MEACO 2016
XIII International Congress of the Middle East Africa Council of Ophthalmology
4 – 8 May, 2016 | Bahrain

PiXL™
NEW HOPE WITH AVEDRO'S MOSAIC™-SYSTEM
THINK OUTSIDE THE BOX

NO FINANCIAL INTEREST

Sylvia Paulig MD

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History of crosslinking (CXL)

- Bases for the currently employed corneal crosslinking techniques were developed in Europe.
- Research at the University of Dresden in the late 1990's (Prof. Seiler/Prof. Spörl).
- Human studies of UV-induced corneal crosslinking began in 2003.

1. Standard-CXL: 30 min. soaking time / UV-Light 30 min. / 3 mW / 5400 mJ energy
2. Accelerated CXL with Avedro's KXL I: 30 min. soaking time / UV-Light 3 min / 30 mW / 5400 mJ energy

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History of crosslinking (CXL)

3. Treatment with transepithelial Riboflavin: time + energy similar to previous treatments
4. New: personalized CXL (PiXL™) with Avedro's KXL II (Mosaic™), higher power, individual shape, pulsed mode, different treatment time

Courtesy of Avedro

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Advantages and possibilities using Mosaic™ (PiXL™)

1. General facts

- Individual treatment profils
- Customized shapes (only certain areas of the cornea will recieve UV-irridation)
- Pulsed mode (to deliever oxygen into the cornea), different power (15, 30, 45 mW)
- Real-time eye-tracking
- Different treatment time (usually varies between 10–16 minutes)

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Advantages and possibilities using Mosaic™ (PiXL™)

1.1. For Keratoconus

- Flattening of the conus
- Area around the conus recieves less energy
- Correction of refractive error (to a certain point)
- Results are more stable
- Improvement of visual acuity
- New treatment hope for advanced Keratoconus / special cases
- Less time consuming, can be treated Epi-on or Epi-off

Advantages and possibilities using Mosaic™ (PiXL™)

1.2. PiXL™

- Photorefractive intrastromal crosslinking
- Non-invasive refractive correction just by strengthening the cornea
- Significantly higher power output, pulsed mode, about up to 15 mJ energy
- Vision improvement using just crosslinking

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Case presentation

- **Male patient, 38 years old, from Iraq**
- **Keratoconus on both eyes**
- History:
  - 2008 right eye Kerarings (Iraq)
  - 2014 first visit at our Clinic → progressive Keratoconus on both eyes,
  - UCVA R 0,05 (20/400) BCVA=UCVA,
    UCVA L 0,50 (20/40) BCVA L 0,63 (20/30)
  - We successfully performed conventional (standard) Epi-on CXL (Avedro KXL I) on both eyes,
  - 2015: second visit at our Clinic
- **Patient asks for explanting the Kerarings because of blurred vision, UCVA=BCVA on right eye 0,05 (20/400) with pinhole 0,4 (20/50), still conus and elevation, refractive error between Kerarings. Left eye showed a stabilized Keratoconus, UCVA=BCVA on left eye 0,63 (20/30).**

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What to do?

The idea: personalized Epi-on crosslinking (PiXL™) on both eyes using Avedro's Mosaic™ system to get as good visual acuity as possible.

The treatment:

- Left eye: performing PiXL™ – personalized, transepithelial pattern, just on top of the conus high energy (15 mJ) and surrounded less energy (7,2 mJ)
- Right eye: performing PiXL™ – inside the Kerarings, to flatten the conus and reduce the refractive error as much as possible (15 mJ)

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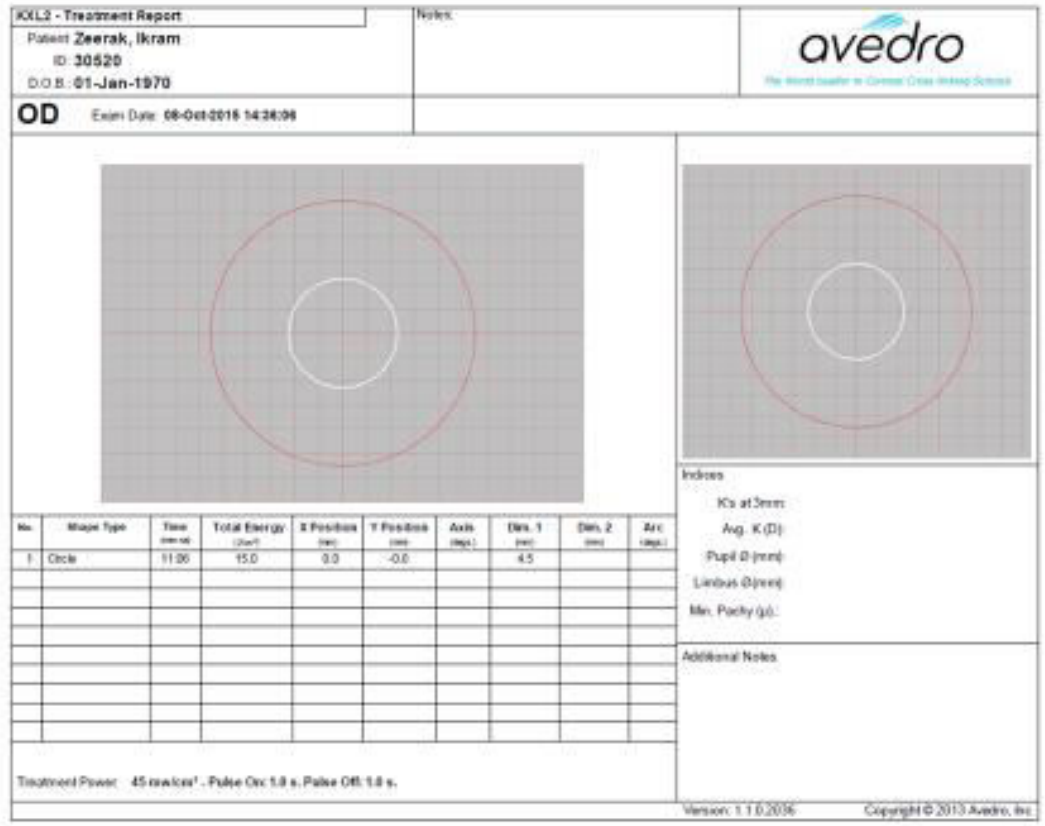
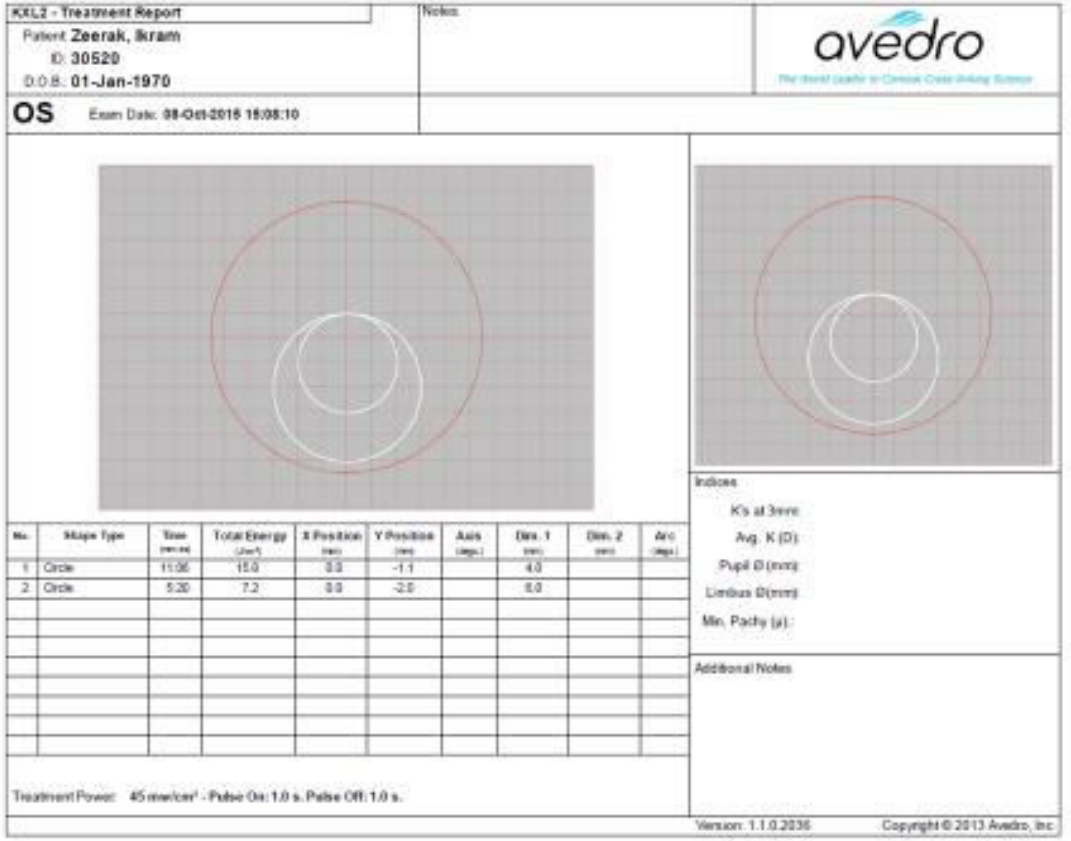
Treatment profiles





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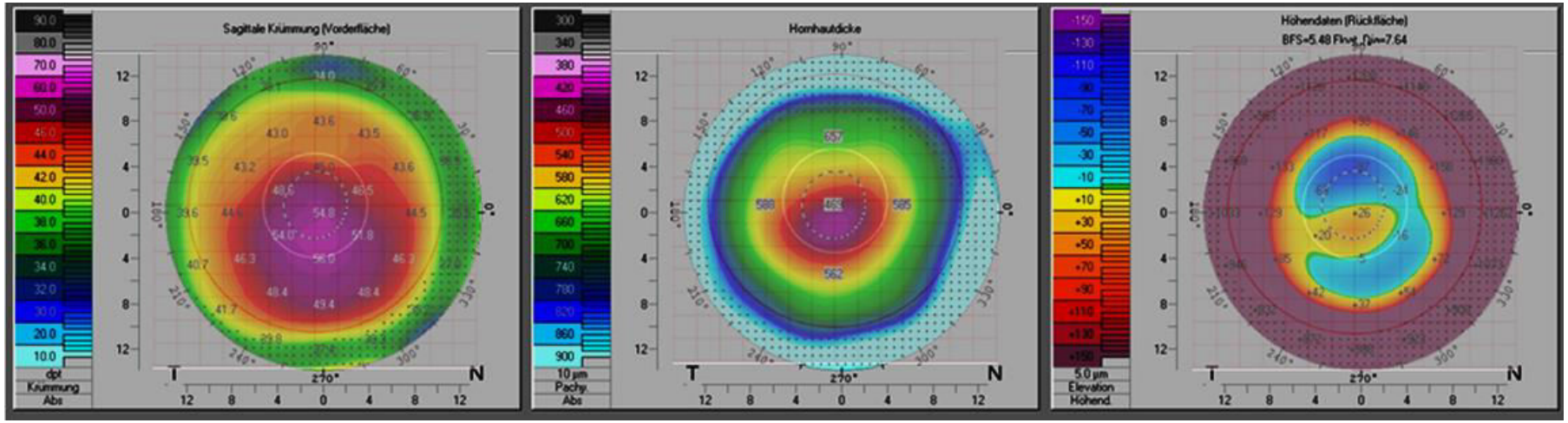
Pentacam pre-operatively



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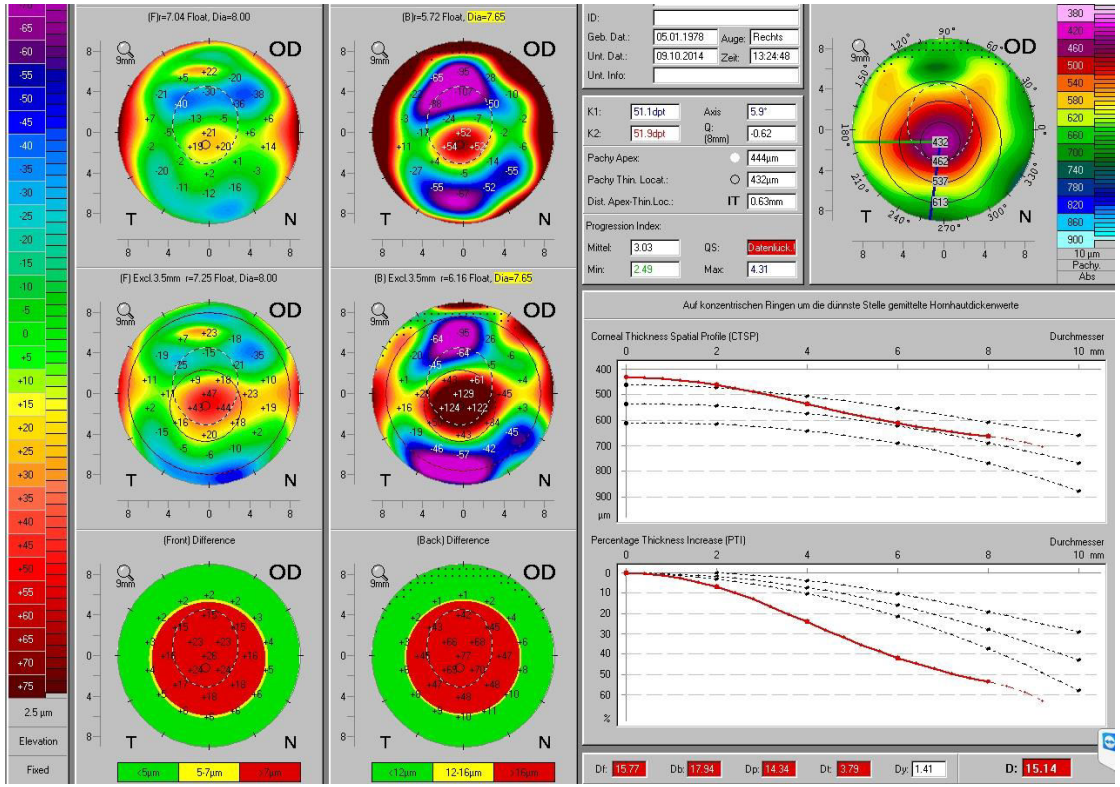
Pentacam pre-operatively



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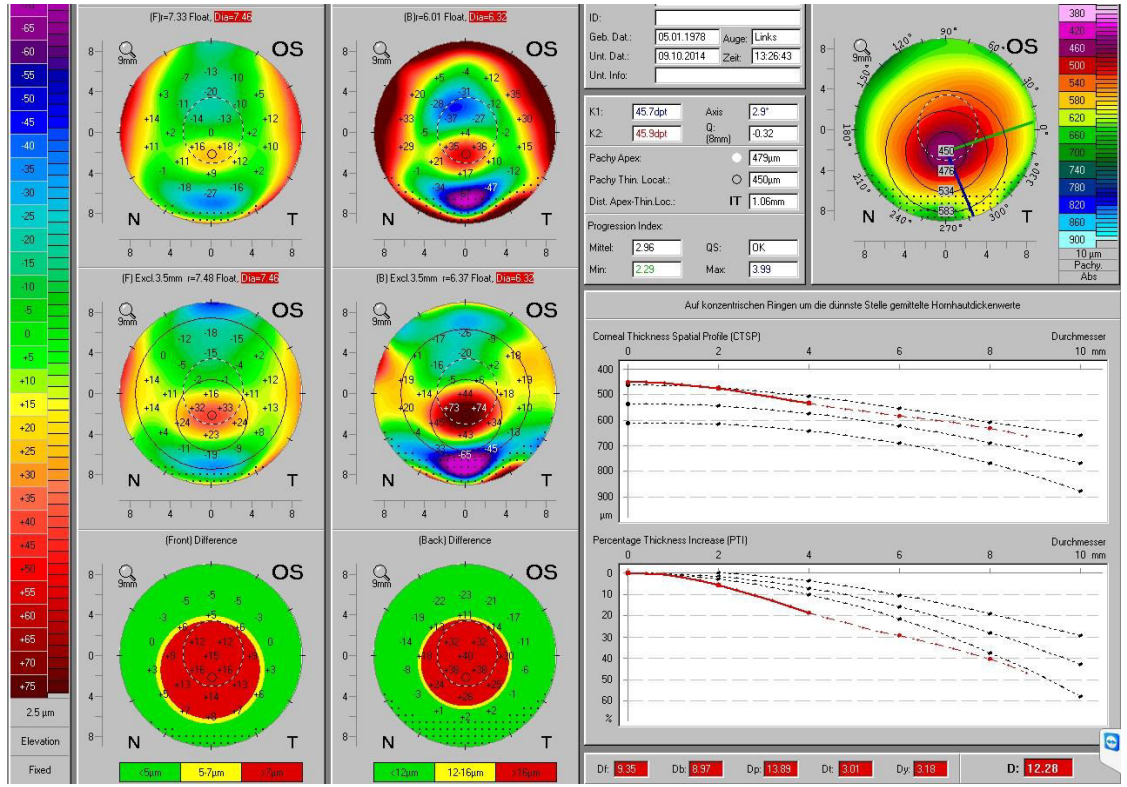

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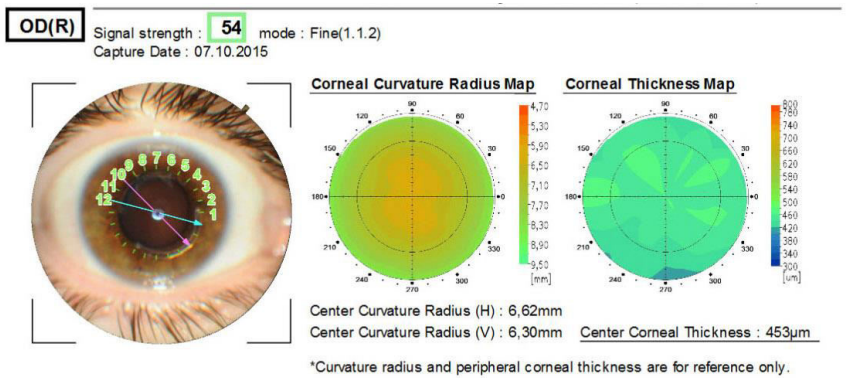
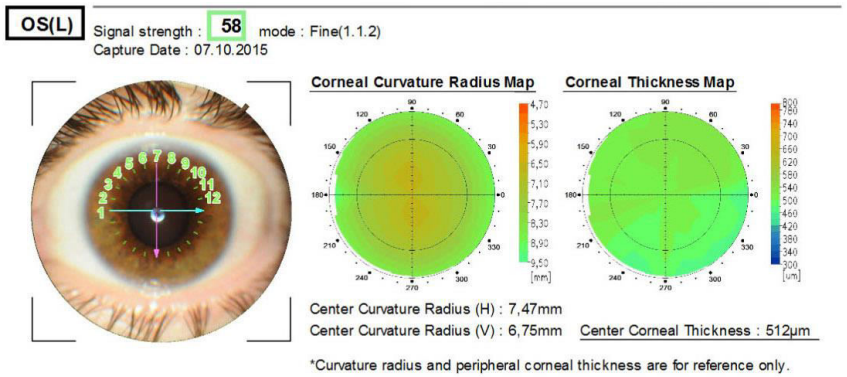
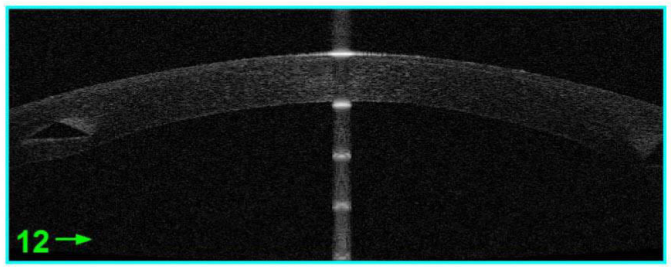
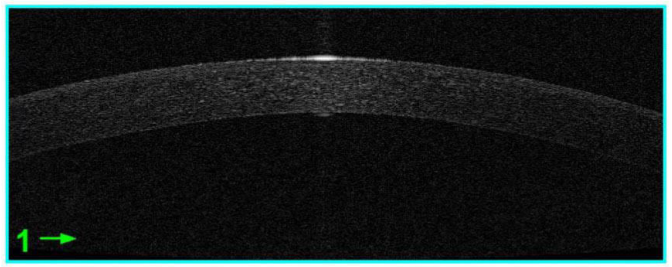
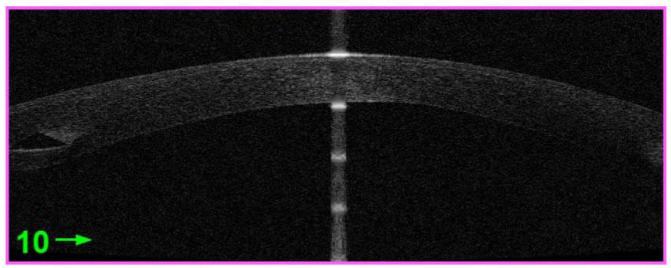
OCT pre-operatively

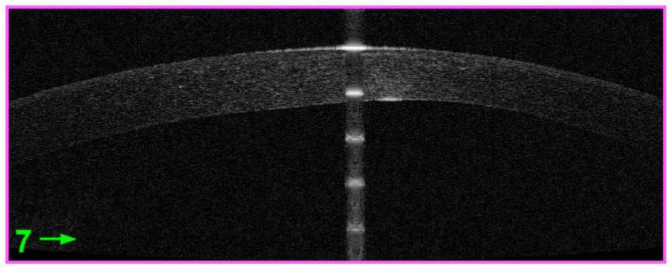












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Results

Visusal improvement (3 days post-operatively)

• UCVA:	R 0,4 (20/50)	L 0,63 (20/30)
• BCVA:	R 0,63 (20/30)	L 0,8 (20/25)
• Pinhole:	R 1,0 (20/20)	L 1,0 (20/20)

Post surgery we were surprised about the significant improvement of patients visual acuity.

Patient is very happy about his results.

In our next presentation we are looking forward to informing you about the long-term results of this treatment.

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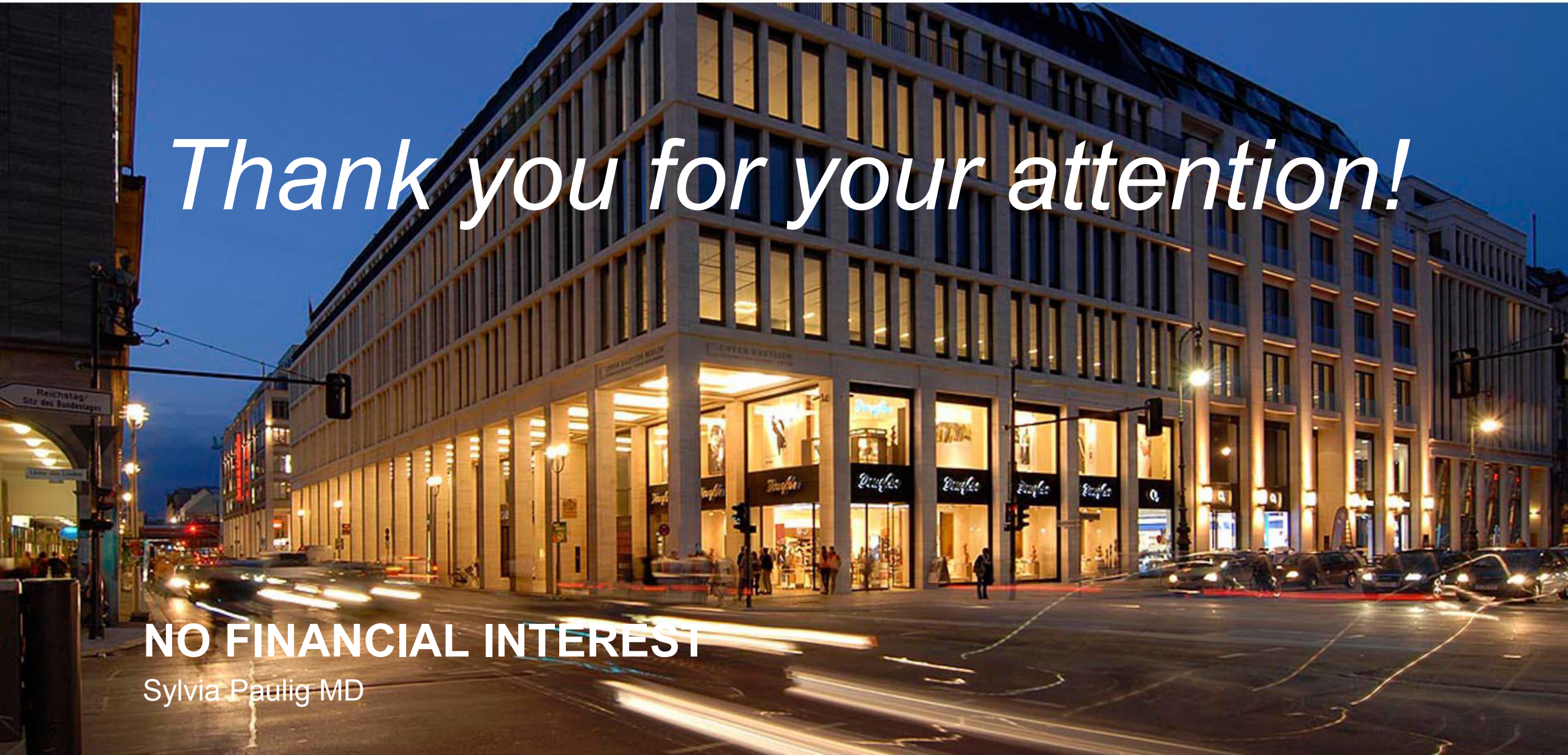
Conclusion

- PiXL™ is a non invasive method for an effective treatment even in so far unthinkable situations.
- Of course more studies and higher amount of treatment cases need to be done.
- Future: imaginable are treatments of astigmatism, lower myopia and presbyopia – we started to treat all these options already – results are promising.



Thank you for your attention!

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