SPECIALTY EYE INSTITUTE

Customized Cataract Surgery

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Definition

- Customized cataract surgery is a detailed process
- Matching lens technology to a patient's individual lifestyle.
- Involves an understanding of the MTF's of each lens at various focal points. Also involves analysis of the defocus curves of each lens.
- Need a screening process to determine what activities your patient does and how much time your patient spends doing them.

Customized Cataract Surgery is NOT just using Multifocal Lens Implants

- Some patients lifestyle are not well suited for multifocal lens implants
- Patients who do qualify for multifocal lenses are still offered a monofocal lens implant with discussion of insurance coverage
- Performed 2,342 cataract surgeries in 2018
  - Only 1 in 5 received a multifocal or EDOF lens
  - 4 in 5 received either a monofocal or monofocal toric lens

Pre-Op Evaluation

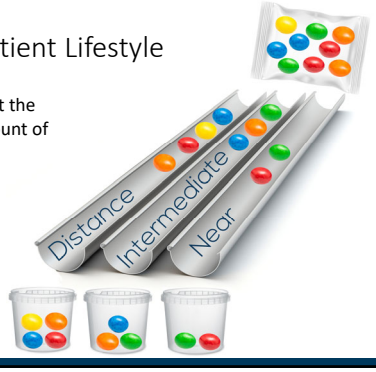
- Thorough ocular evaluation to detect conditions other than cataracts (ERM, ION, Glaucoma, Fuchs' Corneal Dystrophy. ABMD, ARMD, DES)
- Refractive error and corneal astigmatism
- OPD Wavescan III
  - Confirms corneal astigmatism
  - Corneal coma
    - Red Flag - > 0.32 microns – contraindication for multifocal lenses
  - Placedo disc – dry eye
  - Mesopic pupil size
    - Yellow Flag – pupils > 6 mm will have more side effects from multifocal lenses

Evaluation of Patient Lifestyle

- Discuss Buckets
- Discuss "Time"

Evaluation of Patient Lifestyle

Discuss with each patient the concept of a limited amount of M&M candies being distributed between 3 buckets.

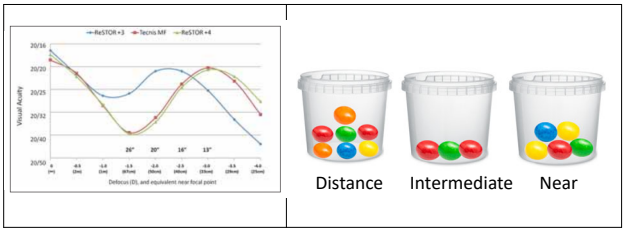


Evaluation of Patient Lifestyle

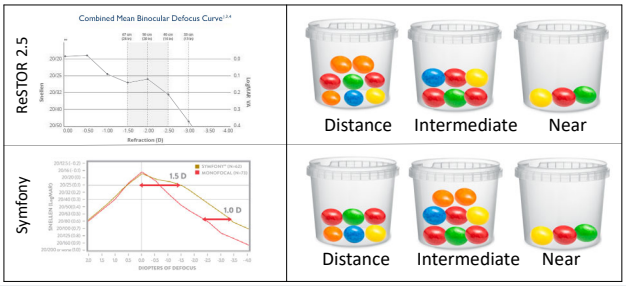
- Pre-op refractive error
  - -1.25 D -> -1.50 D
  - -2.00 D -> -2.50 D
  - Does this patient like to remove glasses to use computer or read?
    - If "YES" be very careful about recommending multifocal lenses

Current Intraocular Lenses
Monofocal / Monofocal Toric

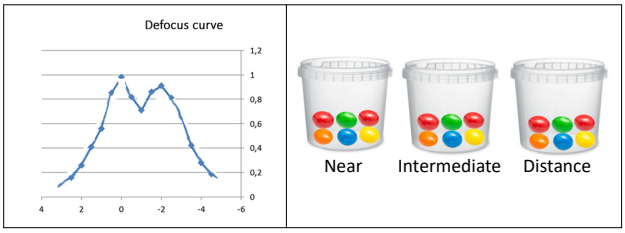
Current Intraocular Lenses
Multifocal Lenses - ReSTOR 3.0 / Technis Multifocal



Current Intraocular Lenses
Depth-of-Focus Lenses – ReSTOR 2.5 & Symfony



Current Intraocular Lenses
Trifocal - PanOptix



Questions?

Matching Technology with Lifestyle

- Based on what a patient does in each bucket and how much time spent in each bucket – can match technology with patient's individual lifestyle.
- Example:
  - Patient with an active outdoor lifestyle
  - Majority of the time he is in the distance bucket (hunting, golfing, farming)
  - Moderate amount of time in the middle bucket (computer)
  - Little time in the near bucket (reading)
- Recommended Technology
  - Bilateral ReSTOR 2.5 Lenses

Matching Technology with Lifestyle

- Example:
  - Patient spends majority of the time in the middle bucket
  - Works most of the day on the computer, enjoys crafts – quilting, wood working, likes to cook
  - Next active bucket is distance – driving, walking, gardening
  - Least active bucket - Near
- Recommended Technology:
  - Bilateral Symfony Lenses

Matching Technology with Lifestyle

- Example:
  - Patient spends majority of the time in the middle bucket
  - Time spent in the distance and near buckets are similar
- Recommended Technology:
  - Bilateral Symfony Lenses with modified mono-vision
  - Non-dominant eye target -0.50 D -> -0.75 D

Matching Technology with Lifestyle

- Example:
  - Patient very active in distance and middle buckets
  - Active outdoors on weekends and summers (golf, boating, hunting)
  - Busy on a computer and desk work during weekdays
- Recommended Technology:
  - Dominant eye - ReSTOR 2.5 Lens
  - Non-dominant eye – Symfony Lens

  "Mix and Match"

Matching Technology with Lifestyle

- Example:
  - Majority of time in distance bucket
  - Equal amount of time in the middle and near buckets
- Recommended Technology:
  - Dominant Eye - ReSTOR 2.5
  - Non-dominant eye – Technis Multifocal or ReSTOR 3.0

Matching Technology with Lifestyle

- Example:
  - Majority of the time in the distance bucket
  - Very little time in the middle bucket
- Recommended Technology:
  - Bilateral Monofocal Lenses – set for emmetropia
  - Reading glasses
  - ***If a patient is not doing much activity in the middle bucket they do not need advanced technology lenses***

Matching Technology with Lifestyle

- Example:
  - Equal amount of time in all three buckets
  - Very active in all three buckets
- Recommended Technology:
  - Bilateral PanOptix Lens

Matching Technology with Lifestyle

- Example:
  - Patient wears contacts in monovision format
- Recommended Technology:
  - Maintain monovision using monofocal lenses
    - One eye for distance
    - Other eye for near (-2.00 D)
    - Correct pre existing astigmatism

Matching Technology with Lifestyle

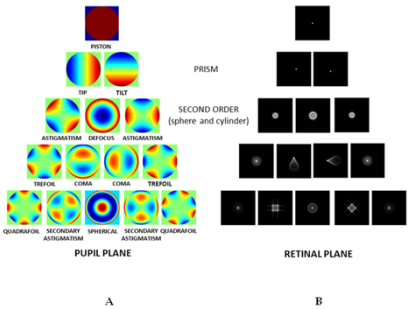
- Example:
  - Patient wears bilateral multifocal contact lenses
- Recommended Technology:
  - Match the implant technology to the contact lens technology
  - Need to know if patient needs supplemental reading glasses in addition to their multifocal contact lenses

Questions?

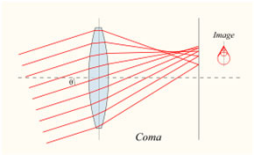
Astigmatism Control

- Target post-op astigmatism 0.50 D or less
- Use femtosecond laser or toric lenses

Reduction of Higher Order Aberrations



Coma



Higher Order Aberrations in Femtosecond Laser-Assisted Versus Manual Cataract Surgery: A Retrospective Cohort Study

Recent publications[1] have shown no statistical difference regarding refractive error or uncorrected vision between FLACS and MCS

1. Popovic M, Campos-Moller X, Schlenker MB, Ahmed IIK. Efficacy and safety of femtosecond laser-assisted cataract surgery compared with manual cataract surgery: a meta-analysis of 14567 eyes. Ophthalmology 2016;123(10):2113-26.

Study Parameters

- Evaluate patients with TECNIS Symfony (Johnson & Johnson Vision, Santa Ana, CA) and AcrySof IQ ReSTOR +2.50 D (Alcon Laboratories, Inc.) lenses into two groups:
  - With femtosecond laser / without femtosecond laser
  - Data collected 2-14 months post-op using the Marco OPD-Scan III
- Excellent quality of surgery for each group
- Evaluate centration of lens with regards to visual axis (angle alpha, angle kappa)
- Evaluate internal coma of both study groups
- Evaluate refractive error and visual acuity
- Standardized patient satisfaction questionnaire for each patient
- Statistical analysis of results

Study Findings

No difference between femtosecond and manual cataract surgery group

- Angle Alpha and Angle Kappa
- UCVA and BCVA
- Post-op refractive error

Statistical Analysis

	Symfony Femto n=32	ReSTOR 2.5 Femto n=25	Symfony Non-Femto n=50
Internal Coma µm	Range **0.019-0.296** AVG **0.109**	Range **0.029 – 0.728** AVG **0.141**	Range **0.029 – 2.052** AVG **0.275**

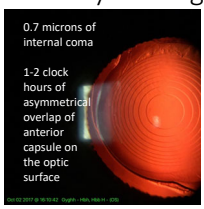
	FLACS n=57	MCS n=50	p value
Internal Coma	0.12 ± 0.12	0.28 ± 0.41	p<0.05

Outliers

Internal coma ≥ 0.400 microns

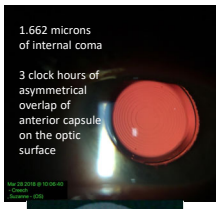
Femtosecond Outliers	Manual Cataract Surgery Outliers
1/57	7/50

Study Findings Internal Coma – Outliers



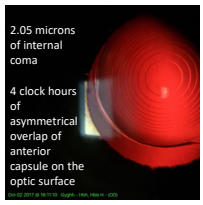
0.7 microns of internal coma

1-2 clock hours of asymmetrical overlap of anterior capsule on the optic surface



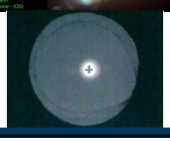
1.662 microns of internal coma

3 clock hours of asymmetrical overlap of anterior capsule on the optic surface



2.05 microns of internal coma

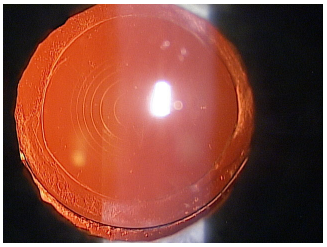
4 clock hours of asymmetrical overlap of anterior capsule on the optic surface



0.728 microns of internal coma

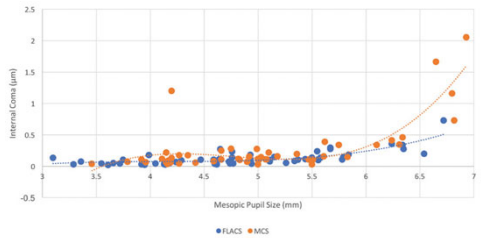
Split of anterior capsule

Study Findings Internal Coma



0.023 microns of internal coma

Scatterplot of the Relation between Mesopic Pupil Size and Internal Coma



Compare Patient with Low Internal Coma with Patient with High Internal Coma

Day vision low coma

Day vision high coma

Compare Patient with Low Internal Coma with Patient with High Internal Coma

Night vision low coma

Night vision high coma

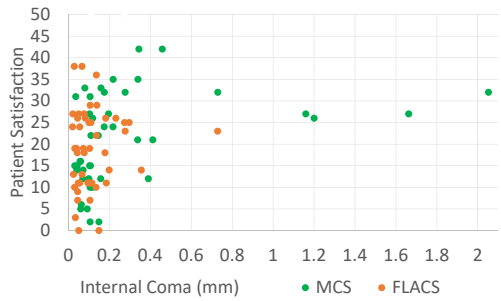
Does the increase in internal coma impact patient satisfaction?

Study Findings
Patient Satisfaction Survey Scores

- Patients were asked 30 questions from 10 categories with responses ranging from 0-3
  - 0 Not a problem
  - 1 Mild
  - 2 Moderate
  - 3 Severe
- 10 Categories Include
  - Glare
  - Haloes
  - Starburst
  - Hazy Vision
  - Blurred Vision
  - Distortion
  - Multiple Images
  - Fluctuation in vision
  - Focusing difficulties
  - Depth perception

Colin McAlinden,1,2 Konrad Pesudovs,3 and Jonathan F. Moore2,4. **"The Development of an Instrument to Measure Quality of Vision: The Quality of Vision (QoV) Questionnaire."** *IOVS,* November 2010, Vol. 51, No. 11

Scatterplot of Relation between Internal Coma and Patient-Reported Satisfaction Scores



Comparison of satisfaction score and internal coma less than 0.20 microns

Satisfaction Score	% of People with Internal Coma of 0.20 µ or less
0-10 (n=15)	**100%**
11-20 (n=29)	**93.1%**
21-30 (n=30)	**60%**
>30 (n=15)	**46.7%**

(p<0.001)

- There is a direct correlation between the overlap of the anterior capsule on the optic and higher order aberrations (internal coma)
- The more symmetrical the overlap of the anterior capsule on the optic, the lower the internal coma
- The Femtosecond laser gives a more symmetrical overlap of the anterior capsule on the optic ($p<0.05$)
- Internal coma affects the quality of patients' vision under mesopic conditions especially with multifocal lenses (satisfaction survey)

Management of the Unhappy Patient

- Patient Selection
  - Unrealistic expectations
  - Disconnect between level of cataract and symptoms
  - Patients that are very difficult to please
- Corneal Surface
  - Multifocal and EDOF lenses require good corneal surface
  - Tear plugs, hourly artificial tears, artificial tear gel or ointment at bedtime
  - Restasis or Xiidra
- Residual astigmatism
  - PRK 90 days post-op after intensive corneal surface treatment fails
- PLEASE do not prescribe astigmatic, bifocals, or progressive glasses in patients with multifocal or EDOF lenses

Management of the Unhappy Patient

- Halos:
  - 1% pilocarpine eye drops TID
  - Use for 1 month then taper

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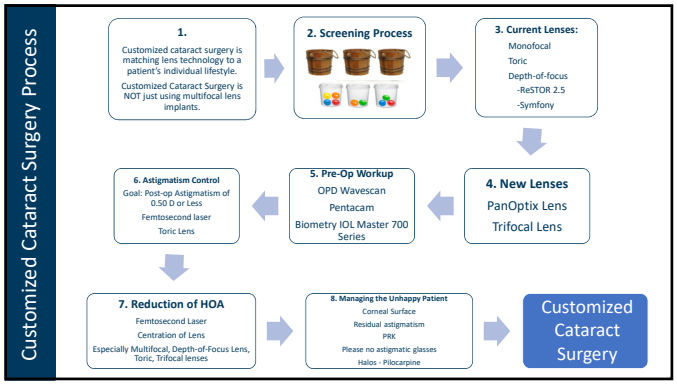
Customized Cataract Surgery Process
1.
Customized cataract surgery is matching lens technology to a patient's individual lifestyle.
Customized Cataract Surgery is NOT just using multifocal lens implants.
2. Screening Process
3. Current Lenses:
Monofocal
Toric
Depth-of-focus
-ReSTOR 2.5
-Symfony
4. New Lenses
PanOptix Lens
Trifocal Lens
5. Pre-Op Workup
OPD Wavescan
Pentacam
Biometry IOL Master 700 Series
6. Astigmatism Control
Goal: Post-op Astigmatism of 0.50 D or Less
Femtosecond laser
Toric Lens
7. Reduction of HOA
Femtosecond Laser
Centration of Lens
Especially Multifocal, Depth-of-Focus Lens, Toric, Trifocal lenses
8. Managing the Unhappy Patient
Corneal Surface
Residual astigmatism
PRK
Please no astigmatic glasses
Halos - Pilocarpine
Customized Cataract Surgery

Questions?