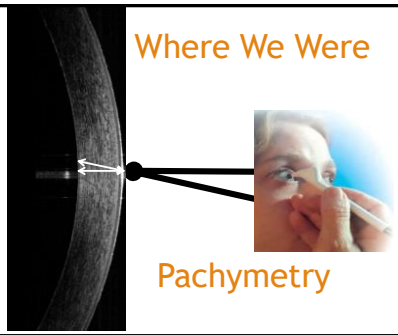
Anterior Segment OCT Applications

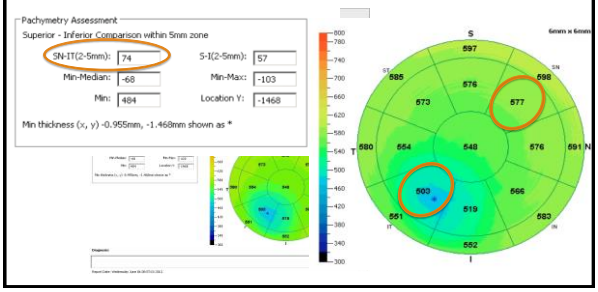
Mile Brujic, OD, FAAO

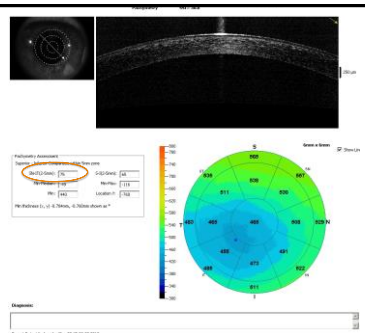
Disclosure

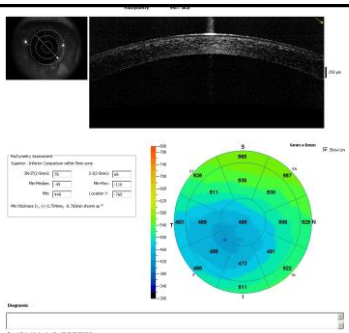
I have received honoraria in the past 2 years for speaking, writing, participating in an advisory capacity, research or meeting support from: Apellis, ABB Optical, Aldeyra, Allergan, Art Optical, Bausch + Lomb Health, Contamac, CooperVision, CSEye, Dompe, Dopavision, Glaukos, Horizon Therapeutics, Iveric Bio, Johnson & Johnson Vision Care, Lentechs, MDElite, Notal Vision, Novartis, Radius XR, RVL, Sun Pharma, Tangible Science, Tarsus, Santen, Viatris, Visus, Visionix, Walman Optical and Zea Vision

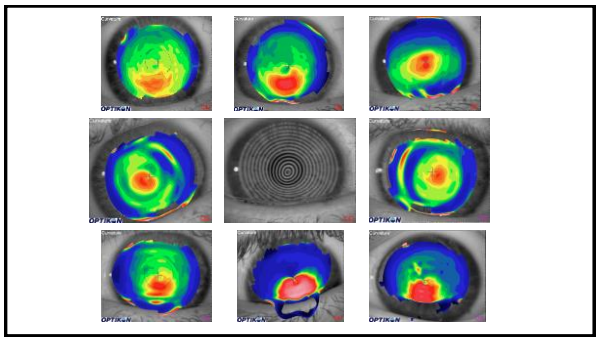


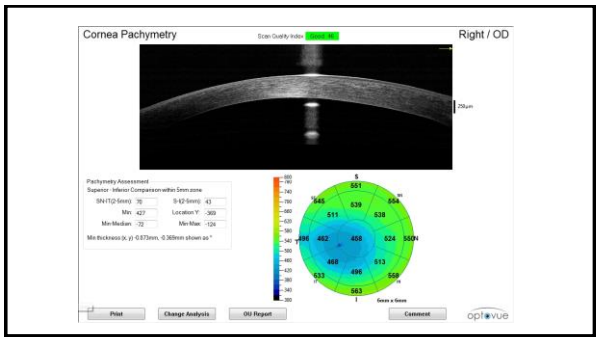
Pachymetry

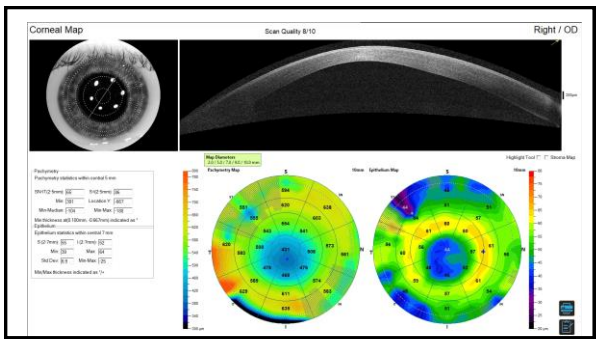




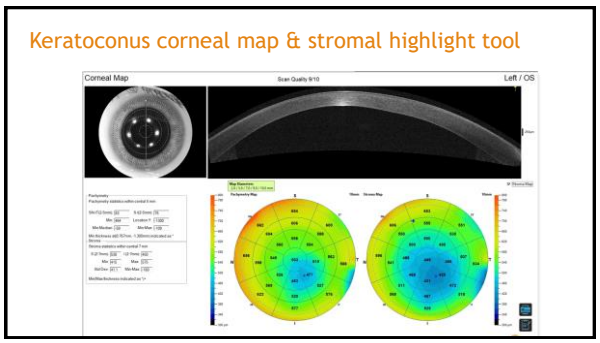


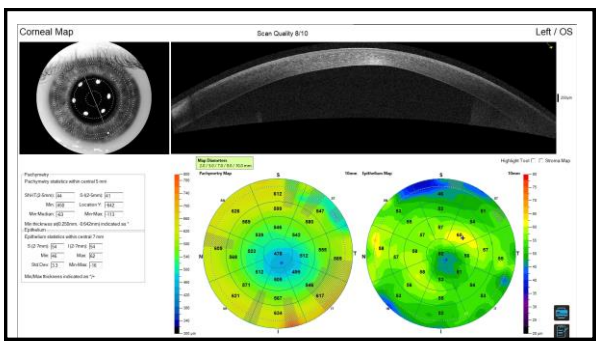


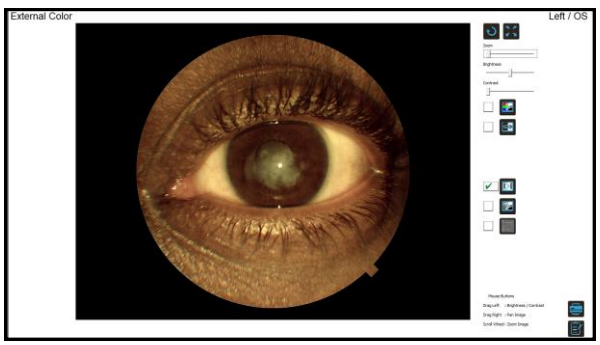




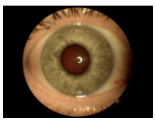
Keratoconus corneal map & stromal highlight tool



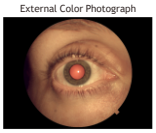




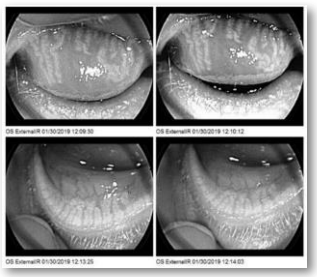
External color photography & IR imaging



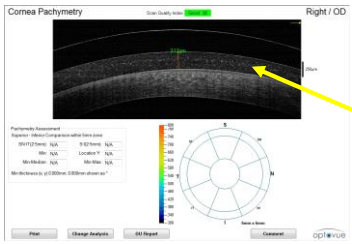
External Color Photograph

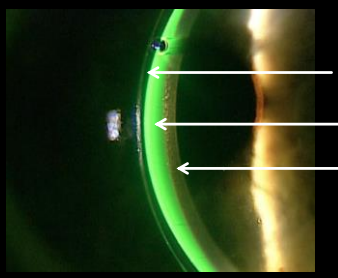


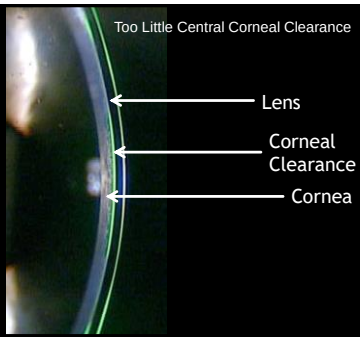
External Color Photograph with Red Reflex

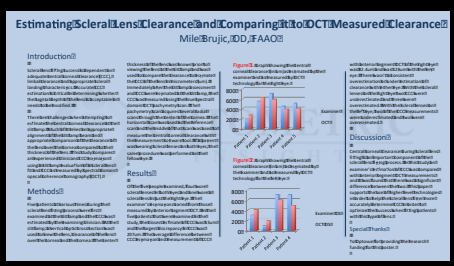


Keratoconus









Estimating Scleral Lens Clearance and Comparing Fit to OCT Measured Clearance

Miles Brujic, OD, FAAO

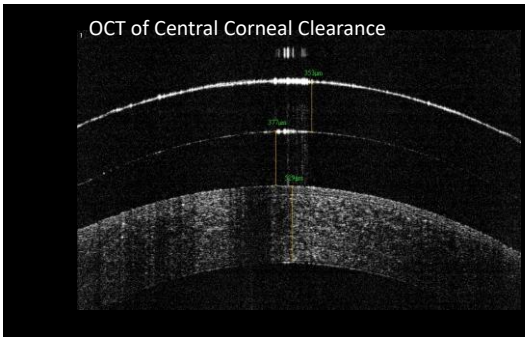
Introduction

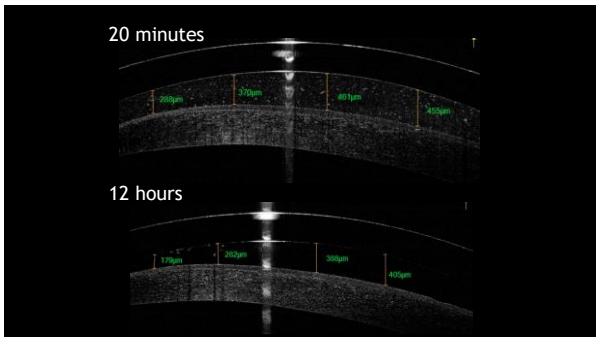
Methods

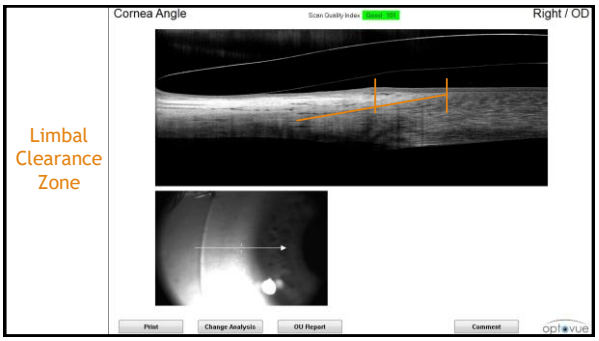
Results

Discussion

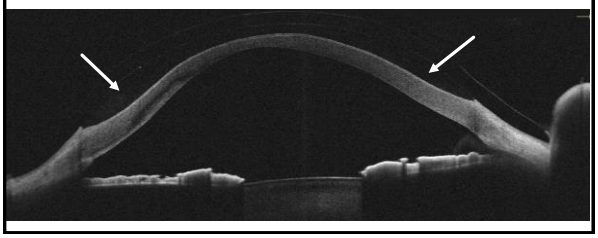
Special Thanks



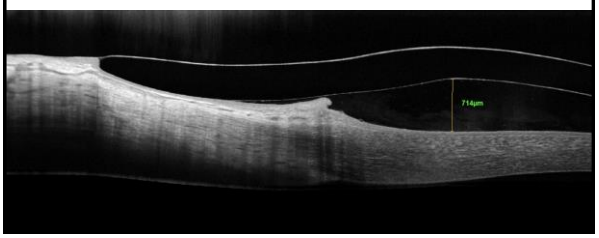




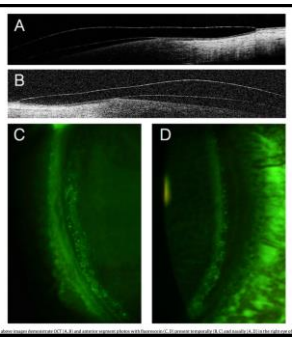
Full corneal scan



Limbal / Peripheral Corneal Clearance

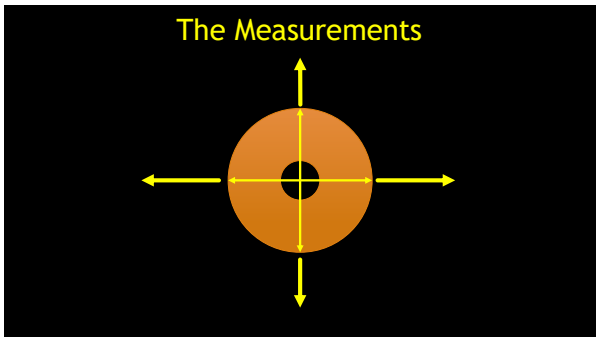


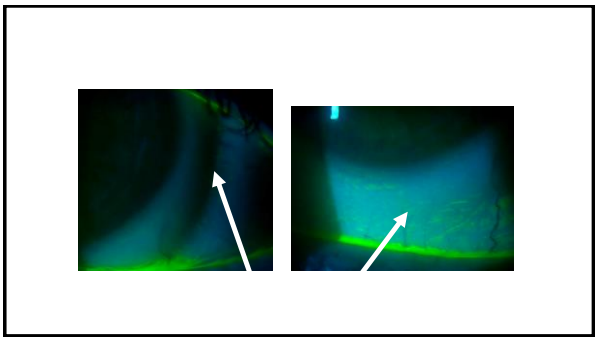
The Limbus

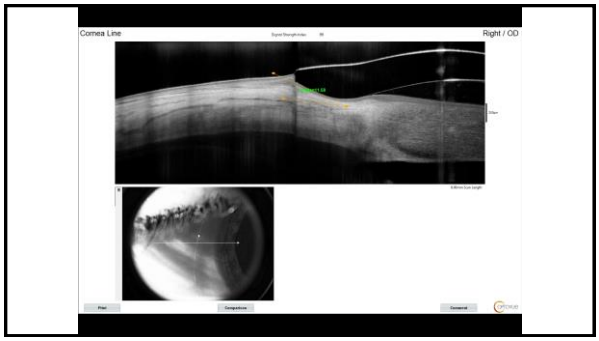


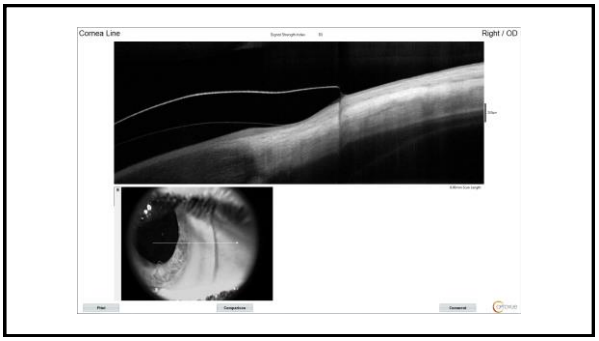
The Limbal

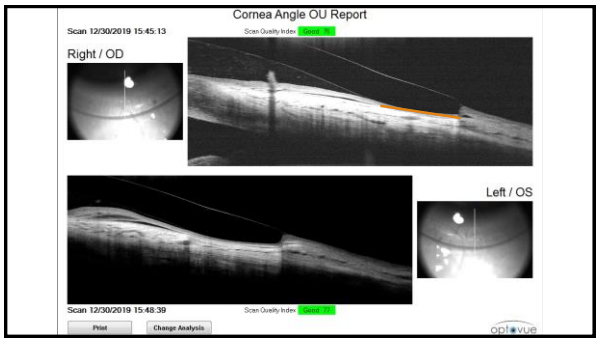
Parameter	Grading scale						
	-3 Not Acceptable	-2 Not Acceptable	-1 Acceptable	0 Optimal	+1 Acceptable	+2 Not acceptable	+3 Not Acceptable
Limbal clearance (µ)	N/A	<50	50 - 100	100 - 200	200 - 300	>300	N/A

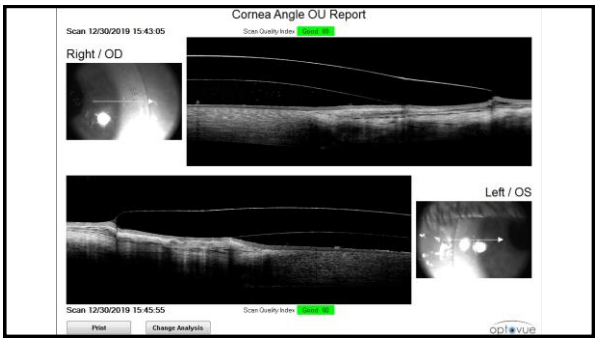

The Measurements

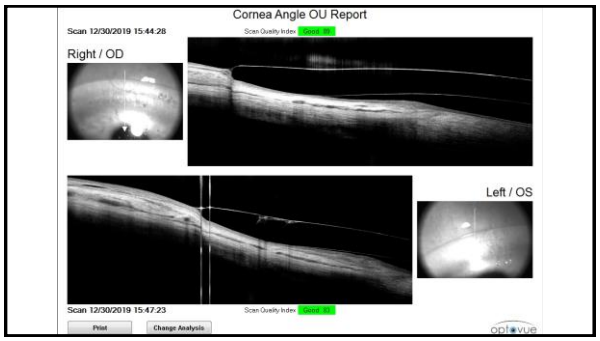


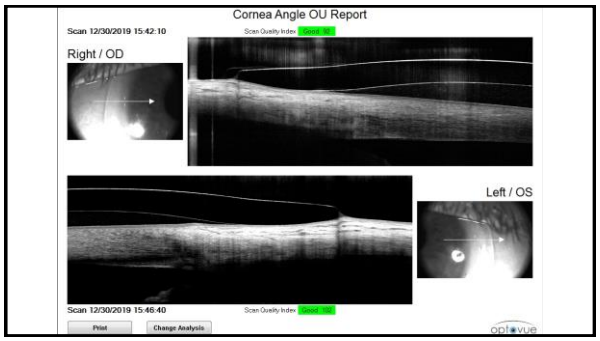

Cornea Line
Right / OD

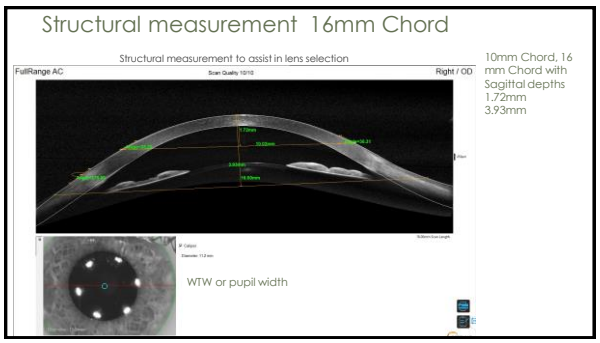

Cornea Line
Right / OD

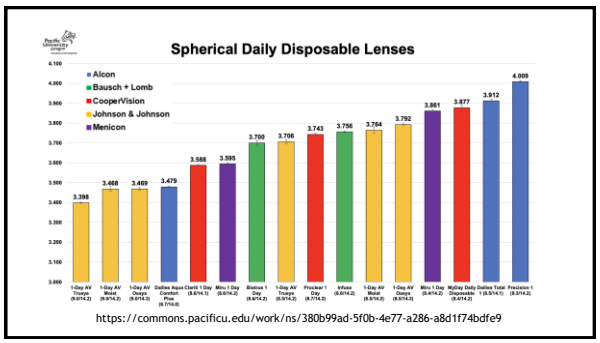

Cornea Angle OU Report
Scan 12/30/2019 15:45:13
Right / OD
Left / OS
Scan 12/30/2019 15:48:39
Print
Change Analysis
optovue


Cornea Angle OU Report
Scan 12/30/2019 15:43:05
Right / OD
Left / OS
Scan 12/30/2019 15:45:55
Print
Change Analysis
optovue


Cornea Angle OU Report
Scan 12/30/2019 15:44:28
Right / OD
Left / OS
Scan 12/30/2019 15:47:23
Print
Change Analysis
optovue


Cornea Angle OU Report
Scan 12/30/2019 15:42:10
Right / OD
Left / OS
Scan 12/30/2019 15:46:40
Print
Change Analysis
optovue


Structural measurement 16mm Chord
Structural measurement to assist in lens selection
FullRange AC
Right / OD
10mm Chord, 16 mm Chord with Sagittal depths 1.72mm 3.93mm
WTW or pupil width


Spherical Daily Disposable Lenses
Alcon
Bausch + Lomb
CooperVision
Johnson & Johnson
Menicon
3.398
3.468
3.469
3.479
3.588
3.595
3.700
3.706
3.743
3.756
3.764
3.792
3.861
3.877
3.912
4.009
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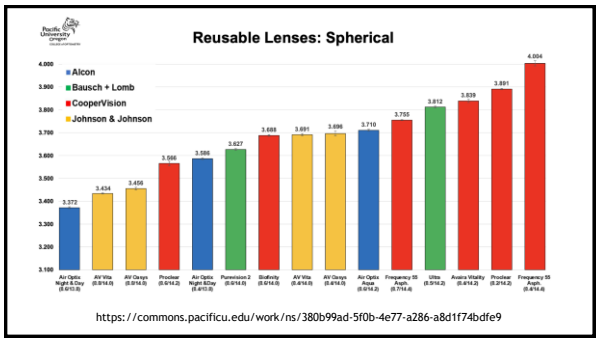
Reusable Lenses: Spherical
Alcon
Bausch + Lomb
CooperVision
Johnson & Johnson
3.372
3.434
3.456
3.566
3.586
3.627
3.688
3.691
3.696
3.710
3.755
3.812
3.839
3.891
4.004
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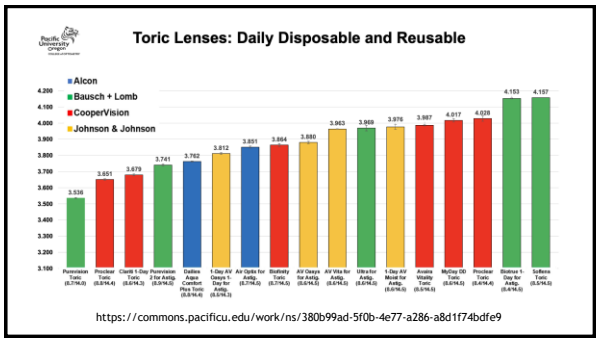
Toric Lenses: Daily Disposable and Reusable
Alcon
Bausch + Lomb
CooperVision
Johnson & Johnson
3.536
3.651
3.679
3.741
3.762
3.812
3.851
3.864
3.880
3.963
3.968
3.976
3.987
4.017
4.028
4.153
4.157
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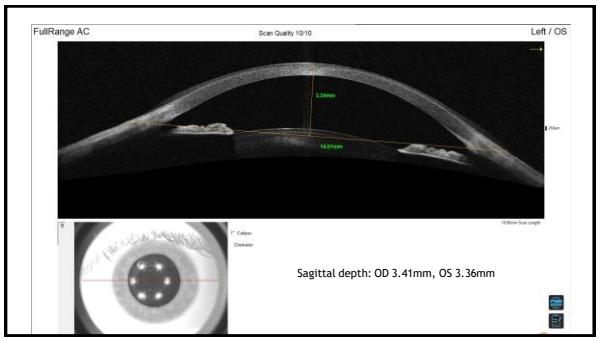


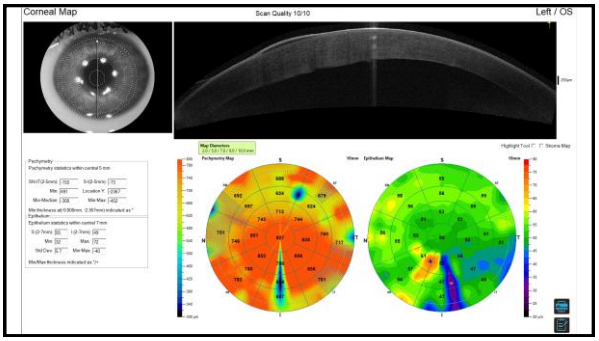
Sagittal depth: OD 3.41mm, OS 3.36mm

31 year old female

- In for an emergency visit
- She heard a pop in her eye, vision got fuzzy and the eye started to get sore shortly after that
- Currently wears soft contact lenses on a part time basis
- SiHy lenses -4.00-4.00x180
- Vision 20/100
- IOP 16 mmHg

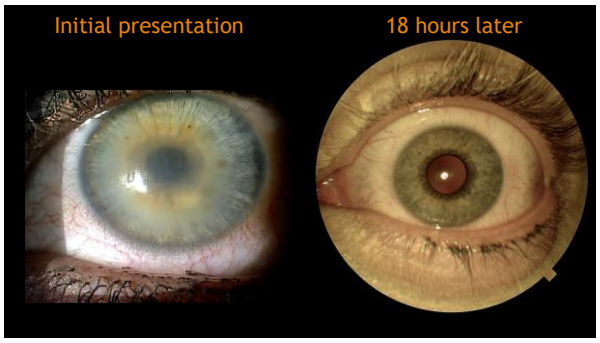
31 year old female

Low Magnification | High Magnification

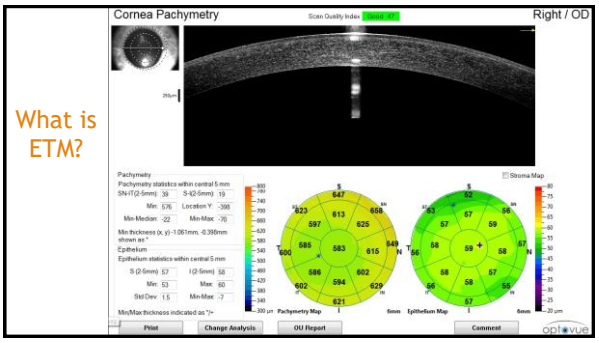


Initial presentation

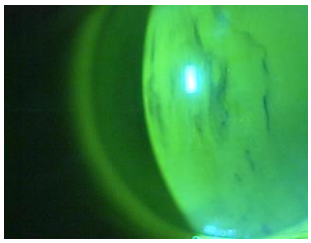
18 hours later



What is ETM?



Dry Eye



ORIGINAL ARTICLE

Assessment of Corneal Epithelial Thickness in Dry Eye Patients

Xinhan Cui*, Jiaxu Hong†, Fei Wang*, Sophie X. Deng†, Yujing Yang*, Xiaoyu Zhu*, Dan Wu*, Yujin Zhao*, and Jianjiang Xu†

ABSTRACT

Purpose. To investigate the features of corneal epithelial thickness topography with Fourier-domain optical coherence tomography (OCT) in dry eye patients.

Methods. In this cross-sectional study, 100 symptomatic dry eye patients and 35 normal subjects were enrolled. All participants answered the ocular surface disease index questionnaire and were subjected to OCT, corneal fluorescein staining, tear breakup time, Schirmer I test without anesthetic (S1t), and meibomian morphology. Several epithelium statistics for each eye, including central, superior, inferior, minimum, maximum, minimum − maximum, and map standard deviation, were averaged. Correlations of epithelial thickness with the symptoms of dry eye were calculated.

Results. The mean (±SD) central, superior, and inferior corneal epithelial thickness was 53.57 (±3.31) μm, 52.00 (±3.39) μm, and 53.03 (±3.67) μm in normal eyes and 52.71 (±2.83) μm, 50.58 (±3.44) μm, and 52.53 (±3.36) μm in dry eyes, respectively. The superior corneal epithelium was thinner in dry eye patients compared with normal subjects ($p = 0.037$), whereas central and inferior epithelium were not statistically different. In the dry eye group, patients with higher severity grades had thinner superior ($p = 0.017$) and minimum ($p < 0.001$) epithelial thickness, more wide range ($p = 0.032$), and greater deviation ($p = 0.003$). The average central epithelial thickness had no correlation with tear breakup time, S1t, or the severity of meibomian glands, whereas average superior epithelial thickness positively correlated with S1t ($r = 0.238$, $p = 0.017$).

Conclusions. Fourier-domain OCT demonstrated that the thickness map of the dry eye corneal epithelium was thinner than normal eyes in the superior region. In more severe dry eye disease patients, the superior and minimum epithelium was much thinner, with a greater range of map standard deviation.

(Optom Vis Sci 2014;91:1446–1454)

NIH Public Access

Results—The mean (±SD) central, superior, and inferior corneal epithelial thickness was 53.57 (±3.31) μm, 52.00 (±3.39) μm, and 53.03 (±3.67) μm in normal eyes and 52.71 (±2.83) μm, 50.58 (±3.44) μm, and 52.53 (±3.36) μm in dry eyes, respectively. The superior corneal epithelium was thinner in dry eye patients compared with normal subjects (p=0.037),whereas central and inferior epithelium were not statistically different. In the dry eye group, patients with higher severity grades had thinner superior ($p = 0.017$) and minimum ($p < 0.001$) epithelial thickness, more wide range ($p = 0.032$), and greater deviation ($p = 0.003$). The average central epithelial thickness had no correlation with tear breakup time, S1t, or the severity of meibomian glands, whereas average superior epithelial thickness positively correlated with S1t ($r = 0.238$, $p = 0.017$).

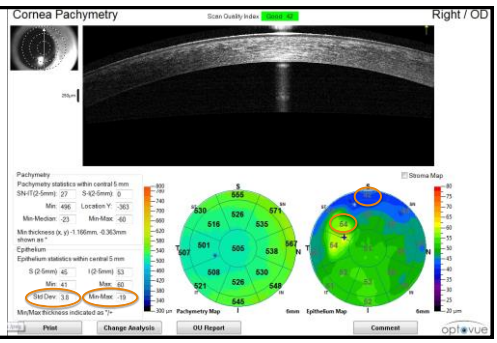
Shanghai Medicine, Fudan University, Shanghai, China (AJ)

In Vivo 3-Dimensional Corneal Epithelial Thickness Mapping as an Indicator of Dry Eye: Preliminary Clinical Assessment

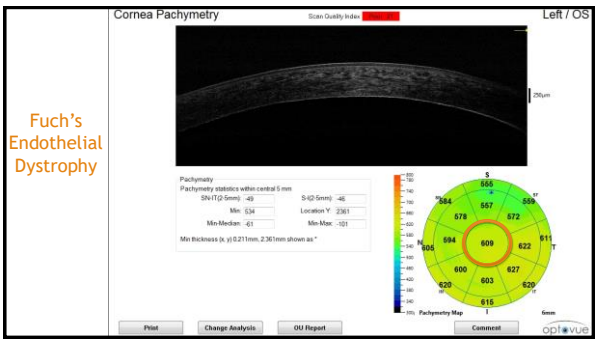
• CONCLUSIONS: This study, based on very user-friendly, novel AS-OCT imaging, indicates increased epithelial thickness in dry eyes. The ease of use and the improved predictability offered by AS-OCT epithelial imaging may be a significant clinical advantage. Augmented epithelial thickness in the suspect cases may be employed as an objective clinical indicator of dry eye. (Am J Ophthalmol 2013;■:■–■. © 2013 by Elsevier Inc. All rights reserved.)

MATERIALS AND METHODS

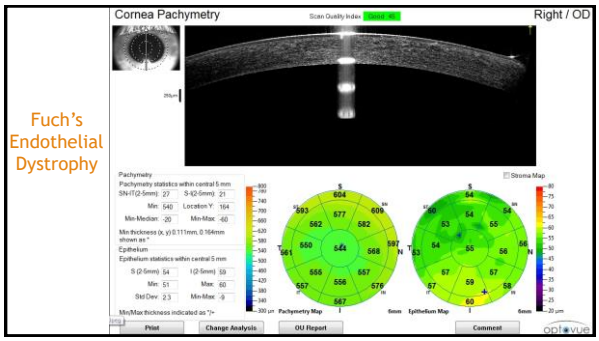
Dry Eye

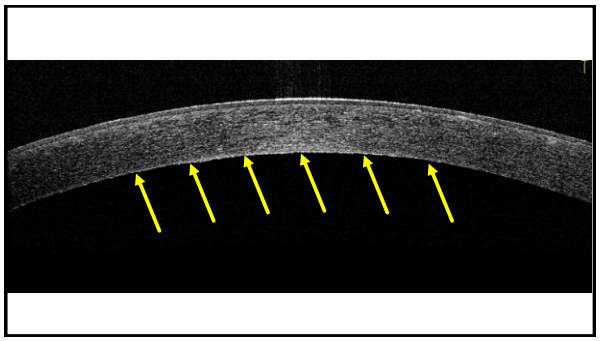


Fuch's Endothelial Dystrophy

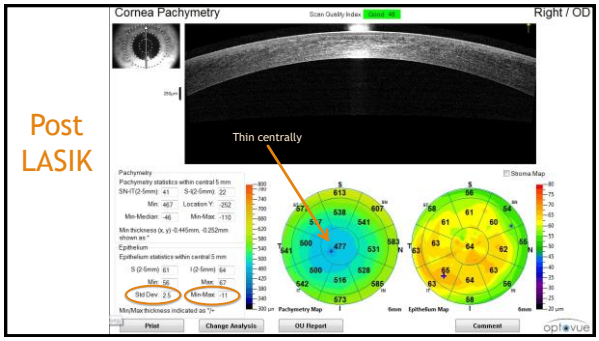


Fuch's Endothelial Dystrophy

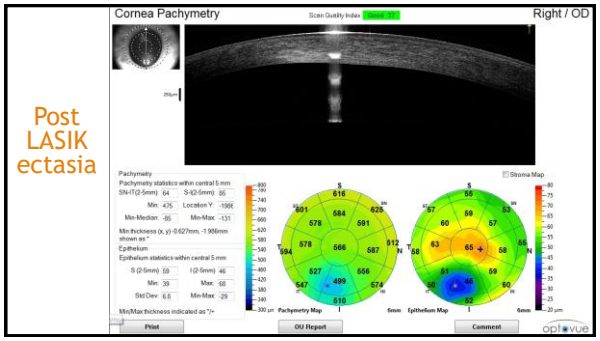




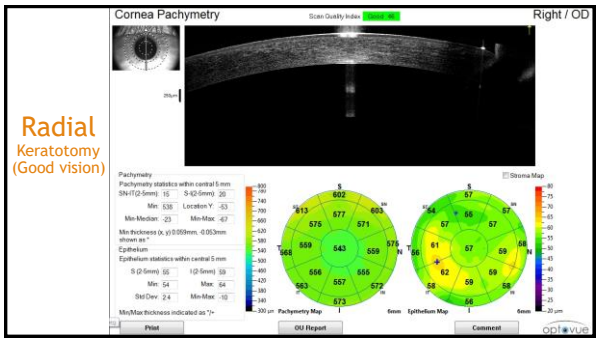
Post LASIK



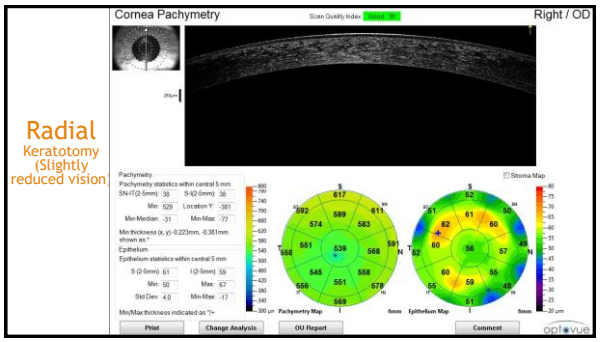
Post LASIK ectasia



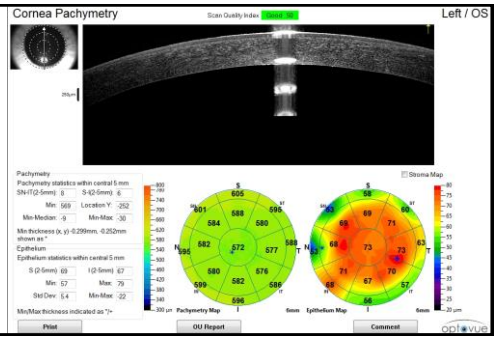
Radial Keratotomy (Good vision)



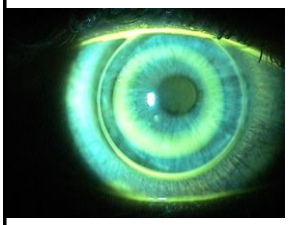
Radial Keratotomy (Slightly reduced vision)

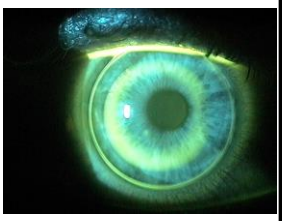


Radial
Keratotomy
significant visual complaints)

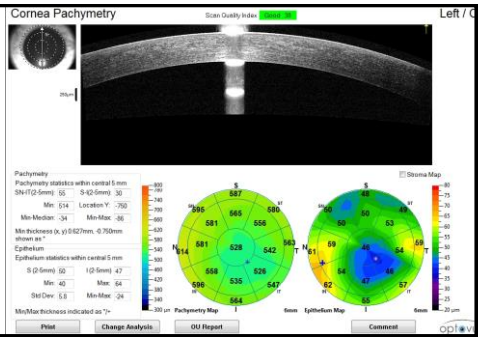


Orthokeratology

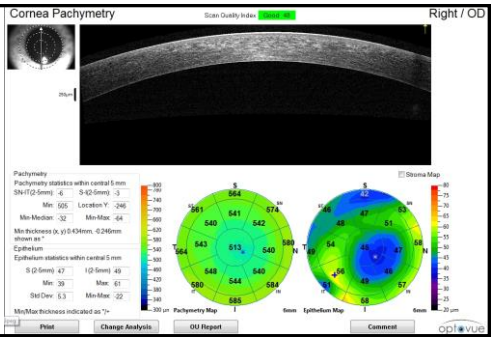




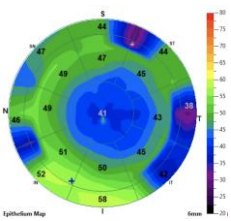
Ortho K

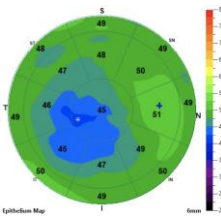


Ortho K



Anterior Segment OCT for Orthokeratology





EBMD