

Refractive Impacts on Posture, Balance & Gait

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Disclosure

- ▶ This course material was developed independently by Samantha Slotnick, OD, FAAO, FCOVD.
- ▶ There are no relevant financial relationships to disclose.

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Visual Input defines the "Field"

- ▶ There is a direct, immediate physical response to the sensory processing of an array of light through lenses, prisms and filters.
- ▶ This array of light is the VISUAL FIELD, whether processed consciously or unconsciously.
 - This presentation will demonstrate the impact of lenses and filters on movement, balance, posture and gait.

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Visual Input defines the "Field"

- ▶ In collaboration with colleagues in body-work disciplines, I have been able to provide visual guidance through the visual field.
 - This has helped our shared patients fulfill their own objectives for improved body integration, pain management, balance and comfort.
- ▶ In recent explorations, I have begun to hone these visual impacts intentionally.
- ▶ I hope to share some of these refractive strategies with you so that you may also *play* with lenses to help your patients with greater freedom of movement.

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Sculpting the visual field

- ▶ A person can be cued to attend to an aspect of the visual field. For example:
 - Think of "red"... and now scan the room and count the red things.
 - *Now: How many blue things can you recall?*
- ▶ Similarly: Lenses can be provided to help a patient to attune to their visual environment in therapeutic and provocative ways.
 - With **filters**, we can help sculpt attention to **color**.
 - With lenses and prisms, we can sculpt attention to orientation, to depth, to domains of space, to the ground.

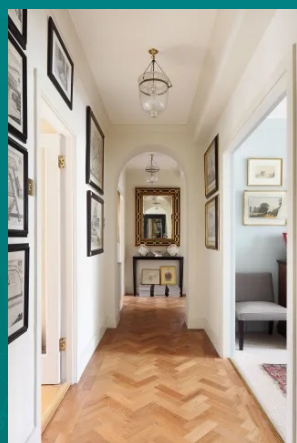
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Refractive Sculpting: Structure the Field

with Non-Compensatory Cylinder

- ▶ Even patients with spherical Rxes may benefit from the yoked effects of subtle cylinder:
 - -0.25 DC x 090 OU: Enhances binocular fusion
 - ▶ Narrows field
 - ▶ Creates the functional equivalent of WTR astigmatism!
 - -0.25 DC x 180 OU: Enhances awareness of horizon
 - ▶ Can support head-leveling and near/far transitions.
 - ▶ Creates the functional equivalent of ATR astigmatism!
 - **Explore impact on standing, gait and head posture.**
 - **Retest stereoacuity to validate impact.**

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Effect of x 090



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Effect of x 180

Treatment of Subtle Cyclodeviations

- ▶ The use of Low Yoked Cylinders can be a surprising asset in helping patients integrate sensory information through both visual channels.
- ▶ We utilize Primitive Reflex work to help patients engage the two halves of the body and integrate head/body relationships as a FOUNDATION for visual development, especially in strabismus...
- ▶ For many of the same reasons, we can use Low Yoked Cylinder as a tool to help patients **passively** engage both visual channels and become more well-oriented to their spatial environment.
- ▶ This even has impacts on BODY ORGANIZATION.

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Observing the impact of Vision on Movement

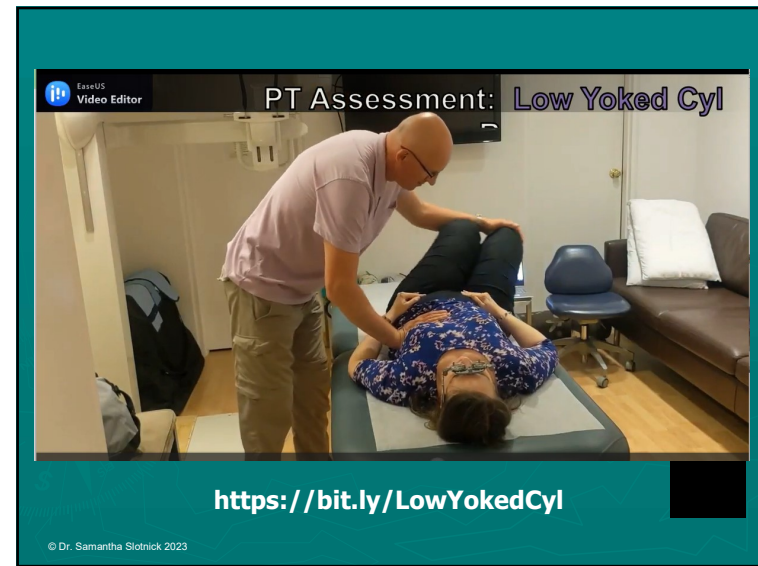
- ▶ The next series of cases will demonstrate some of the changes which "refractive sculpting" can create for our patients, in terms of their movement.
- ▶ I will follow the demonstrations with some of the ideas and concepts I have been applying to the binocular visual field.
- ▶ With these strategies, we can begin to guide these postural changes with greater efficiency and intention.

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Instant effect on posture & movement

- ▶ The next video displays some salient differences in body movement, all explored minutes or even seconds apart.
- ▶ The four conditions shared are:
 1. Intermediate Vision (IV) Rx with Blue Zero (BZ) filter
 2. No Rx
 3. Trial Frame of IV Rx (no BZ filter)
 4. Trial Frame with Low Yoked Cylinder Rx

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Refractive info/ Low yoked cyl video

- ▶ Current Refractive state:
 - OD +0.12 sph
 - OS -1.25 sph
- ▶ "Blue Zero" – blue light filter & TF comparison
 - OD +0.75 sph
 - OS $\text{pl sph} = \frac{1}{2} \wedge \text{BD (OS only)}$
- ▶ Low Yoked Cyl in TF, Rx used:
 - OD +0.75 -0.25 x 090
 - OS +0.25 -0.25 x 090

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Case Example: Joan

- ▶ Age 80
- ▶ c/o continual headaches around eyes, neck, shoulders.
- ▶ Has had several concussions:
 - profound injury at age 19, (+LOC): slipped on ice against a curb and hit her head on the cement.
- ▶ Aware of 3 other concussions:
 - age 27 or 28, Baseball hit between eyes, +LOC, *had to lay flat x 3 weeks.*
 - Late 50's, Hit with fist up-under her nose (2 yo jumped)
 - Late 50's, head-to-head bump at forehead (taking child from parent)

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It takes a village! Case Example: Joan

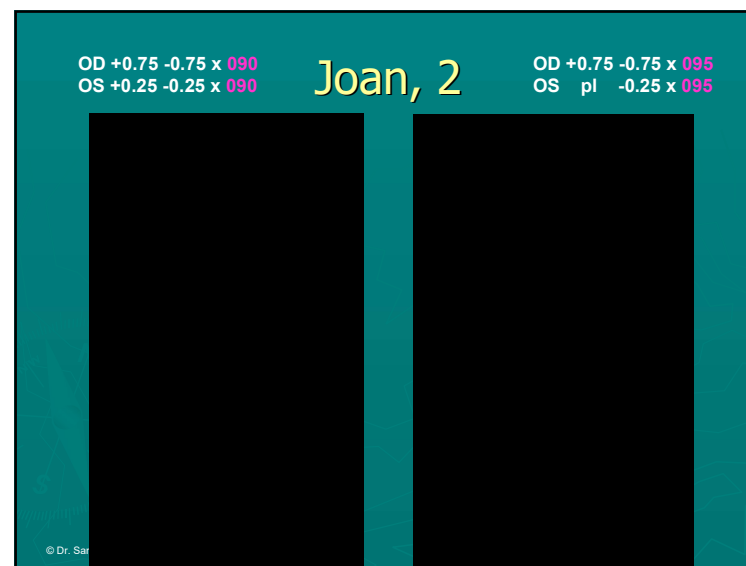
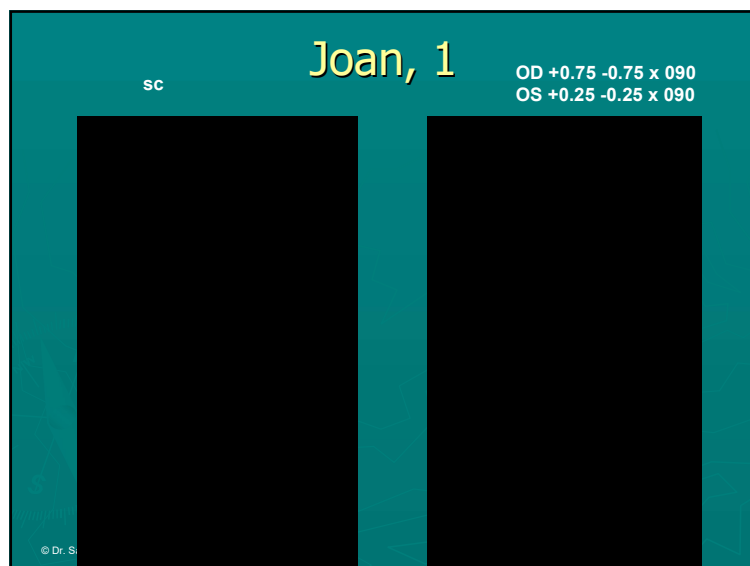
- ▶ Referral chain:
- ▶ Craniosacral therapist...
 - To Postural Restoration PT
 - ▶ To Behavioral Optometrist #1
 - ▶ Then PT to Holistic Dentist for TMJ
 - Dentist to Behavioral Optometrist #2

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Case Example: Cyclo(T), Joan

- ▶ Identified to have small cyclodeviation on dissociation.
- ▶ Variable reports (not uncommon w/ cyclo):
 - OS horizontal line tips CW.
 - OU: Vertical lines seem tilted CW.
- ▶ Double Maddox Rod findings:
 - 1. | 2. – OD: 5° excyclo OS: 5° Incyclo
 - 2. – 1. | OD: 2° excyclo OS: 0°
 - 1. – 2. – OD: 2° excyclo OS: 0°

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Case Example: Cyclo(T), Joan

- ▶ Low "Yoked Cyls" helped her organize the visual field and resolve a low cyclo-deviation tendency (R exyclo):
- ▶ Refractive state (Ret):
 - OD +1.50 -0.75 x 085
 - OS pl -0.25 x 090
- ▶ Final Rx
 - **OD +0.75 -0.75 x 095**
 - **OS pl -0.25 x 095**

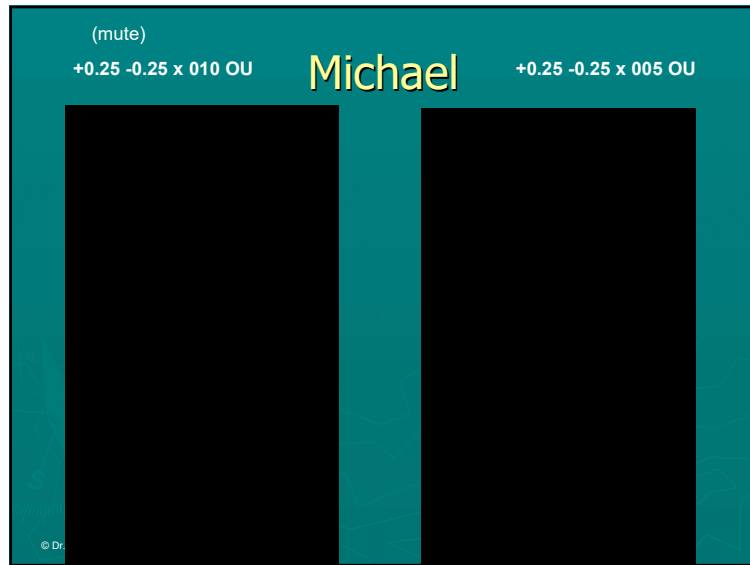
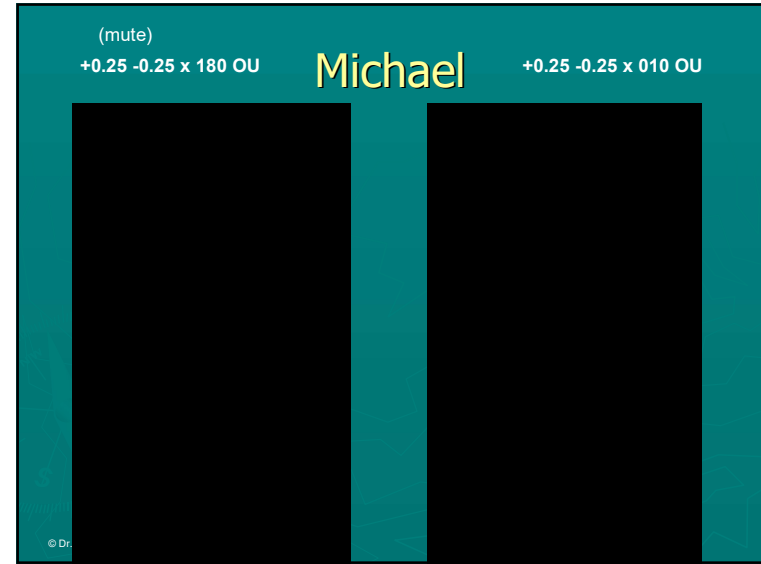
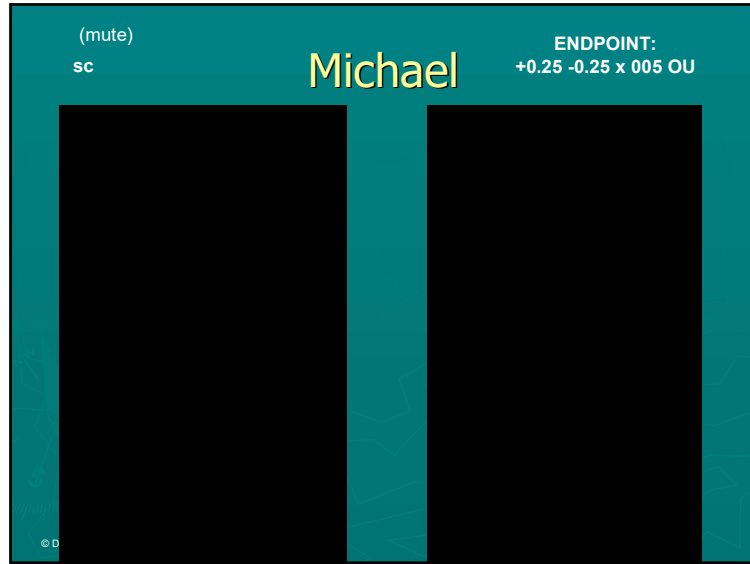
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Michael, effective emmetropia



- ▶ Referred by holistic dentist
- ▶ Presents as having a lot of insecurity
- ▶ Can be very intense and over-centered
- ▶ Bobbing and weaving, disorganized/ inefficient movement
- ▶ AHP tip to L

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Refractive Impacts on Posture, Balance & Gait, KISS





Case Example: Spatial Insecurity, Michael

- ▶ Low Yoked Cyls helped him to organize the visual field, and match his slight AHP tilt to left /lean to left.
- ▶ Cyl x 005 brings the verticals into alignment with his 5° head tilt, reducing advantage of his AHP.
 - He straightens the posture, feels lighter, and moves more quickly.
- ▶ sc, he reports, "I want to move faster, but I can't."
 - Not included in video: Tried x 010 / 170 to "ramp up," but did not change posture.
- ▶ Refractive state (Ret): Subjective Refraction (OS 1st)
 - OD +0.25 -0.25 x 180 2. OD +0.25 -0.25 x 015
 - OS +0.25 -0.50 x 170 1. OS +0.25 -0.50 x 180
- ▶ Final Rx  BOTH retaining Relative EXcyclo! 
 - OU: +0.25 -0.25 x 005 OU

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Posture/ Gait Refractive Strategies

- ▶ Much of my recent success has come through the non-compensatory application of **low powered cylinder** for its spatial effects. This is particularly helpful with head tilts.
 - Low Yoked Cylinder:  
 - For Tip to Right: x 095-105 OU, or x 175 to 165 OU
 - For Tip to Left: x 085-075 OU, or x 005 to 015 OU
 - Rotational binocular field effects (OD/OS):
 - Ramp up: 005/175 to 020/160; 085/095 to 070/110
 - Ramp down: 175/005 to 160/020; 095/085 to 110/070

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Posture/ Gait Refractive Strategies

- ▶ I have also been applying unilateral low spheres (+ or -) to address **torso rotations** (one shoulder forward/back).
- ▶ With heavier weight on one leg, or placing the head over one leg (often seen with one shoulder higher/ one side of body compressed), I've applied **lateral yoked prism** or **unilateral prism** to bring attention to the other side.

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Anterior/Posterior bias strategies:

- ▶ Weight too forward on toes, or hands pronating/ spine in flexion:
 - Try one of the "Ramp up" strategies to make the body sense as though it is walking uphill.
- ▶ Body leaning back/ spine in extension:
 - Try one of the "Ramp down" strategies to make the body sense as though it is walking downhill.

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Rotational binocular field effects

- ▶ Ramp up:
 - 005/175 to 020/160;
 - 085/095 to 070/110
- ▶ Ramp down:
 - 175/005 to 160/020;
 - 095/085 to 110/070

OD OS

010 170
080 090

170 010
090 080

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Case Example: HyperT (RSO paresis); Taiki, Golf Pro

- ▶ RSO paresis, prism compensated (net 6^).
- ▶ Moderate-High myopia, low oblique cyls
- ▶ Habitual Rx ("top of the line from Japan")
 - OD -5.68 -0.63 x 124 = 1^BI = 3^BD / Add +0.75
 - OS -5.11 -0.77 x 036 = 1^BI = 3^BU / Add +0.75
- ▶ Referred by PT, Postural Restoration Institute. "Needs to engage L glute." Suspects Vertical Prism is interfering with body symmetry– does not retain progress between PT visits.

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RSO- Gait, 1

sc ("double") Hab Rx

OD -5.68 -0.63 x 124 = 1^BI = 3^BD
OS -5.11 -0.77 x 036 = 1^BI = 3^BU

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RSO- Gait, 2

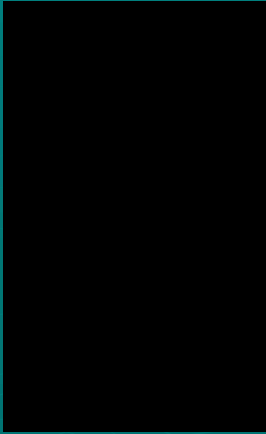
TF 1 TF 2

OD -5.50 -0.50 x 090
OS -5.00 -0.25 x 090

OD -5.50 -0.50 x 090 = 1^ABU
OS -5.00 -0.25 x 090 = 1^ABU

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RSO- Transitioning from TF 2 back to Habitual Rx



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Hab Rx RSO- Gait, 3 TF 2


OD -5.68 -0.63 x 124 = 1^BI = 3^BD	OD -5.50 -0.50 x 090 = 1^BU
OS -5.11 -0.77 x 036 = 1^BI = 3^BU	OS -5.00 -0.25 x 090 = 1^BU



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Hab Rx RSO: Vision & Neck ROM TF 2


OD -5.68 -0.63 x 124 = 1^BI = 3^BD	OD -5.50 -0.50 x 090 = 1^BU
OS -5.11 -0.77 x 036 = 1^BI = 3^BU	OS -5.00 -0.25 x 090 = 1^BU



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Hab Rx RSO: Vision & Balance TF 2

OD -5.68 -0.63 x 124 = 1^BI = 3^BD	OD -5.50 -0.50 x 090 = 1^BU
OS -5.11 -0.77 x 036 = 1^BI = 3^BU	OS -5.00 -0.25 x 090 = 1^BU



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Case Example: RSO paresis, Taiki

- ▶ Vertical Yoked Cyls helped him to organize the visual field, resolve vertical deviation, and release compensatory muscle engagement head to toe.
- ▶ Refractive state (Ret):
 - OD -6.00 -0.50 x 080
 - OS -5.25 -0.75 x 065
- ▶ Final Rx
 - OD -5.50 -0.50 x 090 = 1^BU
 - OS -5.00 -0.25 x 090 = 1^BU

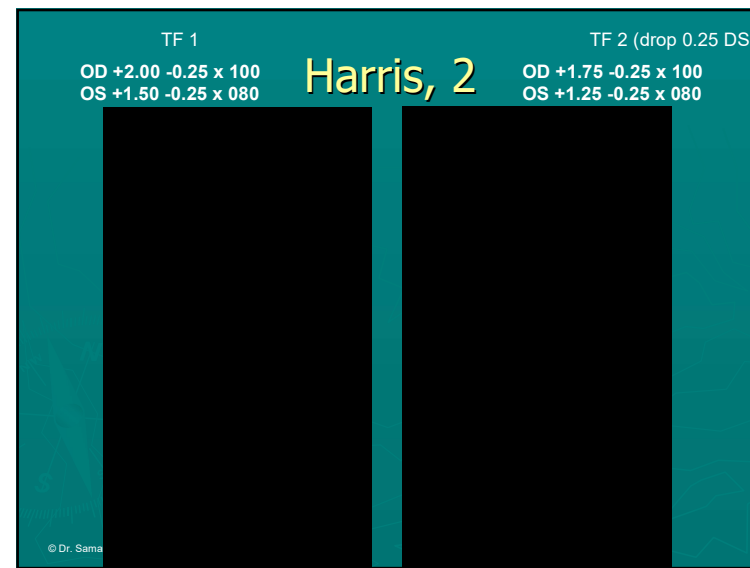
Habitual Rx:
 OD -5.68 -0.63 x 124 = 1^BI = 3^BD
 OS -5.11 -0.77 x 036 = 1^BI = 3^BU

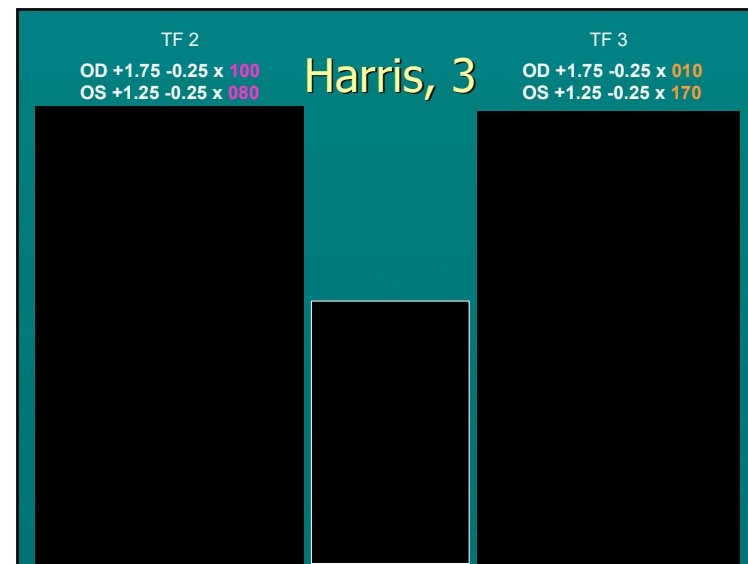
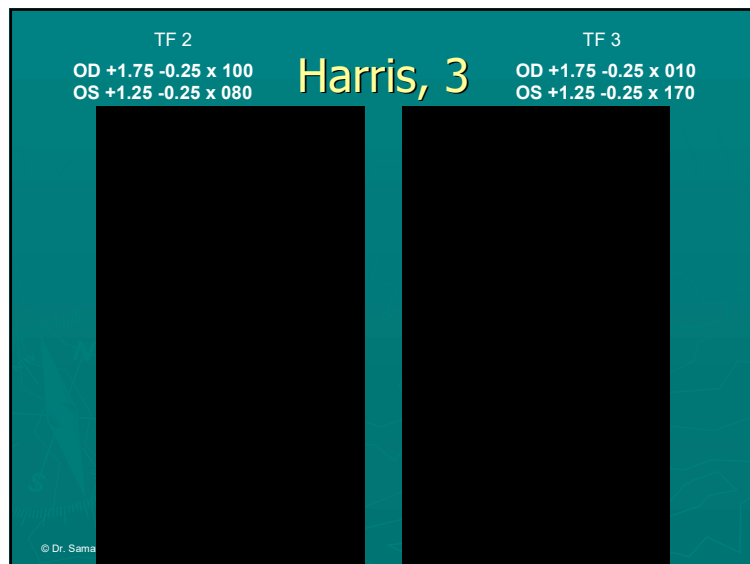
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Case Example: RET, &..., Harris

- ▶ Former Hyperope, small angle RET
- ▶ Post-op combined DSEK* and cataract extraction, Fuch's Endothelial Dystrophy
 - * Descemet's Stripping Endothelial Keratoplasty
- ▶ Very successful co-management between OMD/OD.
- ▶ Pre-surgery, most recent Rx:
 - OD +7.00 -0.50 x 180 = 1^BO
 - OS +6.00 sph = 1/2^BI / ADD +2.00

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Case Example: RET (etc), Harris

- ▶ Horizontal Yoked Cyls with small offset to bring horizon higher helped him organize the visual field and feel more connected to walking "IN" the world, instead of "ON" it:
- ▶ Refractive state (Ret):
 - OD +3.00 -0.50 x 070
 - OS +2.50 -0.50 x 092
- ▶ Final Rx
 - **OD +1.75 -0.25 x 010**
 - **OS +1.25 -0.25 x 170**

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Summary

- ▶ Subtle changes to the matrix of light entering the eye can have surprising, PASSIVE effects on one's posture, balance, and movement through space.
- ▶ AHP's may be masking a subtle cyclophoria. For these patients, Low Yoked Cyls act like "graph paper" for the visual field, supporting cyclo-rotary binocular alignment.
- ▶ With reduced binocular stress, a significant change is noted in these patients' freedom of movement, posture, and gait.

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Summary

- ▶ Similar visual field shifts can be generated with symmetric offsets around the major axes ("ramp up" and "ramp down"), which help patients neutralize their anterior/posterior imbalances of weight over their feet.
 - In a longer forum, I will include this and more at ICBO 2024 this summer.
- ▶ It is my hope that this presentation will inspire you to experiment, and give you some basic guidelines for helping your patients orient and organize themselves to their environment.

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Discussion Points

- ▶ How does the use of cyl lenses as a "yoke" in patients with cyclophoria impact your thinking about:
 - The role of **cyclorotary movements** in our daily maintenance of single binocular vision?
 - The longstanding use of cyl along the major axes (or applied symmetrically) as a well-received prescription?
 - The treatment of patients with head tilt (**AHP**), especially with a paretic **Superior Oblique**?
- ▶ Other thoughts welcome!



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Discussion

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AUGUST 14 -17, 2024

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