Refractive and Refractive Cataract Surgery: What can we treat and who don’t we want to treat

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Refractive Surgery

Who are our patients?

Where are we with Laser Vision Correction Today?

Life lessons from Dr. Karl.....

LVC Procedures by Quarter

Financial Interest Disclosure

- Alcon – consultant/grants/research/speaker/travel
- Allergan – consultant/grants/research/speaker/travel
- B & L – consultant/travel/speaker
- LaserACE – consultant/MAB
- LenSx – consultant/research/MAB
- Nexus – consultant/research/MAB
- Nidek – consultant/grants/research
- Refocus – consultant/grants/research/speaker/travel
- TLC medical director
- 1800 Doctors-MAB

Femtosecond Laser Flaps vs. Mechanical Laser Flaps Preference

*Estimated*
Where are the Patients Coming From?

Key Take Aways from Current Data

- LVC procedures are on the rise again.
- Femtosecond flaps for LVC surgery are now the most common flaps in the US.
- Satisfied patients are the best source of new patients.

External Factor Affecting LVC

- Demographic shift
  - Baby Boomers
  - Millennials
    - Gen X profile
    - Gen Y profile

Cost and the outcome are considered the most important factors in the decision to have LVC

Consumer Challenges to Consider

What are Refractive Patients Looking for?

Quality of Life
- Education on their options
- Improvement in their vision
- Spectacle Freedom
- A surgeon’s recommendation
What about the ocular surface?

Lid pattern staining  Diffuse staining  Meibomian gland disease

The Reasons

- Improved Lid Margin Hygiene
- Improved Lids promote an improved Tear Film
- Improved Tear Film allows for better diagnostics on the day of surgery
- What goes in the computer is what comes out
- Better numbers equals Better Vision and outcomes as soon as day one
- Better outcomes means Less Enhancements

Regimen V. NO REGIMEN AND THE EFFECT ON Postoperative day 1 UCVA

- Topical Corticosteroid
  - 4x/day for the days prior to surgery
- Topical Fluroquinolone
  - 4x/day for the days prior to surgery
- If you work in a medical environment,
  - I add Polytrim or Gentamicin
  - (Trust Study)

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Final Comparison Myopia

Final Comparison Hyperopia

Conclusions

- There was an improvement in UCVA at the POD 1 level related to the switch from the microkeratome to the femtosecond laser.
- The major improvement in POD 1 UCVA was related to the preoperative regimen of a corticosteroid 4x/day and a fluroquinolone 4x/day for 3 days preoperatively.
Therapeutics

COULD IT BE WE NEED TO WORK ON THE OCULAR SURFACE?

Dry Eye Following LASIK

- Reported incidence of over 50%, but reports vary widely
  - 21% of LASIK patients seeking consultation for complications complained of dry eye
- Most common within 6 months postsurgery, but may last a year or more
- Reduced incidence with FS laser flaps


Cyclosporine Study

PROFILE

COULD IT BE WE NEED TO WORK ON THE LASER ABLATION PROFILE?

Slide courtesy of PD Dr. Michael Mrochen / IROC - Zurich, Switzerland
REFRACTION

COULD IT BE WE NEED TO WORK ON THE DATA INPUT AND OUTPUT?

Wavefront optimized

WFO=Pure Refractive treatment with reduced induction of HOA's

How do you measure success?

Enhancements
Outcomes
BCVA=UCVA
Patient Satisfaction

Patient Satisfaction

WFG vs Conventional LASIK (all fs flaps)

Wavefront Outcomes of Custom LASIK, PRK, and IntraLASIK, Shallhorn, s, et all, WFC, Vancouver, BC
Femtosecond and Excimer Lasers

- Combination of femtosecond flap with excimer laser ablation for 100% of primary LASIK procedures.
- Good technologies available by several manufacturers.

<table>
<thead>
<tr>
<th>Excimer Laser</th>
<th>WaveLight® Allegretto Wave® Eye-Q</th>
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<tbody>
<tr>
<td>Tracker Speed</td>
<td>60Hz</td>
</tr>
<tr>
<td>US Rx DFU</td>
<td>Myopia, Hyperopia, Mixed, PTK</td>
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<tr>
<td>Wavefront Optimized® Ablation</td>
<td>No</td>
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<tr>
<td>Wavefront Guided Ablation</td>
<td>Yes</td>
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<tr>
<td>Iris Registration</td>
<td>Yes</td>
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<tr>
<td>Spot Size</td>
<td>Variable 0.65 - 5.0mm</td>
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<tr>
<td>Beam Profile</td>
<td>Flat Top</td>
</tr>
<tr>
<td>Laser Speed</td>
<td>Variable 6-20 Hz</td>
</tr>
</tbody>
</table>

Technical Details

Refractive Surgery Consultant-200 Hz

Internet based refractive analysis-400 Hz

Optimizing the Optical Zone

- Controlling the peripheral ablation profile allows for:
  - Large, true optical zones
  - Minimized and smooth transition zones
  - And with up to 9-mm treatment diameter, minimal induction of nighttime glare

Wavefront Optimized® optical zone

What About the Laser Technology

- Femtosecond Laser
- Excimer Laser
What about the Data Input

1. Refraction
2. Refraction
3. Refraction
4. Ocular Surface
5. Nomogram

Nomograms Have Multiple Influences

Speed of the Surgeon
Technique of the Surgeon
Laser Platform
Temperature
Humidity
Ocular Surface Disease
Tracking

Manifest Refraction
Age
Myopia
Hyperopia
Astigmatism
Speed of the laser
Registration

Wavefront Optimized® Ablation -400 Hz*

- Wavefront Optimized® Treatment=Pure Refractive treatment with reduced induction of HOA's
- Stonecipher finding support FDA Clinical Data

Enhancements Cost More than Money

1. Patients think of an enhancement as failure of the procedure
2. Enhancements cost us around $500.00/case
3. Lost surgery slot and consultation slot
4. Loss of patient referrals because it didn't work
5. Decreased doctor referrals because you had to do it twice
6. Lost play time because you were wasting your time doing enhancements.
Patient Satisfaction

- In our practice patients say:
  - “It went by quickly”
  - “No big deal”
  - “I only remember one laser”
  - “Your staff is awesome”
  - “Your staff treated me like I was part of the family”
- Minimal wait time
- Procedure flow
- Outcomes

COMPARISON OF POSTOPERATIVE DAY 1 AND MONTH 1 VISUAL OUTCOMES BETWEEN LASER VISION CORRECTION AND FEMTOSECOND CATARACT SURGERY

IS THE FEMTOSECOND LASER REALLY WORTH IT?

METHODS

- 2 GROUPS (N=103)
  - LENSX
  - CE IOL
- OUR CENTER HAS DONE OVER 1300 CASES (3 SURGEONS)
- THIS SERIES CONSECUTIVE PATIENTS FROM ONE SURGEON (KGS)
- PATIENTS TARGETED FOR PLANO
- 2.7 MM INCISION LENGTH
- PREMIUM IOL CHANNEL PATIENTS
- NO RETINAL OR SYSTEMIC PATHOLOGY
- NO COMPLICATIONS INTRAPERATIVELY OR POSTOPERATIVELY

AXIAL LENGTH

- LENSX
  - AVERAGE 24.2+/‐1.3 MM
  - RANGE 20.97 TO 28.46
- CE IOL
  - AVERAGE 23.3+/‐.5 MM
  - RANGE 21.25 TO 27.67

POD 1 AVERAGE UCVA

LENSX
- Day 1 Average
  - 0.74+/‐.21
CE IOL
- Day 1 Average
  - 0.69+/‐.1

ULTRASOUND TIMES

A 64% REDUCTION IN US TIME

ULTRASOUND TIMES

*Compared to surgical patients, femtosecond laser phacoemulsiﬁcation resulted in a 64% reduction in phacoemulsiﬁcation power and a 51% decrease in phacoemulsiﬁcation time.

POD 1 UCVA

MONTH 1 AVERAGE UCVA

LEN SX
- Month 1 Average
- 0.9+-0.19
- SE -0.23+-0.47 D

CE IOL
- Month 1 Average
- 0.82+-0.29
- SE -0.44+-0.41 D

WHAT ABOUT LASIK VS FS VS MANUAL?

- Overall 81% of the FS laser group saw 20/30 or better at 1 month compared to 65% of the manual group.
- In a comparative set of LASIK patients, overall 98% of the LASIK group saw 20/20 or better at 1 month and 89% of the group saw 20/20 at POD 1.

SUMMARY

- 64% REDUCTION IN ULTRASOUND TIME
- POD 1 100% ≤20/40 LEN SX v 77% CE IOL
- POD 1 67% ≤20/30 v 59% CE IOL
- MONTH 1 100% ≤20/40 LEN SX v 87% CE IOL
- MONTH 1 94% ≤20/30 LEN SX v 68% CE IOL

Enhancements

Is this a dirty word?
TLC Lifetime Commitment

These are what we do...

REASONS-LASIK

Poor refractions
Head alignment
Poor wavefronts
Regression
Dry Eye Disease

REASONS-CATARACT

Poor biometry
Dry eye disease
Wrong lens
Wrong patient
Residual Refractive Error
Poor lens alignment

PEARLS TO LIVE BY
No man left behind...
Doug Katsev

Remember you always get injured on your last run..............

When to Enhance

– Unhappy with current vision
– No anatomical issues to enhance
– Understands the risks of having a new procedure
– Has the appropriate expectations... this is even more important to understand than for the primary procedure.
– UCVA justifies an enhancement
– RX justifies an enhancement

How to prevent enhancements

• Aggressive preoperative management of ocular surface disease
• Diagnostics, diagnostics, diagnostics (Know what you have before you start)
• Measure twice cut once
• Monitor you outcomes to help get better results
• Establish patient expectations
Incidence of Concomitant Cataract & Dry Eye: A Prospective Health Assessment of Cataract Patients’ Ocular surface

William Trattler, MD
Damien Goldberg, MD, Charles Reilly, MD, Mark Packer, MD,
Parag Majmudar, MD, Eric Donnenfeld, MD, Marguerite McDonald, MD, Jon Vukich, MD, Gregg Berdy, MD,
Rajjan Malahotra, MD, and Karl Stonecipher, MD

Results: Tear Break up Time

• Average TBUT: 4.93 seconds
  – # of eyes with TBUT ≤ 5 seconds: 126 eyes (61.7%)
  – # of eyes with TBUT ≤ 7 seconds: 169 eyes (82.8%)

Corneal Staining

• Positive Corneal Staining: 154 eyes (75.5%)
• Central Corneal Staining: 92 eyes (45.1%)

Summary of PHACO Study

• Dry eye signs are very common in patients scheduled for cataract surgery
  – TBUT:
    • More than 60% with very abnormal TBUT (≤ 5 seconds)
      – 83% with TBUT TBUT ≤ 7 seconds
    – Corneal Staining
      • 45% with Central staining
      – Schirmer’s score
        • 18.6% with very low Schirmer’s (≤5mm)

A New Approach: WaveTec Vision’s Intraoperative Wavefront Technology

Standard Toric Cases Cylinder Reduction

Pre-op Keratometric Astigmatism
N= 86, Mean Cyl 1.91 ± 0.90

Post-op Refractive Cylinder
N= 86, Mean Cyl 0.50 ± 0.40

*Dr Stonecipher & Dr Woodcock Toric Data
**WHAT WE HAVE DONE.....**

- **SLIT LAMP LIMBAL RELAXING INCISIONS**

- **OPERATING ROOM LIMBAL RELAXING INCISIONS**

**The Enhancement**

- **Primary Procedure was PRK or LASIK**
  - Choices for enhancement are PRK, LASIK, Custom (LASIK or PRK), Laser Astigmatic Incisions, AK.
  - +/- MMC
- **Primary Procedure was RK**
  - May consider RLE or CE IOL depending on age
  - Enhancement procedure can be LASIK or PRK (with MMC)
  - IntraLase is not an option, as the gas can escape through the RK incisions.
- **Primary Procedure was Cataract Surgery**
  - IOL Exchange or Piggyback IOL
  - Choices for enhancement are PRK, LASIK, Custom (LASIK or PRK), Laser Astigmatic Incisions, AK.
  - +/- MMC

**Arcuate Astigmatic Incisions**

Excellent precision, depth, length, axis

**PRK Enhancements**

**MYOPIAN MYOPIAN ASTIGMATIC ENHANCEMENTS**

**CUSTOM, MIXED ASTIGMATIC, HYPEROIC AND HYPEROIC ASTIGMATIC ENHANCEMENTS**
Transepithelial PRK

- 50-58 micro PTK
  - 54 micron PTK
  - 58 micron PTK
- Previous surgery
- PTX diameter 6.5 mm
- Spherical Adjustment
  - 0.66 D
- Standard PRK 6.0 mm
- 125 MMC if indicated
  - Apply in all Enhancements
- Frozen BSS Irrigation
- Medications + BCL

Preop BCVA v. UCVA Post-Enh v Postop BCVA