

Lasik Xtra in Hyperopia

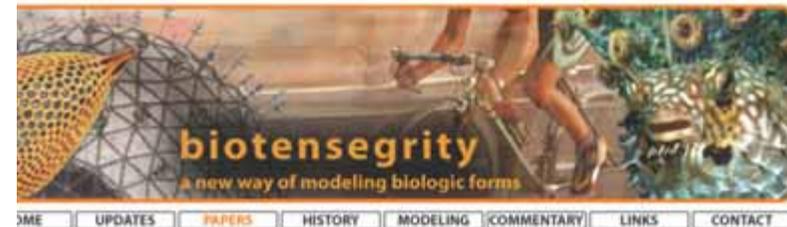
AK Xtra Clear cornea cataract surgery Xtra

A. John Kanellopoulos, M.D.

Clinical Professor of Ophthalmology
New York University School of Medicine,
New York, NY, USA

Laservision.gr Institute, Athens, Greece

consultant for Alcon, Wavelight, Ocular Therapeutix, Bausch and Lomb, and Avedro.



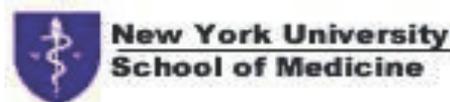
Continuous Tension, Discontinuous Compression: A Model for Biomechanical Support of the Body

The following is the text of an address made before the North American Academy of Manipulative Medicine in 1980. Since then, refined and upgraded editions have been presented to the following: Medical College of Virginia, Anatomy Department of Howard University, The Paleontology Society of the Smithsonian Institution, the Alliance for Engineering in Biology and Medicine (fall, 1981), International Society for the Study of the Lumbar Spine in Toronto June, 1982. [Reprinted from The Bulletin of Structural Integration, Vol. 8, No. 1: Spring-Summer 1982] and numerous other venues.

It is only in recent history when we have developed newer materials that we have recognized that tension forces can play a significant role in the integrity of structures. However, engineers use tension mainly as a support system for compression loads. In humans, McNab, Farfan, White and others recognize that tensional components of muscles and ligaments probably play a role in spinal support, but only Kirkby and Robbie felt that at times tension may be the major support force of the spine. Robbie, however, still believes that the spinal column is capable of functioning only as a "stack of blocks" and Kirkby feels that only when the body is properly "balanced" in the gravitational field does tension function as the major support.

It is the author's contention that only in failure does the spinal column function as a "stack of blocks." The support system of the spine, and indeed the remainder of the body as well, is a function of continuous tension, discontinuous compression, so that the skeleton, rather than being a frame of support to which the muscles and ligaments and tendons attach, has to be considered as compression components suspended within a continuous tension network.

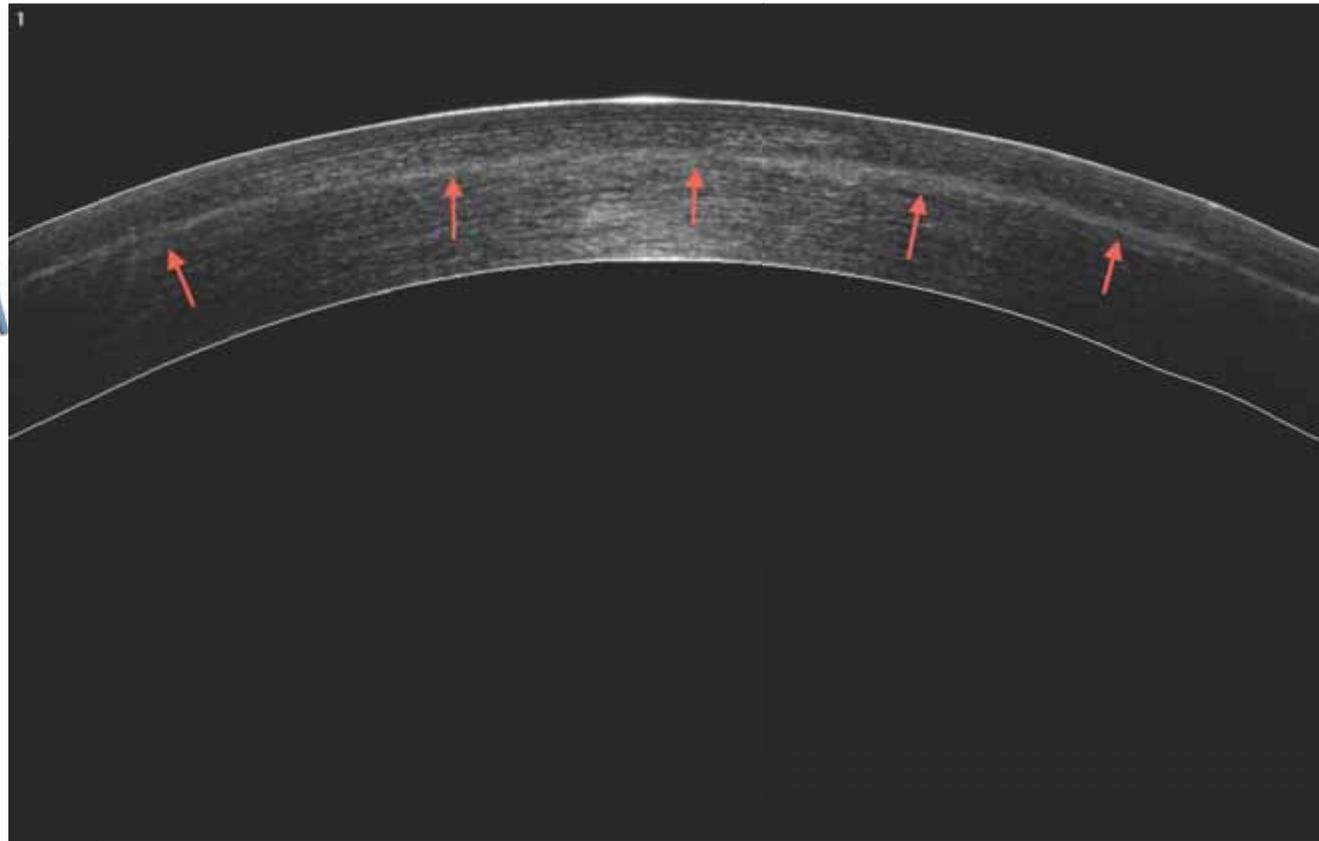
Since the spine is a mechanical structure, investigators have used mechanical models to attempt to



Kanellopoulos,MD



CXL evidence in Hyperopic LASIK Xtra group



AK

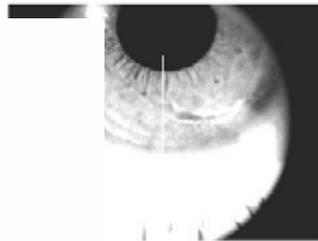


Patient: MPOVI, Anna
DOB(age): 01/01/1976 (36)
ID:
Disease: AK, CL, LASIK MK
Ethnicity:
Gender: F
Operator:
Algorithm Version: A6, 9, 0, 27
Physician:

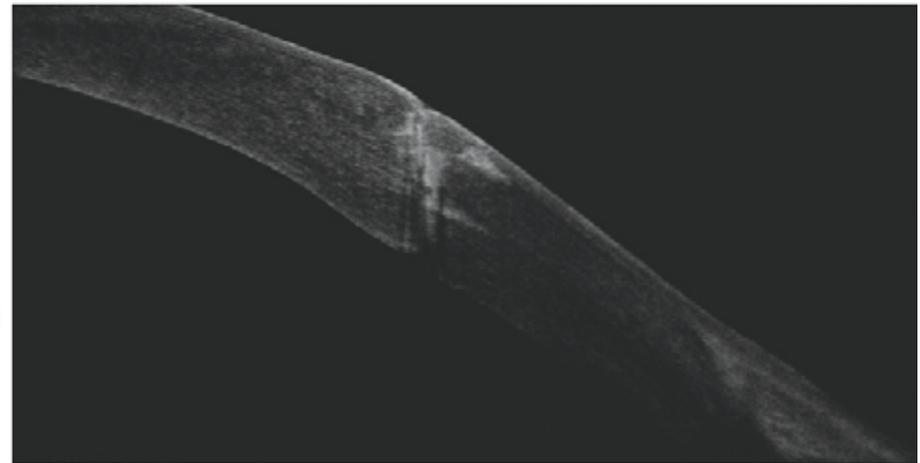
OD 12/05/2012 19:31:39

CL - Line 551= 24.6

6.00 Scan Size (mm)



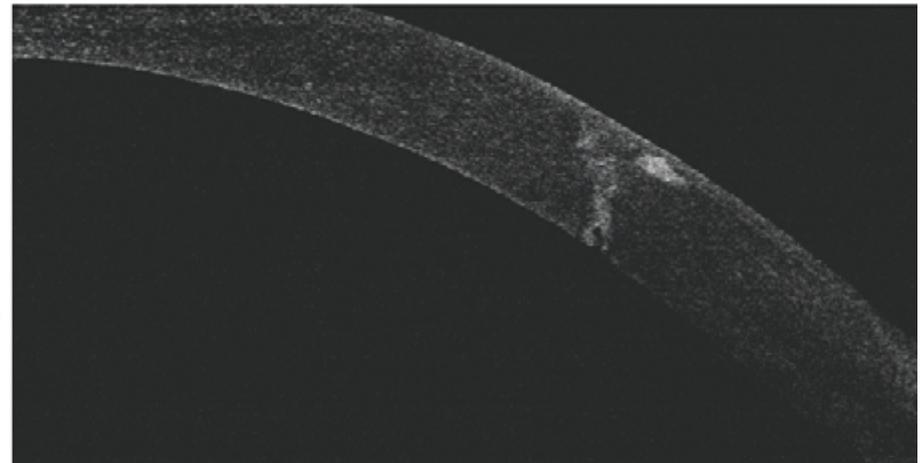
250 μm

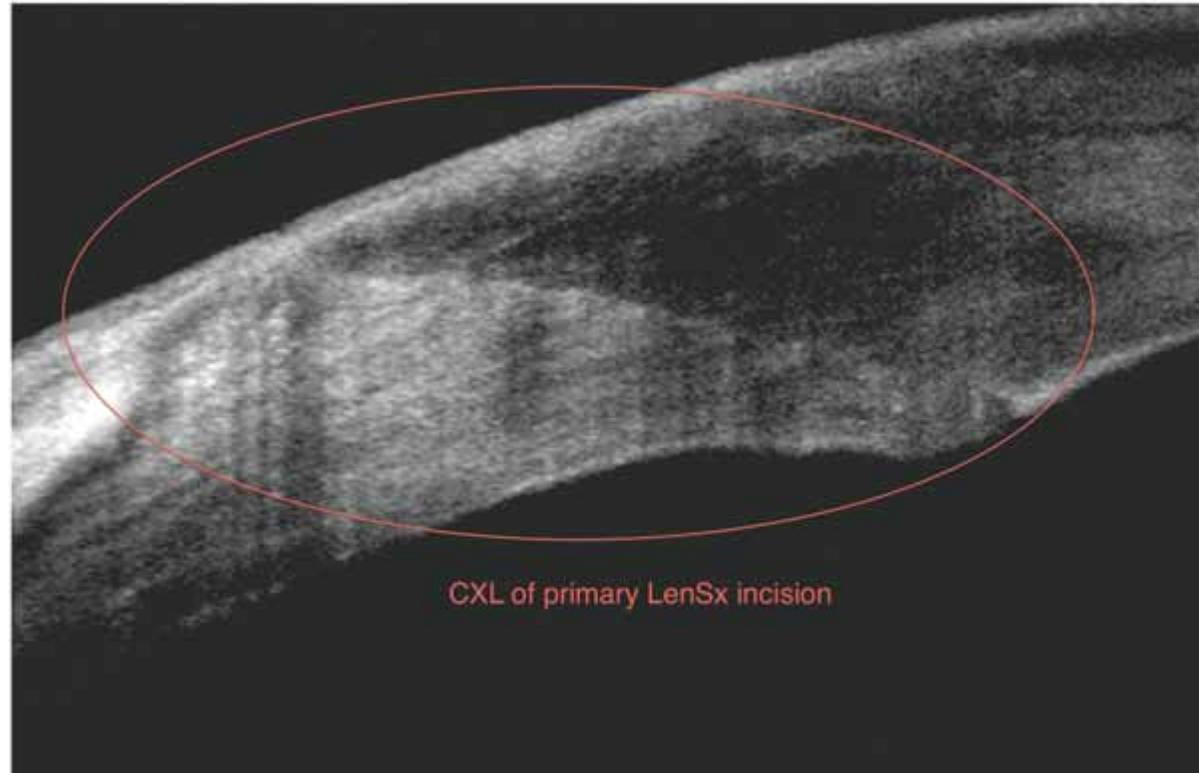


12 13:21:44

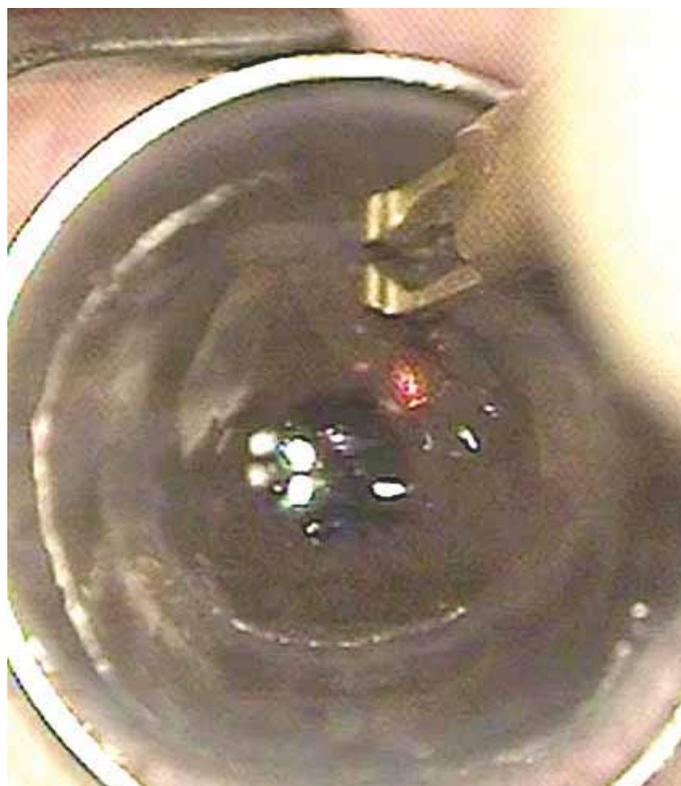


250 μm





past



future



Ultraviolet A cornea collagen cross-linking, as a pre-treatment for surface excimer ablation in the management of keratoconus and post-LASIK ectasia

1st CCL Meeting Zurich Dec, 2005



A. John Kanellopoulos, MD

Clinical Associate Professor NYU Medical School

Director, Laservision.gr Institute, Athens, Greece

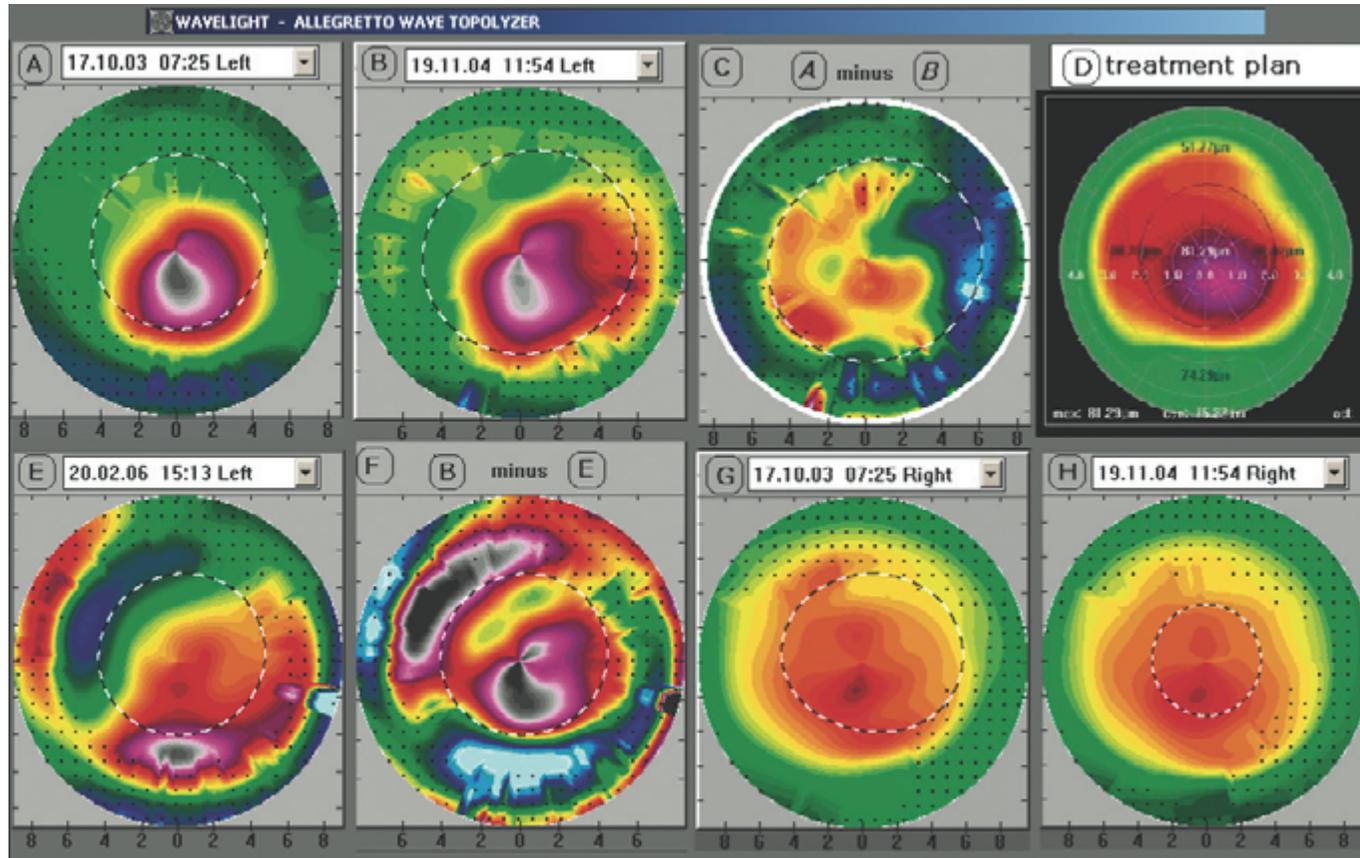


Kanellopoulos, MD



Over the last 7 years we have treated over 800 cases of KCN and ectasia with CXL

J Cornea
August
2007



CASE REPORT

Collagen Cross-Linking (CXL) With Sequential Topography-Guided PRK

A Temporizing Alternative for Keratoconus to Penetrating Keratoplasty

A. John Kanellopoulos, MD^{††} and Perry S. Binder, MS, MD[‡]

Purpose: To assess the effectiveness of ultraviolet A (UVA) irradiation-induced collagen cross-linking (CXL) on keratoconus (KC) progression.

Methods: A patient with bilateral, progressive KC underwent UVA irradiation (180°C for 30 minutes) after topical 0.1% riboflavin drops over a dehydrated cornea. Twelve months later, a topography-guided penetrating keratoplasty (PRK; wave-light 400 Hz Eye-Q excimer) was performed in 1 eye for a refractive error of -3.50 \times -4.00 \times 155 by using an attempted treatment of -2.50 \times -3.00 \times 155 . At all postoperative follow-up visits to 18 months, uncorrected visual acuity (UCVA), best spectacle-corrected visual acuity (BSCVA), pachymetry, and topography were performed.

Results: In the treated left eye, the UCVA after the UVA CXL improved from 20/100 to 20/30, and the BSCVA improved from 20/50 to 20/40. Eighteen months after the topography-guided PRK, the UCVA was 20/20, and the BSCVA was 20/15, with a refractive error of Plano \times -0.50 \times 150 . The cornea was clear, and the endothelial cell count remained unchanged. The untreated right main eye continued to progress during the same period.

Conclusions: The significant clinical improvement and the apparent stability of more than a year after UVA CXL and subsequent PRK compared with the untreated main eye serves to validate this treatment approach for KC. An adjusted nomogram may be considered in the ablation of cross-linked cornea tissue to avoid overcorrections.

Key Words: keratoconus, cornea ectasia, surgical management, collagen cross-linking, ultraviolet A, riboflavin, customized topography-guided cornea ablation, visual rehabilitation
(Cornea 2007;26:891-895)

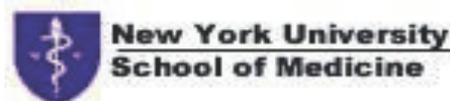
Received for publication June 19, 2006; revision received April 6, 2007; accepted April 12, 2007.
From the [†]LaserVision.gr Institute, Athens, Greece; the [‡]New York University Medical College, New York, NY; the [§]Madame Curie Cancer Institute, Paris, France; the [¶]Harvard Medical School, Boston, MA; the ^{**}University of California, San Diego, CA.
Reprints: A. John Kanellopoulos, LaserVision.gr Institute, 2 Mesogeion Avenue, Athens 11527, Greece (e-mail: laser@laserinstitute.gr).
Copyright © 2007 by Lippincott Williams & Wilkins

Cornea • Volume 26, Number 7, August 2007

891

Copyright © Lippincott Williams & Wilkins. Unauthorized reproduction of this article is prohibited.

CXL followed 6 months later by a partial tPRK



Kanellopoulos, MD



We introduced: Higher fluence CXL: 6 mW/cm²

AAO 2008: CXL for 15 minutes utilizing 7mW/cm² fluence

Shorter duration, higher ultraviolet A irradiation (UVA) fluence collagen cross-linking (CCL) for keratoconus (KCN)
A. John Kanellopoulos, MD
From the New York University School of Medicine, Manhattan Eye, Ear and Throat Hospital, New York, NY, USA
www.laser-vision.gr

Background:
We have presented our experience with the laser cross-linking (CXL) in this study to be conducted from 15 min CXL treatment. With good results for the duration and potentially increase efficacy we decided to study a model of CXL or higher UVA light intensity (7mW/cm² or 7 mW/cm²) and the same fluence 0.1% riboflavin solution photoreactive solution.

Objective: To evaluate the safety and efficacy of higher UVA fluence and shorter duration for collagen cross-linking in KCN.

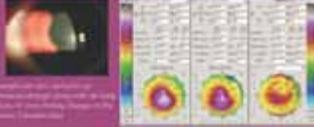
Design: Prospective randomized comparative case series.

Methods: 11 patients with bilateral keratoconus had unilateral CXL treatment evaluated for UCVA, BCVA, refractive keratometry changes (K), topographic changes, corneal thickness and average keratic astigmatism (KVA) with respect to the median keratic astigmatism and compared to UVA fluence was randomized for each patient. 11 eyes were CXL with 7mW/cm² for 15 minutes and the 11 eyes were CXL with 3mW/cm² for 30 minutes.

Results:
The mean improvement of UCVA was 82 to 114. BCVA improved from 0.4 to 1.0.
The average change of spherical equivalent was 1.9D reduction in myopia, the average change in cylinder was 1.1D reduction. The average highest keratic astigmatism was 11.20D pre-op and changed to 49.7D post-op. There was no statistical difference in the outcome in the 2 groups.

Conclusion:
Shorter duration, higher UVA fluence CCL appears to be as safe and as effective as traditional of patients in KCN.
If long-term low post-treatment due to lower corneal deformation (but more and shorter exposure of keratocytes and endothelial cells to UV light strong with riboflavin). Further studies are needed to evaluate this data.

	UCVA	BCVA	SE (D)	Cylinder (D)	KVA (D)	Top. Keratometry (D)	Corneal Thickness (µm)	Average Keratic Astigmatism (D)
Pre-op	0.2	0.3	1.5D	2.2D	100	2.3	0	
Post-op	0.2	0.3	1.4D	2D	200	2.1	0	



Long term results of a prospective randomized bilateral eye comparison trial of higher fluence, shorter duration ultraviolet A radiation, and riboflavin collagen cross linking for progressive keratoconus

This article was published in the following Dove Press journal:
Clinical Ophthalmology
14 January 2013
Number of views this article has been viewed

Anastasiou John
Kanellopoulos^{1,2}

¹LaserVision.gr Institute, Athens, Greece; ²Manhattan Eye, Ear and Throat Hospital, New York, NY, New York University Medical School, New York, NY, USA

Purpose: To evaluate the safety and efficacy of higher fluence cornea collagen cross linking (CXL).

Methods: Twenty-one patients with bilateral keratoconus had randomized CXL in one eye (group A) with 7 mW/cm² for 15 minutes; the other eye (group B) had the standard 3 mW/cm² for 30 minutes. 70 sec PTK with the Eye-Q 400 (E-Fraction laser (Wavelength, Erlangen, Germany)) was used for epithelial removal. The patients were evaluated postoperatively at the following intervals: day 1, day 4, month 1, month 3, and then every 6 months.

Results: For groups A and B respectively, in mean values, uncorrected distance visual acuity (UDVA) improved from 20/40 to 20/30, and 20/40 to 20/40; best corrected visual acuity (BCVA) from 20/30 to 20/25 in both groups, mean sphere was reduced by 2.7 and 2.5 diopters, mean cylinder was reduced by 2.4 and 2.3 diopters on average; spherical K was reduced from 49.5 to 46.1, and from 48.7 to 43.8 diopters. There was no ectasia progression in any of the eyes during the follow-up time studied. There was no change in the endothelial cell count. All patients returned to full activities postoperatively within a month. Four cases from group A and five cases from group B had delayed epithelial healing (completed by postoperative day 6). No other adverse effects were noted in any of the cases studied. Mean follow-up was 46 months (18–56). Corneal optical coherence tomography (OCT) revealed diffuse light scattered in anterior third of the cornea stroma, which was more intense and much broader in diameter in group A than in group B.

Conclusion: This novel technique offers similar clinical results in cornea stabilization without any adverse effects noted.

Keywords: cornea collagen cross linking (CXL); ectasia management; keratoconus management; higher fluence ultraviolet light

Introduction

The management of keratoconus (KCN) with collagen cross linking (CXL) utilizing UV irradiation and simultaneous topical riboflavin administration, has been studied at length. This has taken place both in laboratory work as well as clinical work,^{1–10} and received the CE mark of approval, in December 2000, for clinical use in countries in the European Union. The standard technique described by Wollensak et al involves partial or complete central epithelial removal, followed by topical administration of riboflavin 0.1% solution in order to achieve intra-stromal penetration.¹

Correspondence: Anastasiou John
Kanellopoulos
LaserVision.gr Institute, 177 Thessaly
Street, 11521 Athens, Greece
Tel: +30 210 7472777
Fax: +30 210 7472788
Email: jk@laser-vision.com



The Athens Protocol 4 steps:

same day PTK > topoPRK > MMC > CXL (10mW/cm² x 10 min)

1- PTK

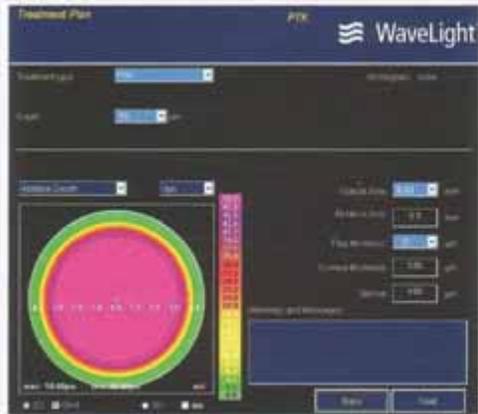


Figure 4.1: Epithelium removed with 50 micron PTK



Figure 4.3: Topography-guided PRK to correct part of the refractive error (TCAT treatment plan) maximal thickness removal 50 microns

4-: CXL



2- topo-guided PRK

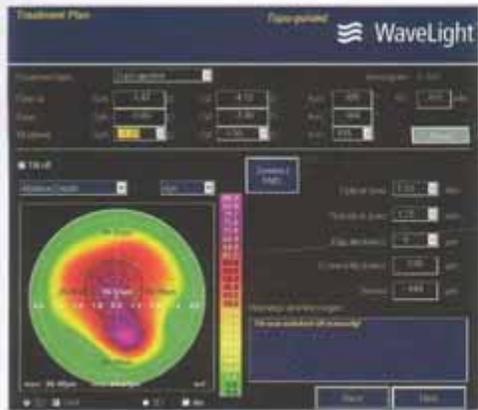


Figure 4.2: TC at treatment plan

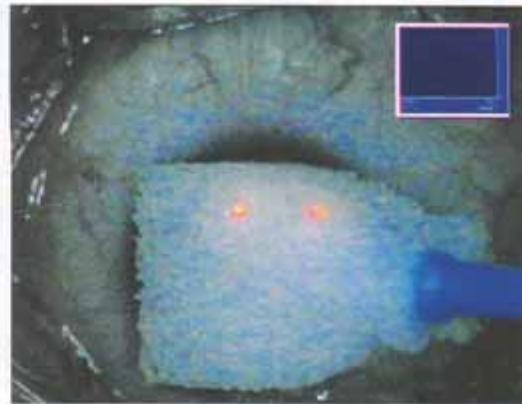


Figure 4.4: MMC solution 0.02% for 20 seconds

3- 30" MMC



past

Higher Fluence CXL in hyperopic LASIK

Zurich CXL meeting 2011

A. John Kanellopoulos, MD
Clinical Professor NYU Medical School, New York
Director, Laservision.gr Institute, Athens, Greece



Kanellopoulos,MD



CCL in bullous keratopathy and cornea edema

Can we avoid cornea transplants?

Zurich 2007

A. John Kanellopoulos, MD

Professor of Ophthalmology, NYU Medical School, NY

Director, Laservision.gr Institute, Athens, Greece.

www.brilliantvision.com

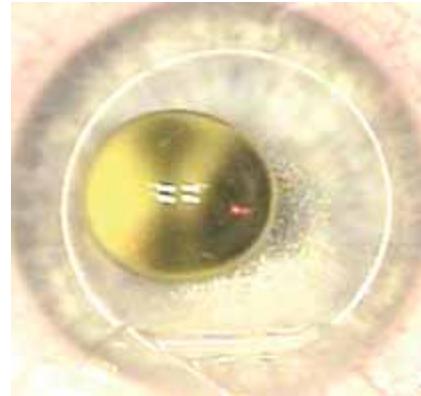


Kanellopoulos,MD



Prophylactic higher fluence UV CCL in LASIK a novel technique

Dresden 08

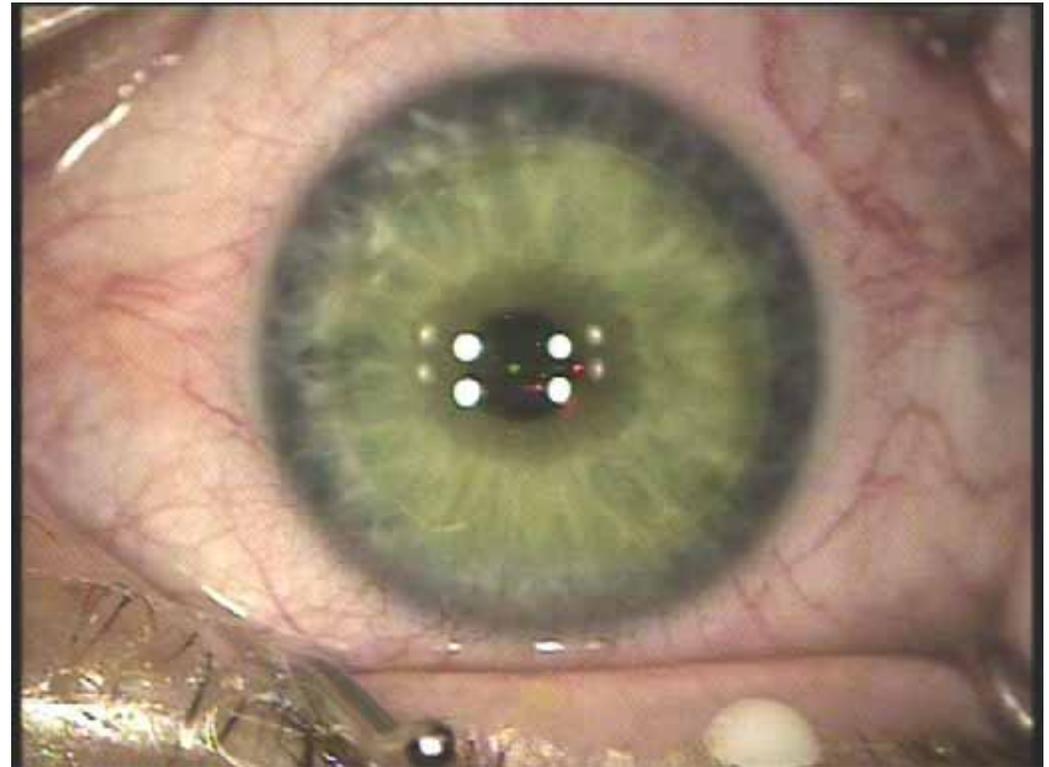
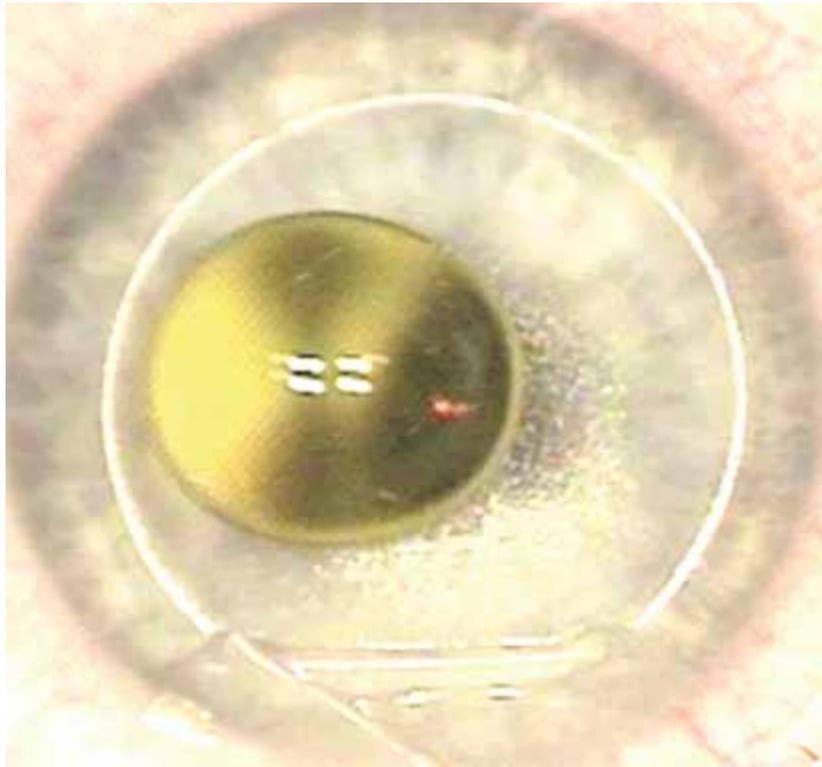


*Henry Perry, MD and A. John Kanellopoulos, MD
Clinical Associate Professor New York University Medical School
Director, Laservision.gr Institute, Athens, Greece*



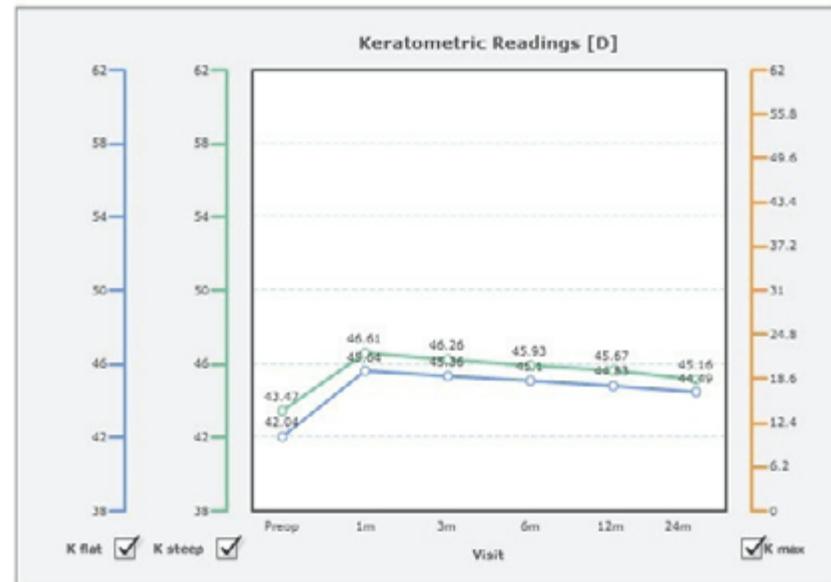
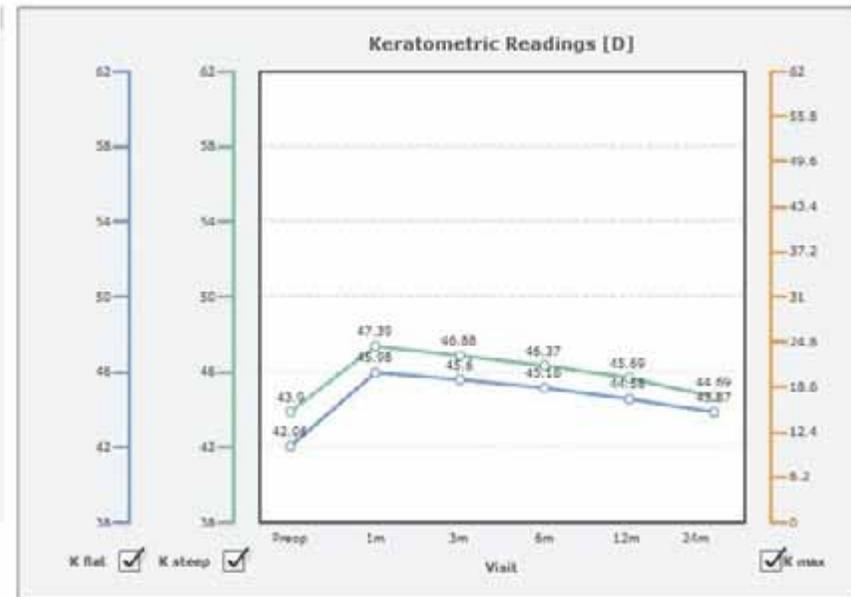
HYPEROPIC LASIK

A drop of 0.1% riboflavin sodium phosphate solution,
just prior to its spread over the exposed stromal bed

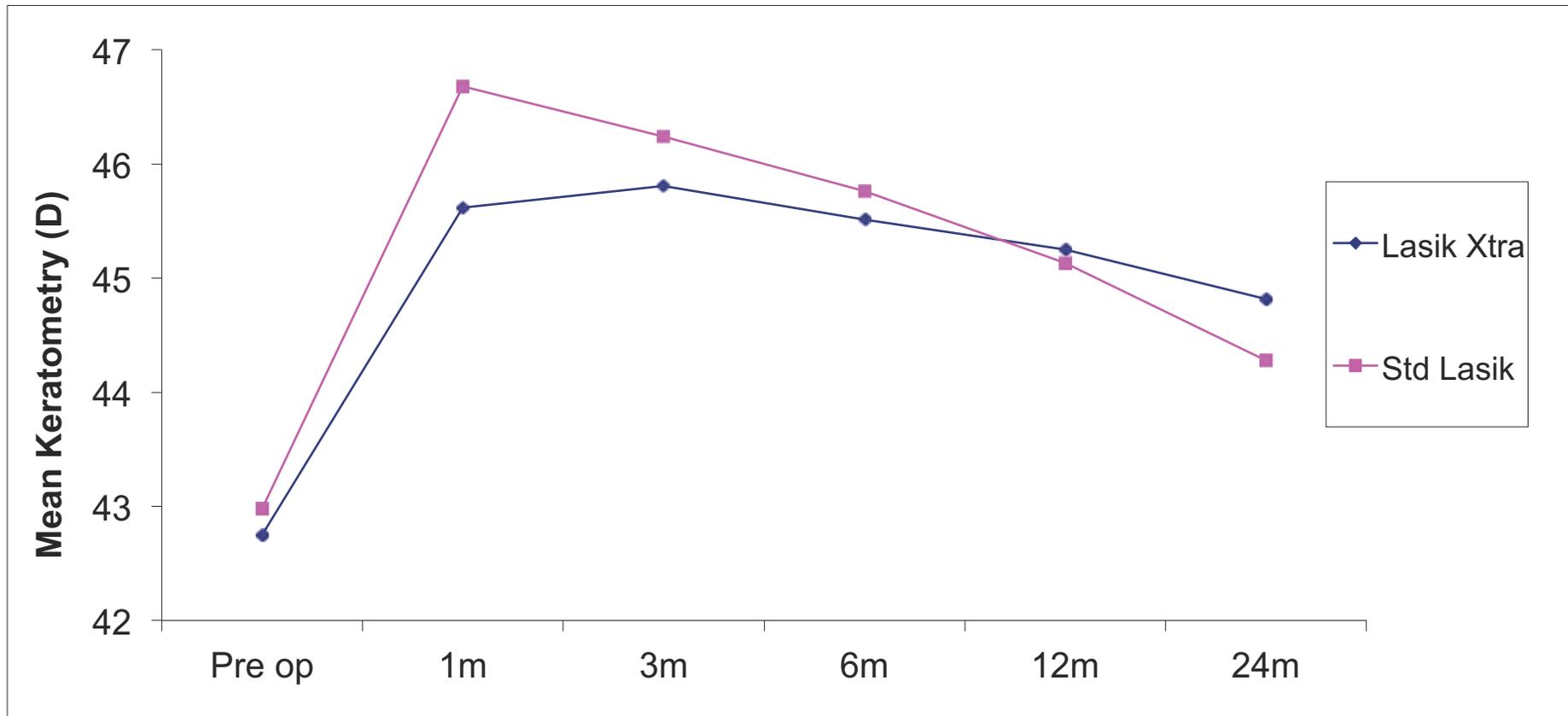


LASIK Control Group

Lasik Xtra Group



Comparison of Keratometric Stability



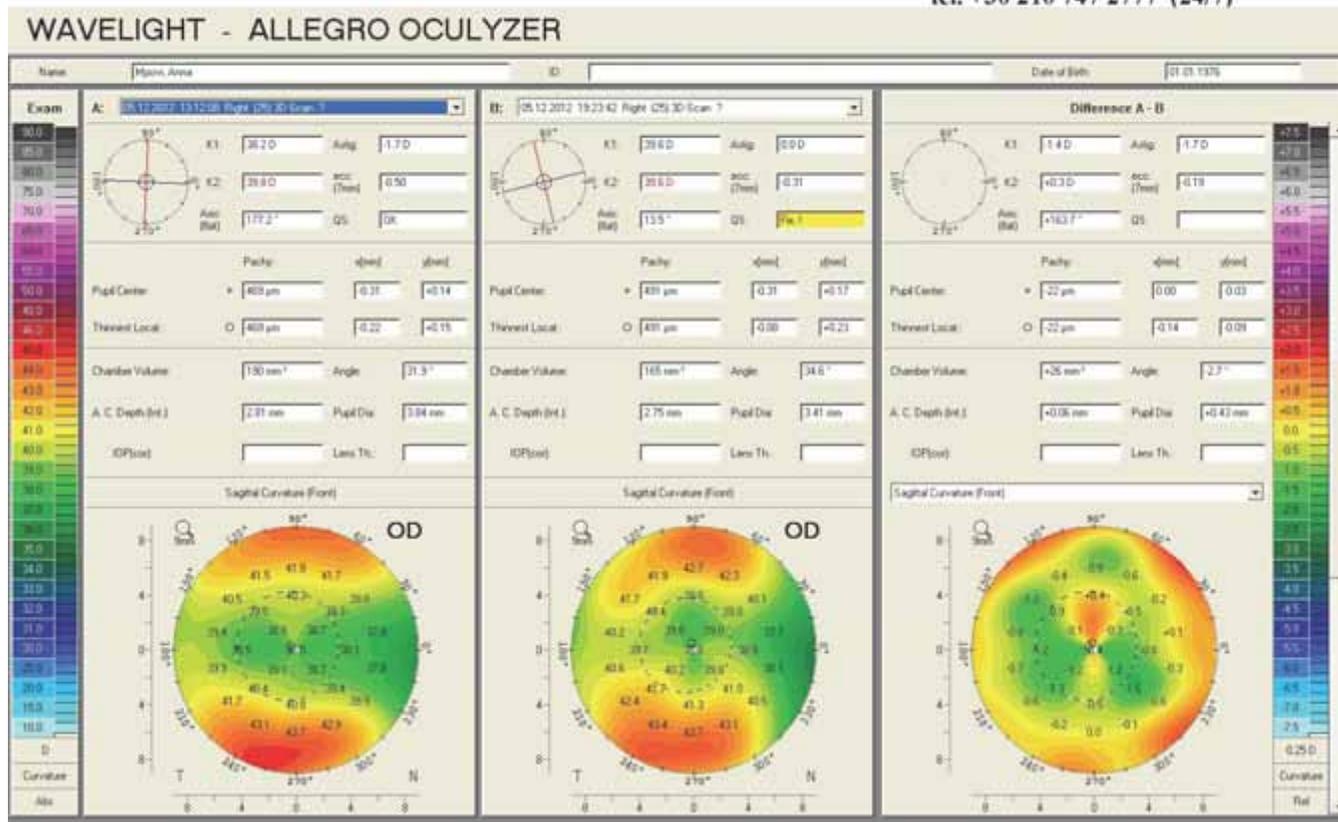
Kanellopoulos AJ, Kahn J: RS November 2012 supplement

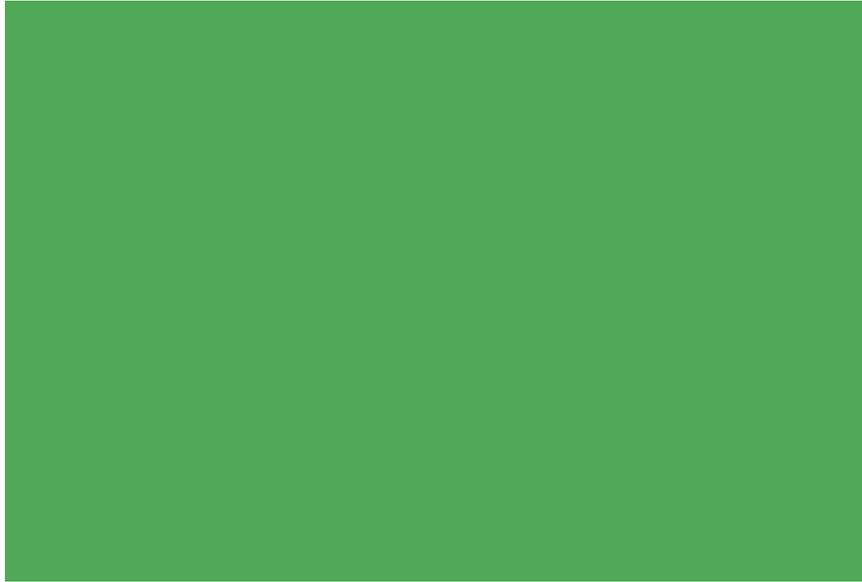


Older AK + LASIK after enhanced with AK Xtra

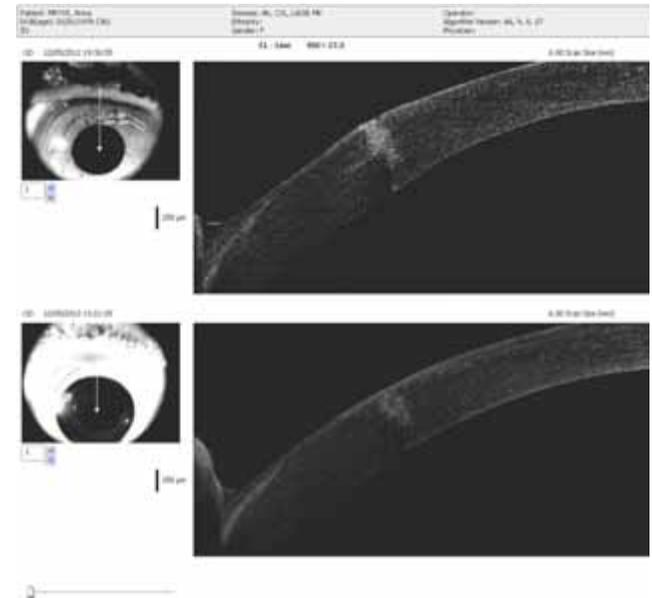
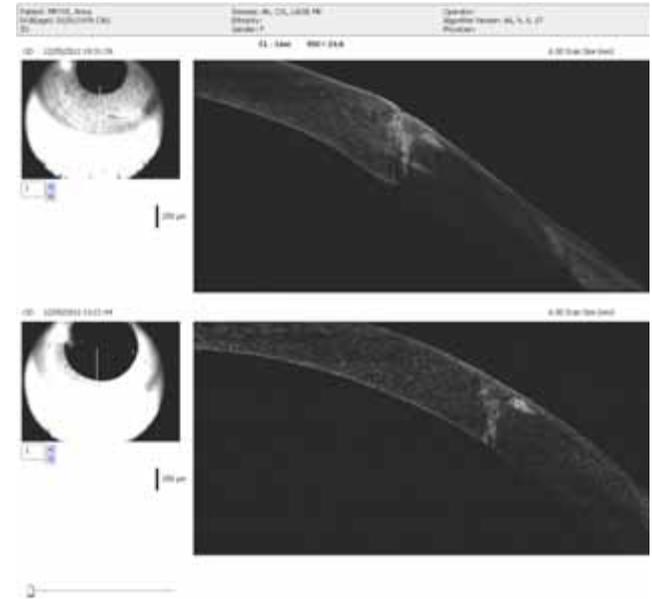
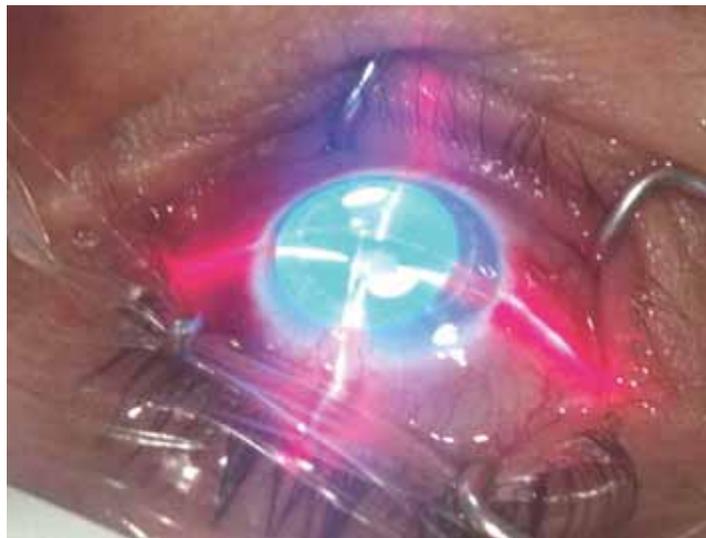
LaserVision.gr

Prof. A. J. Kanellopoulos, MD
An. Tsocha 17, Athens
tel. +30 210 747 2777 (24/7)





High fluence CXL AK-enhancement



**Enhancement of femtosecond astigmatic keratotomy
(fsAK) with combined simultaneous high fluence CXL
(hfCXL)**

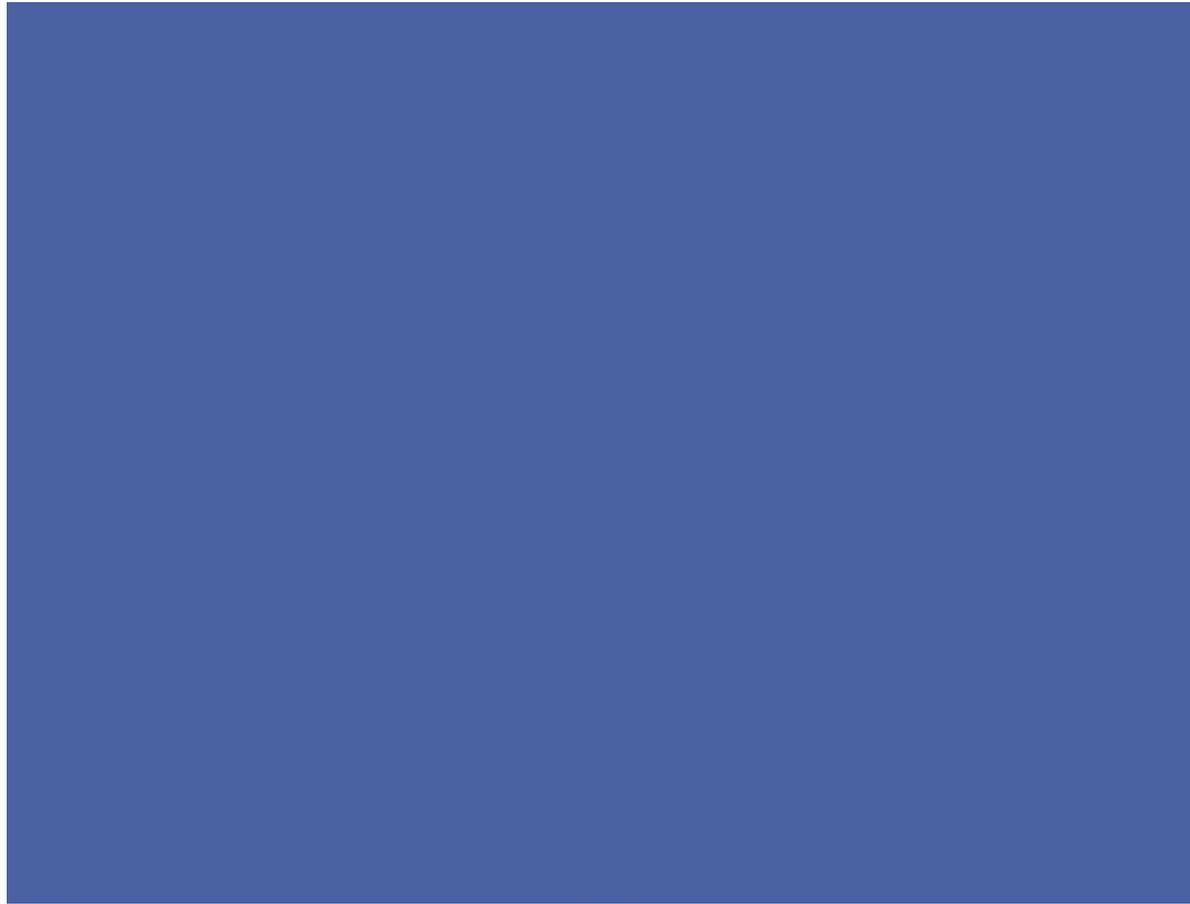
Kanellopoulos: Presented at AAO 2012



Kanellopoulos,MD



AK Xtra Post Penetrating Keratoplasty



New York University
School of Medicine

Kanellopoulos, MD

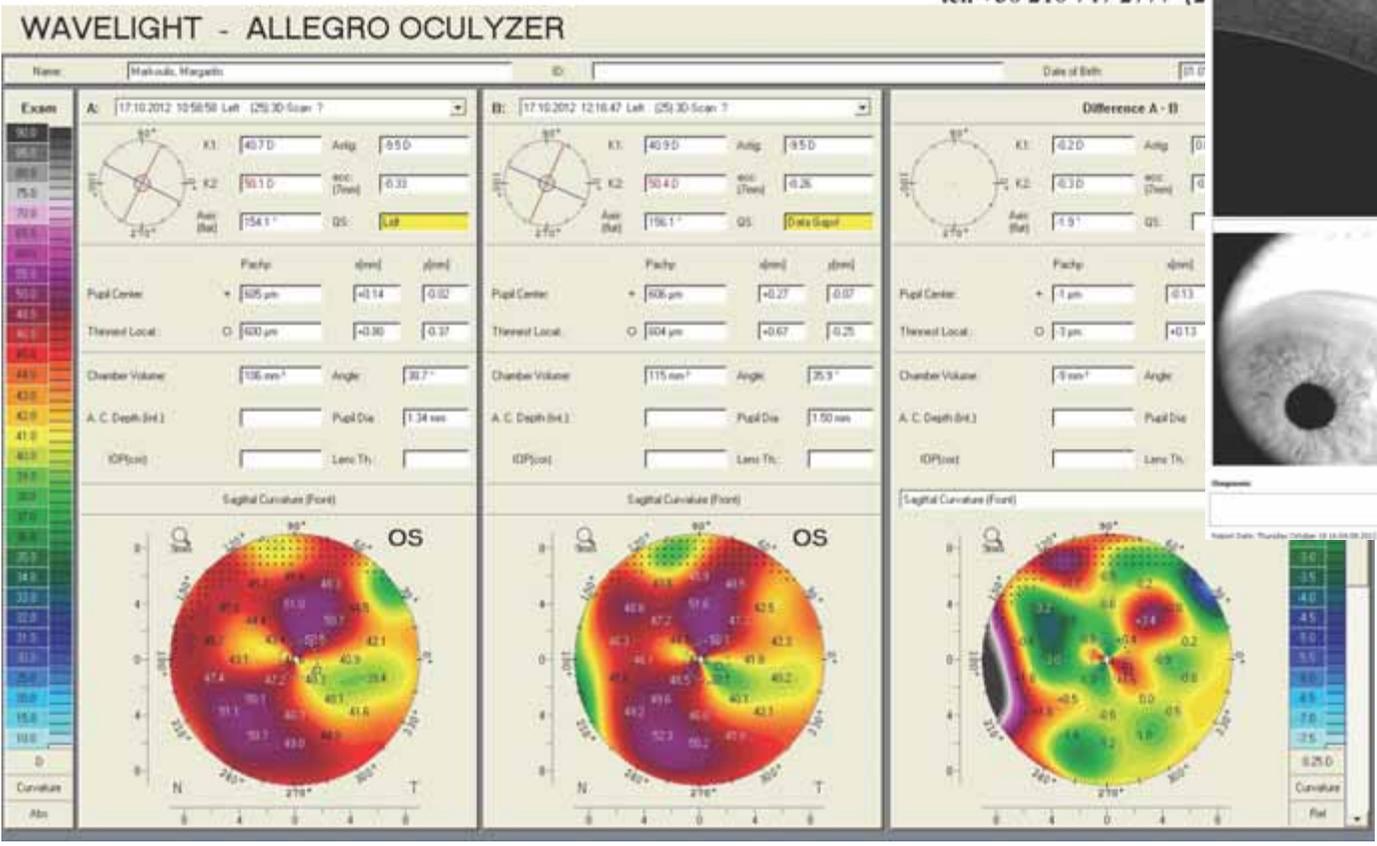
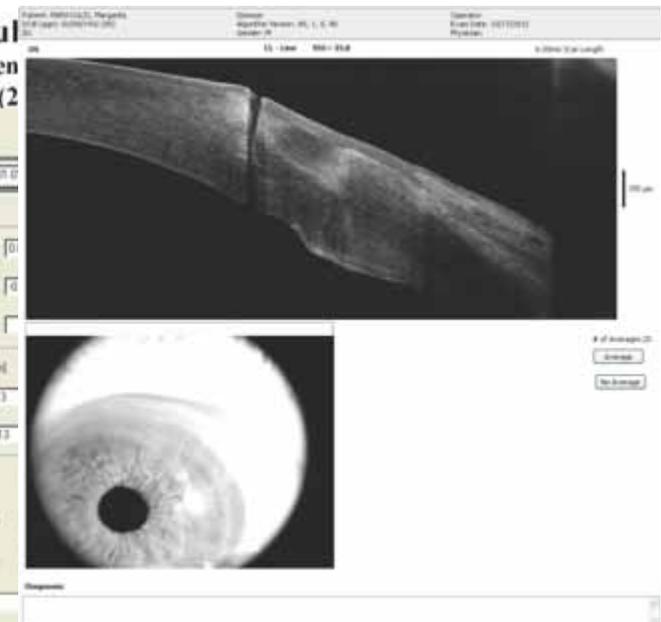
LaserVision.gr
Institute for laser



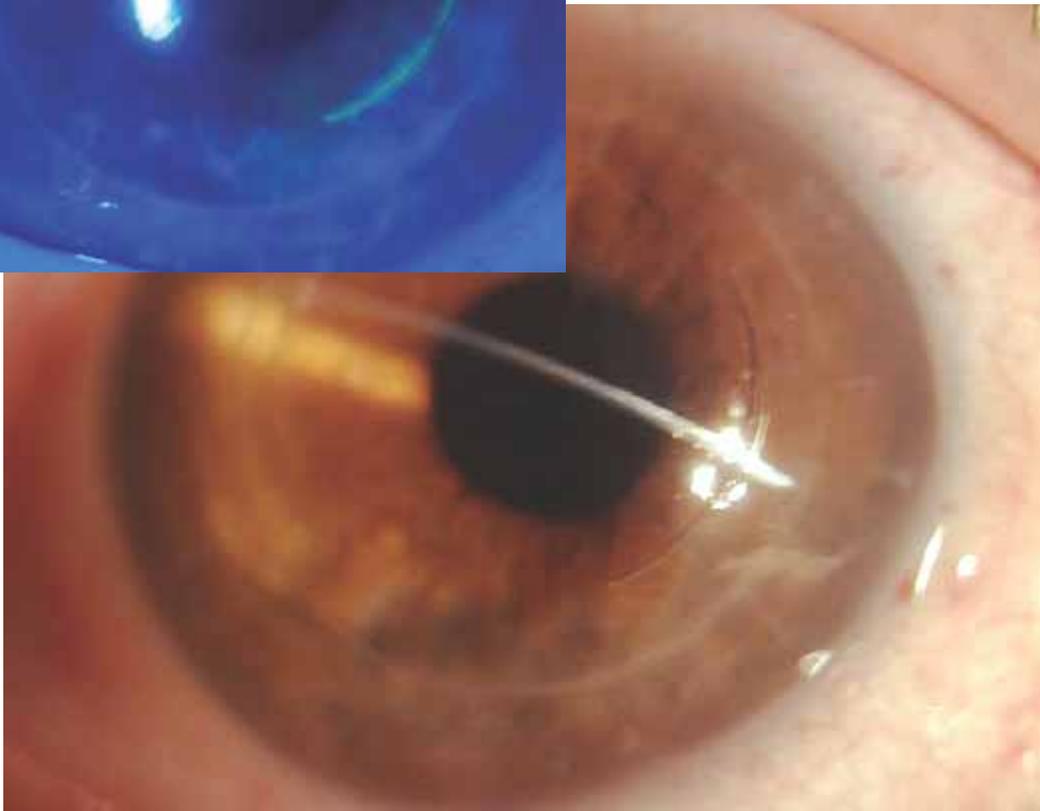
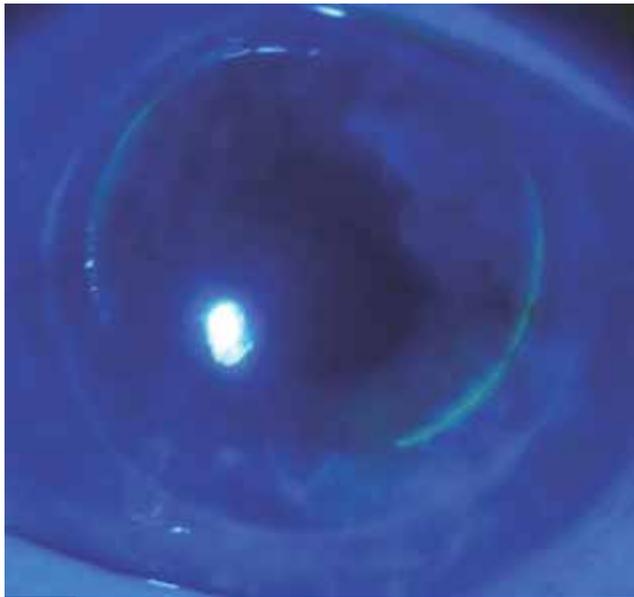
Astigmatic change following LenSx-placed AK insiions on the steep axis

LaserVision.gr

Prof. A. J. Kanellopoul
An. Tsocha 17, Athen
tel. +30 210 747 2777 (2



Precision: LenSx AK axis

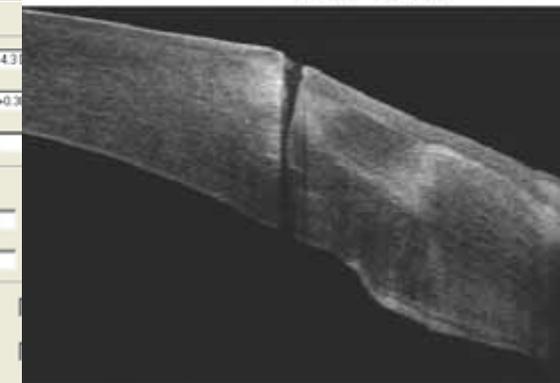
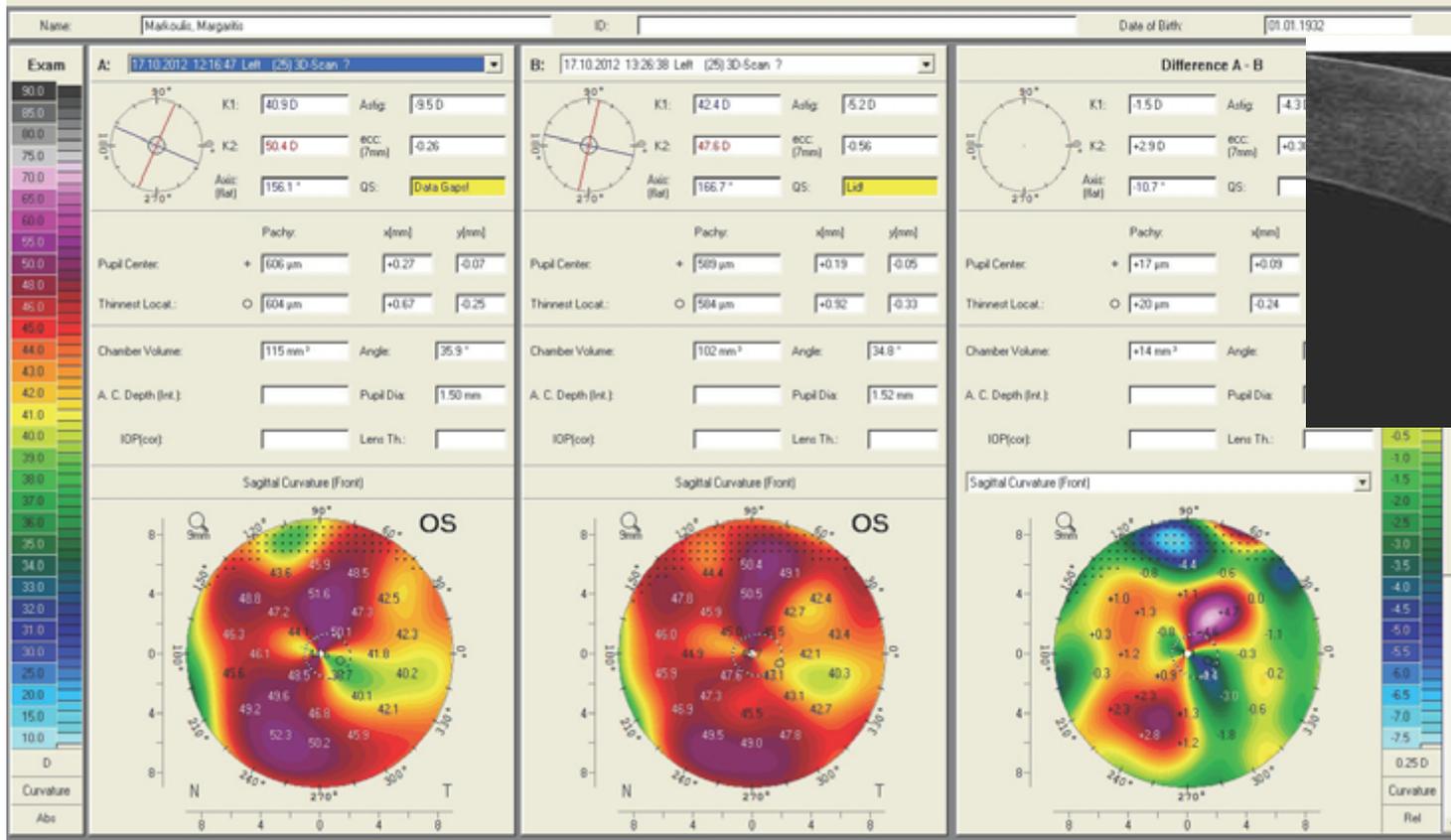


Astigmatic change following high-fluence CXL enhancement

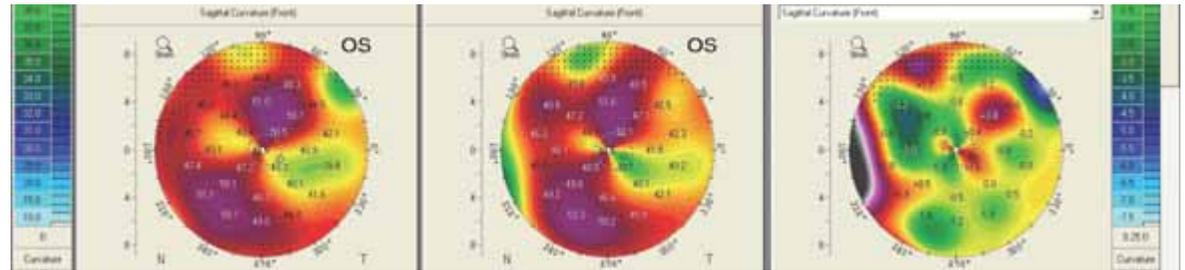
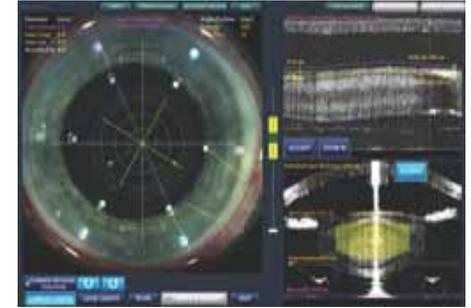
LaserVision.gr

Prof. A. J. Kanellopoulos, MD
An. Tsocha 17, Athens
tel. +30 210 747 2777 (24/7)

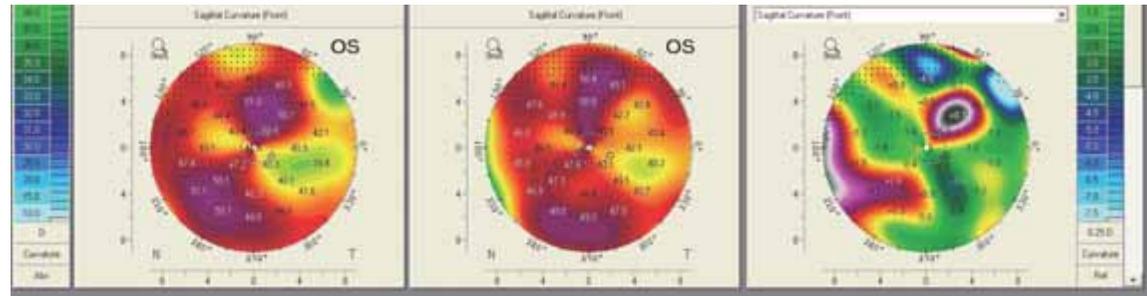
WAVELIGHT - ALLEGRO OCULYZER



Femto AK combined with CXL!
30mW cm² X 3 min
Kanellopoulos 2012



After AK



AK after high fluence CXL



Our current CXL protocols

- 1-Athens Protocol: topoPRK +10 x 10mw/cm²
- 2-LASIK Xtra: 1 (90") 30mW/cm² all HYPERC
- 2-PRK Xtra: 1 (90") 30mW/cm²
- 3- femtoAK Xtra: 3' 30mw/cm²-no soaking!
- 4-Cataract incision Xtra: 45mW/cm² for 2.5 min
- 5-TransepiCXL: 0.25% ribo + 30mW X 3
- 6-Infection: 0.25% riboflavin + 45mW/cm² x 5 ‘



Conclusions: very high fluence CXL

LASIK Xtra may be the preferred way to perform LASIK in myopes, we have proven that it maybe necessary for long term stability of hyperopic LASIK

This novel combination of hfCXL may significantly enhance fsAK efficacy allowing for a smaller arc treatment, potentially higher stability and lesser ocular surface symptoms.

This novel combination of hfCXL may significantly enhance steep axis flattening in **clear cornea cataract** surgery.



3D Femtosecond & Nanosecond Laser Cataract surgery, Cross-linking and Cornea Imaging: Video Surgery Workshop and Wetlab

Saturday, September 14th 2013 at LaserVision.gr Eye Institute Auditorium and Surgical Facilities Tsocha 15-17, Athens GREECE



Athens, September 14th, 2013



Kanellopoulos,MD





Thank you



New York University
School of Medicine

Kanellopoulos, MD

LaserVision.gr
Institute for laser

