

2nd Avedro CXL meeting,
ROME 2013

PiXL: Photorefractive Intrastromal CXL: Initial clinical data

A. John Kanellopoulos, M.D.^{1,2}

¹New York University School of Medicine, New York, NY, USA

²Laservision.gr Institute, Athens, Greece

AJK is a consultant for Alcon, Wavelight and Avedro.



Kanellopoulos, MD



Saturday
September
14th, 2013



3D Athens Course

Next Saturday
Athens!



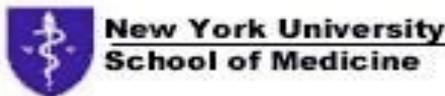
Program Schedule - Saturday 14th 2013

10:00 - 10:30	REGISTRATION & COFFEE	1. Higher and very high Flashes (330-400/um) CXI The Avastar KXL 20 th
10:30 - 10:45	WELCOME & INTRODUCTION	2. Pulsing/PL Pumping 20 th
10:45 - 12:30	FEMTOSECOND AND NANOSECOND LASER APPLICATIONS IN CORNEA, REFRACTIVE AND CATARACT SURGERY	3. Customized CXI and the Athens Protocol 20 th
1. Femto Refractive Surgery 3D video applications 10 th & Discussion 1 st	4. Refractive CXI results (new technology CXI 10 20 th)	5. LASIK Wave (topography and topography) 20 th
2. Femto Transplantation surgery applications 10 th - 3D Surgery video symposium 10 th	6. Use of the new Toric IOL (torics) in CXL cases 20 th	11:30 - 12:00
3. Femto Cataract surgery 3D video applications 10 th & Discussion 1 st		14:00 - 18:00
4. Femto CXL applications 10 th - 3D Surgery video symposium 10 th		COURSE BREAK
5. Nanosecond/psr Cataract applications 10 th & Discussion 1 st		WETLAB IN CORNEAL IMAGING (group A & B) th
6. Combined Nano / Femto Cataract surgery 10 th - 3D Surgery video symposium 10 th		1. Scheimpflug Imaging Pentacam 10 th
12:30 - 13:30	LUNCH	2. Placido and IOL MWT Topography 10 th
13:30 - 13:30	WETLAB IN COLLAGEIN CROSS-LINKING (CXL) DEMONSTRATION AND PERFORMING OUR TECHNIQUE	3. Interferometric Pachymetry & Topography Aberrometry 10 th
		4. Scatter measurement device (E-Quant) 10 th
		5. Contrast Sensitivity, Contrast Acuity & Stray Light 10 th
		6. Anterior Segment OCT with emphasis on epithelial mapping and dry eye 10 th

Inquire at +30 210 7472770 <http://www.kanelloupsoul.gr>
 Waitlist availability will be limited to 50 participants. Registration Priority will be given.

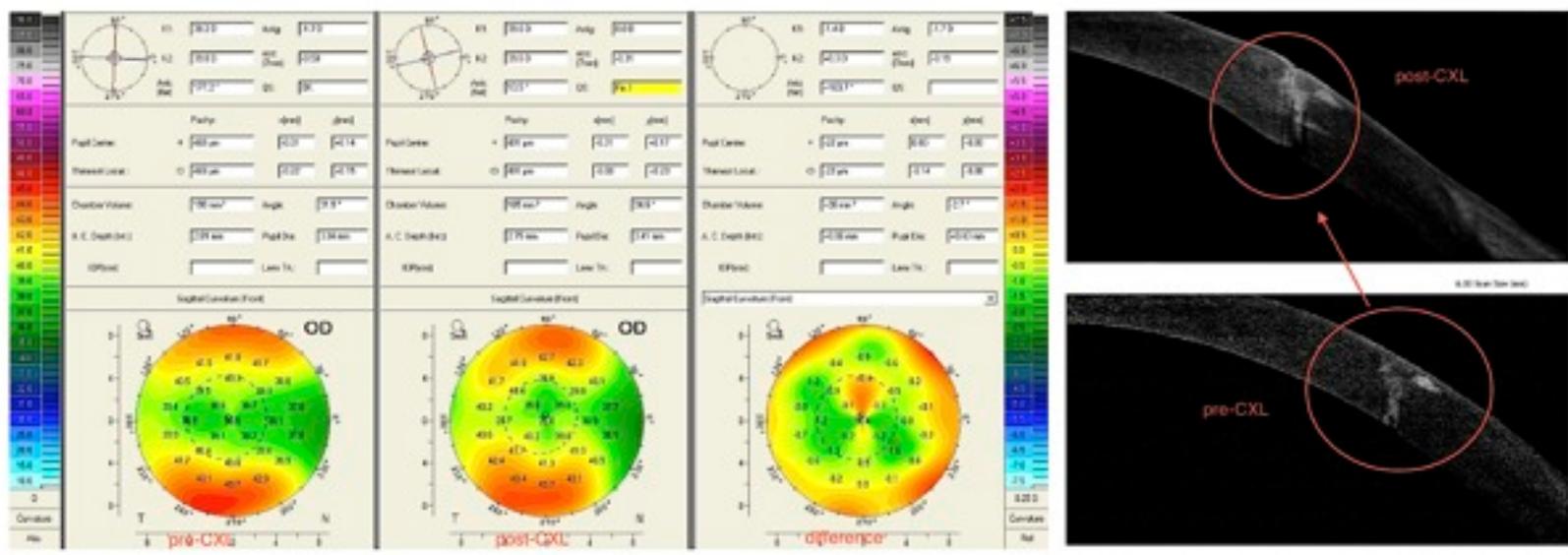
7. High-Frequency Ultrasound 10th
 8. Pupilometry Corneal Shift Studies 10th
 *Group A will be discussing 3D video symposium, group B will do so on-site for the first half and then rotate on each activity. In the wetlab course, each participant will use and master the equipment to capture, analyze and make a diagnosis analysis file.

- Course Faculty**
- A. John Kanellopoulos, MD, Athens, Greece & New York, NY, USA
 a Novel CXI application
 a Novel Femto application
 a Novel Imaging application
 - George Asimellis, PhD, Athens, Greece
 Corneal Imaging principles
 - Ioannis Adamidis, MD, Iraklio, Crete, Greece
 Epithelial Corneal Imaging
 - Ioannis Datsinis, MD, Athens, Greece
 Melodic Imaging in anterior segment surgery
 - Konstantinos Karalabas, MD, Athens, Greece
 Dry eye principles, Imaging and management
 - David Harman, MD, Reumarkt, Germany
 The Galgala LASIK Wave experience
 - Yvonne Kozianka, MD, Alexandria, Egypt
 Biomechanical contribution to CXL-ORA
 - Ronald R. Krueger, MD, Cleveland, Ohio, USA
 Customized Ablation and CXL (Athens Protocol)
 - Bradley I. Sandeman, MD, Atlanta, Georgia, USA
 Correlation of Corneal Imaging to HRT suspect diagnosis
 - Ahmed Sedky, MD, Cairo, Egypt
 Femto keratoplasty
 - Theo Seiler, MD, Zurich, Switzerland
 Femtosecond laser assisted GALK and PK
 - Rohit Shetty, MD, Bangalore, India
 OCT intra operative imaging in anterior segment surgery
 - Pavel Stodulka, MD, Prague, Czech Republic
 Femto / Nano second laser cataract surgery
 - Thomas J. T.F. Van den Berg, PhD, Amsterdam, The Netherlands
 Scatter measurements and clinical consideration in visual functions

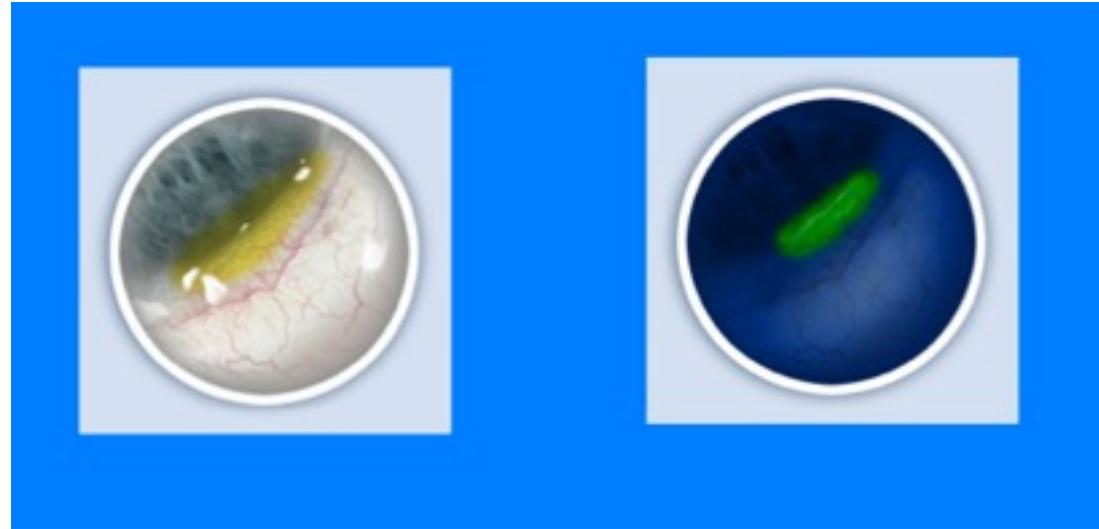
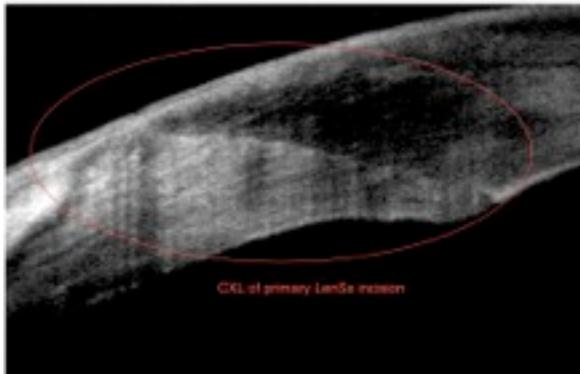
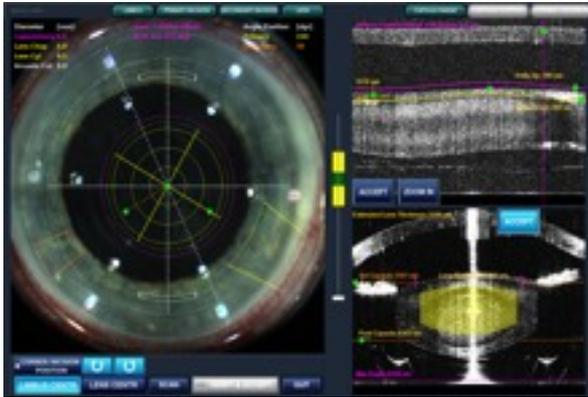


Kanellopoulos, MD

- 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

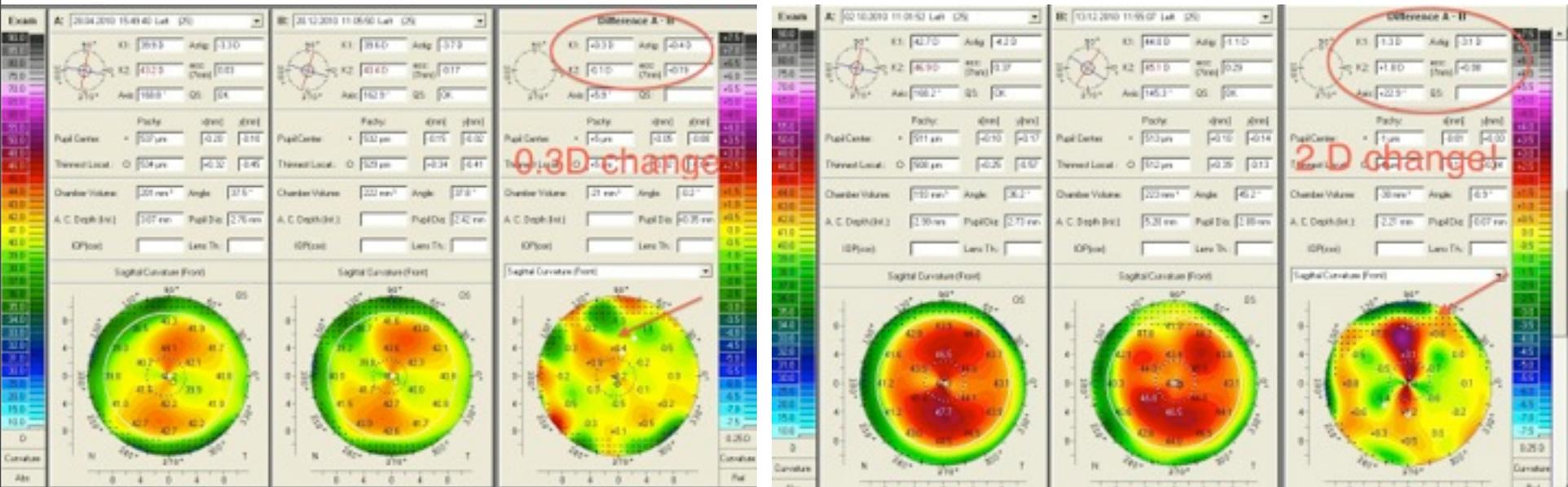


Bilateral Cataract surgery patients one eye randomized to flash CXL:



flashCXL of clear cornea cataract incisions!

Kanellopoulos 2012



Control

Flash CXL





Thank you Dave and Artie!



KXL II:

customised CXL treatments, a new era



New York University
School of Medicine

Kanellopoulos, MD

LaserVision.gr
Institute for laser



Methods

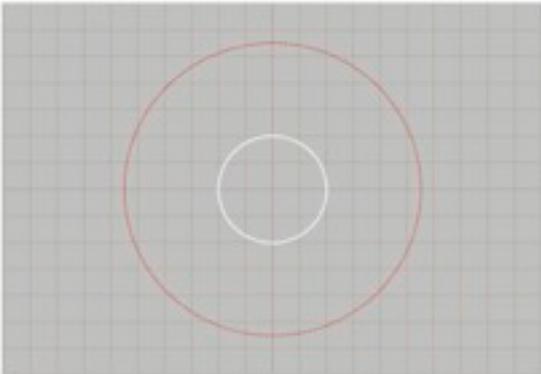
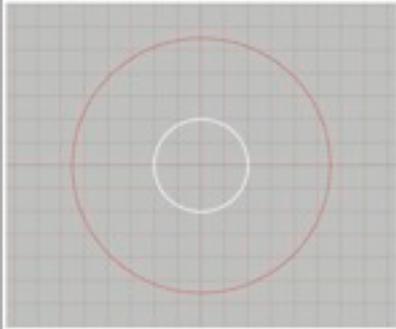
We treated 30 consecutive cases of partially sighted eyes with 5 different treatment patterns:

- Transepithelial myopic pattern+O₂ puls
- Myopic pattern following a 5mm OZ PTK of 50 um
- Transepithelial toric pattern+O₂ puls
- Transepithelial customised topography-guided pattern+O₂ puls
- Hyperopic pattern, after donut-like PTK (30um 6-9mm oz)



Myopic profile central 4mm OZ transepi

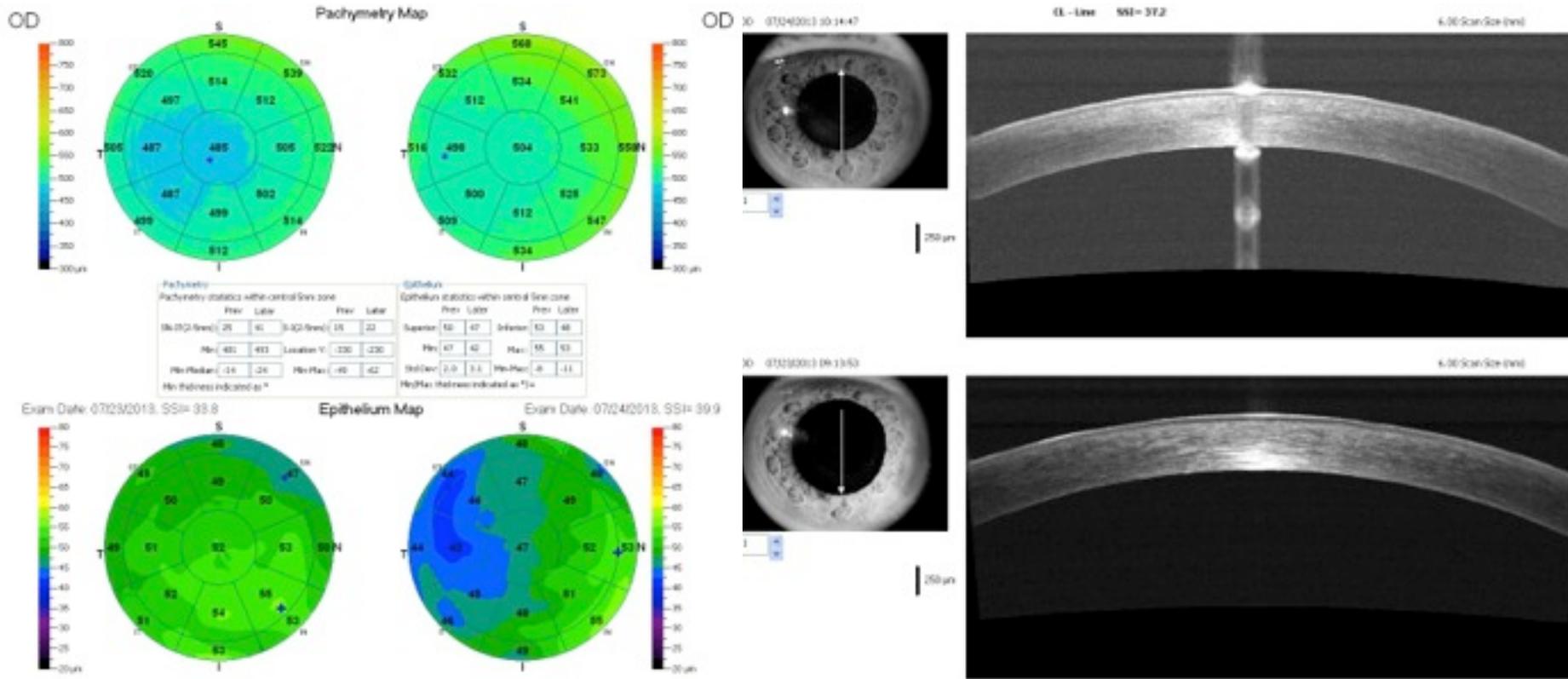
4min Paracel+6min VibexXtra

KXL2 - Treatment Report Patient: XXXXXXXXXX ID: 001817 D.O.B: 16-Aug-1944		Notes:	 The World Leader in Central Cross-Linking Science																																																																																																															
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<table border="1"> <thead> <tr> <th>No.</th> <th>Shape Type</th> <th>Time (min:sec)</th> <th>Total Energy (J/cm²)</th> <th>X Position (mm)</th> <th>Y Position (mm)</th> <th>Axis (deg)</th> <th>Dim. 1 (mm)</th> <th>Dim. 2 (mm)</th> <th>Arc (deg)</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Circle</td> <td>4:11</td> <td>11.3</td> <td>0.0</td> <td>-0.0</td> <td></td> <td>4.0</td> <td></td> <td></td> </tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table>		No.	Shape Type	Time (min:sec)	Total Energy (J/cm²)	X Position (mm)	Y Position (mm)	Axis (deg)	Dim. 1 (mm)	Dim. 2 (mm)	Arc (deg)	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):		
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1	Circle	4:11	11.3	0.0	-0.0		4.0																																																																																																											
Treatment Power: 45 mw/cm² - Continuous.		Additional Notes																																																																																																																
		Version: 1.0.7.0 Copyright © 2013 Avedro, Inc.																																																																																																																



Myopic profile central 4mm OZ transepi

4min Paracel+6min VibexXtra

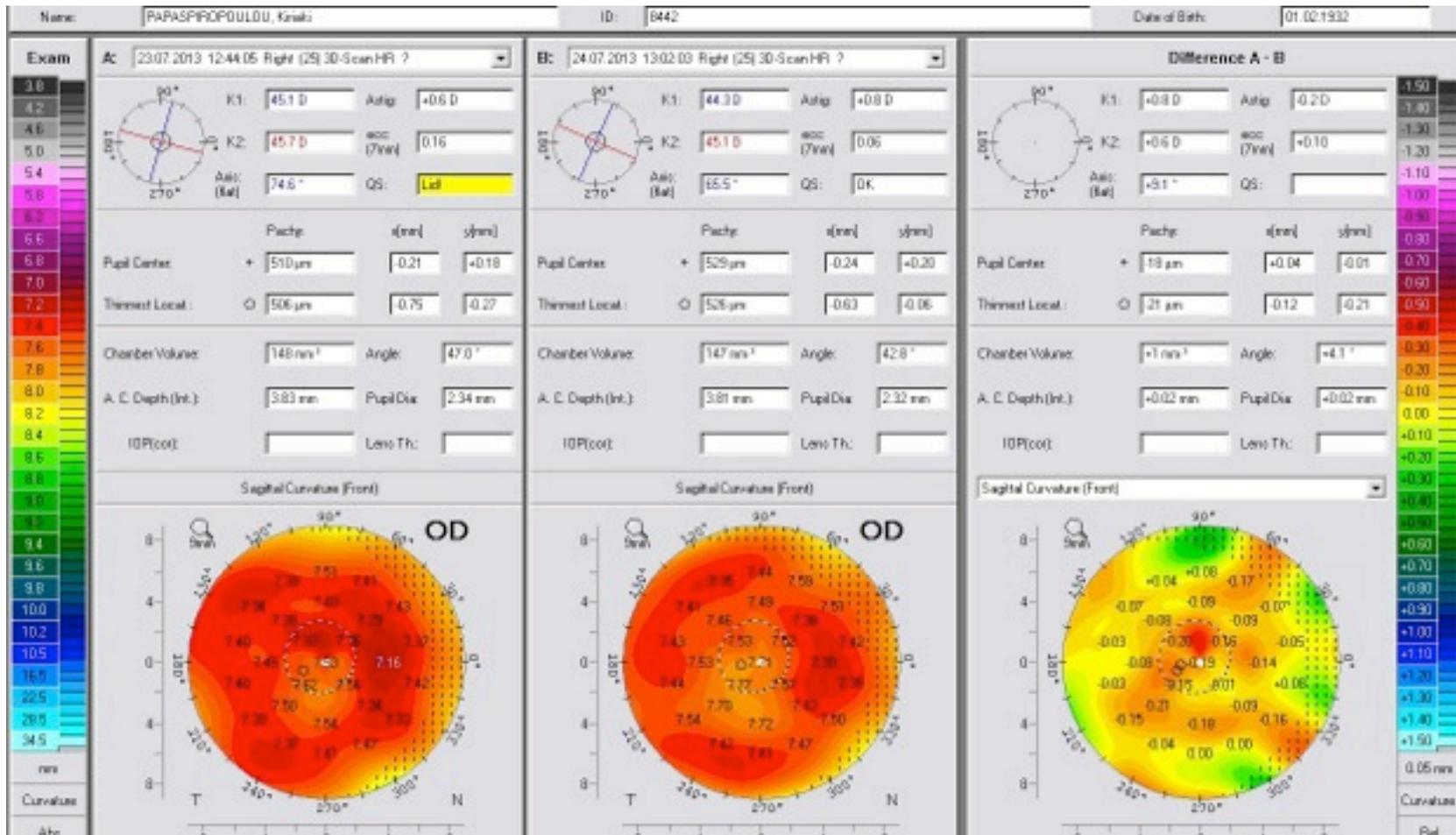


Case 1



Myopic profile central 4mm OZ transepi

4min Paracel+6min VibexXtra

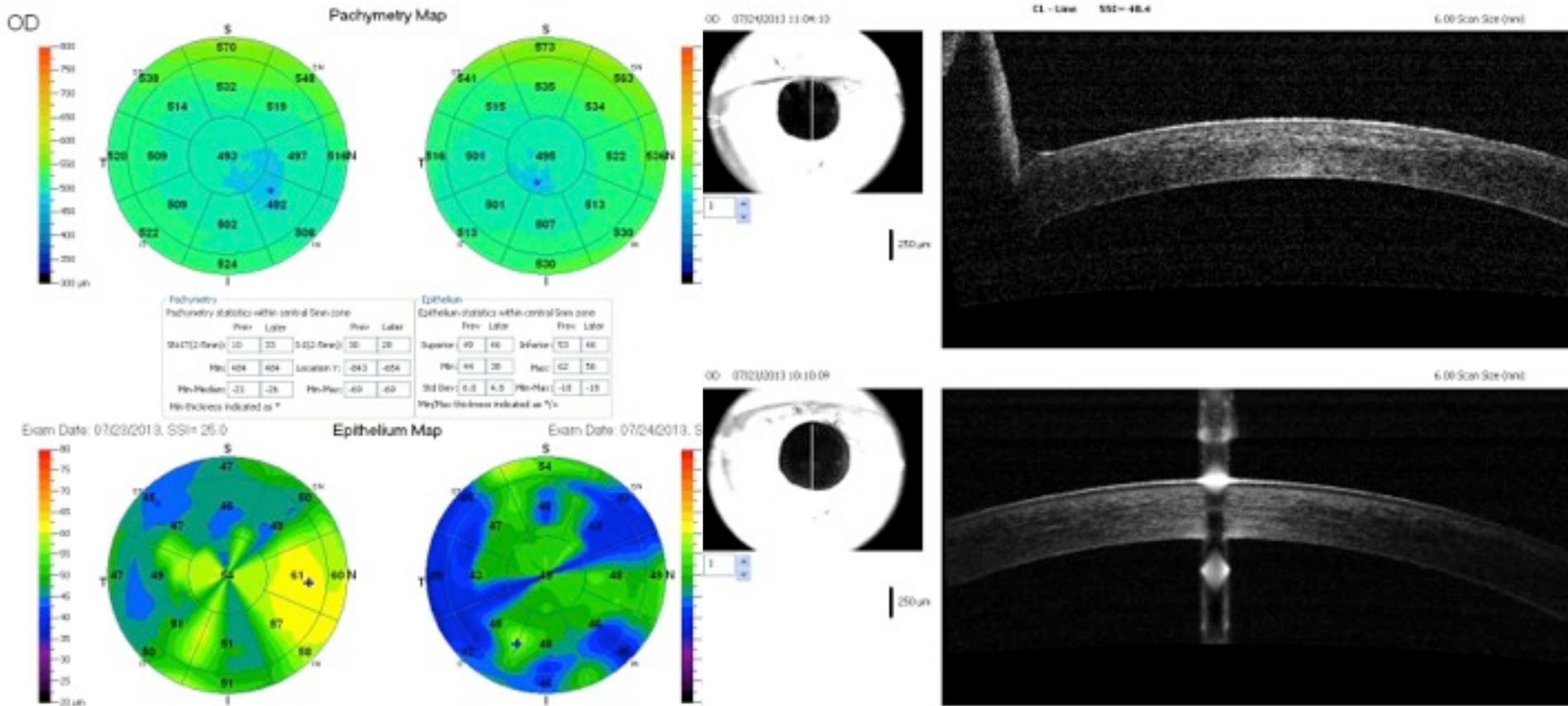


Case 2



Myopic profile central 4mm OZ transepi

4min Paracel+6min VibexXtra



Case 2

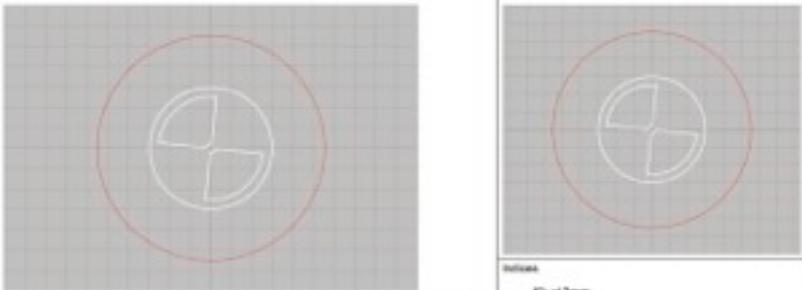


Toric profile-transepi: 4min Paracel+6min VibexXtra

AKLJ - Treatment Report

Patient: **XXXXXXXXXXXX**
 ID: **019608**
 DOB: **23-Jul-1976**

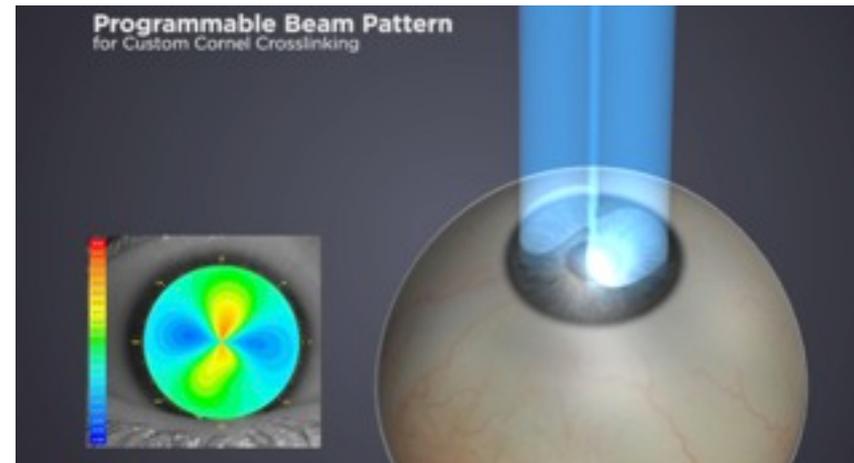
OS Exam Date: **23-Jul-2013 19:08:36**



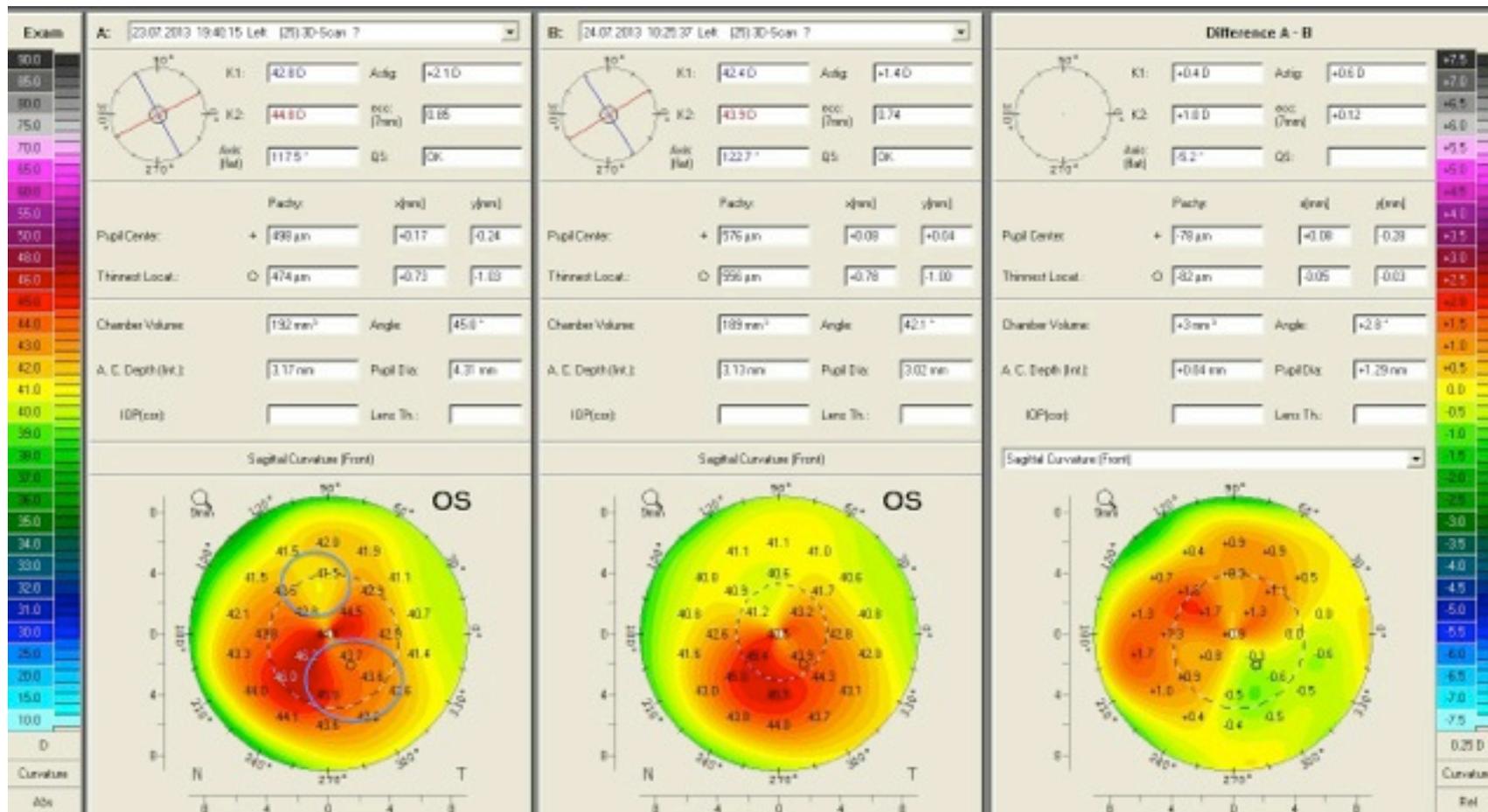
No.	Wave Type	Time (sec)	Total Energy (mJ)	X Position (mm)	Y Position (mm)	Axis (deg)	Scan 1 (mm)	Scan 2 (mm)	Avg Depth (mm)
1	Axial	19:20	18.8	0.0	-0.0	120	5.0	2.0	30
2	Circ	2:50	4.8	-0.0	-0.0	-0.0			

Treatment Power: 45 mW/cm² - Pulse On: 1.0 s, Pulse Off: 1.0 s.

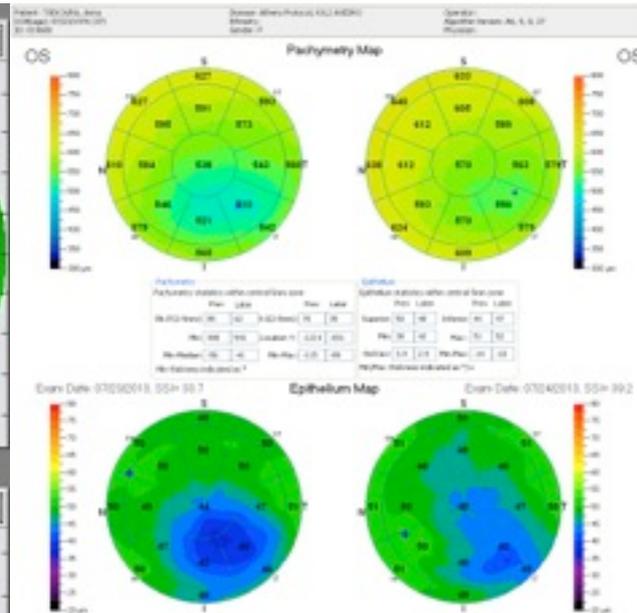
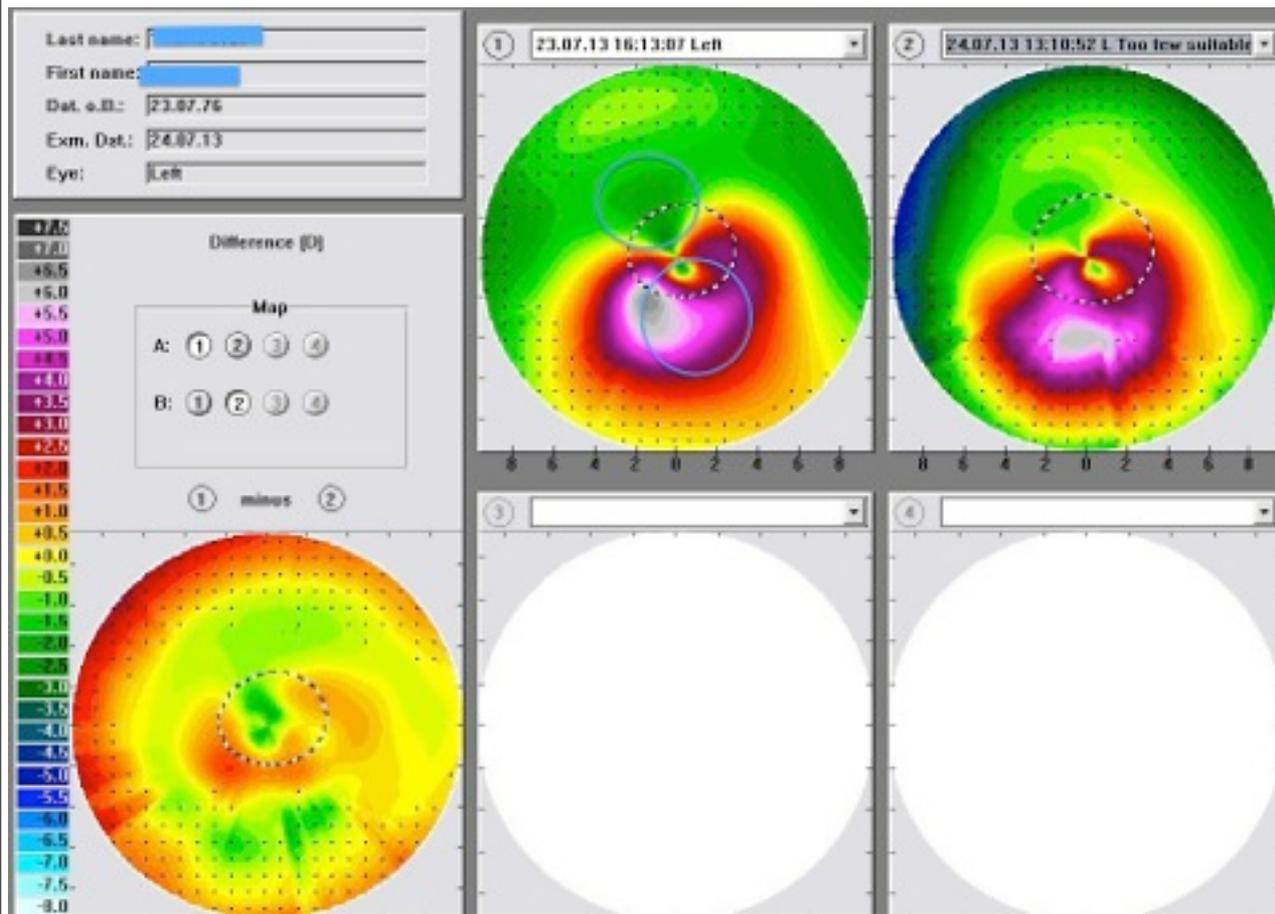
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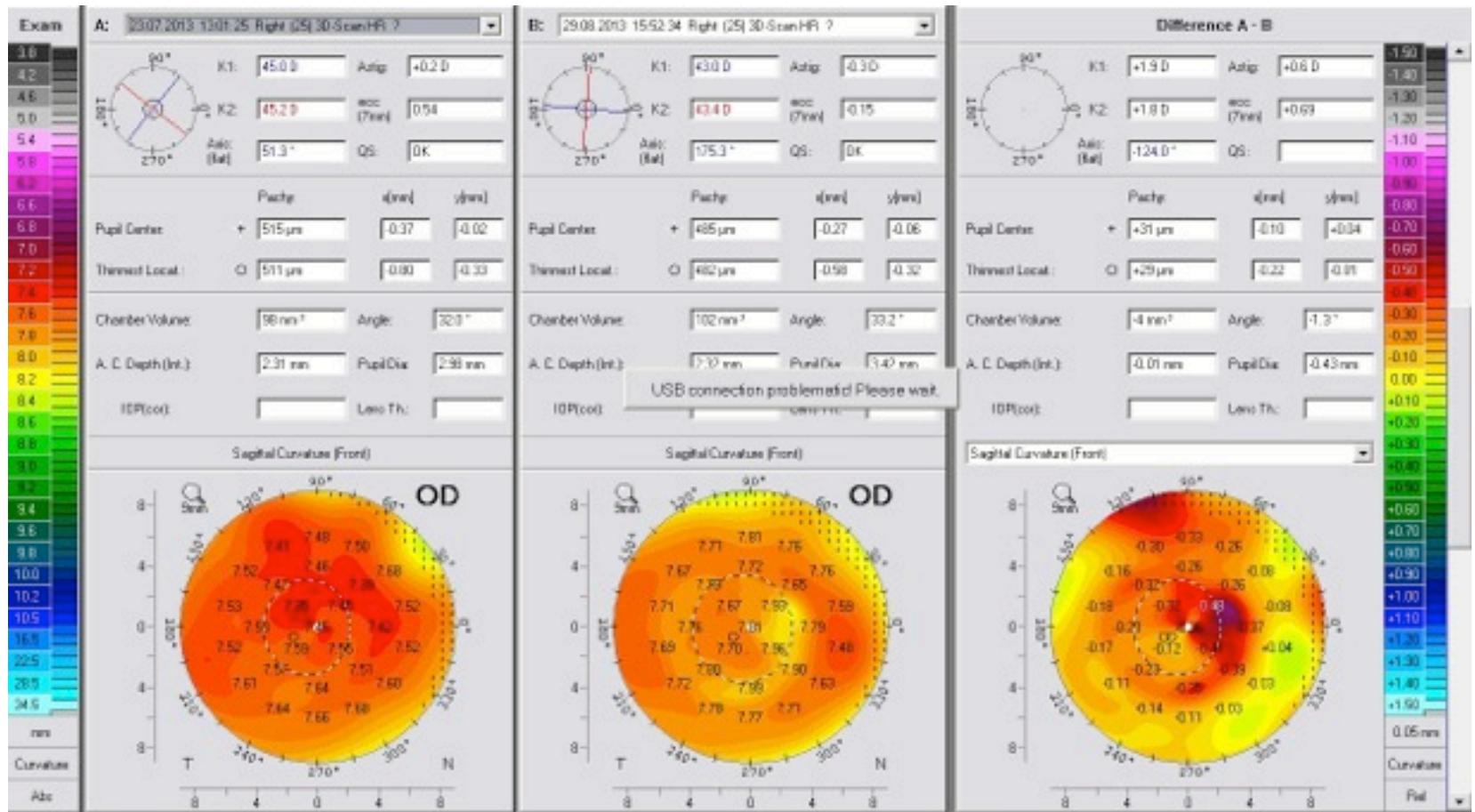
Toric PiXL!



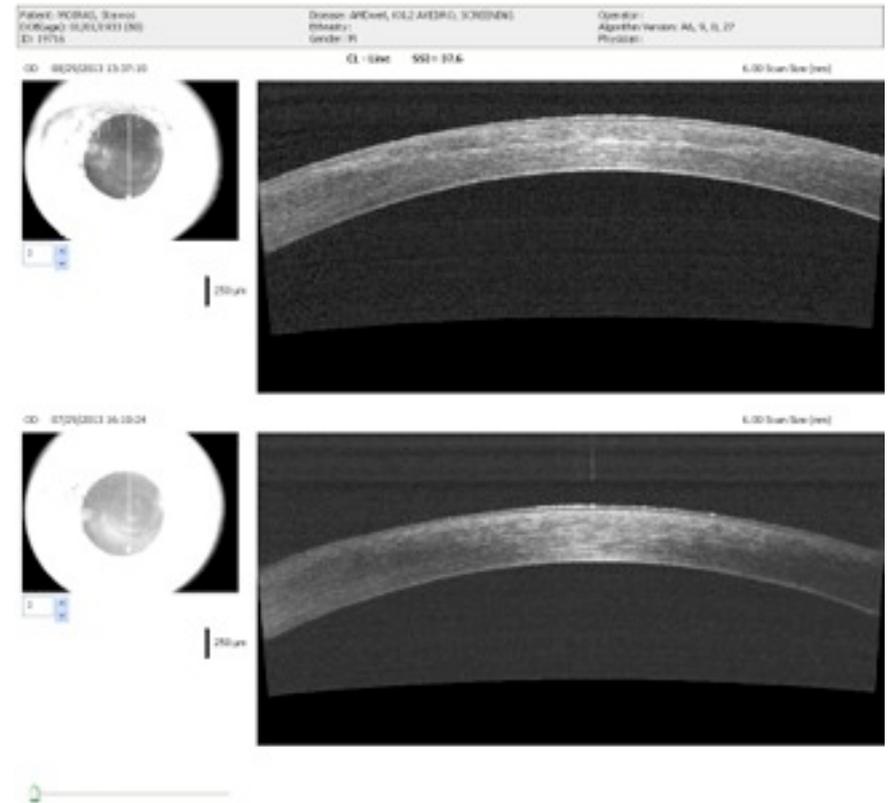
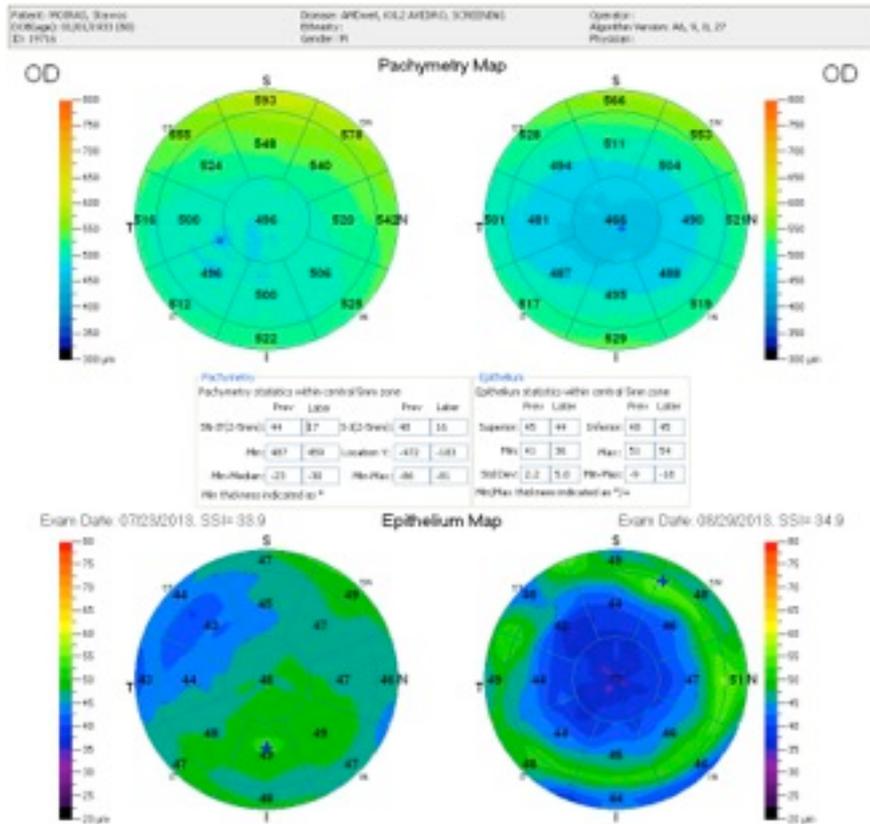
Toric PiXL!



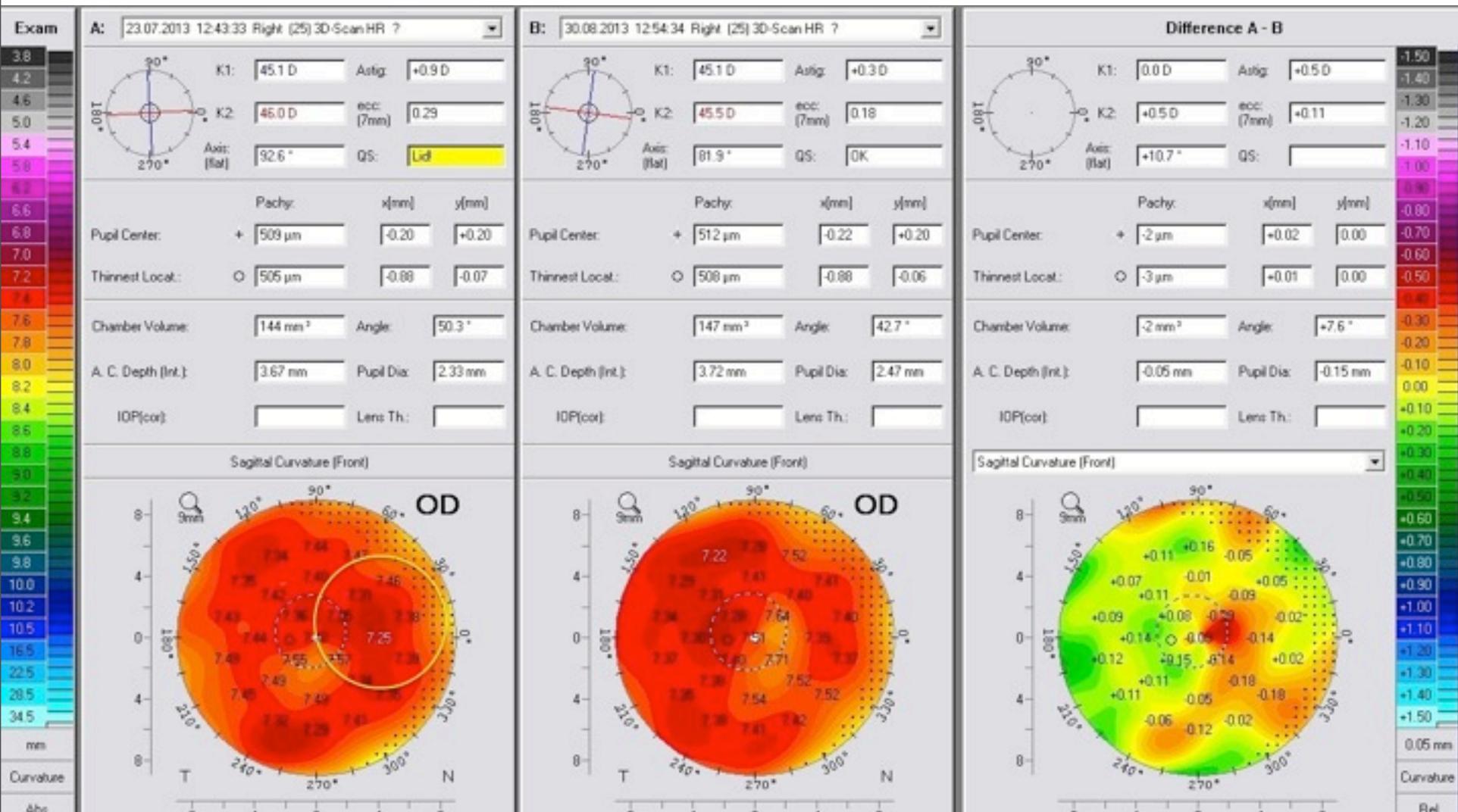
6 weeks myopic treatments 4D flattening



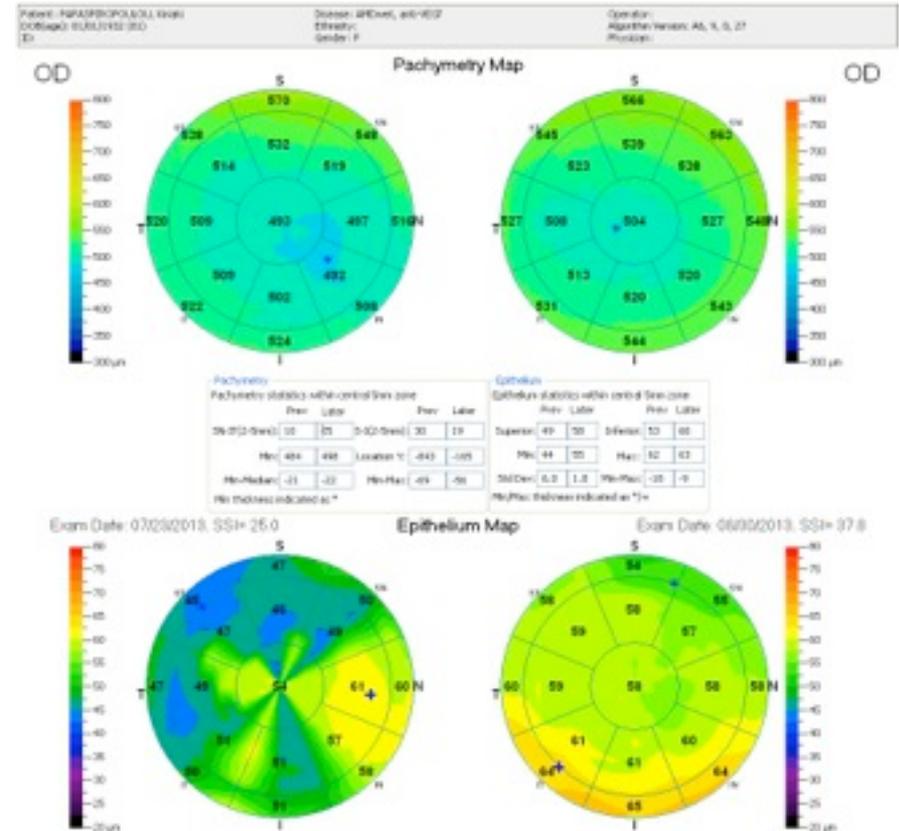
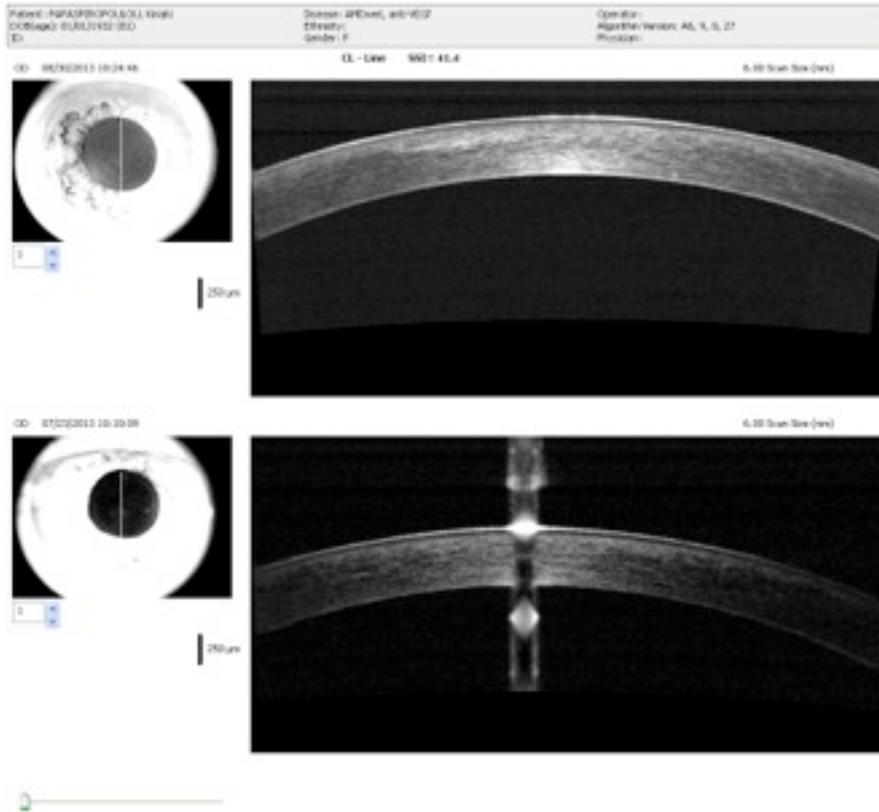
6week PTK + myopic treatments



Irregular astigmatism treatments



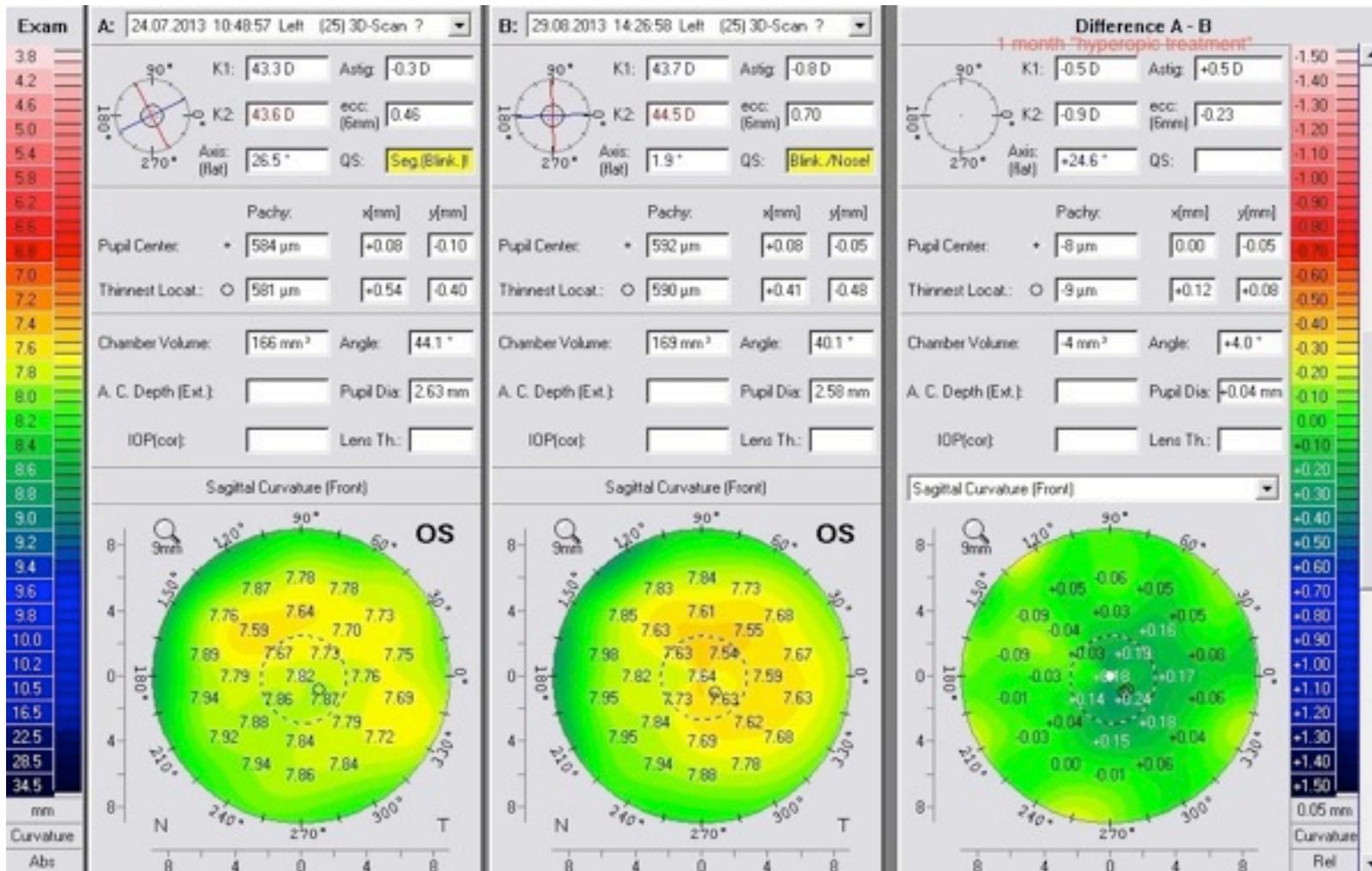
Irregular astigmatism treatments



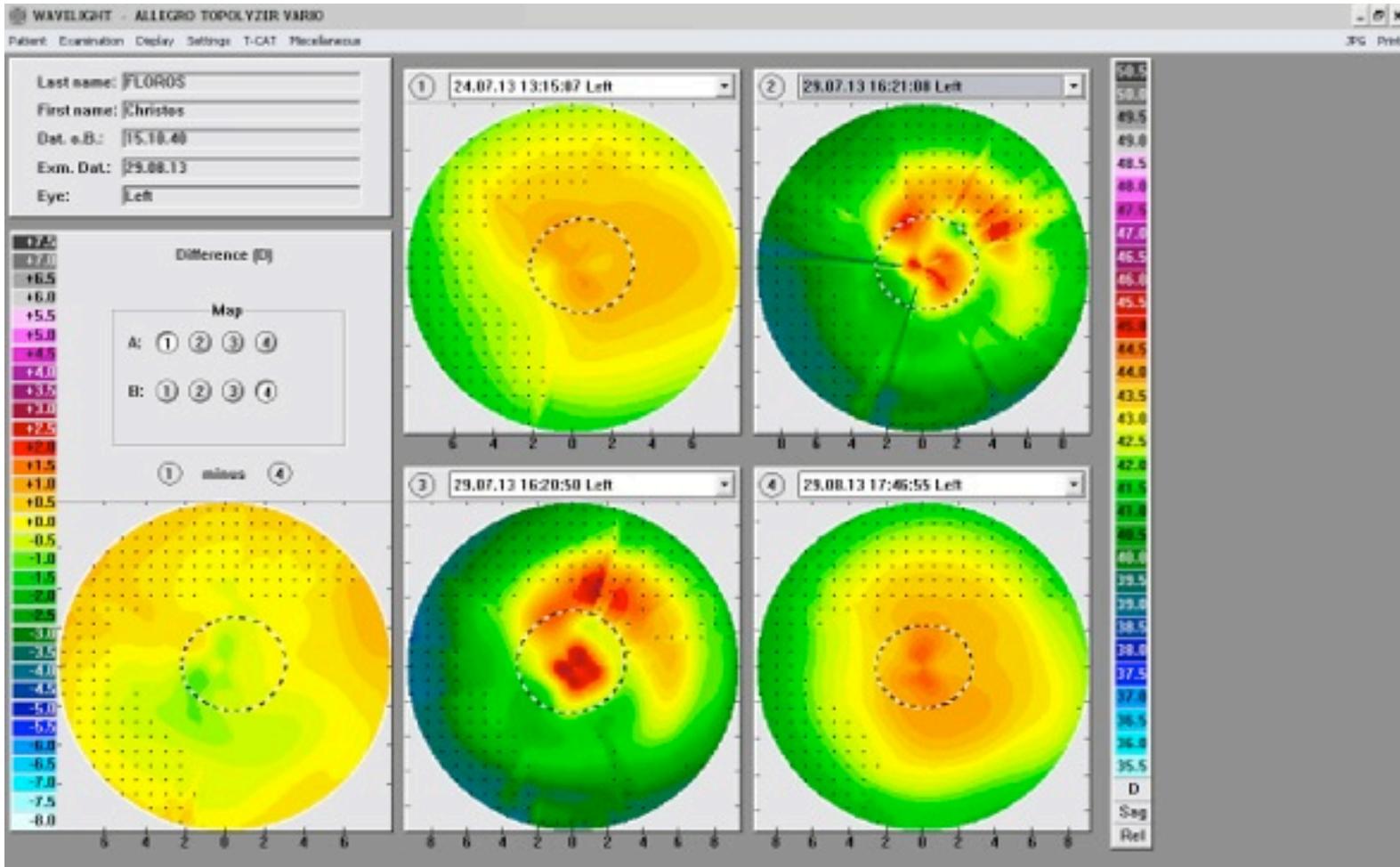
“profile Hyperopic” oz 6-9mm
 “hyperopic PTK” 6-9oz 30 microns



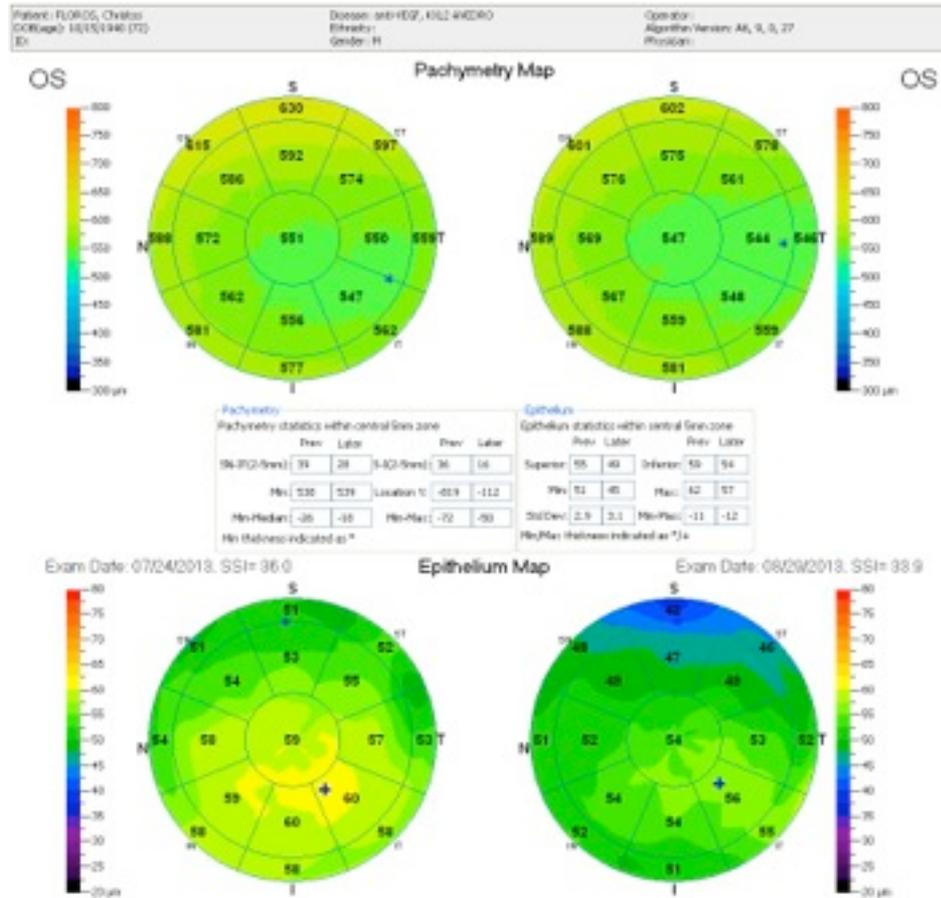
6 weeks hyperopic (presby) 3 D refractiev change



6 weeks hyperopic (presby)



6 weeks hyperopic (presby) epithelial response



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



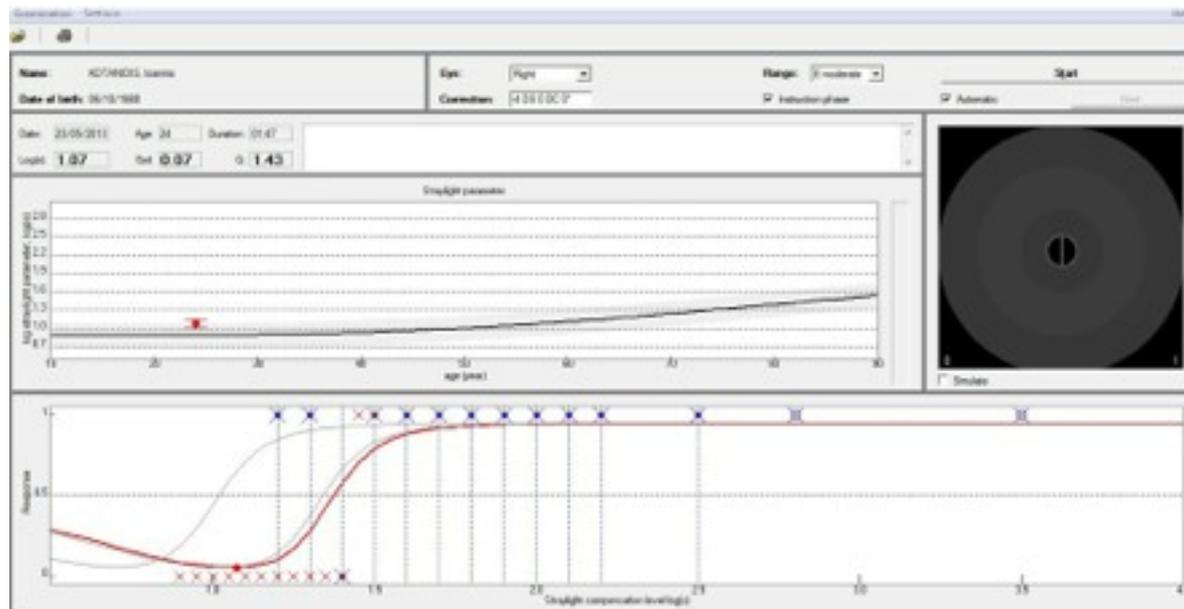
Conclusions

- 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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3D Athens Course



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08:30 - 09:00	WELCOME & INTRODUCTION	2. Poling/OCT Pumping 20 th
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1. Femto Refractive Surgery 20 th ultra applications 20 th & Discussion 2 nd	4. Refractive CW, Healy Laser Technology KMG 20 th 20 th	4. Refractive CW, Healy Laser Technology KMG 20 th 20 th
2. Femto Transplantation surgery applications 20 th - 20 th Surgery-ultra application 20 th	5. LASIK like (single and topological) 20 th	5. LASIK like (single and topological) 20 th
3. Femto Cataract surgery 20 th ultra applications 20 th & Discussion 2 nd	6. Use of the new Foco 45, Orbscan in CW, seeds 20 th	6. Use of the new Foco 45, Orbscan in CW, seeds 20 th
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6. Combined Femto / Femto Cataract surgery 20 th - 20 th Surgery ultra application 20 th		
12:30 - 13:30	LUNCH	
13:30 - 14:30	NETFLUX IN CORNEAL WOUNDING (GROUP 4 & 5)*	7. Schlemm ring imaging Perforator 20 th
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		8. Phacolytic and UG MEMRY Topography 20 th
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		9. Interferometric Perfluorimetry & Topography 20 th
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		10. Scatter measurement device 20 th (Quanta) 20 th
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- 7. High-Frequency Ultrasound 20th
 - 8. Fluorimetry Contact Lens Studies 20th
- *Group 4 will be discussing 20th ultra application, group 5 will be working for the first half and then make a small entry in the middle course, each participant will use our course the equipment to capture, analyze and make a diagnosis and plan the best.

Course Faculty

A. John Kanellopoulos, MD, Athens, Greece & New York, NY, USA

- 1. Novel CW application
- 1. Novel Femto application
- 1. Novel Imaging application

George Armiou, PhD, Athens, Greece

Corneal Imaging principles

Ioannis Avramidis, MD, Ioannina, Greece

Katharina Coroneo, MD, Athens, Greece

Ioannis Datsis, MD, Athens, Greece

Ultrasound imaging in anterior segment surgery

Konstantinos Karathanas, MD, Athens, Greece

Dry eye principles, imaging and compensation

Christoph Krumholz, MD, Neurmarkt, Germany

The College LASIK Wound experience

Yoshitomo Kuroki, MD, Akashi, Japan

Microkeratome contribution to CW LASIK

Ronald K. Krueger, MD, Cleveland, Ohio, USA

Customized Ablation and CW (Athens Protocol)

Bradley L. Kramida, MD, Atlanta, Georgia, USA

Contribution of femto imaging in IOLs - expert diagnosis

Almond Lofsky, MD, Cairo, Egypt

Healy Transplants

Theris Lofsky, MD, Zurich, Switzerland

Postoperative laser assisted SMILE and PM

Rishi Mehta, MD, Bangalore, India

OCT intra-operative imaging in anterior segment surgery

Pavel Orlovsky, MD, Prague, Czech Republic

Patrick P. Orlovsky, MD, Prague, Czech Republic

Thomas J. P. van den Berg, PhD, Amsterdam, The Netherlands

Scatter measurements and clinical correlation in visual function

Thank you!



Kanellopoulos Eye Center
Specialized Diagnosis and Surgery

