

Post LASIK Phaco: How to Avoid & Treat a Refractive Surprise

By

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No Financial Interest
in any of the material in
this presentation

- LASIK has been performed now for over 2 decades.
- A growing number of LASIK patients have developed age related lens opacities, and are now in need for cataract surgery.

Such patients opted for LVC in the first place to enjoy **spectacle independence**, so, naturally, they are eager to maintain this privilege.

However, in post LASIK phaco, **refractive surprises** are common, and can be a source of great patient **dissatisfaction**, in spite of an excellent surgical technique.

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5

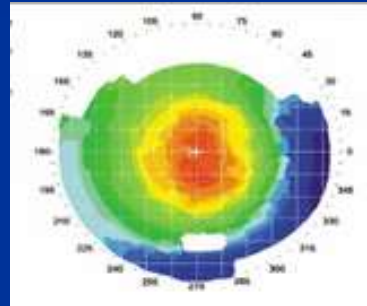
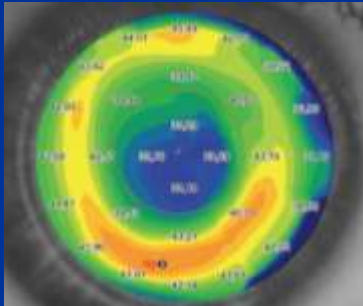
Preop Diagnostic Topography

- Confirms that LVC was performed
- Sometimes, patients confuse the term **laser** (for a retinal problem) with **LASIK!**
- They may not be sure whether they had a myopic or a hyperopic ttt, so we look for the characteristic central **flattening** or **steepening**

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6

Post LASIK Topography



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7

- It is well known that standard IOL power calculations are less accurate in post LASIK eyes, due to **2 specific errors**.
- Those 2 errors result in a **hyperopic** refractive surprise in post **myopic** LASIK and a **myopic** surprise in post **hyperopic** LASIK

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8

What are these 2 Errors?

1. Measuring the **TOTAL Corneal Power**
2. Determination of the Effective Lens Position (**ELP**)

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9

Error #1: TOTAL Corneal Power

- **TOTAL** corneal power is needed for IOL power calc. formulas.
- However, keratometers measure only the **anterior** corneal curvature
- They employ a default post : ant **ratio** to extrapolate the total power

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10

LASIK alters only the anterior corneal curvature, (changing the normal ant: post relationship), so the default ratio used is **no longer valid**.

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11

Keratometers will give **steeper K** readings than the actual Ks, and hence, underestimate the IOL power, resulting in a **hyperopic** refractive surprise after myopic LASIK.

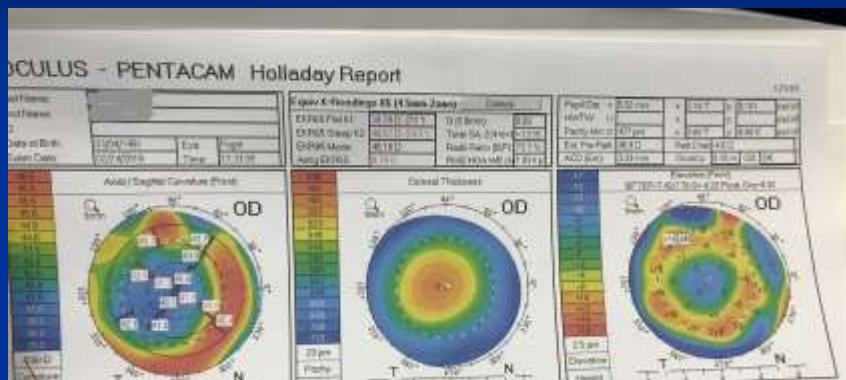
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12

How to overcome this Problem?

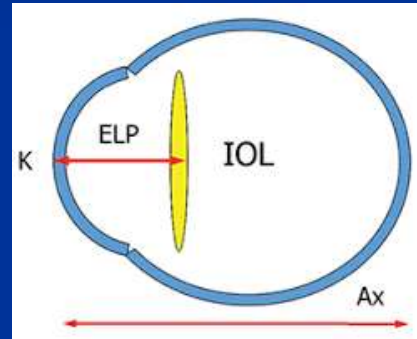
- Clinical History Method
- **Pentacam Equivelant K Reading**
- **Haigis L formula (available on the older IOLMaster 500)**
- True Keratometry (using SS OCT in the newer IOLMaster 700)

Holladay Report (Pentacam): measures TOTAL corneal power



Error #2: ELP

- Is the dist between corneal vertex & the IOL's optical center
- Popular 3rd gen formulas use AL & Ks, to **estimate** the postop **ELP**



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IOL power depends on its actual position

If a **20 D** lens in the bag produces emmetropia,

That same lens has an effective power of **21 D** w only a 0.5 mm **ant** disp

If moved **post** by 0.5 mm, it's effective power would only be **19 D**.

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16

ELP post Myopic LASIK

- Ks are flatter, so formulas predict a falsely shallower ACD, thus a more **anterior** ELP with **underestimation** of IOL power, and a consequent **hyperopic** refractive surprise!
- The flatter the cornea, the bigger the problem

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17

Possible Solutions

1. "Aramberri Double K" correction method
2. Haigis Formula (together w Pentacam EKR)
3. Haigis L Formula (without Pentacam)
4. ASCRS online iolcalc

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18

1. "Aramberri Double K" correction method

Can be used together with popular
3rd generation formulas (Holladay 1,
SRKT & Hoffer Q)

The "Double K" Method uses:

Pre LASIK Ks for **ELP** calculation

Post LASIK Ks for **IOL power**
calculation.

2. Haigis Formula

uses actual **ACD** measured by IOL Master to determine the **ELP**

3. Haigis-L Formula

calculates a **new corneal radius** based on the Haigis-L algorithm (no pentacam needed)

$$r_{corr} = \frac{331.5}{-5.1625 \times r_{meas} + 82.2603 - 0.35}$$

4. Using ASCRS website <http://iolcalc.org>

IOL power can be calculated by a **variety of formulas**, (both those requiring historical data and those that don't)

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23

Choice of IOLs in post LASIK eyes?

■ **Aspheric:**

- For post M LASIK (higher SA)
- Avoid them after H LASIK and in decentered ablations

■ **Multifocals**

- Better avoided (as they further increase HOA)

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24

Management of Refractive Surprises

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Patients should be counseled that despite maximum effort, results are not guaranteed, and that **corrective surgery** may be required.

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26

Possible Solutions

1. Glasses
2. LVC (LASIK or PRK)
3. Piggyback IOL
4. IOL Exchange

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27

1. LVC

Residual **hyperopia** is often less predictably corrected by LVC than myopia.

- **LASIK flap re-lifting:**
risk of **epithelial ingrowth**.
- **Surface ablation on flap:**
risk of **haze**

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2. Piggyback IOLs (in sulcus)

Work best in patients with a **hyperopic** refractive surprises as well as:

- Stable IOL in capsular bag
- Normal or deep AC
- Normal corneal endothelium
- No evidence of pigment dispersion syndrome.

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29

Unlike with an IOL exchange,
piggyback IOL power calculation
relies entirely on the patient's
pseudophakic refractive error

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30

Formulas For Piggyback IOLs

- For a **hyperopic** refractive error:

IOL power = **1.5** x desired SE change

- For **myopic** refractive error:

IOL power = **1.2** x desired SE change

Piggyback Technique

Is familiar to all cataract surgeons and does not require additional equipment or a learning curve.

Interlenticular Opacification

- A membrane developing between the primary and the piggyback lens is the **most common & most serious** complication.
- Could be avoided by IOLs specially designed for this purpose, such as the Rayner **Sulcoflex**

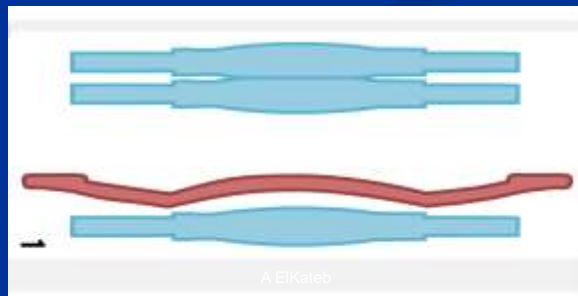
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33

Sulcoflex

Single-piece **hydrophilic acrylic** lens, w an overall D of 14 mm.

The 6.5 mm **optic** has round, smooth edges, a convex ant, and a **concave** post surface, to avoid ILO



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34

Sulcoflex

- **Haptics** are soft & undulating w a 10° post **angulation** to keep the IOL away from post iris surface, reducing pigm disp.
- *Unfortunately, not yet available in Egypt.*



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35

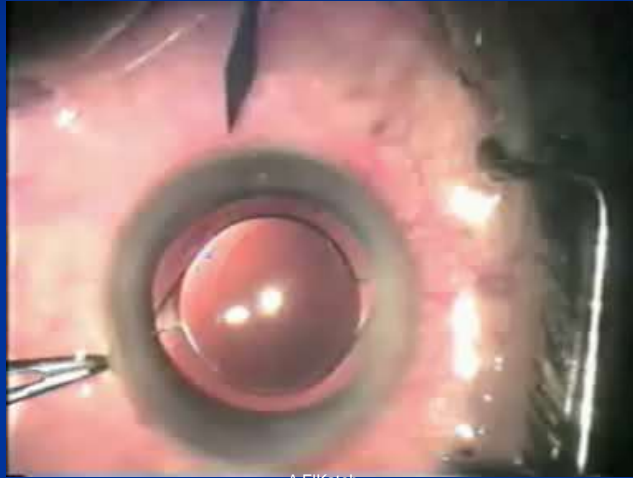
3. IOL Exchange

- Don't wait too long, to avoid adhesions betw IOL & caps bag
- Bisect or refold the optic, or cut a triang sector and rotate the rest f the optic out.
- **Temporary bipseudophakia:** to protect the capsular bag, by implanting the correct power IOL in the bag, before cutting the wrong power IOL

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36

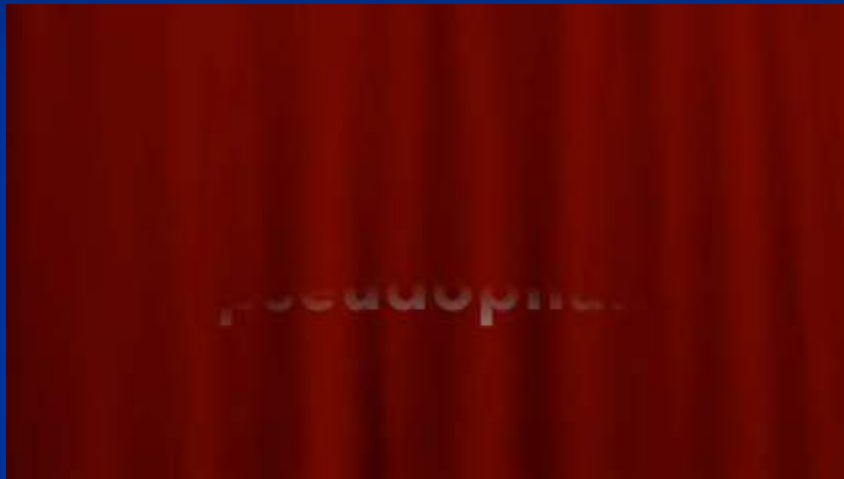
IOL Exchange 4.1 mm CCI **IO Refolding**



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37

IOL Exchange (thru 2.2mm CCI) **Temporary Bipseudophakia**



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38

THANK YOU

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39