I. AXIAL LENGTH MEASUREMENT

The Ossoinig Immersion is proven to consistently produce an axial length measurement that is 0.26 mm longer than that using the application technique that may indent the cornea, creating an artificially shorter reading. An 8 MHz non-focused transducer is recommended - can be attached to most US machines. An Ossoinig shell (cup) is placed between the lids and filled with Goniosol [cut 50% with Dacriose]. The probe is placed into the fluid and aimed in an axial direction. Optical biometry methods are easier and matched to equal Immersion. (See below)

   i. Prager Shell: Order from: ESI, Inc. www.ESI.com 763-473-2533 tab@eyesurgin.com

B. Direct read out of oscilloscope is optimal compared to “black box” readouts without scan.

C. Axiality determined by obtaining simultaneous maximum corneal and retinal spikes.

D. Always measure the axial length of both eyes [Standard of Care].

E. Consider STAPHYLOMA in problem case with AL >25 mm, need B-scan or Optical biometer.

II. CORNEAL POWER [K]

A. The manual keratometer should be standardized often. This is done with steel calibration balls from the manufacturer.

B. K reading errors = diopeter for diopeter error in IOL power. Hard CL’s must be kept out > 2 weeks (Lawsuit)

C. Average K reading is always used; Cylinder is ignored. It has NO effect on IOL spherical power

D. Ignore surgical change in corneal power unless a study of your cases reveals a consistent trend

E. PK: Do secondary IOL after corneal transplant heals when the true K reading is able to be obtained

G. Refractive Surgery Eyes

   1. Over 30 methods to calculate K or fudge the IOL power.

   2. ARAMBERRI DOUBLE-K METHOD: Use Pre-op K to predict the ACD and PO calculated K for the IOL power.

   3. IANCHULEV OR REFRACTION METHOD: [Not FDA Approved] Alcon WaveTec ORA microscope system proven accurate.

DOWNLOAD FREE HOFER/SAVINI LASIK TOOL at www.IOLPowerClub.org Click on Tool
III. ANTERIOR CHAMBER DEPTH

A. All formulas require an AC depth (ACD) = Corneal thick + Endo to IOL surf dist + 10% Tc (Pr-cvx) or 50% Tvl (Bicvx)]
B. ACD (ELP) is not the ultrasound pre-op anatomical AC depth reading; it is the axial position of the IOL (estimated).
C. ACD is individual to each IOL style and can be predicted by the formula or is the average of a PO series.
D. The A constant in SRK formulas and the Surgeon Factor (SF) in the Holladay formula are used to predict ELP.
E. Holliday Q formula uses pACD and the Q formula to develop the predicted ELP for an individual eye.
F. Decrease IOL ~1.00 D when shifting from bag to sulcus placement (0.50 to 1.50 D depending on power of IOL).
G. Expect ~1.25 D/mm shift in IOL Position.

IV. FORMULAS

B. Historical Regression: SRK® (1980) SRK II [1988]
"SRK and SRK II formulas are outdated and are no longer recommended; use the SRK/T for IOL power." John Retzlaff, M.D.1990 (coauthor of SRK).
C. Modern Theoretic:
1. Holladay® I [1988]: Basic theoretic formula which calculates the corneal height (1st used by Olsen) added to the corneal thickness (0.56) and an IOL/surgeon specific constant (the SF), to calculate the ELP.
3. Hoffer® Q [1992]: Basic formula Holladay [1974]. Uses Q formula to predict ELP which is dependent upon AL and K, using a personalized pACD. As accurate as the Holladay 1 formula and superior in short eyes.
5. Haigis® [2000] Uses a0, a1, a2 for ELP. Optimize only a0 = Holler Q. Better if optimize all 3 using 350 PO eyes.
8. Barrett Universal II (2014) Online. 10. RBF No large studies yet show it to be superior; other new systems,
9. Kane: uses new modulators and artificial intelligence; showing to be most accurate formula so far.

V. COMPUTER DATABASE PROGRAMS

1. Holladay® IOL Consultant. Uses Double-K only for Holladay 2 formula, not for Holler Q Holladay 1 or SRK/T.
2. Olsen PhacoOptics uses Olsen C-constant and Ray Tracing, 3 .ASCRS Website Calculator.

VI. BIFOCAL IOL POWER

AL has no effect on Add power, K has minimal but ACD has real effect on add power5-6.

VII. CLINICAL RULES

1. Be sure Surgeon knows more about lens calculation than their Technicians do.
2. Be wary of transcription errors, e.g. AL and K readings. Calculate an average K quickly and use it from then on.
3. If you are accurate, aim for emmetropia but ask the patient what they want. If they want other, have them sign for it.
4. IOL power for a monocular cataract in a bilateral high myope: carefully discuss the options of monocular emmetropia and the necessity of wearing a contact lens on the other eye versus lifelong myopia.
5. A 7 D error at 3 days is 7 D at 3 yrs: DO IOL EXCHANGE QUICKLY! USE Piggyback IOLs: Error Minus X1; Plus X1.5

Optical Biometers
• Work in 95% of eyes.
• Setup Must Have IR set to 1.3375 or Hoffer Q No Good
• BEST in Silicone Oil eyes

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<th>Optical Biometers</th>
<th>Best Modern Formulas 2021</th>
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<td>Barrett, EVO, Hoffer Q &amp; Kane may be best overall.</td>
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Hoffer QST Website

NAESER/SAVINI Toric Calcs
LASIK/PRK/RK Eye Calcs
Research & Optimization
Equal or Better than the best

Bibliography:

MANY PAPERS & CHAPTERS CAN BE DOWNLOADED FROM JCRS, ResearchGate.com and IOLPowerClub.org.
11. Hoffer QST Website: www.HofferQST.com Free calculations [Næsæ/Savini Toric Calcs] [LASIK Eye Calcs]