New Cutting Edge Technology to Manage a Case of Dense Cataract with Keratoconus

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**Purpose**
To present modern management of a case with dense cataract and keratoconus. Compare IOL master, Verion to ORA (Optic wave Refractive Analysis) for accuracy in providing Toric IOL power and axis.

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**Introduction**
Modern technology such as femtosecond laser assisted cataract surgery, Verion and ORA can precisely mark the axis and the power of toric IOL to correct high astigmatism for some keratoconus eye. Sufficient vision can be obtained post-op so further treatment like Lasik, rigid contact lens or corneal transplant can be avoided.

**Case Presentation**
63 years old male with history of corneal transplant and wearing a rigid hard contact lens with 2+ NS cataract over his right eye. He presented with 20/40 vision right eye (-1.00+0.25x45) and 20/200 (-7.75+1.00x3) vision left eye. There is dense cataract (2+ NS, 3+PSC) and a stage 1 keratoconus (Amsler-Krumeich classification) presented over left eye. K: 44.75x48.75x7, mean K: 45.9
- Pre-op IOL Master and Alcon toric IOL calculator suggested SN6AT8 +18.00 at 9 degree for -1.00
- Pre-op Verion suggested SN6AT9 +18.50 at 9 degree for -1.17+0.20x9
- ORA intraoperatively suggested +15.50 T4 at 14 degree for -0.64+0.50x111
- Surgery was done with LenSx 2.23 and Centurion phaco under Verion imaging
- ORA was used to select the toric IOL and rotation of the IOL: +15.50 T4 at 14 degree for -0.64+0.50x111

**Result**
1 month post-op: Vision without correction: 20/25, Refraction: -0.50+1.25x11 20/20-2.

**Discussion**
Due to difficulty in accurate Intra Ocular Lens (IOL) power calculation and correction of astigmatism cataract surgery in eyes with keratoconus can be challenging. Different formula in toric IOL calculation can be used in mild keratoconus. For moderate and advanced keratoconus, predictability in IOL power calculation is more difficult, and no particular formula seems to provide an advantage over another [1]. Toric IOLs may be used to provide good uncorrected postoperative visual acuity after cataract surgery in an eye with keratoconus and high regular corneal astigmatism [2, 3]. However, It seems necessary to avoid cases with irregular astigmatism with toric IOL because the induced higher order aberrations may severely compromise the quality of vision.

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Conclusion

With these new cutting-edge technologies in selecting correct power and axis for toric IOL for this case, satisfactory refractive outcome was achieved. Rigid contact lens or cornea transplant can be avoided for this patient. Future case series study to further confirm the adequacy of these technologies is needed.

Figure 1: Right eye with rigid contact lens, cornea graft and cataract

![Figure 1](image)

Figure 2: Pentacam of left eye

![Figure 2](image)
Figure 3: Verion and LenSx 2.23

![Image of Verion and LenSx 2.23](image_url)

Figure 4: Verion reading

![Image of Verion reading](image_url)
Figure 5: ORA reading

References