicate appointments</p>
<p>Patient</p>	<p>Improves outcome 85% information not retained Keep for years. Make it part of their treatment Plan Know diagnosis Know treatment plan Know Medication Hospital Policies vary sitting Cost.</p>

Patient access

Now book appointments & repeat prescriptions on your mobile and desktop

Available on android and IOS

Scan me

ABC OF MEDICAL COMPUTING

ABC Of
Medical
Computing
1993

BMJ series
Andy Millman , Nick Lee

IBM voice
dictation
lexicons

Early Structural Speech
Building medical Lexicon

Dragon
Dictate

V15 Professional
Gets Better with each version
Need Quiet environment
Error Rate remains up to 5% Difficult to spot
Proof Reading is Key – Get some one else to do this

Typing Vs
Voice
Dictation

Typing

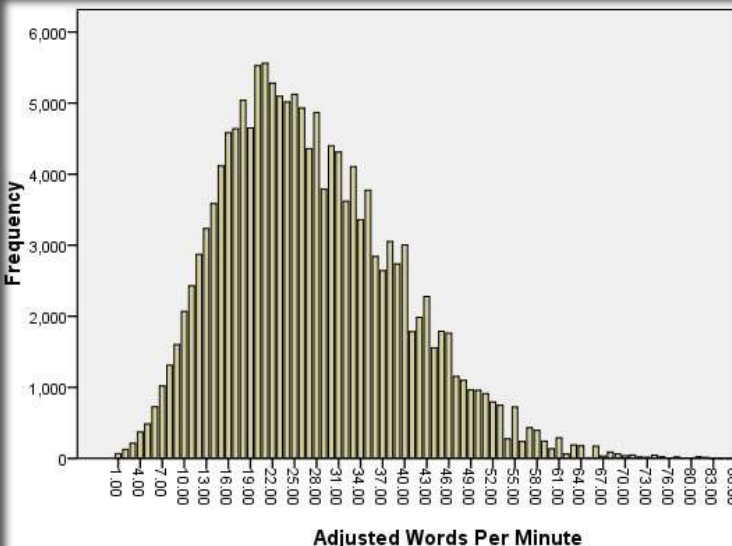
- Average is 40 WPM Wide variation, touch typing, finger typing
- Succinct in nature
- RSI, Shoulder, Neck injuries

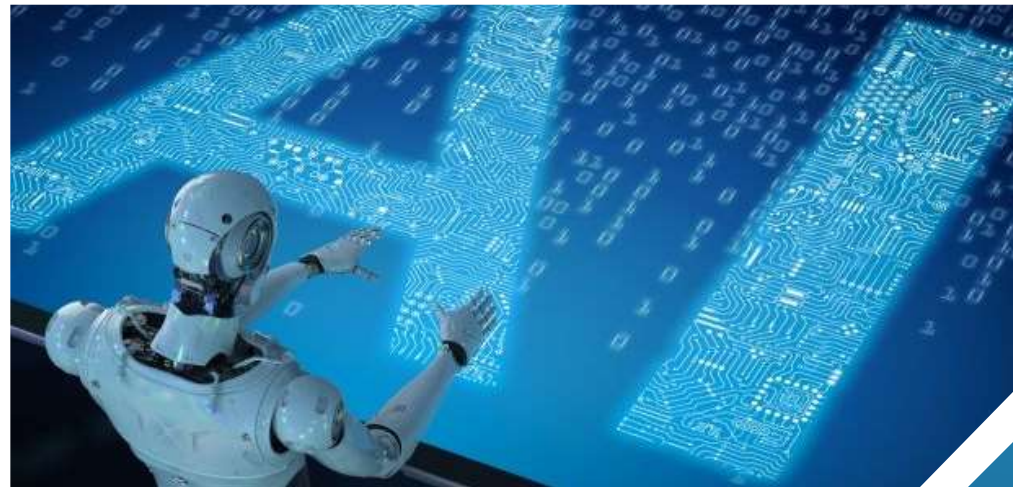
Voice Dictation

- 160 wpm
- Correctly spelt, just the wrong words!

Tape Dictation

- 160 wpm
- Delayed proof reading, not suitable for EPR





► Turin Test -questioner could not tell the difference between human and machine, the computer would be considered to be thinking

ARTIFICIAL INTELLIGENCE
MACHINE LEARNING
DEEP LEARNING

AI WILL BE ASSISTING NOT REPLACING US

- ▶ Managing Medical Data – From your own records – trends to Big data
- ▶ Reparative task – advanced analytics to Ai – Cardiologist & radiologist Data
- ▶ Treatment Design – AI to analyse Pt notes, PMH, HX, FH, Research, Clinical experience to suggest treatment plans
- ▶ Digital Consultations – Babylon and others developing Speech recognition to compare sx to database recommend options based on users Medical hx.
- ▶ Virtual Nurses – Sense.ly –Molly to monitor patients condition, follow up. Machine learning to support nurses. Another example - Drug compliance



AI WILL BE ASSISTING NOT REPLACING US

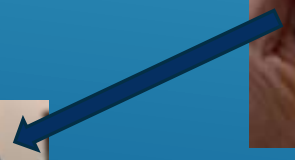
- ▶ Medication Management – Chipped pills, AiCureapp on phone to confirm taking meds
- ▶ Drug creation – Pharmaceutical companies
- ▶ Precision Medicine – Genetics and genomes – predict disease
- ▶ Health monitors – FitBit, Apple, ECG, Blood sugar etc
- ▶ Health Care System Analysis – Netherlands 97% records are digital using to spot mistakes in treatment, workflow inefficiency etc..

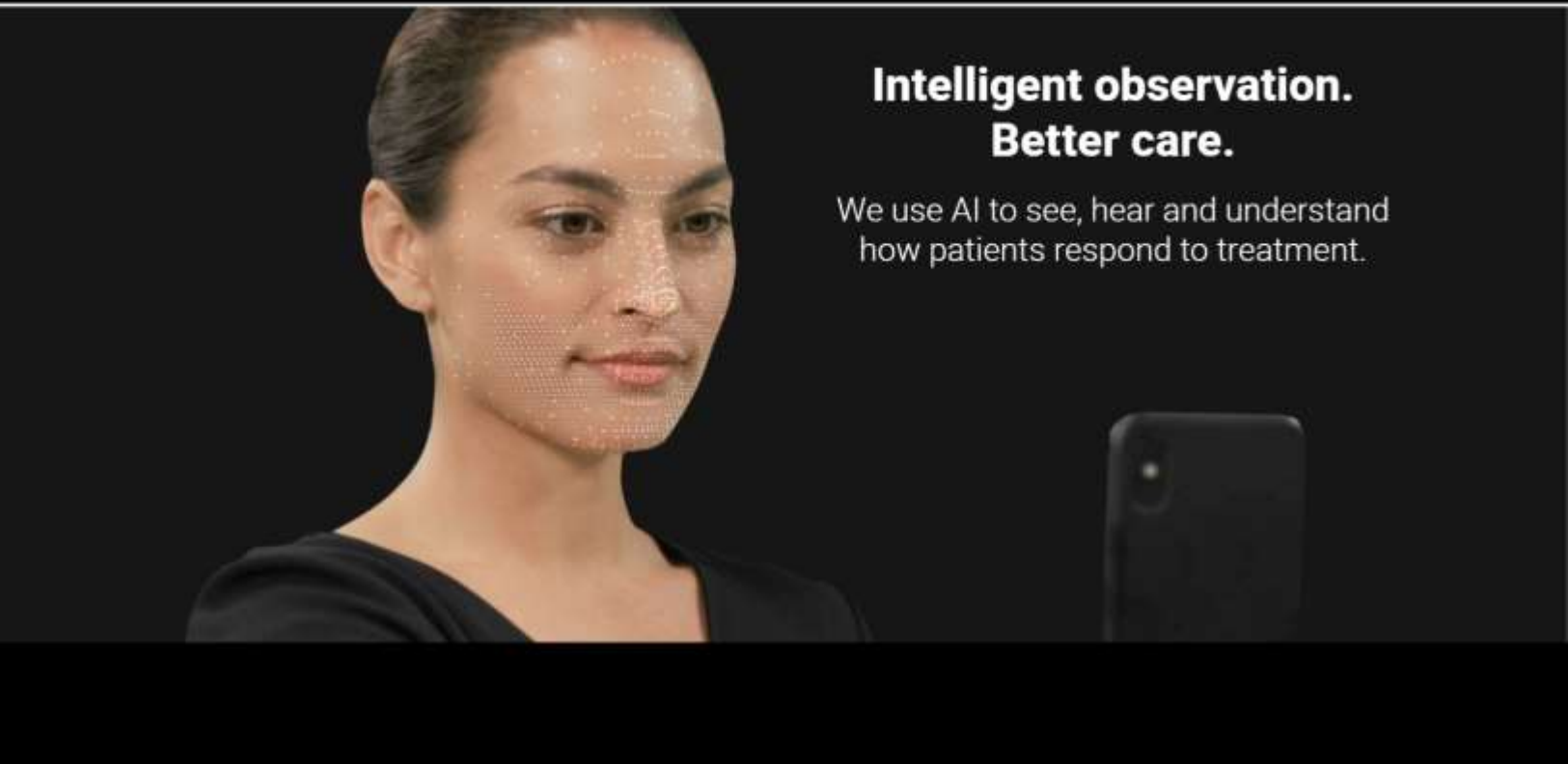


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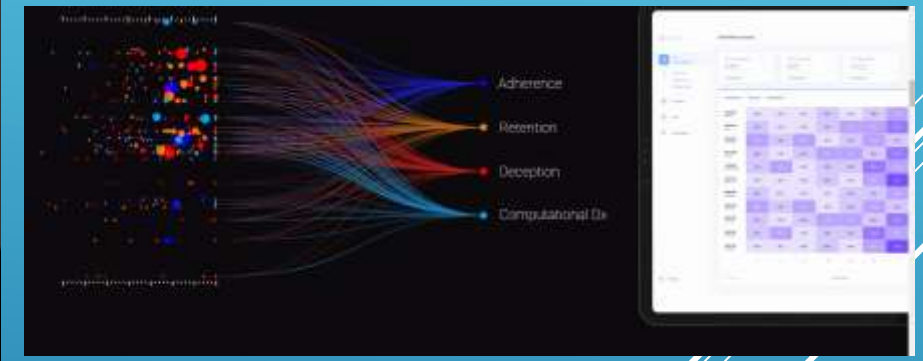
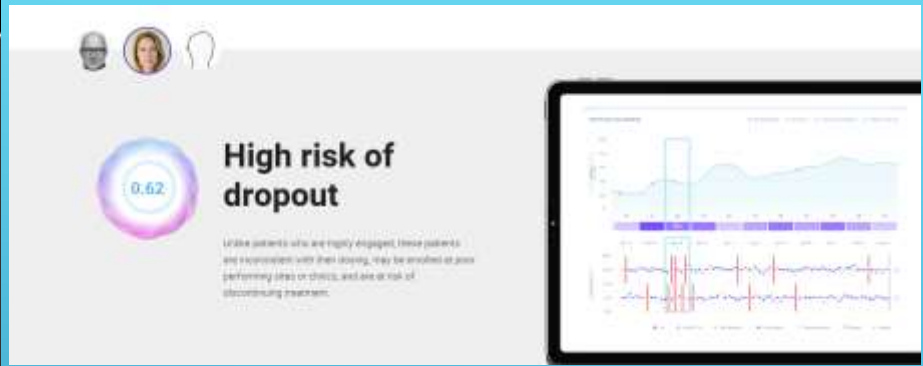
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Intelligent observation. Better care.

We use AI to see, hear and understand how patients respond to treatment.



AICURE.COM
EVERYONE RESPONDS DIFFERENTLY TO DISEASE AND
TREATMENT. AICURE WORKING TO UNDERSTAND HOW.



Parker & Hammond, Northwood
OPTOS, DAYTONA
Laserly R
Red: 92%
Green: 54%

Zoom: 391
Presentation: Approved Oct 9, 2017



Only AI has the Power to:

- Compute the Vast amount of data on one Patient/individual
- Do this over time, repeatedly
- Recommend Best Treatment Option
- Predict the future

Only Doctors have the Power at present

- To treat, To prescribe, to make final decisions

THE FUTURE?





 www.jwickdesign.com

- ▶ Our roles as doctors are changing
- ▶ From Pen & Ophthalmoscope to Computer and OCT
- ▶ AI will change
 - ▶ The way we work – Diverse jobs
 - ▶ The way we deliver medicine
 - ▶ The way patients gain access to healthcare
 - ▶ Unlikely to
 - ▶ Save Money
 - ▶ More productive? – Virtual clinics

THE WISE EMBRACE CHANGE
THE WISE STRIVE FOR CHANGE

Change is the mechanism by which progress is Made - Evolution

- ▶ Currently Many of us Constrained
- ▶ Ideas not encouraged
- ▶ Change not encouraged
- ▶ Routine work load prevents change
- ▶ There are those out there EVOIVING us to the next level
- ▶ Virtual clinics
 - ▶ Currently often nurse technician led
 - ▶ Future AI led and delivered
 - ▶ Consultant moves from 12 patients to 50+ patients per clinic
- ▶ Matt Hancock – 2030 Vision
 - ▶ Joined up Healthcare – repair the Failed IT for Health
 - ▶ Embrace the digital evolution to AI



- ▶ Past Innovations – Physical
- ▶ Current – Putting in place what we already know
- ▶ Future - AI – Challenge

TOO FEW OF US! BIGGEST CHALLENGES

- Stop doing Wasteful tasks
- Team working
- Improved productivity
- College restrictions

15. Workforce Census 2018 Infographic

Ophthalmology – the hospital eye service in crisis

Nearly 10% (9 million annually) of all outpatient appointments are for eye clinics
Ophthalmologists perform 6% of all surgery in the UK



85% of units dependent on waiting list initiative and out of hours sessions



2016

88

new consultant posts needed



2018

230

new consultants needed to meet demand



2018 to 2038

A 40% increase in demand for eye services is predicted over the next 20 years



67% of units are using locums to fill 127 consultant posts
The number of locums has significantly increased since 2016 by 52%



22 patients per month losing vision from hospital initiated system delays



The overall economic burden of sight loss is estimated to be £28 billion in the UK



SOME ONE
WHO MAKES
MORE OF
DIFFERENCE

