



Dr Trevor Gray

Ophthalmologist

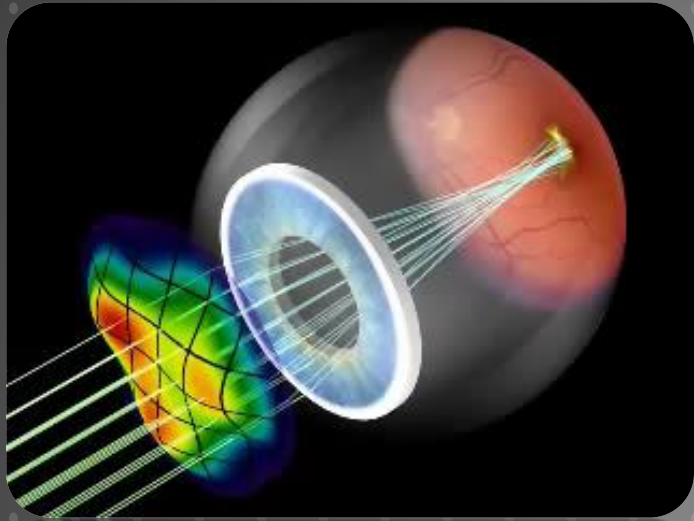
Eye Institute

Clinical Senior Lecturer

University of Auckland

Sunday, June 12, 2016

9:30 - 9:55 Improving Vision



VISION CORRECTION COMMON QUESTIONS

Dr Trevor Gray

- Clinical Senior Lecturer in Ophthalmology, University of Auckland
- Cornea & Cataract Specialist, Greenlane Hospital
- Vision Correction Specialist, Eye Institute
- Degree of Refractive Surgery Lecturer, Sydney Eye Hospital
- RANZCO Part II Exam Course Lecturer in Cataract & Refractive Surgery, Dunedin
- Past President: Cornea & Contact Lens Society of NZ

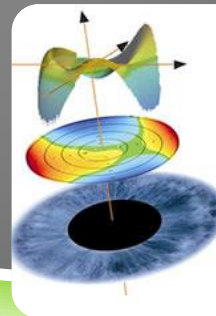
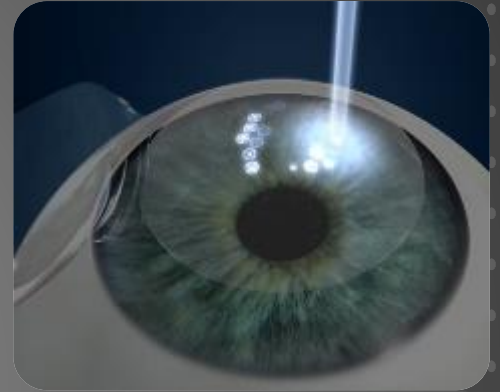
OBJECTIVES

- ▶ Confident & knowledgeable
- ▶ Patient-focused advice
- ▶ Assist patients with realistic expectations



MOST COMMON QUESTIONS

- ▶ How does it work?
- ▶ What treatment is best for me?
- ▶ Can it correct astigmatism?
- ▶ How do I know if I'm suitable?
- ▶ Does it wear off after 10 years?
- ▶ Can it get me out of reading glasses? (50+yrs)
- ▶ Can it go wrong?
- ▶ Cost?



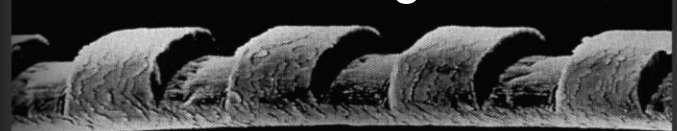
HOW DOES IT WORK? - EXCIMER LASER

- ▶ Precision & safety
 - ▶ <1mm laser beam
 - ▶ 0.00025mm removed in 12 billionths of a second
- ▶ No tissue damage – vapourizes what it strikes
- ▶ >29yrs proven corneal safety

Laser plume



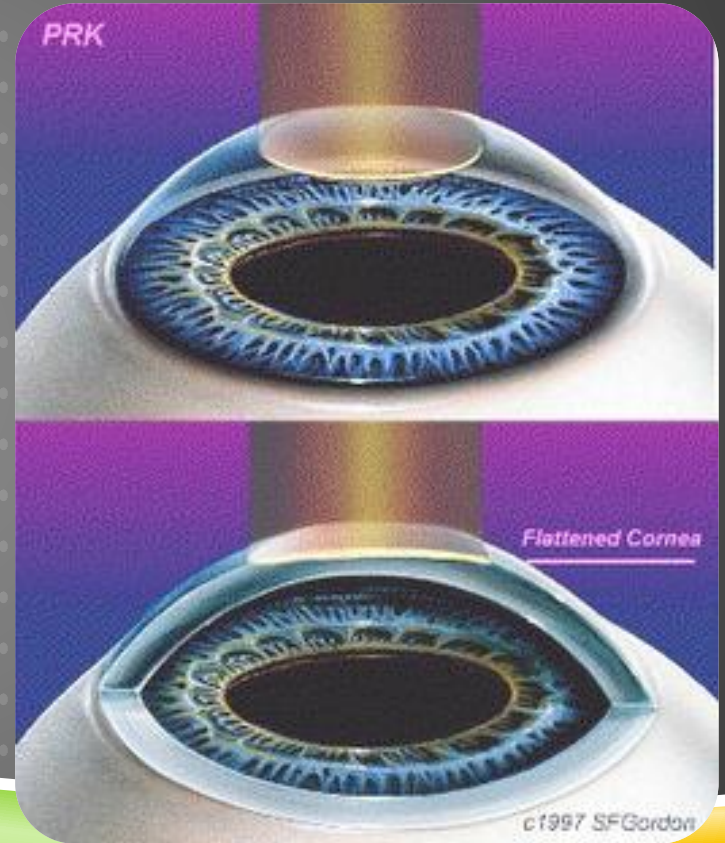
Laser etching

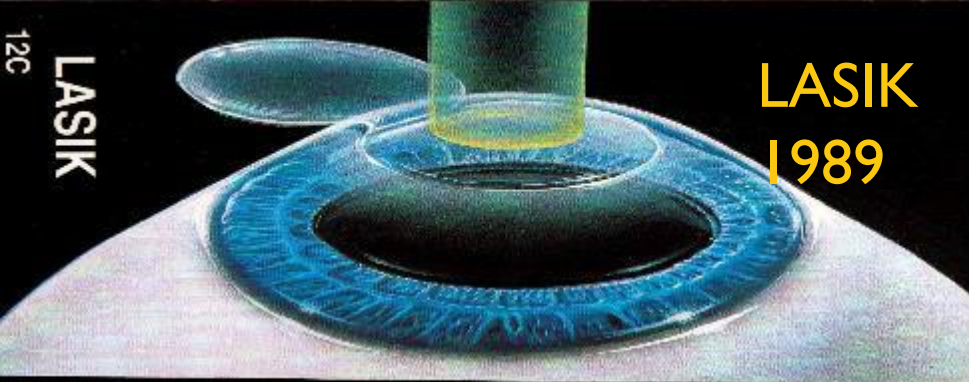


Human hair

PHOTOREFRACTIVE KERATECTOMY= PRK

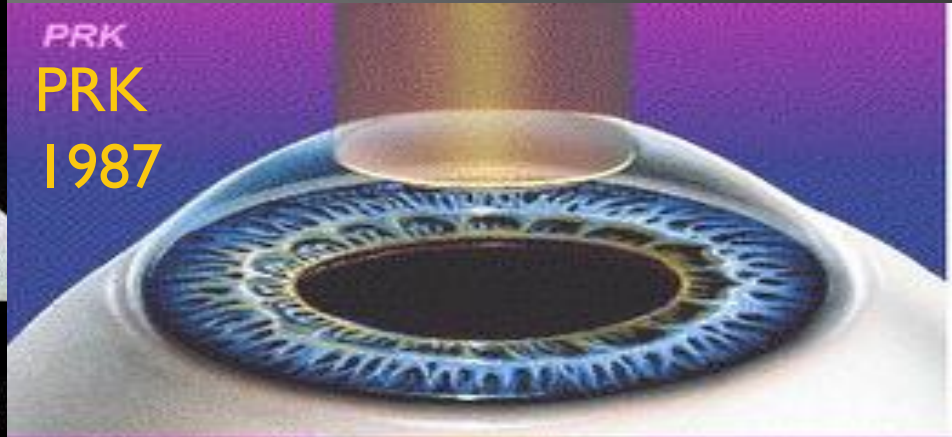
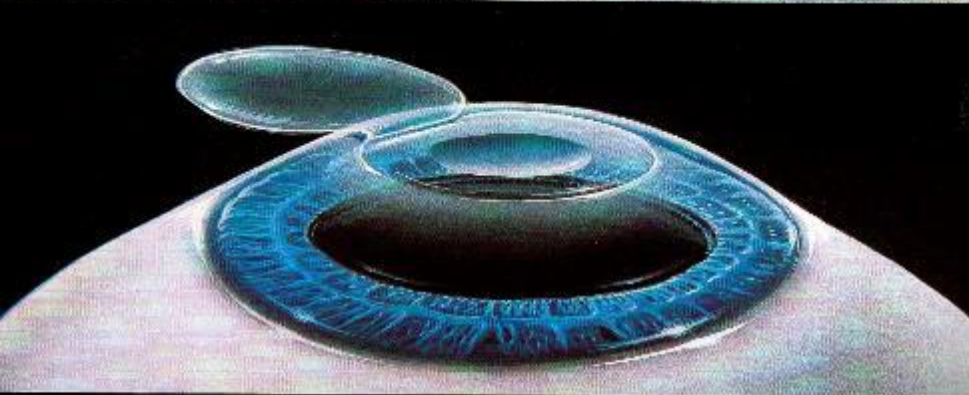
- ▶ 1987 Germany
 - ▶ Dr Theo Seiller
- ▶ Rapid demise of incisional radial keratotomy (RK)



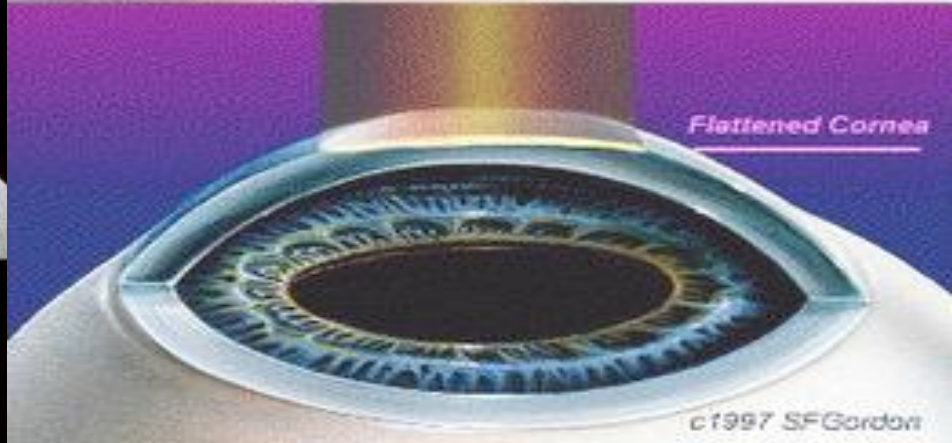


LASIK
1989

LASIK



PRK
PRK
1987



c1997 SFGordon

Laser Vision Correction

Flap Surgery

Microkeratome LASIK

Intralase LASIK

Sub-Bowman's LASIK

Surface Surgery

PRK

LASEK

Epi-LASIK

 Custom
(Wavefront-guided)

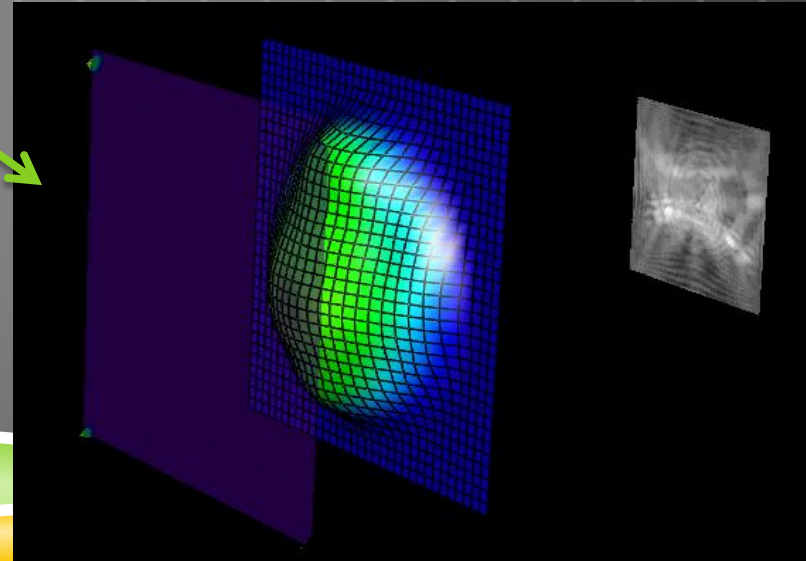
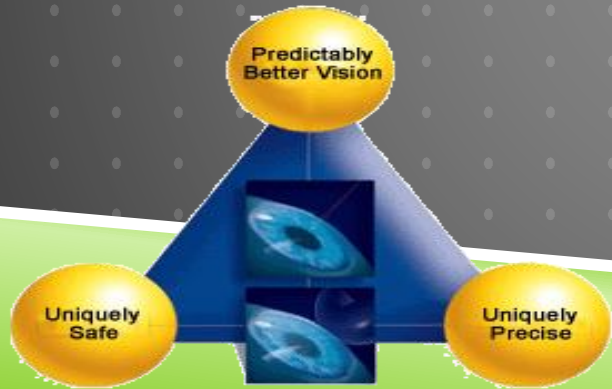
OR

 Non-Custom
(Non-Wavefront-guided)

LASIK LASER VISION CORRECTION

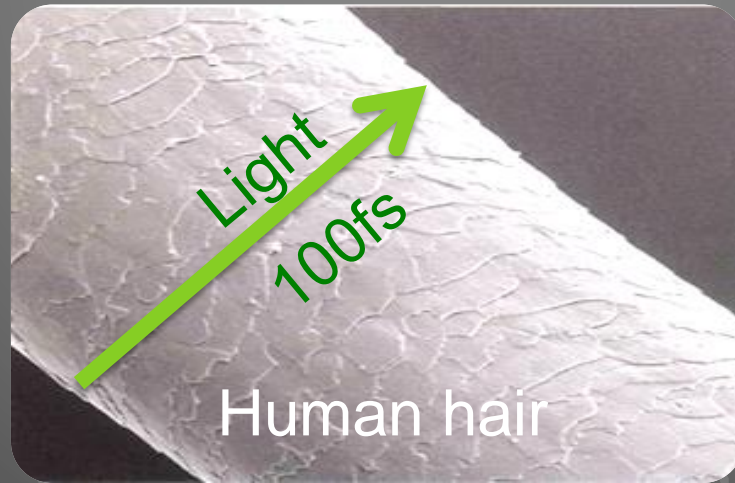
“State of the art 2016”

1. Femtosecond laser flap LASIK
2. Wavefront-guided excimer laser corneal reshaping



WHAT IS A FEMTOSECOND?

- 10^{-15} second
- 1 billionth of 1 millionth of a second
- Femtosecond:Second = Second:32 million years
- Light travels across a human hair in 100fs



A pulse of laser energy is focused to a precise location inside the cornea

1 Micron



A microplasma is created, vaporizing approximately 1 micron of corneal, lens, capsule tissue

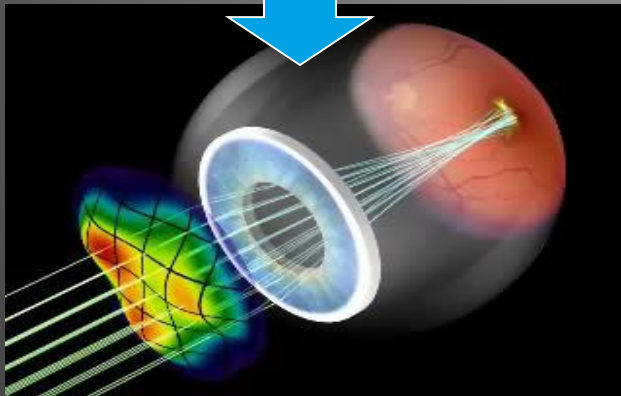
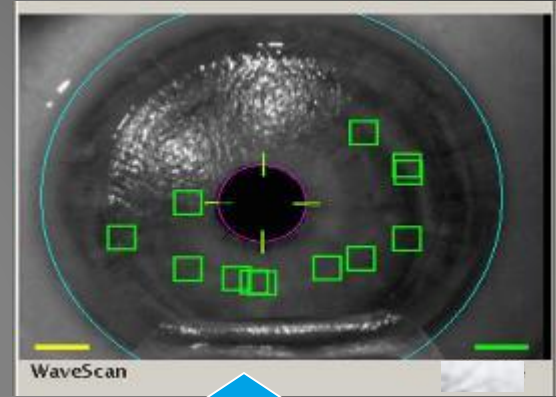


Thousands of laser pulses are connected together to define a resection plane in cornea, capsule or lens

FEMTOSECOND LASIK FLAP



WAVEFRONT-GUIDED LASIK



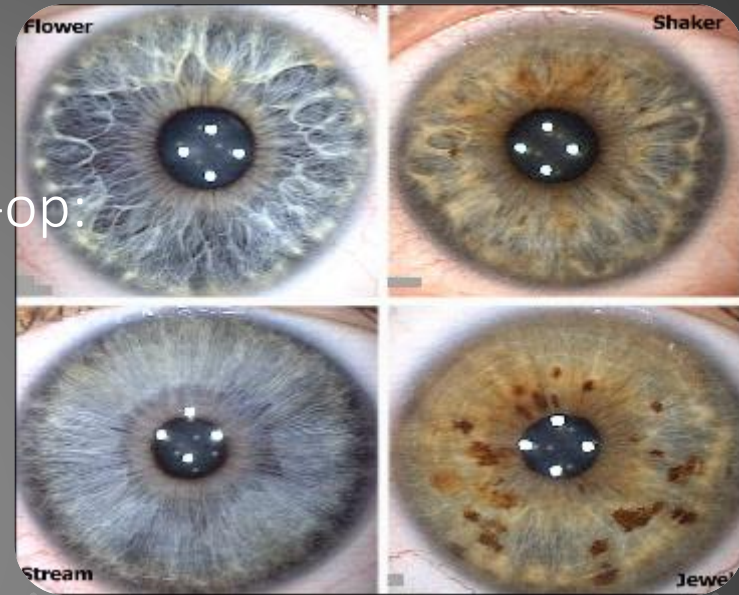
IRIS REGISTRATION

Iris Registration – matching pre- and intra-op:

Limbus

Pupil margin

Iris details



The screenshot shows the WaveScan software interface. On the left, a 'CustomVis Treatment' panel displays a progress bar at 100% and various parameters: Remaining (243 Pulses, 25 Seconds), Depth (0.721 μm), Surface (WaveScan), Spotsize Plane Refraction (+1.13 DS -1.35 DC x 115°), and Ablation/low (8.0 mm). A green circle highlights the 'Spotsize Plane Refraction' field. On the right, a live eye scan shows a circular area with a dashed green line and several small green squares. A yellow arrow points to the center of the scan, and a green arrow points to one of the squares. Below the scan, the text 'Eye Rotation: 1.8° Clockwise' is circled in red. At the bottom, it says 'Patient ID and Eye: VERIFIED' and a 'Close' button.

Prominent Iris
Landmarks
WaveScan Reference
Marks
Cyclotorsion
Rotation
Indicator



Intralase LASIK surgery

Dr Trevor Gray

Laser Vision Correction

Flap Surgery

Microkeratome LASIK

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Sub-Bowman's LASIK

Surface Surgery

PRK

LASEK

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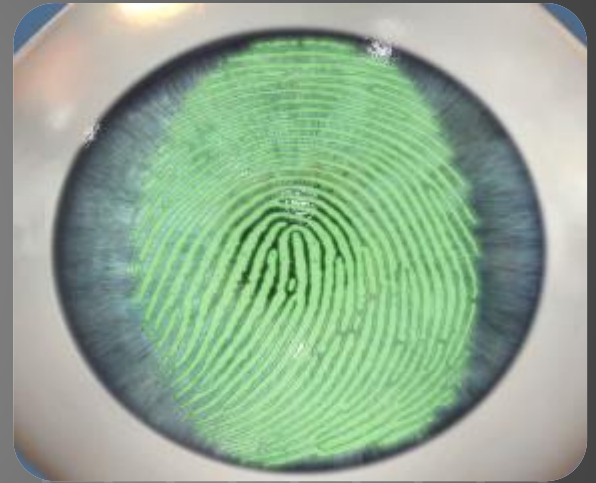
OR

Non-Custom
(Non-Wavefront-guided)



SURFACE LASER VISION CORRECTION = PRK

- ▶ Excellent in low myopes (<-3D)
- ▶ Trauma risk
 - ▶ Police
 - ▶ Armed Forces
 - ▶ Contact sports
- ▶ Excellent outcomes
 - ▶ Negligible scarring or regression
- ▶ Slower visual recovery (4-14d)



PRK OR LASIK?



Fight 3

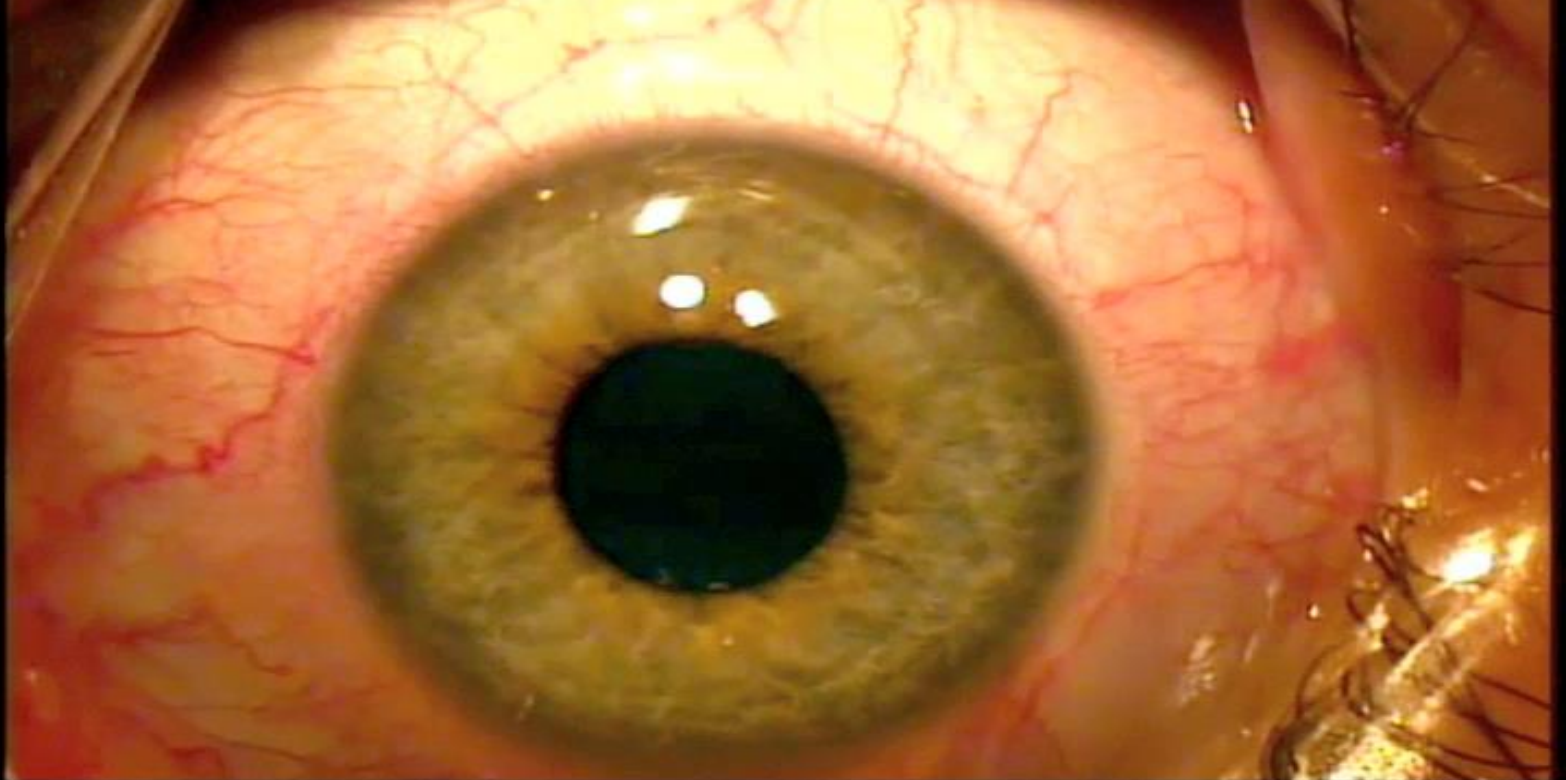
NZMMA.EU

With permission

Fight 3

NZMMA.EU

With permission



Custom Surface PRK

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WHAT IF I'M NOT SUITABLE FOR LASER?

- ▶ Re-examine CL tolerance issues...
- ▶ Consider Orthokeratology (hard CL worn at night)
- ▶ If above unsuccessful, consider surgical options

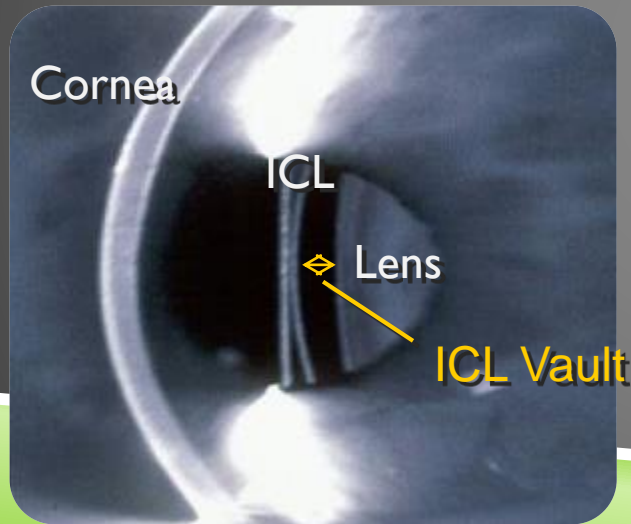


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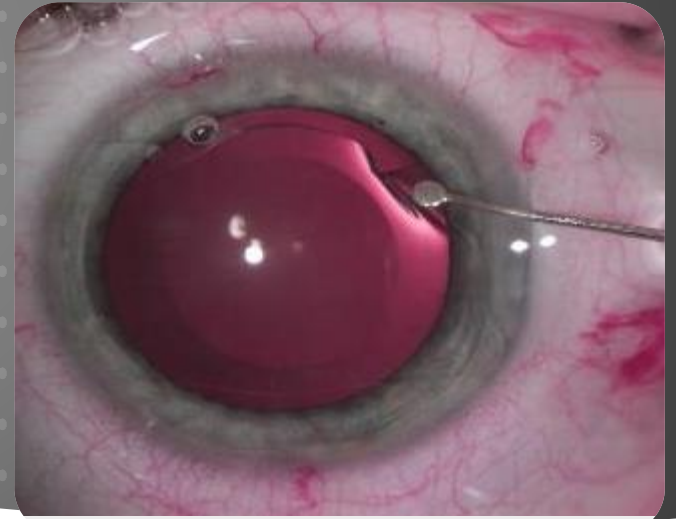


OTHER SURGICAL OPTIONS

- ▶ In my experience...
 - ▶ Implantable Contact Lenses (ICL) – pre-presbyopic 20-45yrs
 - ▶ Refractive lens exchange (RLE) – presbyopic >45yrs

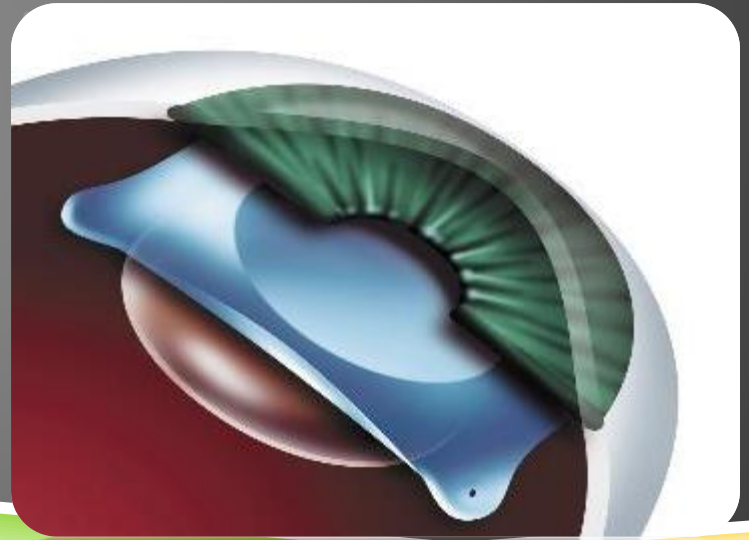
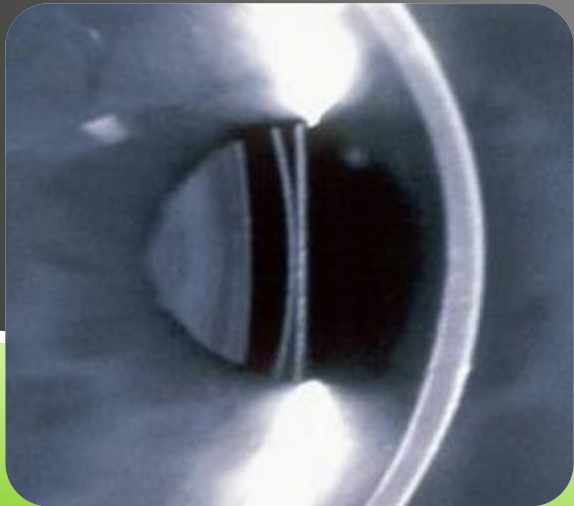


ICL

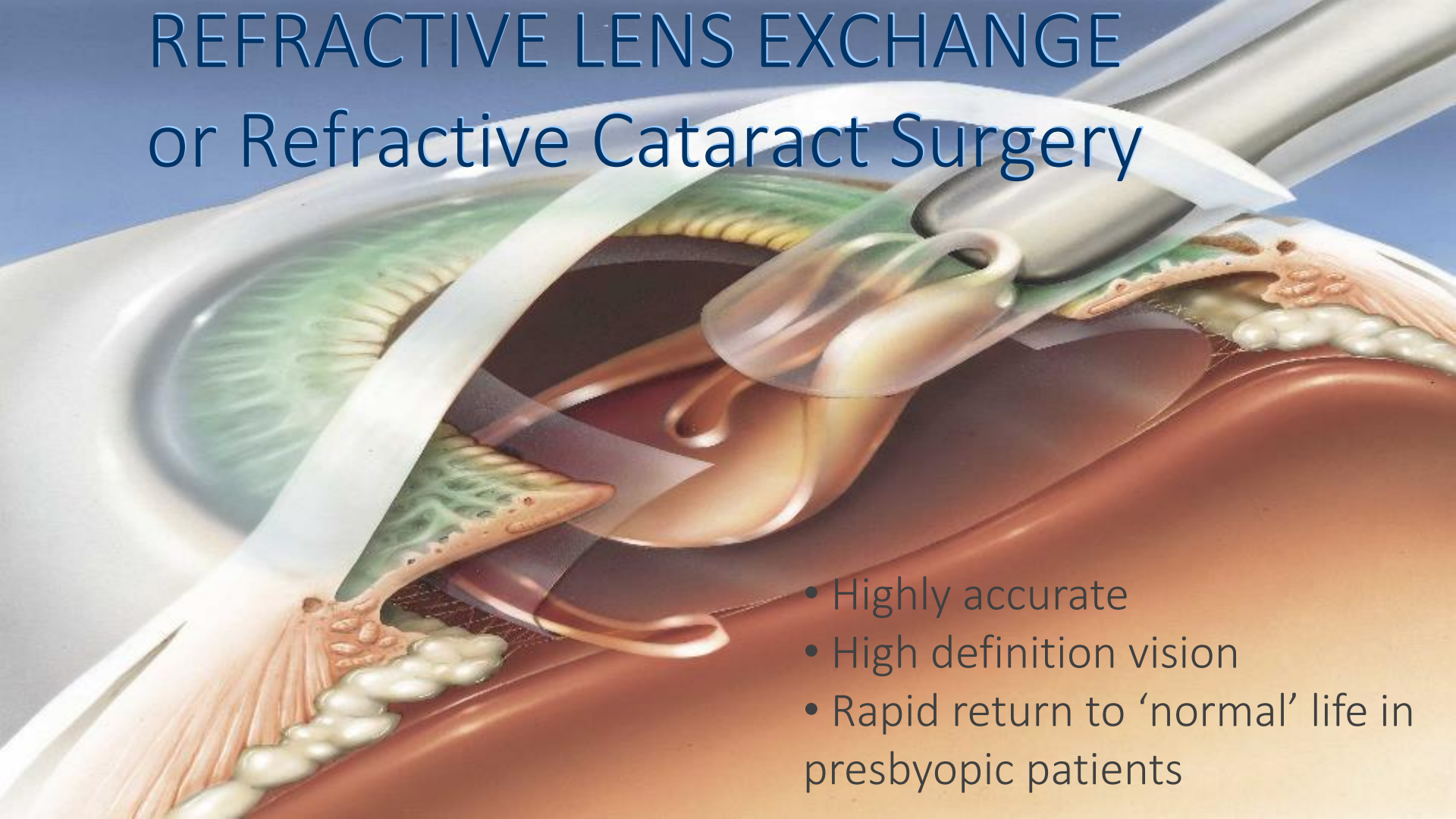


IMPLANTABLE CONTACT LENS

- ▶ ICL (Implantable Contact Lens)
 - ▶ -20 to +10 D Sphere, 6 D Cyl
 - ▶ No dry eye, reversible
 - ▶ >1000 ICLs personally

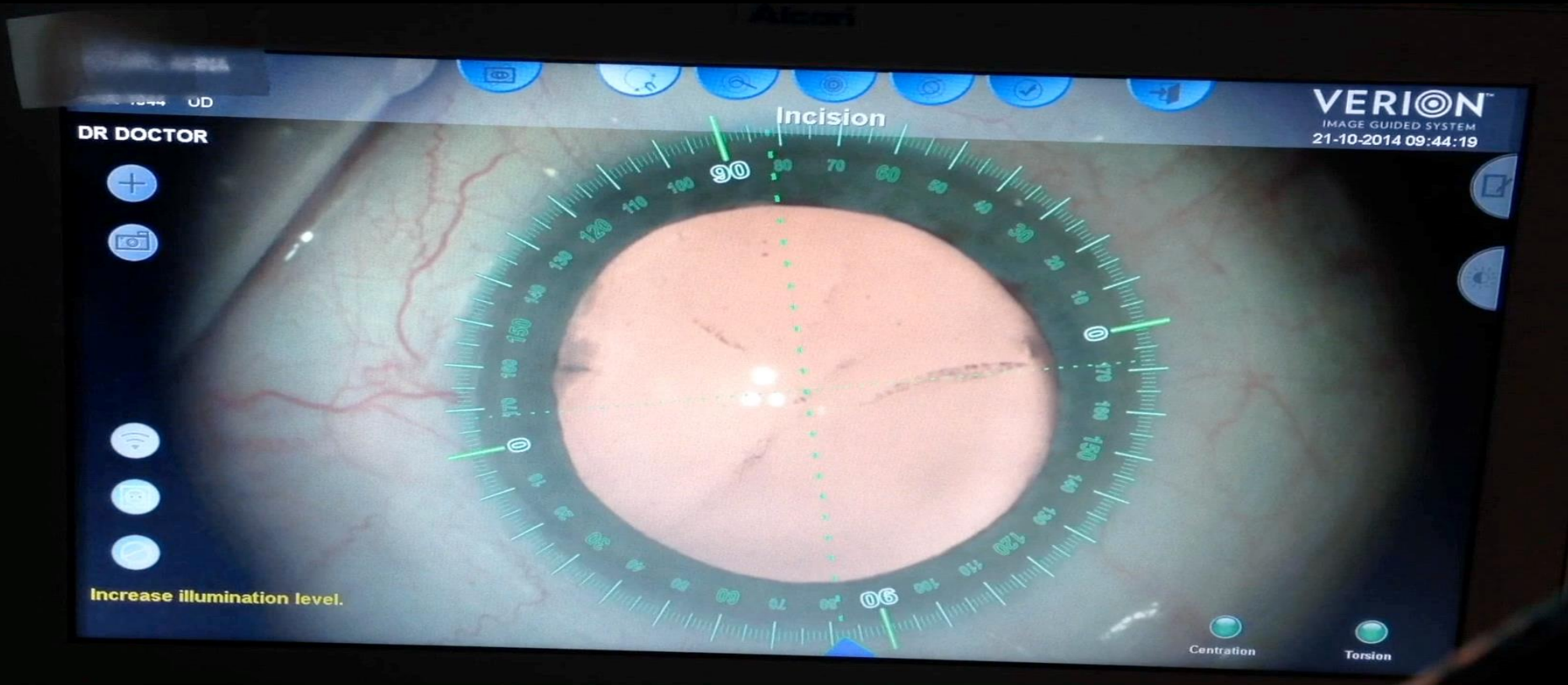


REFRACTIVE LENS EXCHANGE or Refractive Cataract Surgery

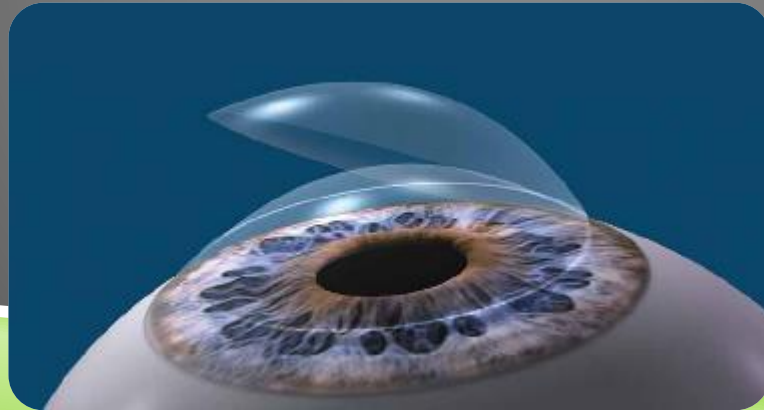


- Highly accurate
- High definition vision
- Rapid return to 'normal' life in presbyopic patients

IMAGE-GUIDED CATARACT SURGERY

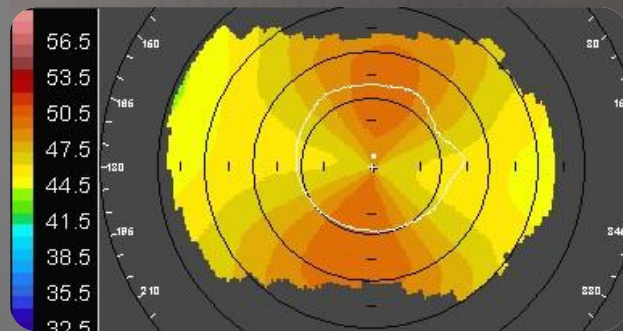


VISION CORRECTION SCALE ...



CAN IT CORRECT ASTIGMATISM?

- ▶ YES – “Iris Recognition”
- ▶ Astig >6D
- ▶ + Higher order aberrations



Refractive lenticule extraction (ReLEx flex) and wavefront-optimized Femto-LASIK: comparison of contrast sensitivity and high-order aberrations at 1 year. Graefes Arch Clin Exp Ophthalmol. May 2013;251(5):1437-42

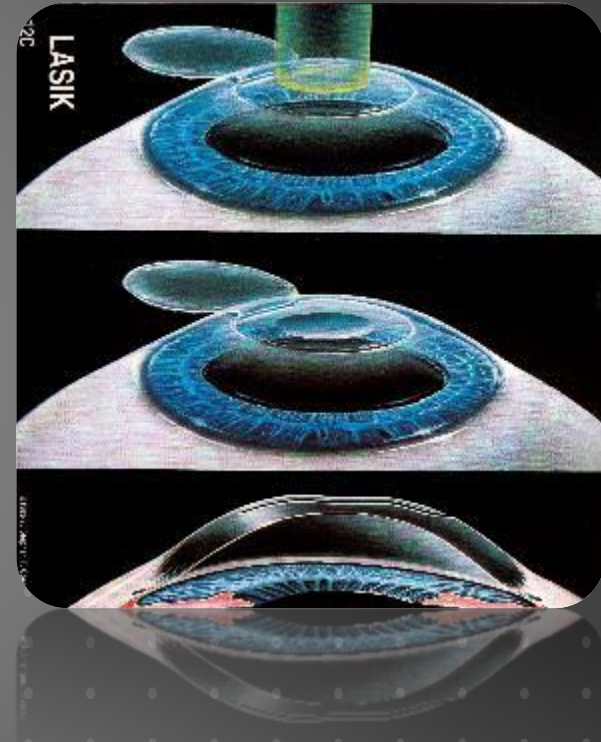
AM I SUITABLE?

- ▶ 1 hour assessment of ocular health and focus
- ▶ 85% suitable to consider LVC
 - ▶ LASIK or PRK
- ▶ Unsuitable
 - ▶ Keratoconus
 - ▶ Pellucid marginal degeneration
 - ▶ Unstable refraction
 - ▶ Herpes simplex keratitis / scarring
 - ▶ Others...
- ▶ No cost, no obligation exam'



WEAR OFF AFTER 10YRS?

- ▶ NO
- ▶ Permanent change to corneal curvature
 - ▶ Normal vision for age...
 - ▶ No crystal ball...
 - ▶ Modern LASIK more stable than 10-15yrs ago



CustomVue laser in situ keratomileusis for myopia and myopic astigmatism using the Visx S4 excimer laser: Efficacy, predictability, and safety. J Cataract Refract Surg. Mar 2006;32(3):475-9

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GET RID OF READING GLS?

- ▶ Maybe...
- ▶ Presbyopia normal aging
- ▶ Blended-Vision = “Social Vision”
 - ▶ Dominant – dist
 - ▶ Non-dominant – near
 - ▶ CL trial before
 - ▶ (also cataract surgery)
- ▶ Multifocal IOLs



Correcting Presbyopia: Laser Blended Vision

Dominant eye:
mainly corrected
for distance



Non-dominant eye:
mainly corrected
for near



~97%
Patients Tolerate



Brain merges two
images to see near and
far without glasses

CAN IT GO WRONG?

- ▶ YES
- ▶ Very rarely vision-threatening
 - ▶ Similar risk to driving home today...
- ▶ Some “complications” are normal
 - ▶ Early dry eyes
 - ▶ Early night blurring/halos
- ▶ iLASIK approved technology for
 - ▶ US Navy fighter pilots
 - ▶ NASA



COST?

- ▶ \$2850 per eye
 - ▶ All pre-op & post-op care
 - ▶ 1+ year post-op care
- ▶ Health care professionals “mates-rates”
- ▶ No cost, no obligation 1hr assessment



THANK YOU

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LASIK VS SMILE

	LASIK	SMILE
Vision improvement	Faster	Slower
Wavefront guided	Yes	No
Iris registration	Yes	No
Auto centration	Yes	No
Astig auto-alignment	Yes	No
High astigmatism	Yes	No
Low Myopia	Yes	No
Hypermetropia	Yes	No
Optic zone size	Larger	Smaller
Easy enhancement	Yes	No
Flap security	Less	More
Dry eye <6mths	Yes (more)	Yes (less)
Dry eye >6mths	Yes (mild)	Yes (mild)