2nd Avedro CXL meeting,
ROME 2013

PiXL: Photorefractive Intrastromal CXL: Initial clinical data

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[1]New York University School of Medicine, New York, NY, USA
[2]Laservision.gr Institute, Athens, Greece

AJK is a consultant for Alcon, Wavelight and Avedro.

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LaserVision.gr Institute for laser

Next Saturday Athens!

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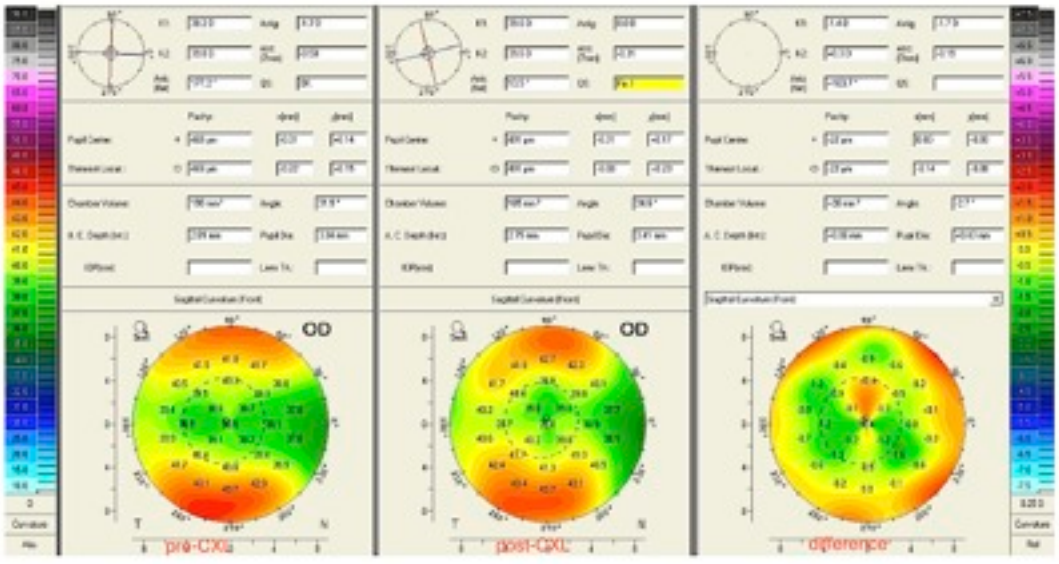
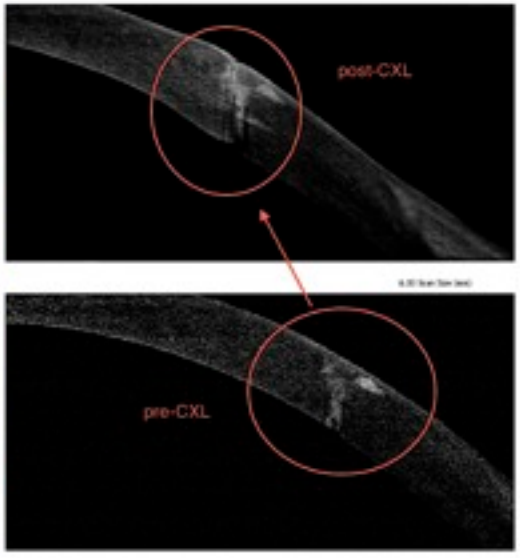
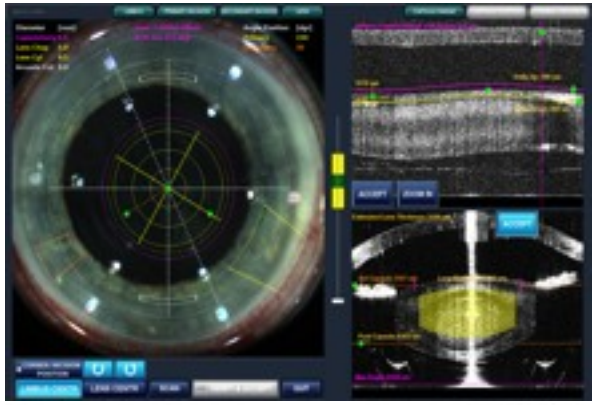
Kanellopoulos,MD

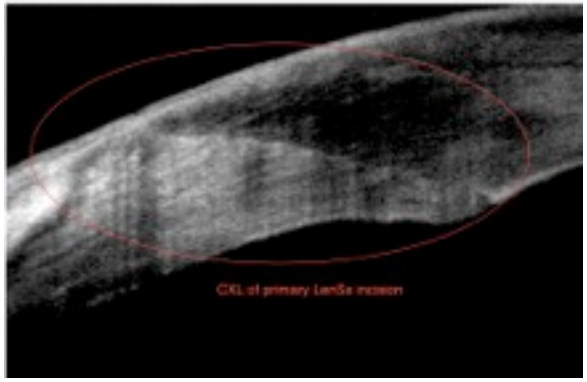
- The creation of CXL differentials within the cornea can have a refractive effect
- First presented in the 2012 CXL meeting in Geneva
- Published: JRS 2013: Kanellopoulos AJ

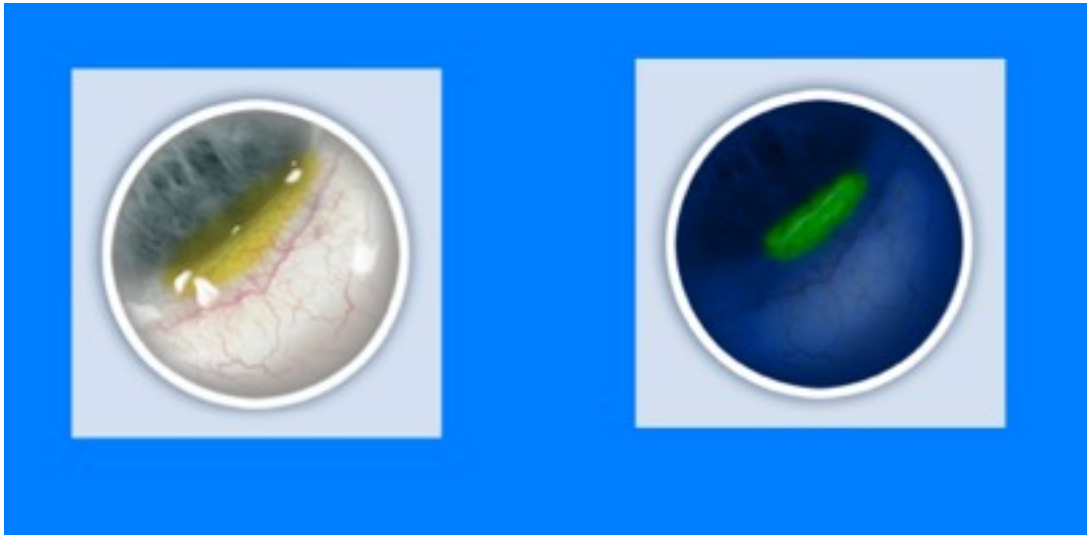




Bilateral Cataract surgery patients one eye randomized to flash CXL:







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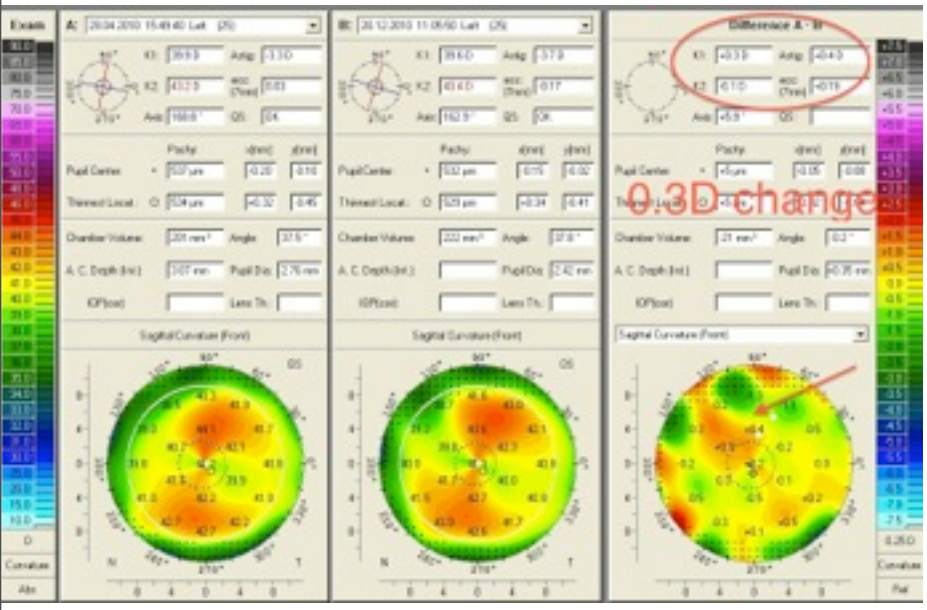
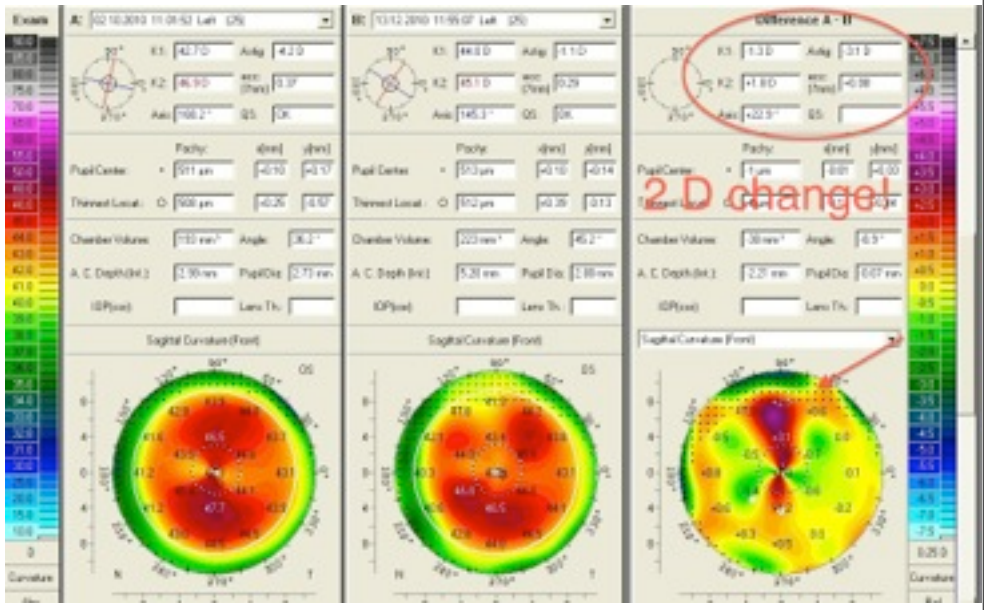
flashCXL of clear cornea catarct incisions!

Kanellopoulos 2012





Control

Flash CXL

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Thank you Dave and Artie!

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KXL II:

customised CXL treatments, a new era

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Methods

We treated 30 consecutive cases of partially
sighted eyes with 5 different treatment patterns:

- Transepithelial myopic pattern+O_2 puls
- Myopic pattern following a 5mm OZ PTK of 50 um
- Transepithelial toric pattern+O_2 puls
- Transepithelial customised topography-guided pattern+O_2 puls
- Hyperopic pattern, after donut-like PTK (30um 6-9mm oz)

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VibeX™
Treatment Activation

avedro
VibeX Rapid™
Treatment Activation

avedro
ParaCel™
Treatment Activation

avedro
VibeX Xtra™
Treatment Activation

Myopic profile central 4mm OZ transepi

4min Paracel+6min VibexXtra

KXL2 - Treatment Report

Patient: [redacted]

ID: 001817

D.O.B.: 16-Aug-1944

Notes:

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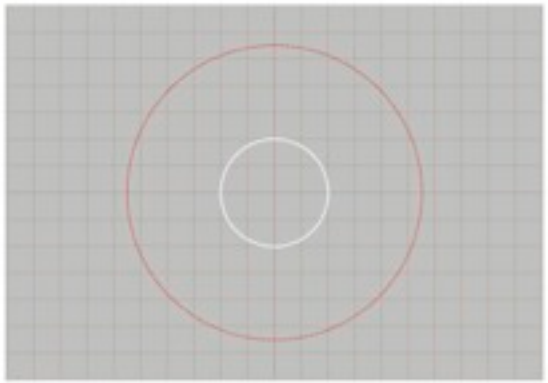
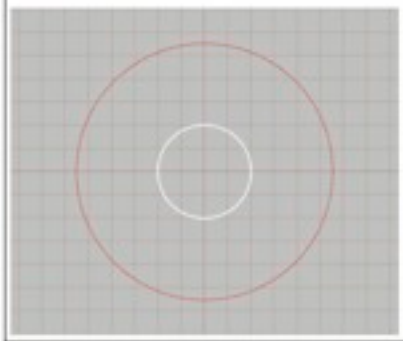
OD Exam Date: 24-Jul-2013 13:40:12





No.	Shape Type	Time (min:sec)	Total Energy (J/cm²)	X Position (mm)	Y Position (mm)	Axis (degs.)	Dim. 1 (mm)	Dim. 2 (mm)	Arc (degs.)
1	Circle	4:11	11.3	0.0	-0.0		4.0		

Indices

K's at 3mm:

Avg. K (D):

Pupil Ø (mm):

Limbus Ø(mm):

Min. Pachy (µ):

Additional Notes

Treatment Power: 45 mw/cm² - Continuous.

Version: 1.0.7.0

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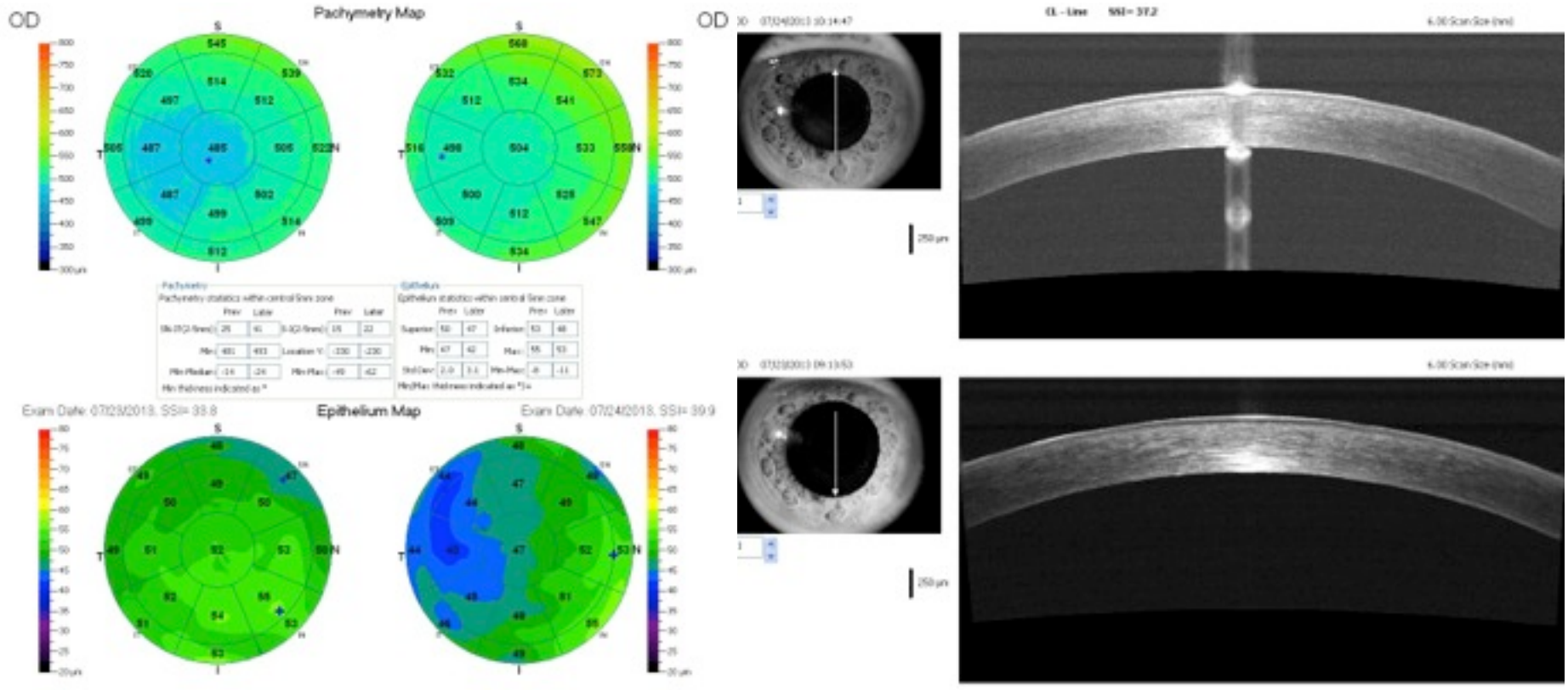
Myopic profile central 4mm OZ transepi

4min Paracel+6min VibexXtra



Case 1

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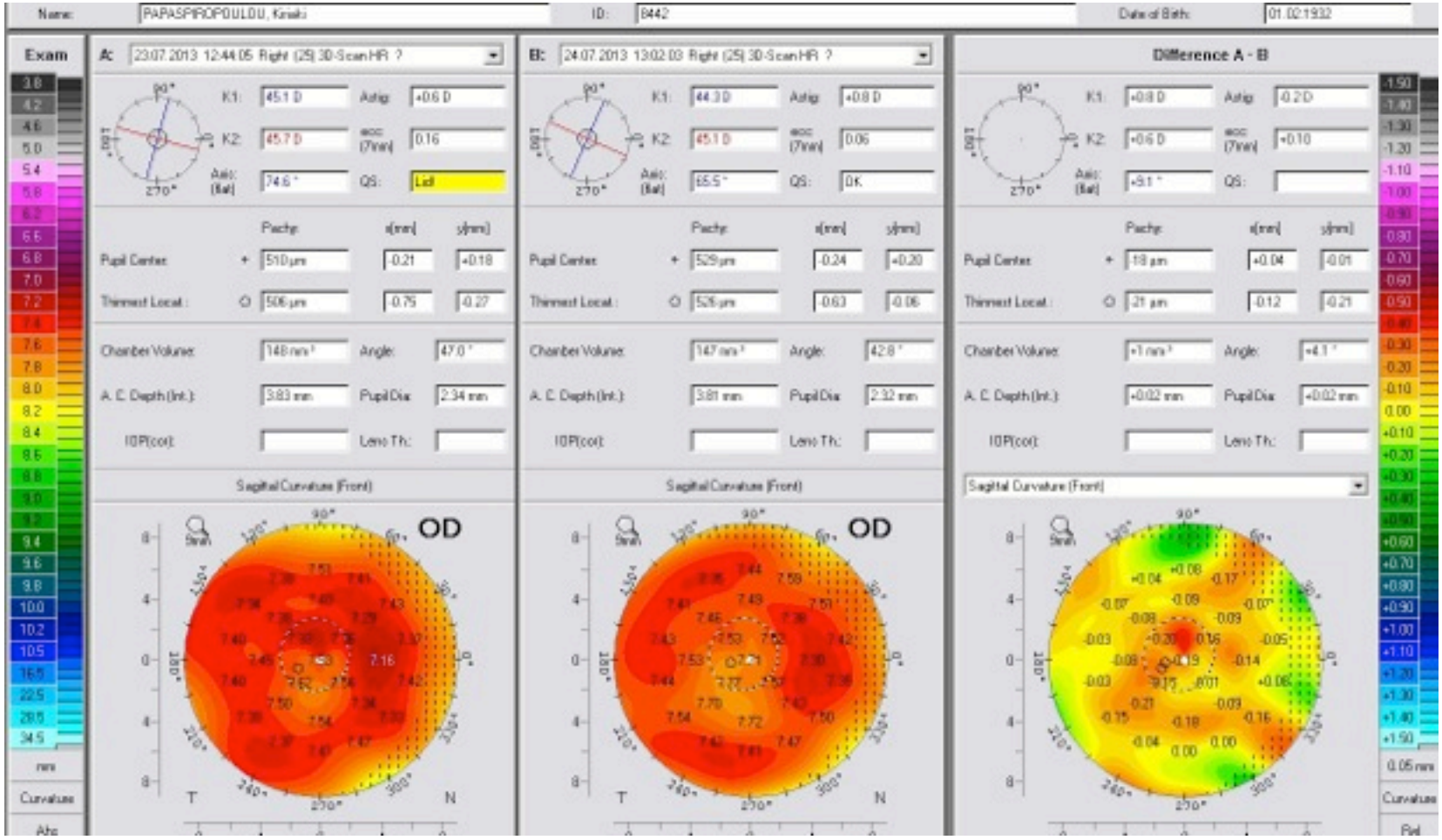
Myopic profile central 4mm OZ transepi

4min Paracel+6min VibexXtra



Case 2

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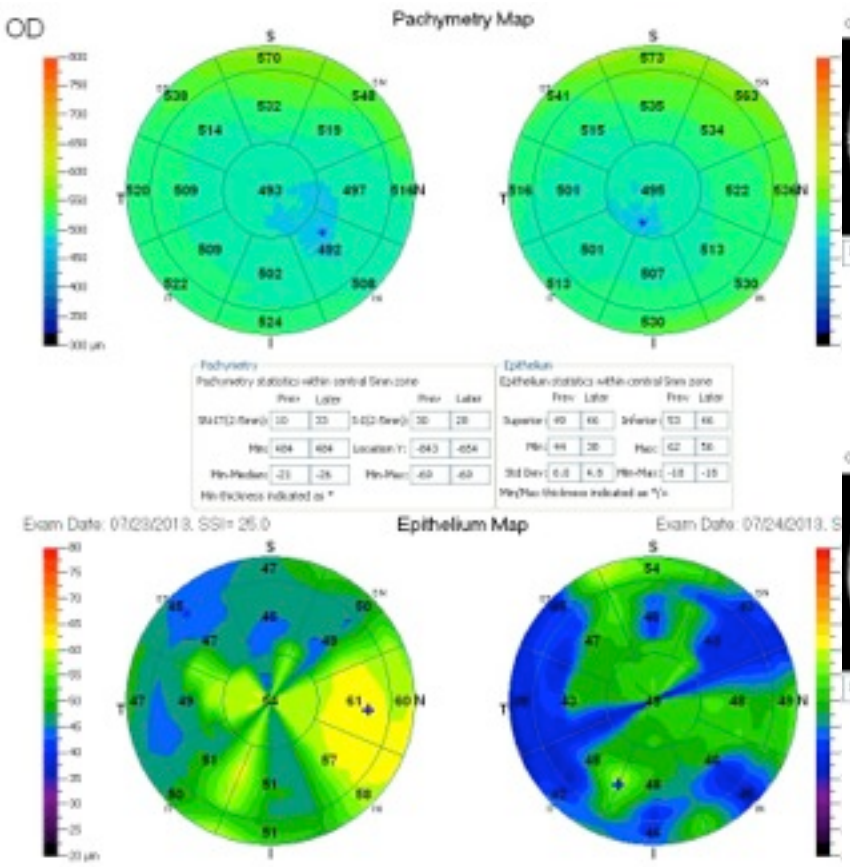
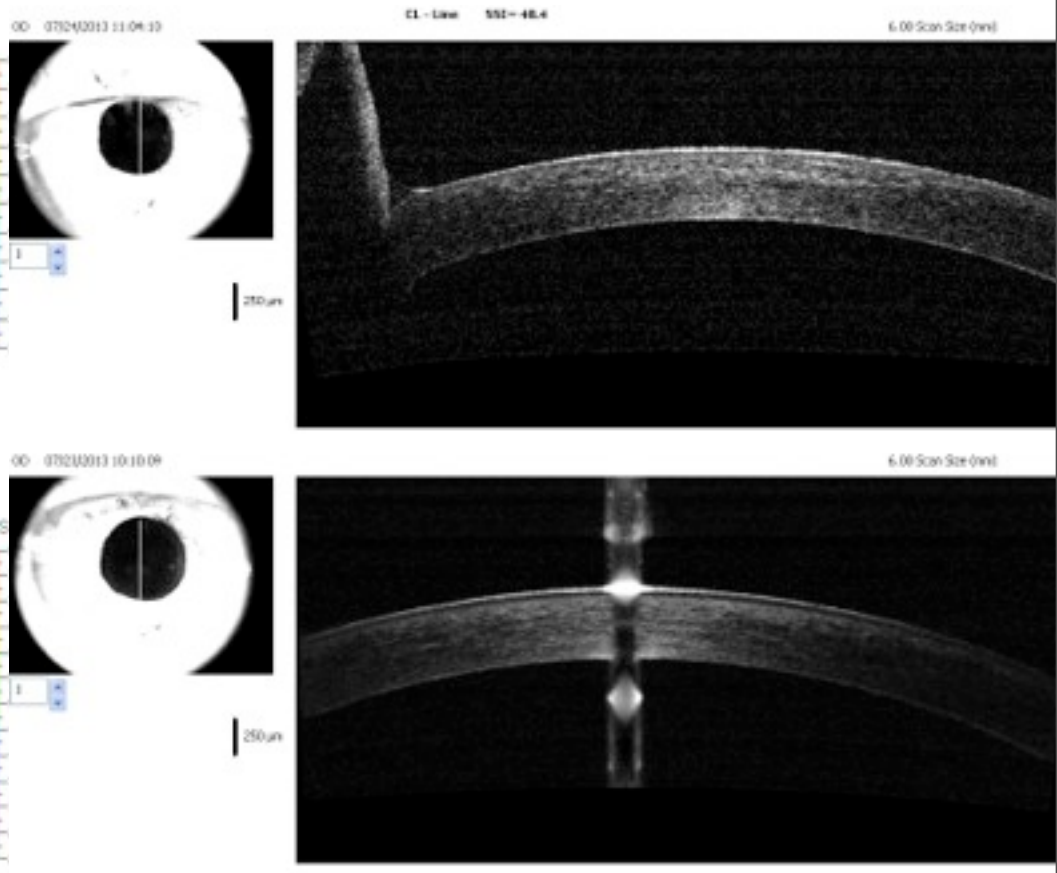
Myopic profile central 4mm OZ transepi

4min Paracel+6min VibexXtra





Case 2

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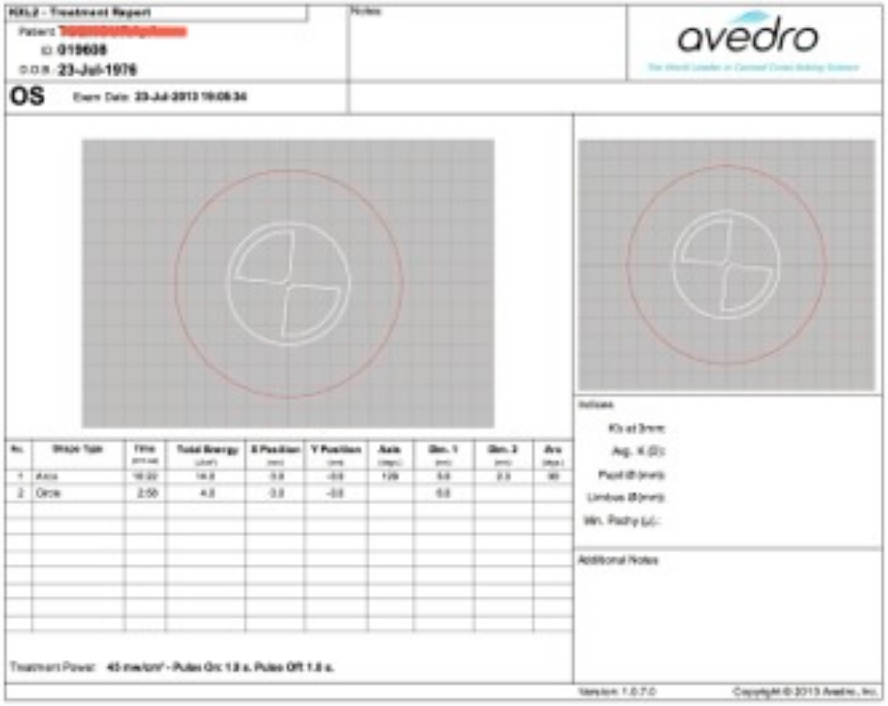
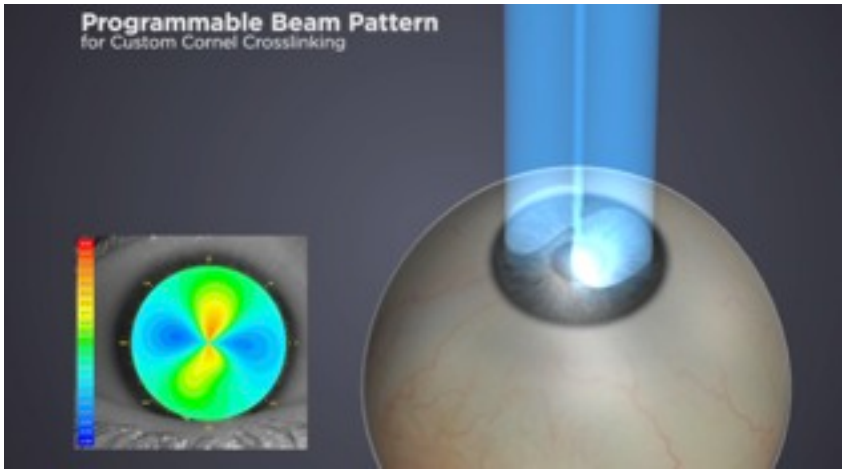
Toric profile-transepi:
4min Paracel+6min VibexXtra





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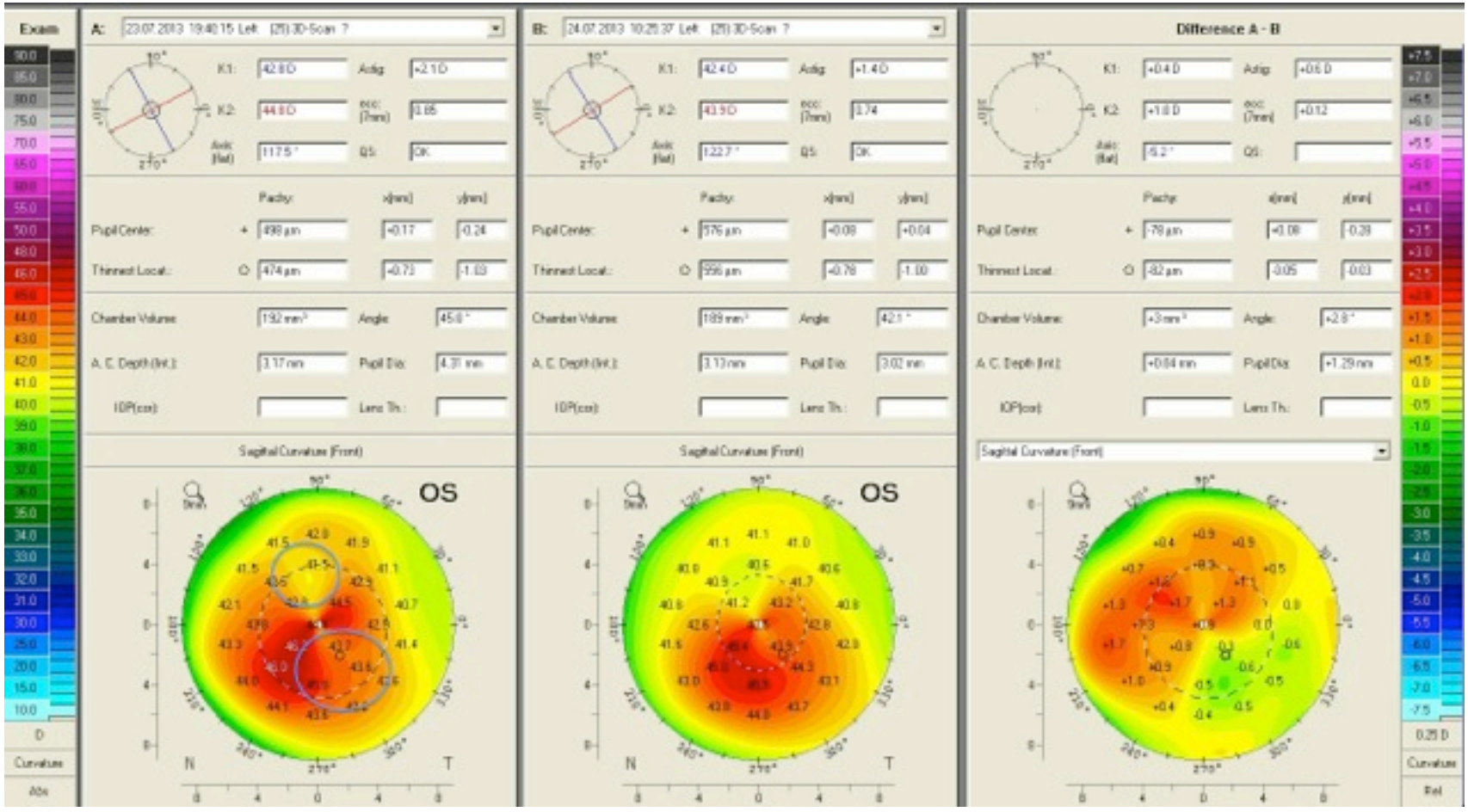
Toric PiXL!



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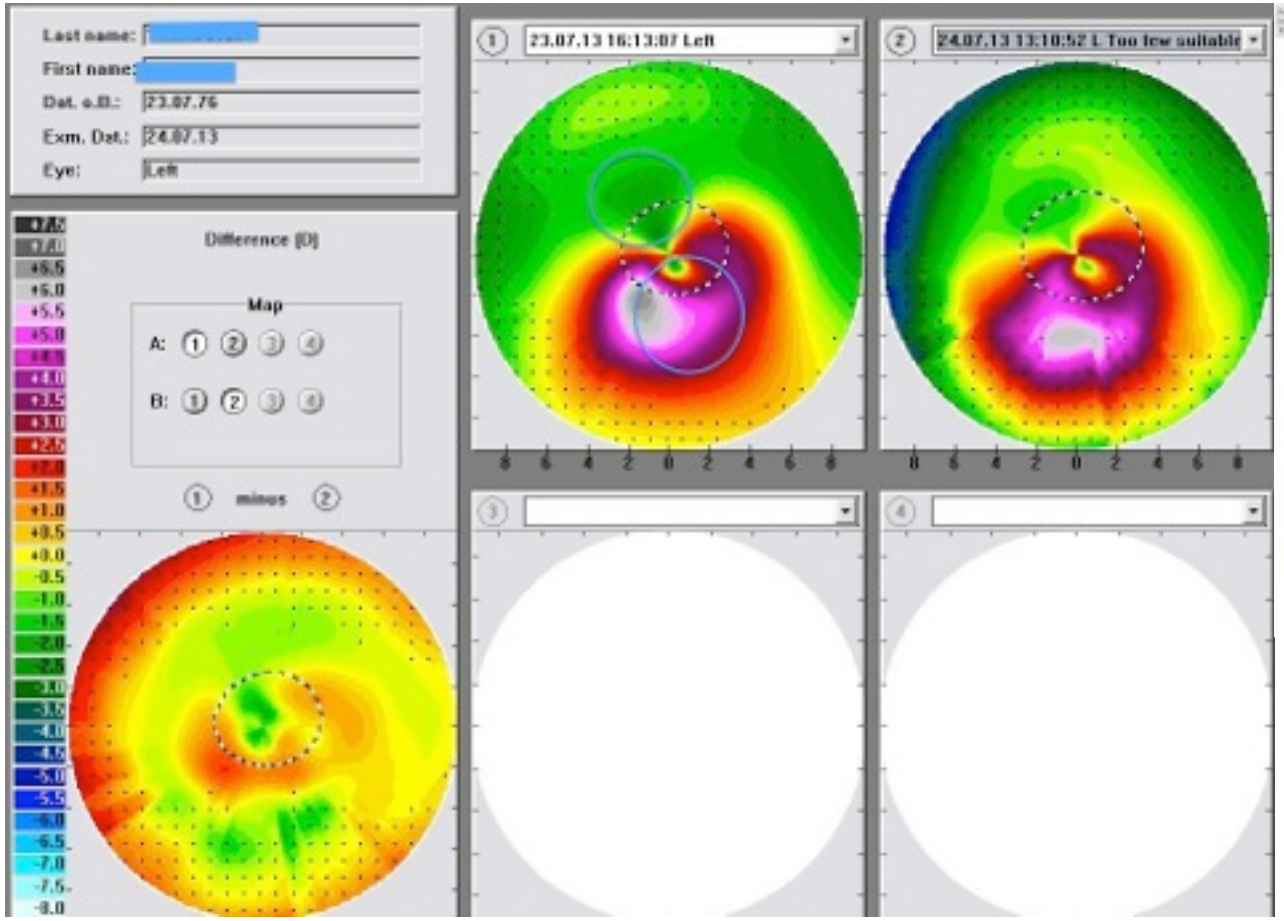
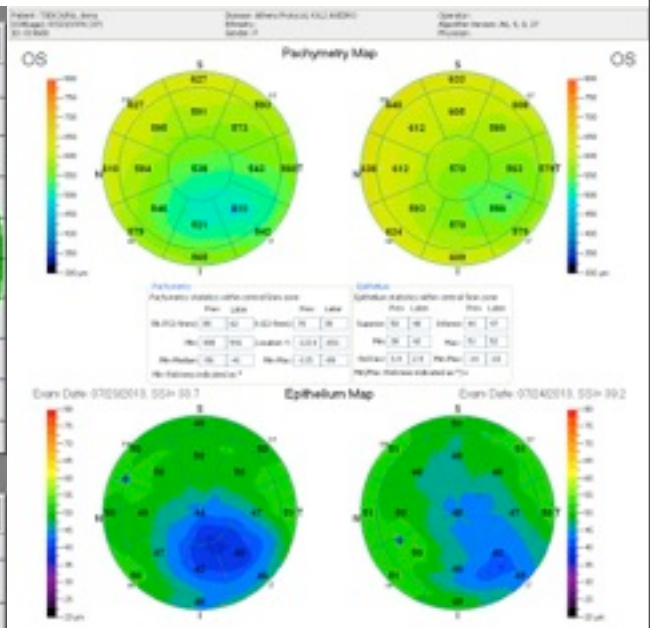
Toric PiXL!





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Myopic profile central 4mm OZ with 6mm PTK epi scrape

KXL2 - Treatment Report

Patient: [redacted]

ID: 001817

D.O.B.: 16-Aug-1944

Notes:

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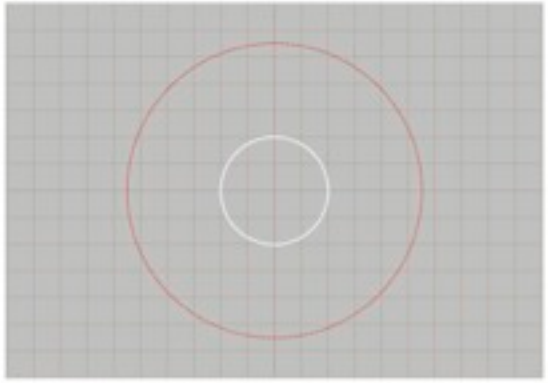
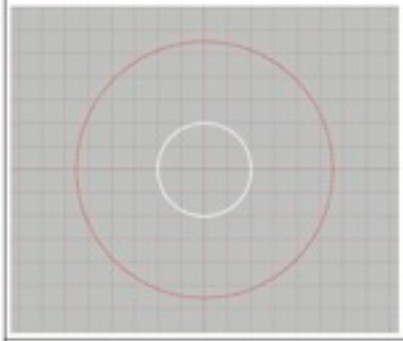
OD Exam Date: 24-Jul-2013 13:40:12





No.	Shape Type	Time (mm:ss)	Total Energy (J/cm²)	X Position (mm)	Y Position (mm)	Axis (degs.)	Dim. 1 (mm)	Dim. 2 (mm)	Arc (degs.)
1	Circle	4:11	11.3	0.0	-0.0		4.0		

Indices

K's at 3mm:

Avg. K (D):

Pupil Ø (mm):

Limbus Ø(mm):

Min. Pachy (µ):

Additional Notes

Treatment Power: 45 mw/cm² - Continuous.

Version: 1.0.7.0

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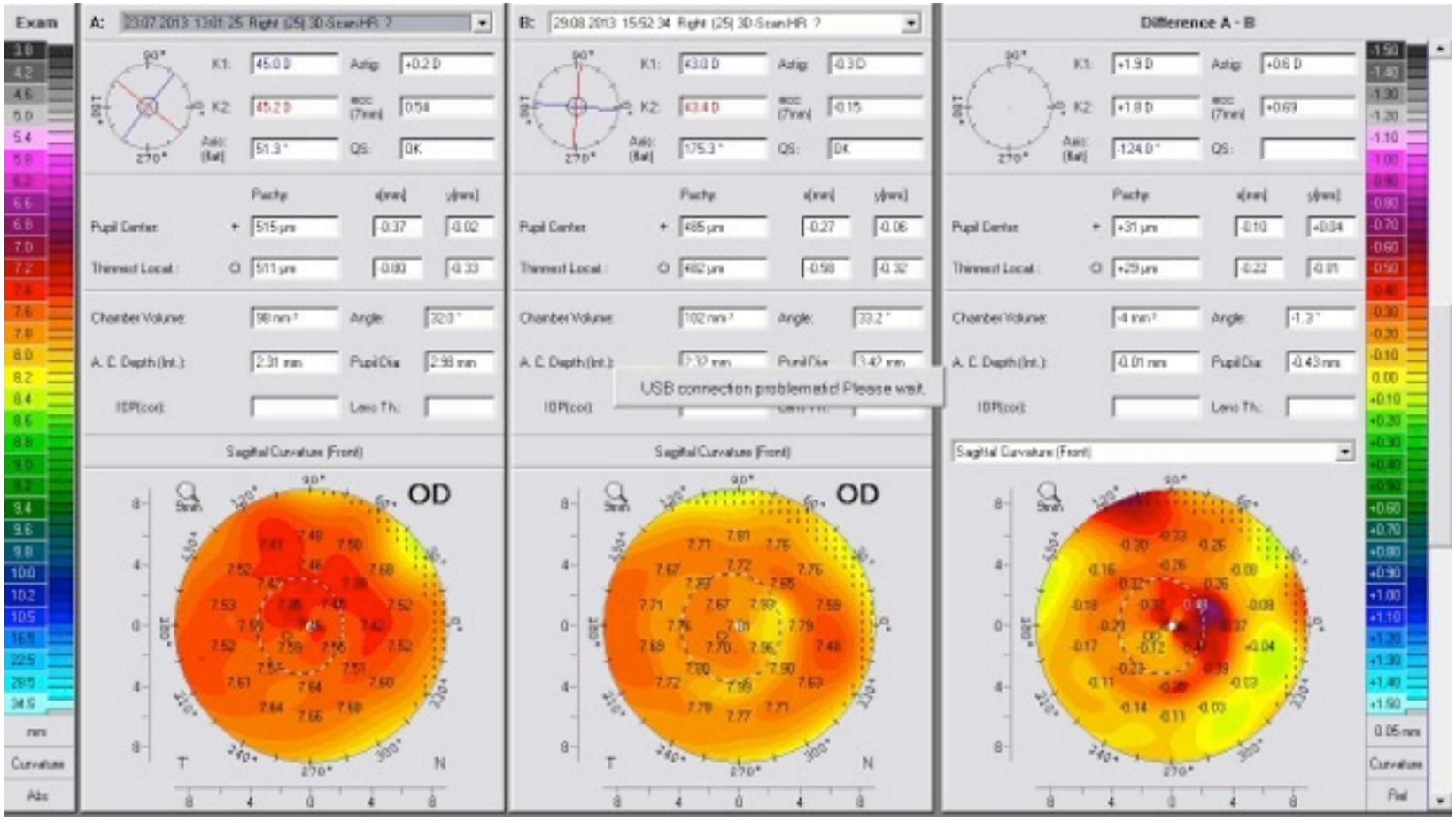
6 weeks myopic treatments 4D flattening



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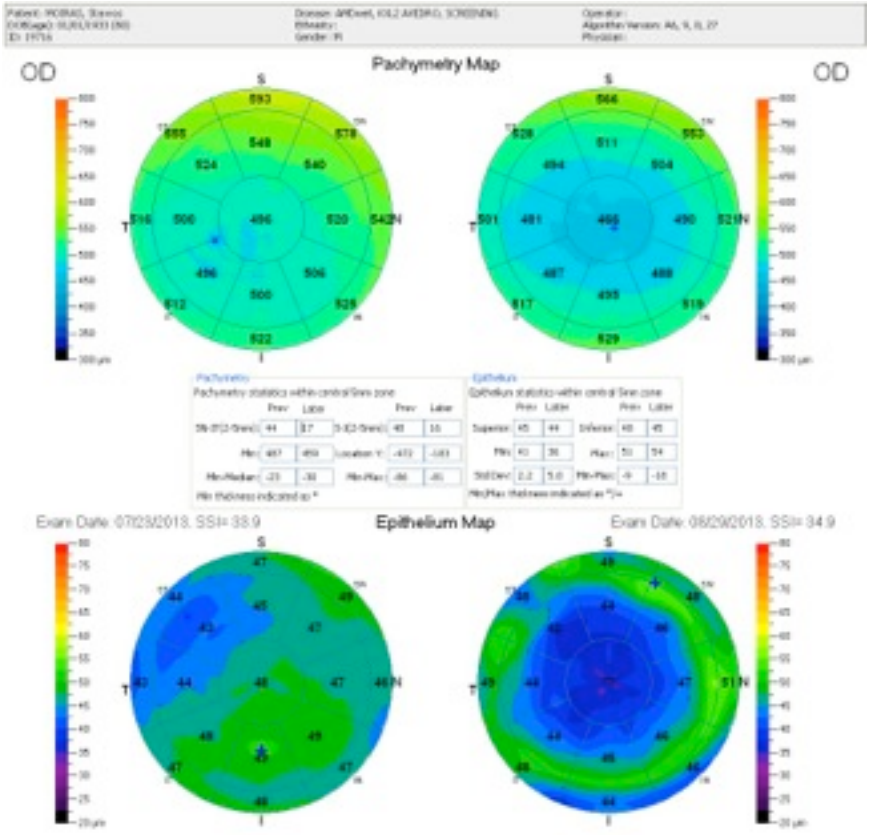
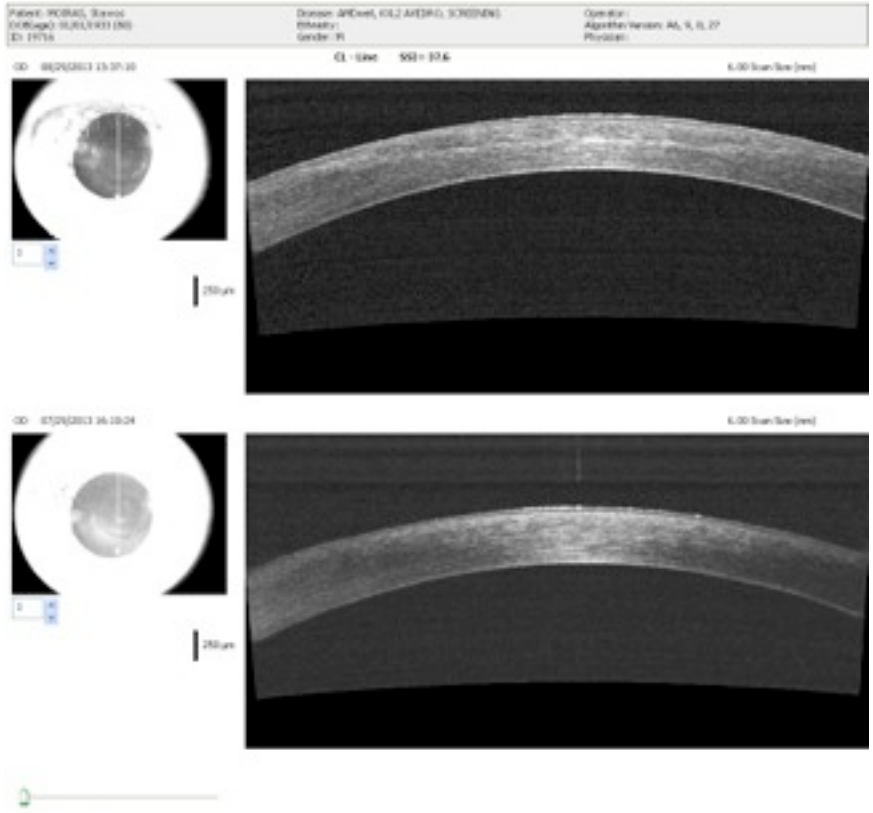
6week PTK + myopic treatments





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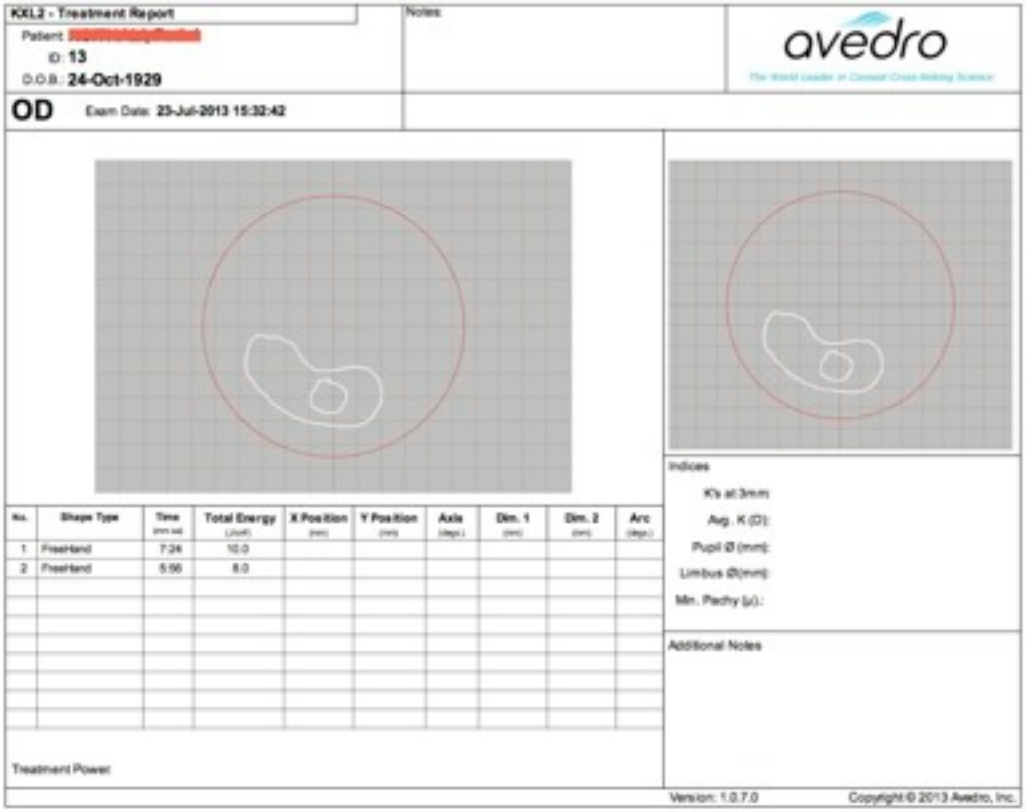
Custom profile (topo-guided) transepi 4min Paracel+6min VibexXtra



KXL2 - Treatment Report

Patient: [redacted]

ID: 13

D.O.B.: 24-Oct-1929

Notes:

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OD Exam Date: 23-Jul-2013 15:32:42

No.	Shape Type	Time (mm:ss)	Total Energy (Joule)	X Position (mm)	Y Position (mm)	Axis (degs.)	Dim. 1 (mm)	Dim. 2 (mm)	Arc (degs.)
1	Freehand	7:24	10.0						
2	Freehand	5:56	8.0						

Treatment Power

Indices

K's at 3mm

Avg. K (D):

Pupil Ø (mm):

Limbus Ø(mm):

Min. Pachy (µ):

Additional Notes

Version: 1.0.7.0

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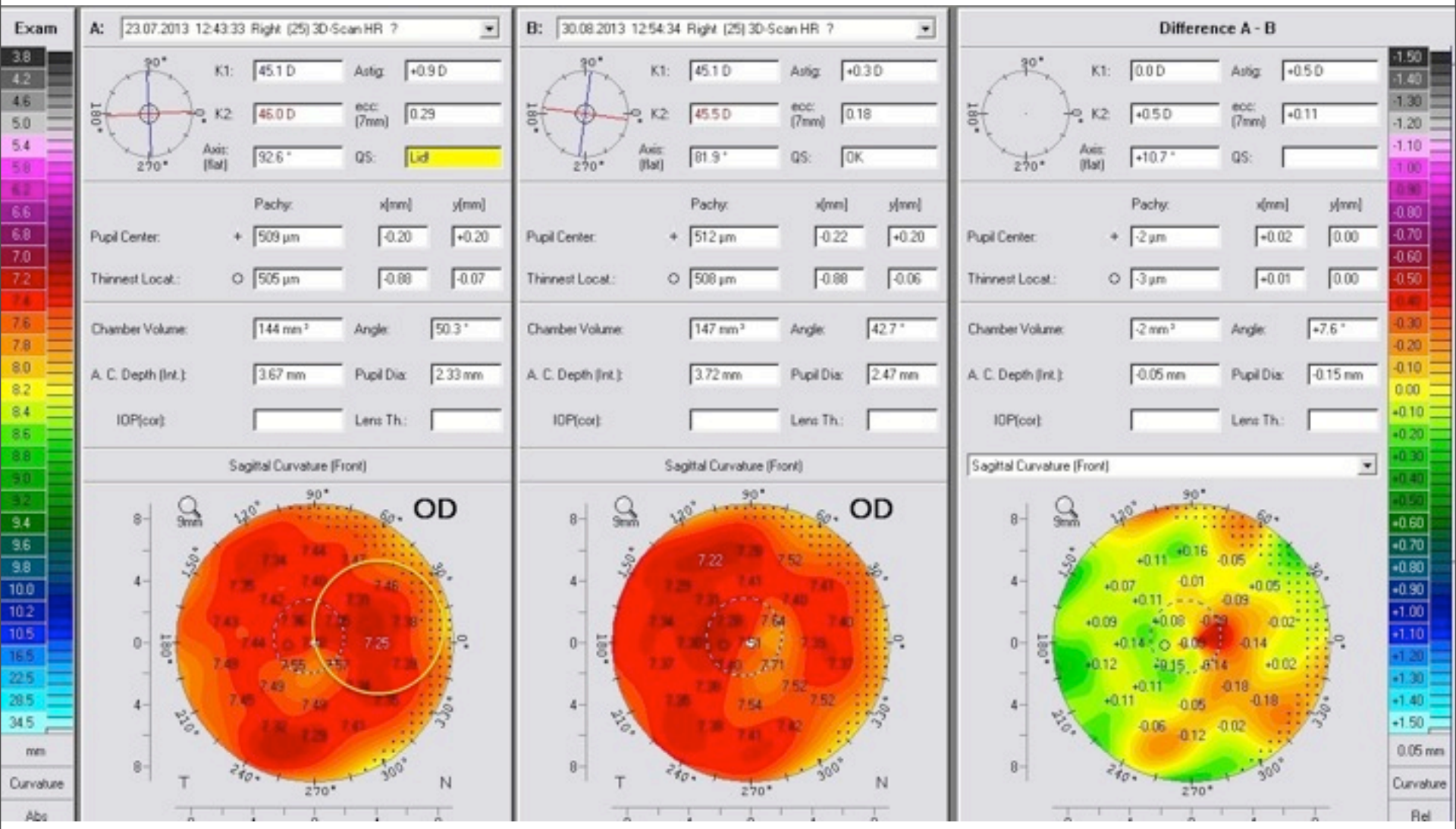
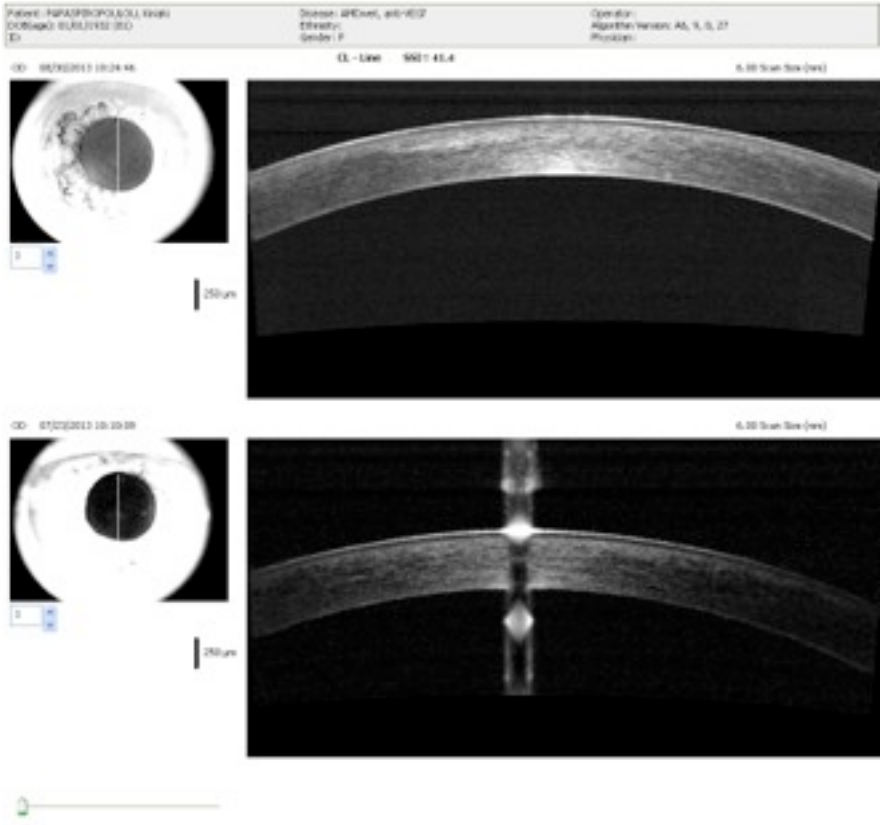
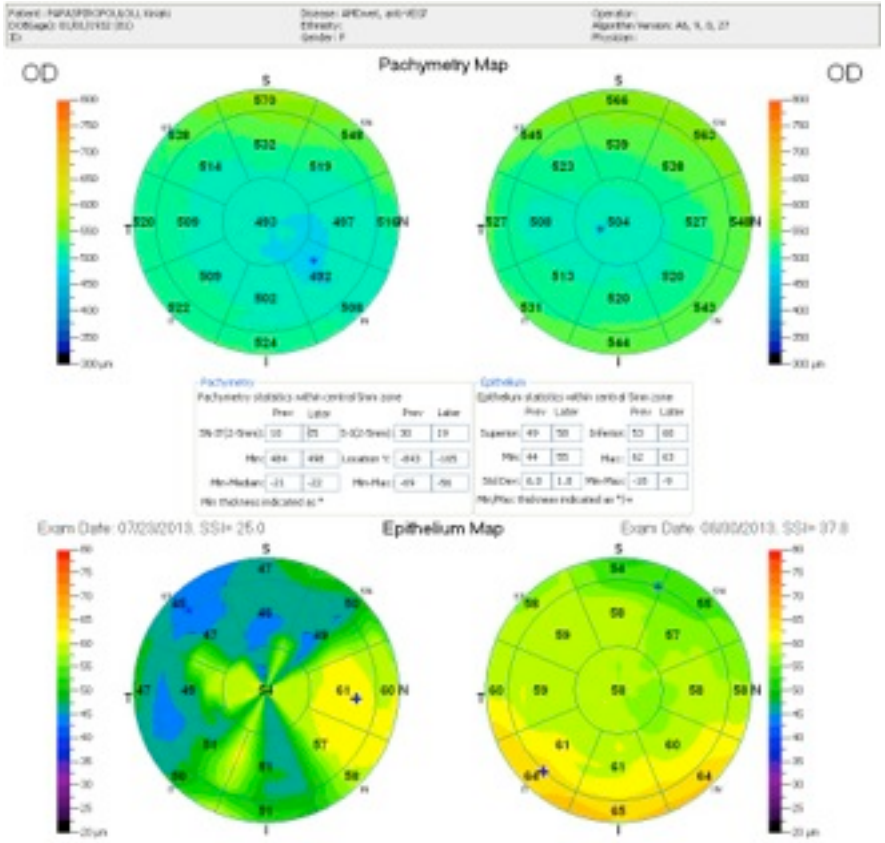
Irregular astigmatism treatments



Irregular astigmatism treatments





“ profile Hyperopic” oz 6-9mm
“hyperopic PTK” 6-9oz 30 microns

KXL2 - Treatment Report

Patient: [redacted]

ID: 020229

D.O.B.: 04-Jan-1983

Notes

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OD Exam Date: 23-Jul-2013 18:44:50

No.	Shape Type	Time (min:sec)	Total Energy (Joule)	X Position (mm)	Y Position (mm)	Axis (degs.)	Dim. 1 (mm)	Dim. 2 (mm)	Arc (degs.)
1	Circle	10:00	6.0	0.0	-0.0		7.0		

Treatment Power: 18 mw/cm² - Continuous.

Indices

K's at 3mm:

Avg. K (D):

Pupil Ø (mm):

Limbus Ø(mm):

Min. Pachy (µ):

Additional Notes

Version: 1.0.7.0

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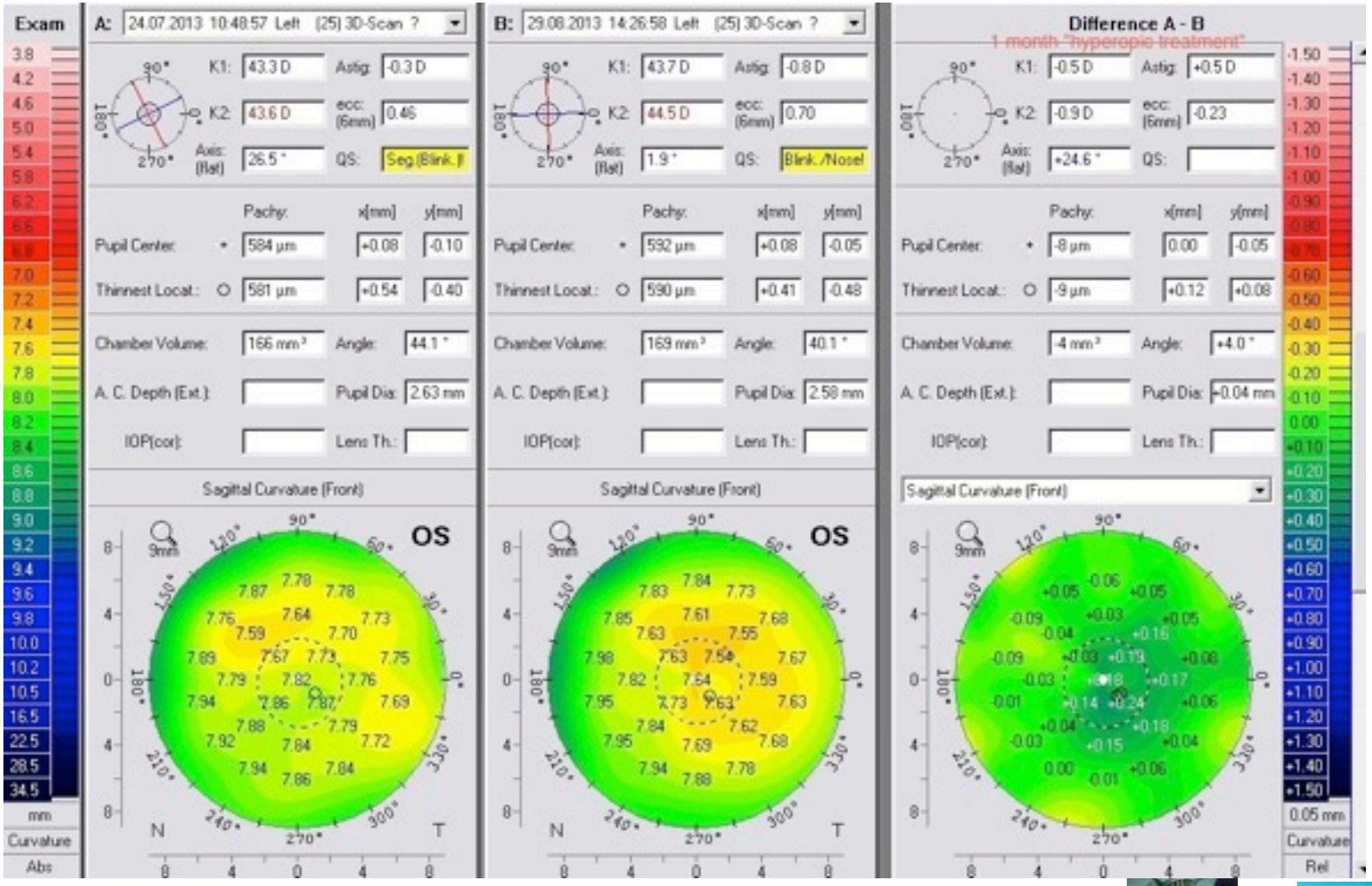
6 weeks hyperopic (presby) 3 D refractiev change



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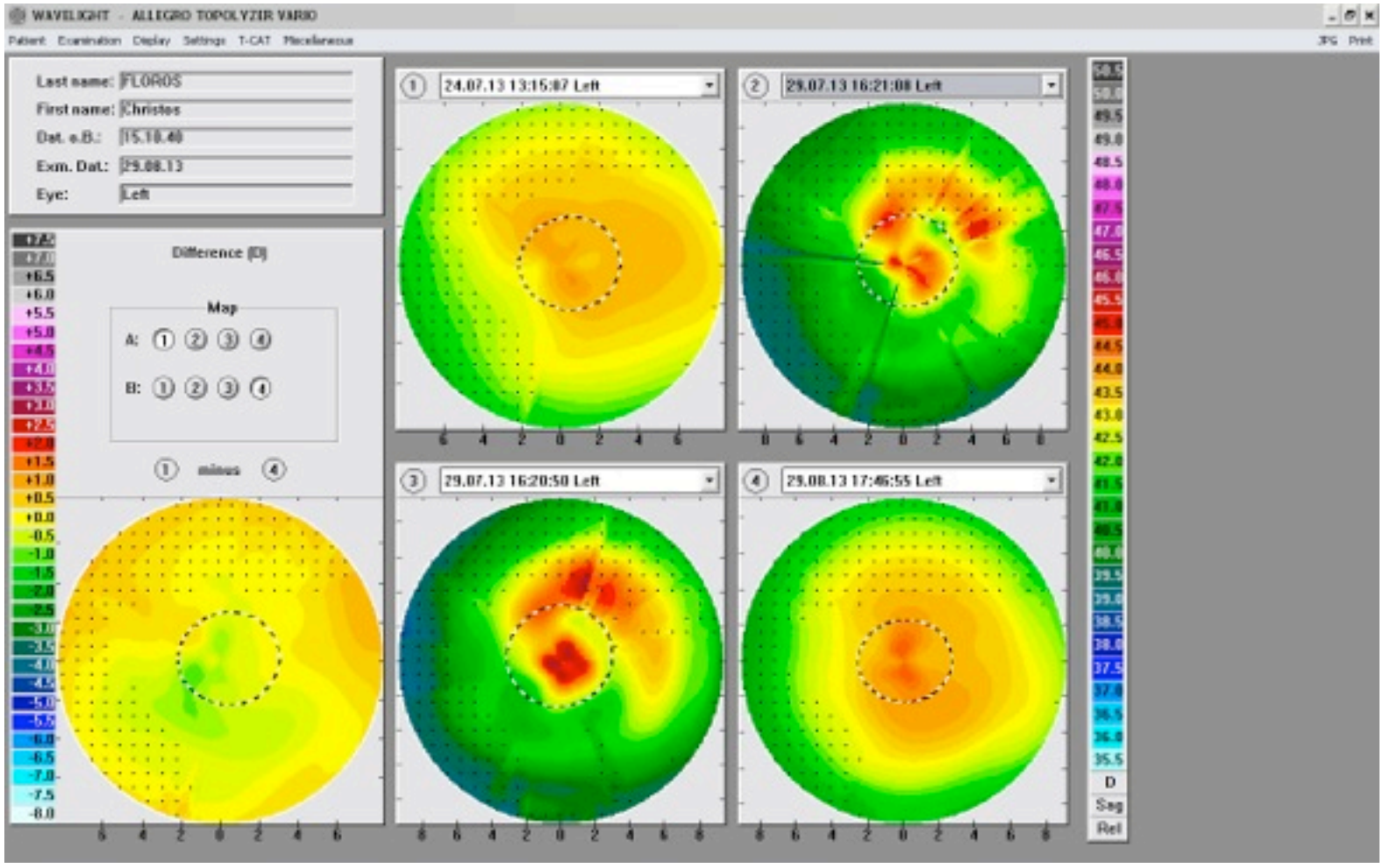
6 weeks hyperopic (presby)



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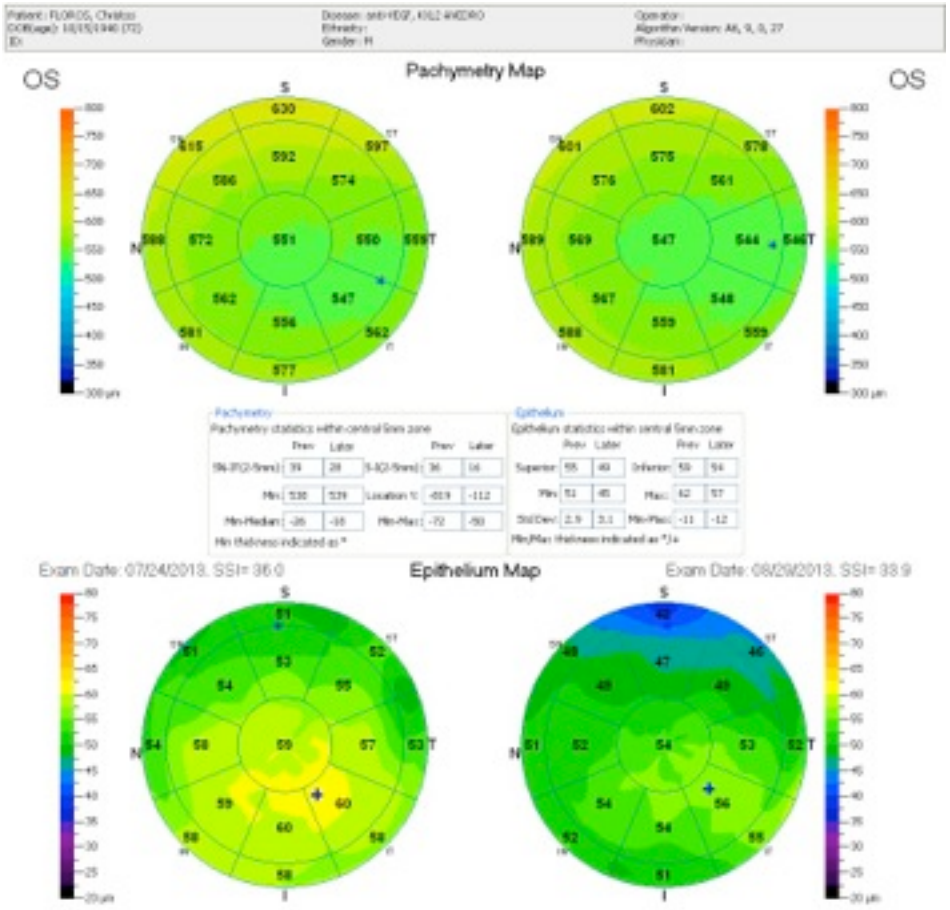
6 weeks hyperopic (presby) epithelial response



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Conclusions

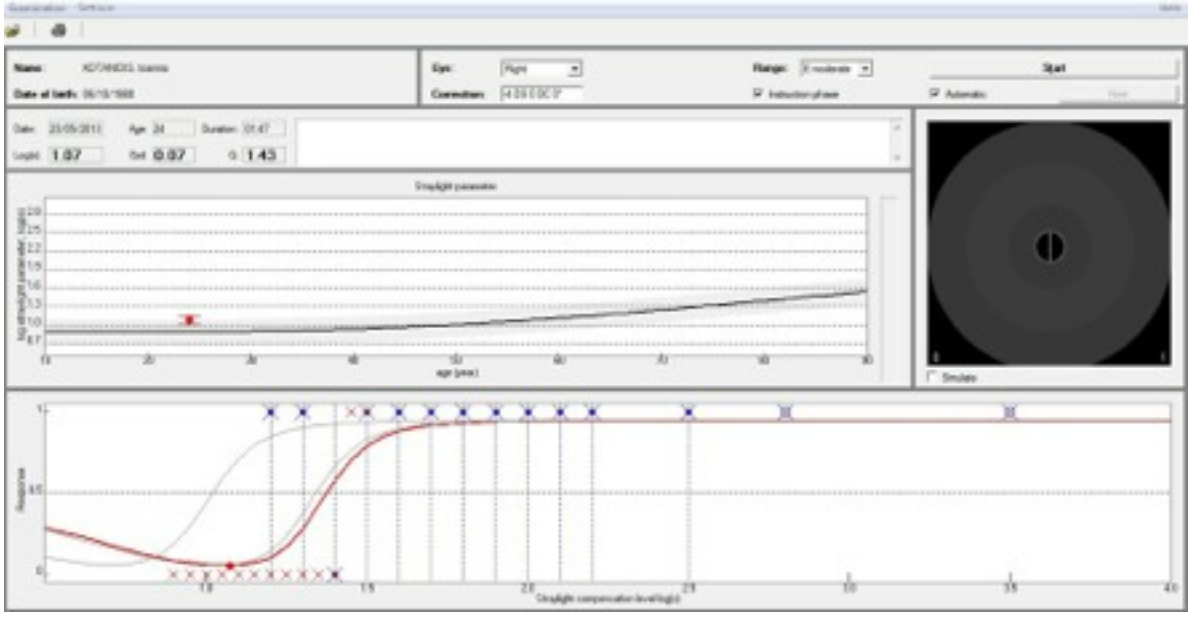
- CXL differentials can profile corneal refractive changes
- Photorefractive Intrastromal CXL treatments
- With the KXL2 have proven safe and effective
- Future customised pattern CXL treatment options become unlimited

Conclusions

- Avedro with the KXL2 device opens yet another
- frontier in CXL and refractive surgery
- Long term results will further validate permanence
- Refractive enhancement with laser in these cases would be interesting to study

Ongoing studies:

- Long term epithelium response
- Light scatter: C-quant and OQAS HD analyzer HD from Visiometrics-preliminary data show no difference in liht scatter aftr first week with LASIK Xtra



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Thank you!

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