Outcomes of Phakic IOL Exchange

Dr. Mathew Kurian Kummelil

CATARACT & REFRACTIVE LENS SERVICES

NARAYANA NETHRALAYA

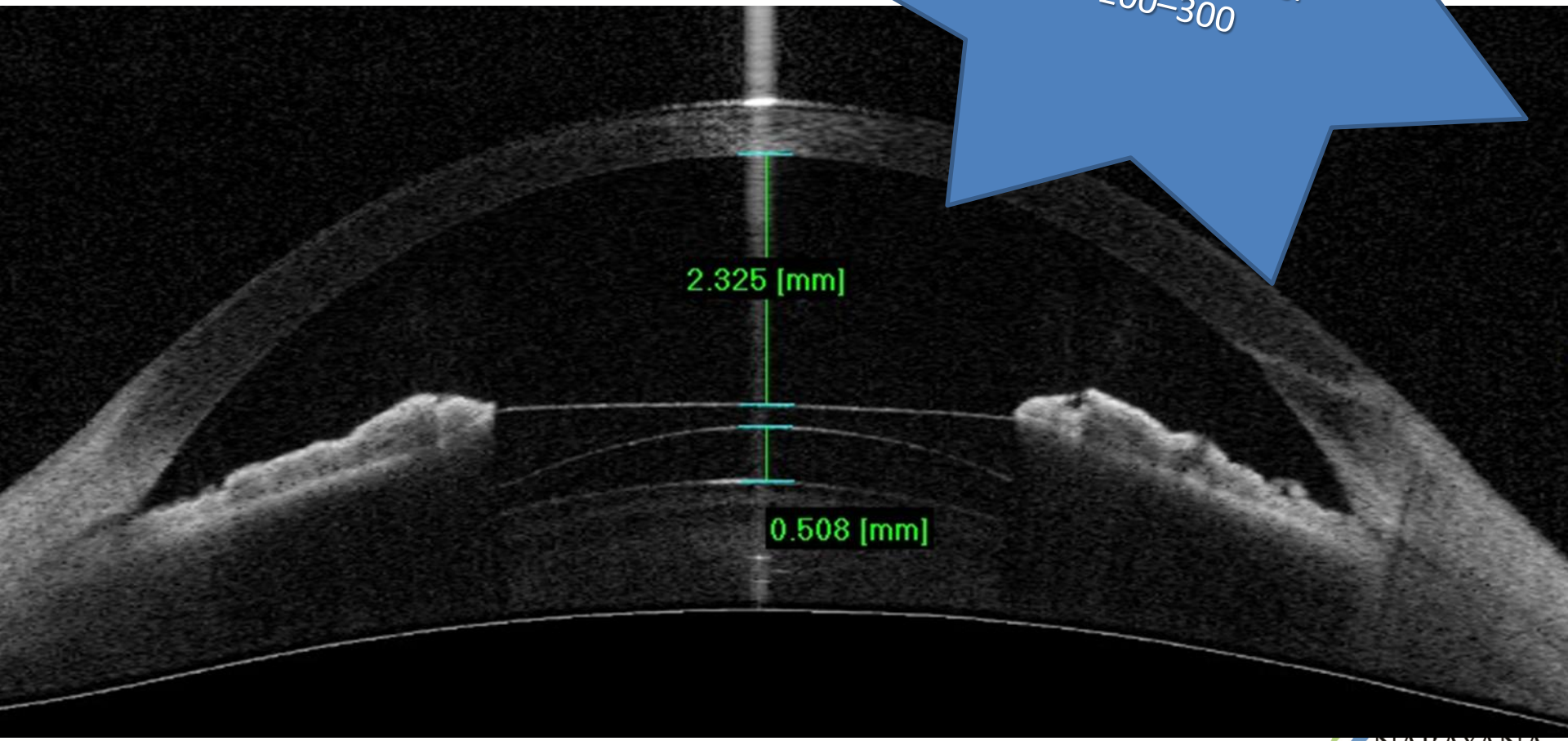
NO FINANCIAL DISCLOSURE

dr.mkurian@gmail.com

Vault of an ICL is calculated using

- WTW(White to White)
- ACD (Anterior Chamber Depth)

Ideal Vault (mm)
Myopes: 500–600
Hypermetropes: 200–300



FDA study: Recommended ICL diameter by WTW and ACD measurements

White to White (mm)	ACD (mm)	Recommended ICL Length
<10.5	All	Not Recommended
10.5-10.6	<=3.5	Not Recommended
10.5-10.6	>3.5	12.1
10.7-11.0	All	12.1
11.1	<=3.5	12.1
11.1	>3.5	12.6
11.2-11.4	All	12.6
11.5-11.6	<=3.5	12.6
11.5-11.6	>3.5	13.2
11.7-12.1	All	13.2
12.2	<=3.5	13.2
12.2	>3.5	13.7
12.3-12.9	All	13.7
>=13	All	Not Recommended

Poor correlation between White to White (WTW) and Sulcus to Sulcus (STS)

Relationship between ciliary sulcus diameter and anterior chamber diameter and corneal diameter

Takushi Kawamorita, CO, PhD, Hiroshi Uozato, PhD, Kazutaka Kamiya, MD, PhD, Kimiya Shimizu, MD, PhD

PURPOSE: To evaluate the relationship between the horizontal ciliary sulcus diameter and anterior chamber diameter measured by 35 MHz ultrasound biomicroscopy (UBM) and the horizontal corneal diameter (white to white [WTW]) measured by scanning-slit topography and to assess the repeatability (intraexaminer difference) of the 2 methods.

SETTING: Department of Orthoptics and Visual Science, Kitasato University School, Sagamihara, Japan.

METHODS: The repeatability and agreement of UBM and scanning-slit topography were assessed using the intraclass correlation (ICC) and the Bland and Altman method (ie, mean difference and 95% limits of agreement [LoA]).

RESULTS: Thirty-one normal eyes of 31 subjects (mean age 22.6 years ± 4.8 [SD]) were evaluated. The mean differences between the repeated measurements were as follows: ciliary sulcus diameter, −0.05 mm (95% LoA, −0.36 to 0.26 mm); anterior chamber diameter, 0.02 mm (95% LoA, −0.42 to 0.45 mm); and WTW diameter, −0.02 mm (95% LoA, −0.18 to 0.13 mm). The agreement between ciliary sulcus diameter and WTW diameter was poor (ICC, 0.679). The mean difference was 0.41 mm (95% LoA, −0.46 to 1.28 mm). The agreement between the ciliary sulcus diameter and anterior chamber diameter was high (ICC, 0.918). The mean difference was 0.13 mm (95% LoA, −0.41 to 0.67 mm).

CONCLUSION: Results suggest that direct measurement of the ciliary sulcus by UBM would reduce the percentage of complications related to intraocular lens sizing over the percentage when sizing is based on WTW diameter.

Financial Disclosure: No author has a financial or proprietary interest in any material or method mentioned.

AIMS AND OBJECTIVES

- The implantable collamer lens (Staar Surgical AG) is FDA approved for correction of myopia but not for compound myopic astigmatism
- We present the outcomes following exchange of the Visian Toric Implantable Collamer lens (TICL) in 2 cases of high vault

MATERIALS AND METHODS

- Retrospective outcomes assessment
- Both cases have completed one year follow-up
- Surgeries performed by a single surgeon.
- ICL Power/Sizing using Staar Surgicals software

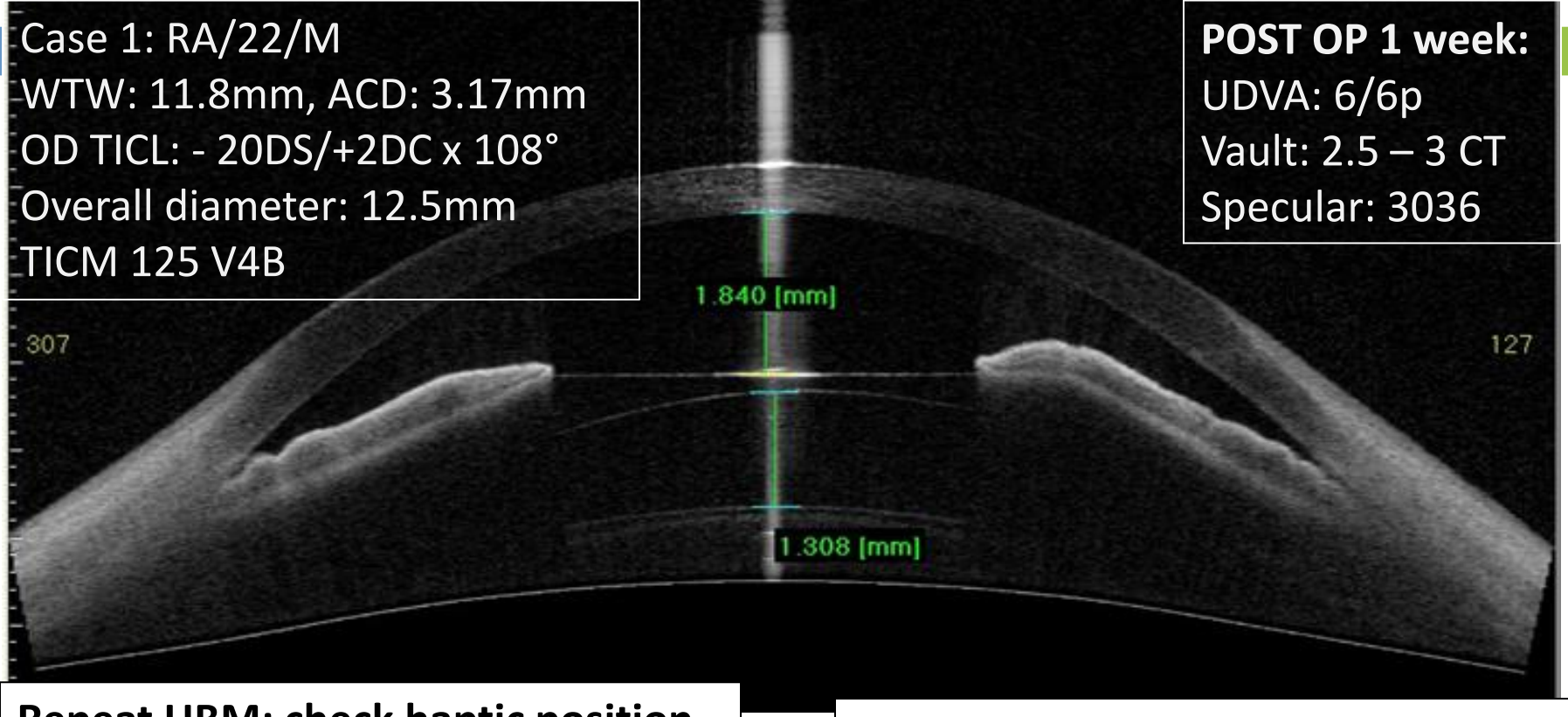
RESULTS

- 2 eyes of 2 patients
- Mean follow-up
  - till date of ICL exchange: 71.5 days
  - Since ICL exchange: 1 year
  - In contralateral eye: 1 year
- Mean change in ECD
  - after exchange was 125.5 cells/mm^3
  - in the contralateral eye with the undersized ICL was 46 cells/mm^3
- No change in lens opacity was evident from the stable Pentacam lens density (Change: 0.3)
- IOP & angle evaluation:
  - No significant difference from baseline & from contralateral eye

0.5 mm reduction in the size of the exchanged ICL diameter reduced the vault by average of 0.547 um

Case 1: RA/22/M
WTW: 11.8mm, ACD: 3.17mm
OD TICL: - 20DS/+2DC x 108°
Overall diameter: 12.5mm
TICM 125 V4B

POST OP 1 week:
UDVA: 6/6p
Vault: 2.5 – 3 CT
Specular: 3036



Repeat UBM: check haptic position
Nasal: Haptic abutting ciliary process
Temporal: Haptic in the ciliary sulcus
ACD: 1.804 mm
Vault: 1.308 mm

↓

Cause of high vault:
? Fault in size due to WTW and STS mismatch

→

Treatment plan:
ICL Exchange undersizing by 0.5 mm
(Preop UBM – 12.1mm)
Therefore assuming a desirable vault of 0.5mm for a V4B ICL

↓

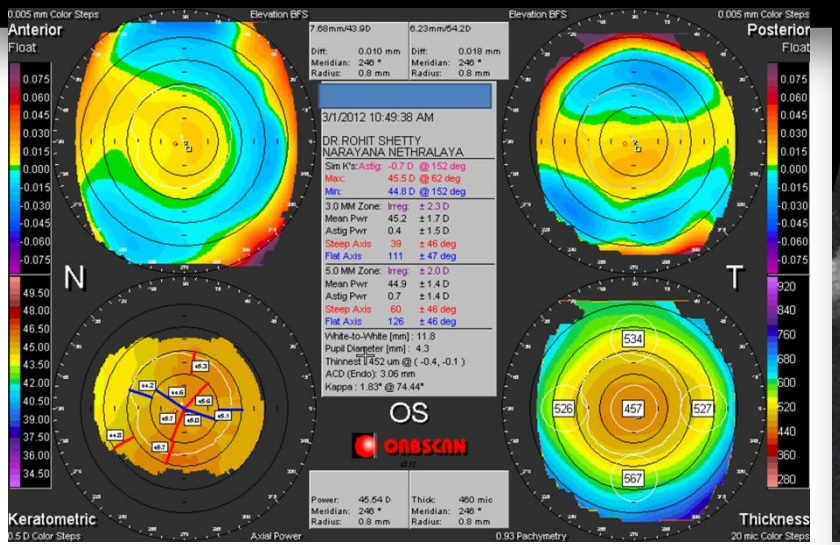
Size of 12mm would have been **'Ideal'**

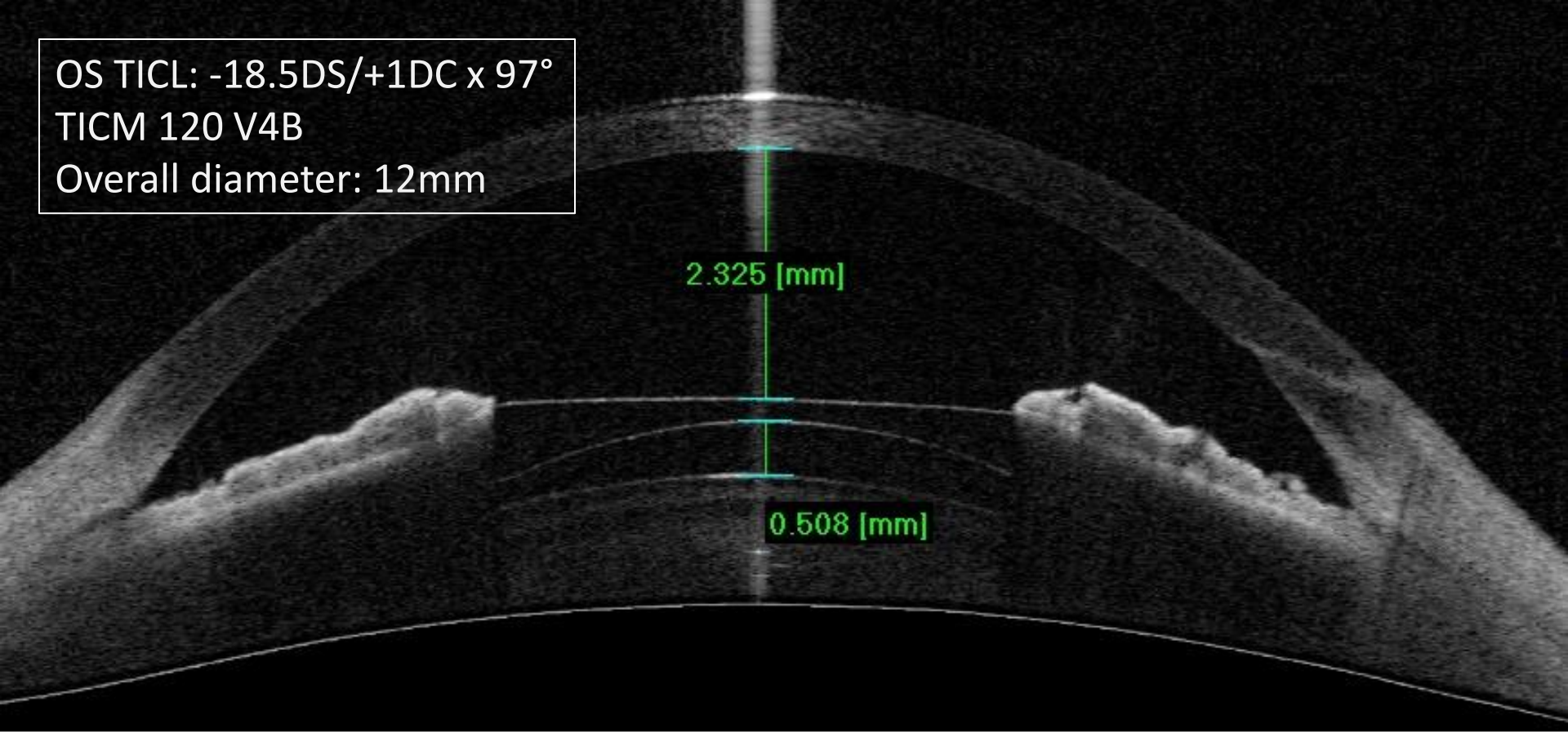
OD TICL Exchange:
- 20DS/+2DC x 118°
TICM 120 V4
Post op 6 months:
Vault: 0.627mm
Specular: 2924

OS:
WTW: 11.8 mm
STS: 12.1 mm

↓

ICL size: 12mm chosen





In OS the ICL size suggested by the WTW was 12.5mm

But

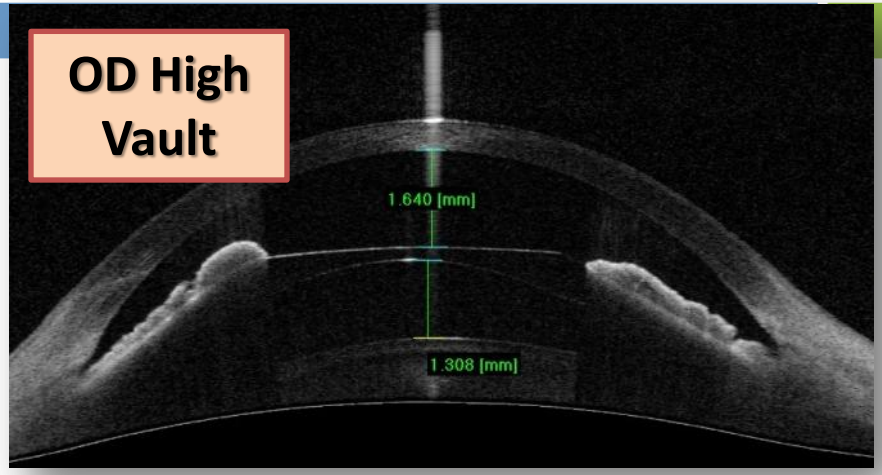
↓

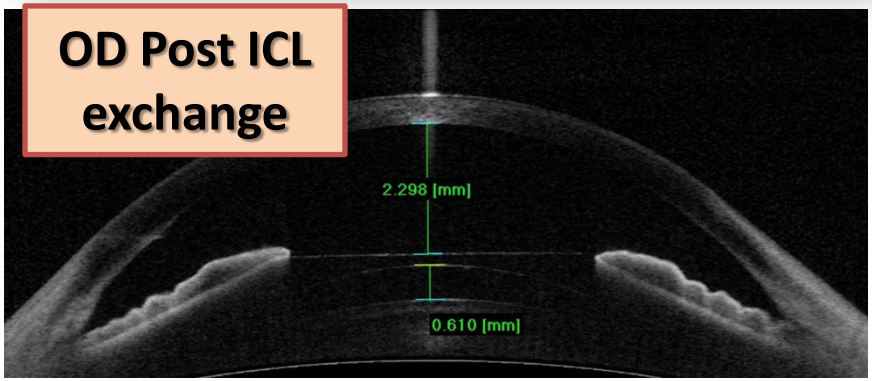
Considering the experience in OD the ICL was undersized to 12mm

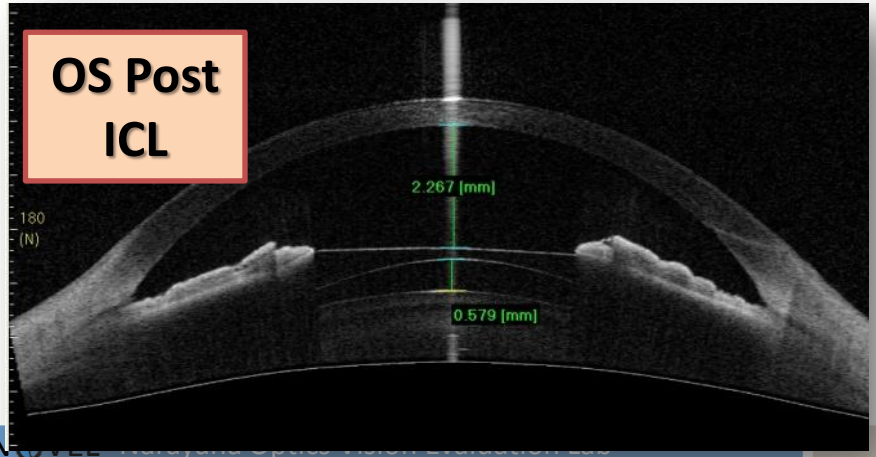
↓

VAULT in both eyes after under-sizing was ideal

Case 2: AS/26/M







- WTW (Orbscan & Digital Caliper)
  - OD: 11.8mm
  - OS: 11.8mm
- ICL
  - **OD: 12.5 mm -> 12.0mm**

  (exchanged for 0.5 mm smaller dia ICL)
  - OS: 12.0

  (primarily undersized considering OD ICL exchange)
- Vault
  - **OD: 1.308 mm -> 0.61mm**

Change in vault=0.689mm

  - OS: 0.579 mm

VISUAL ACUITY & QUALITY METRICS

Case 1

- **OD: UDVA: BASELINE, post TICL & post TICL exchange: 6/6**
- **OS: UDVA: BASELINE, post TICL: 6/6**

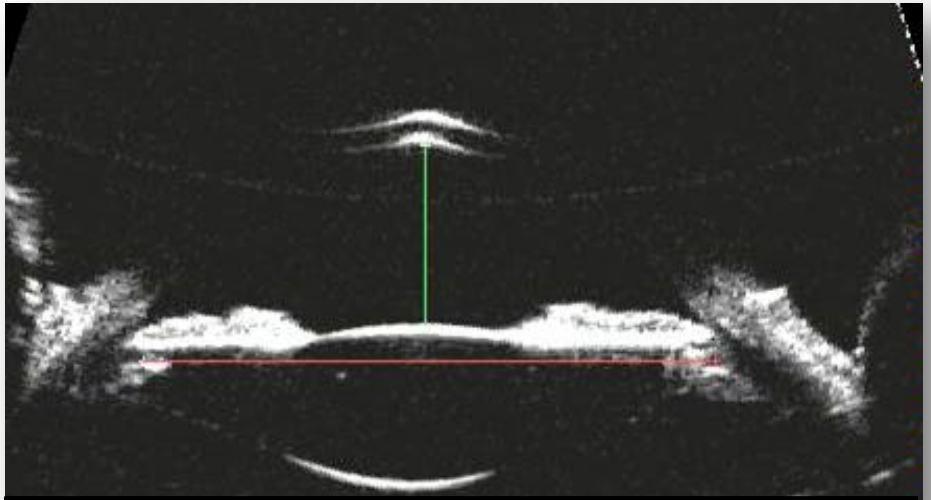
Case 2

- **OD: UDVA: BASELINE, post TICL & post TICL exchange: 6/6**
- **OS: UDVA: BASELINE, post TICL: 6/6**

QUALITY METRICS

- **Point spread function and MTF are comparable in the 2 eyes s/p ICL exchange and in the 2 eyes s/p primary ICL**

How do I prevent this?



Calculate ICL size according to WTW
Pre-op UBM: STS measure
Correlate ICL size with STS

If diff ≤ 0.25mm:
Eg: ICL 12.0
STS 11.75 to 12.25 mm
PROCEED with the same ICL dia

If diff ≥ 0.25mm:
ADJUST SIZE ACCORDING TO STS
ICL 12.0 &
STS < 11.75 mm: UNDERSIZE
STS > 12.25 mm: OVERSIZE

CAUTION with UBM STS measurements:
Very highly operator dependent

- WTW based sizing of the ICL is occasionally prone to vault abnormalities.
- ICL exchange is the only solution
- Need for ICL exchange can be reduced by pre-op STS measurements by Ultrasound biomicroscopy
- We were able to document that the ICL exchange is safe and effective
  - Change in ECD was marginally higher in eyes with exchange
  - IOP and angle structures were the same
  - VISUAL ACUITY & VISUAL QUALITY METRICS were comparable

THANK YOU