

## Experience EXPO With Us!



- **Innovation Stage - Exhibit Hall – The Bridge (Booth P14051)**  
Our Innovation Stage sessions feature free, promotional content for all attendees.
- **OptiCon General Session: A Conversation with Scott Shapiro, Presented by United Opticians Associations (UOA) – Thursday, Sept 19 - The Bridge (Booth P14051)**  
Join us for a conversation with Scott Shapiro, CEO at Europa Eyewear/STATE Optical Co./AO Eyewear and the Chairman of TVC Board.
- **Patient Choice Awards - Friday, Sept 20 - Exhibit Hall – The Bridge (Booth P14051)**
- **Exhibit Hall Hours**  
Thursday, Sept 19 9:30am – 6:00pm  
Friday, Sept. 20 9:30am – 6:00pm  
Saturday, Sept. 21 9:30am – 3:00pm



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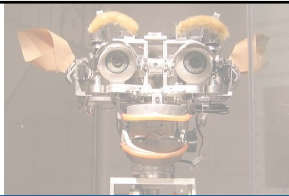
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### Seeing Through The Eyes of the Patient

Charlie Saccarelli, ABOM

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## AGENDA

- Disclaimers and Disclosures
- Soapboxes
  - Why the healthcare system grinds my gears
  - Principles vs. Methods
- A Tour of YOUR Vision
- A Tour of the Visual System (as if we're robots because biology is gross)
  - The Best Of
  - The Worst Of

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### Speaker Financial Disclosure Statement

Charlie Saccarelli is an owner and the president of Chadwick Optical. He potentially makes money when you buy stuff from Chadwick Optical. All relevant relationships have been mitigated.



This is Charlie's Car.  
2009 Nissan Versa

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### DISCLAIMER

- I am an optician presenting information for opticians to help opticians do what opticians do.
- What I am presenting is plenty accurate enough for that specific purpose.
- To many of the things I say, a vision scientist or physics professor might interrupt and say "well technically that's not entirely correct because blahhhhhhhhhhh"
- ...that's why they're not invited.

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### ONE MORE THING

- You can take pictures of the slides if you want, but I'd rather you just pretend to pay attention to what I'm saying. It makes me feel so good.
- Email me at [cbs@chadwickoptical.com](mailto:cbs@chadwickoptical.com), and I'm happy to share the entire presentation with you. Or text/What's App/whatever me at 267-374-5601

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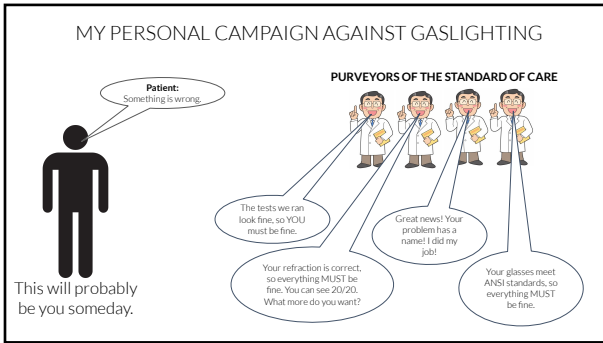
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**Let's Exceed the Standard of Care**

- **Vision** goes far beyond the refraction/diagnosis
- **"Understanding is love's other name"** - Thich Nhat Hanh
- Just keep trying to understand.
- What is it like to have this condition?
- What is it like to see through their eyes?
- Know the people in your area who specialize in that stuff so if you can't help them, you can introduce them to someone who can.

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“As to methods, there may be a million and then some, but principles are few. The man who grasps principles can successfully select his own methods. The man who tries methods, ignoring principles, is sure to have trouble.”

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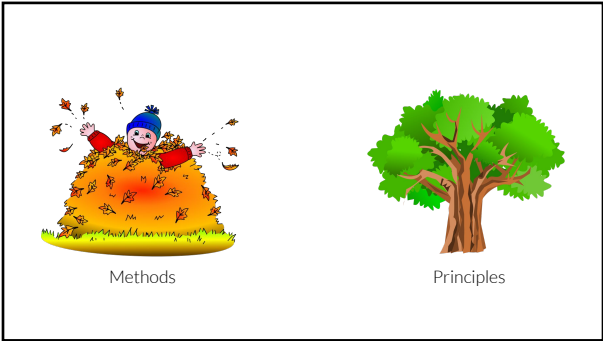
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**Method vs. Principle-Based Approach to Aniseikonia**

RX #1:	RX #2:
OD: +5.00	OD: -5.00
OS: +2.00	OS: -2.00

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A Tour of Your Vision

- Physiological Blind Spot Test
- Visual Field
- What is a Degree?
- Visual Acuity
- Vision & Balance

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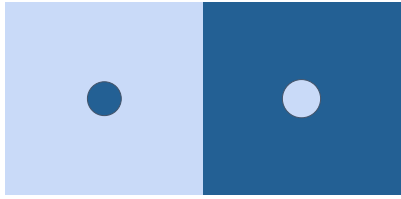
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PHYSIOLOGICAL BLIND SPOT



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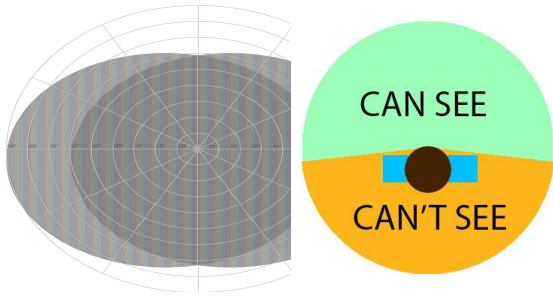
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VISUAL FIELD



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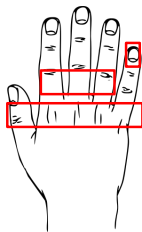
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APPROXIMATION OF A DEGREE

At Arms Length



- 1 degree
- 5 degrees
- 10 degrees

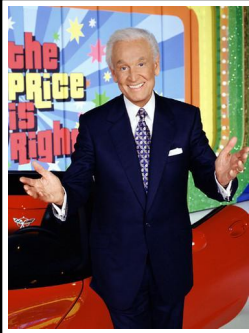
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How many degrees of your 190° visual field is capable of 20/20 vision?

**~1-2 degrees**  
**0.004% of the visual field**

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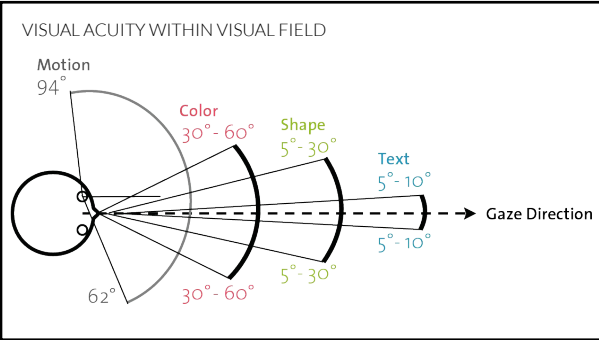
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### Balance and Your Vision

- Stand up
- Stand on one leg
- Close your eyes

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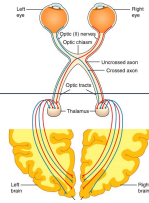
## All the Stuff that Makes That Happen

### The Data Transmission System

- Cornea
- Iris/Pupil
- Lens
- Retina

### The Data Processing System

- Optic Nerve
- Visual Cortex
- The Rest of the Brain



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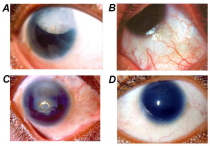
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## OPINION - HUMAN ANATOMY AND BIOLOGY IS GROSS



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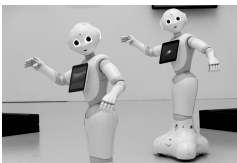
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## LET'S PRETEND WE'RE PERFECT AND FLAWLESS ROBOTS



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### ROBOT EQUIVALENCIES

- Cornea - Magnifying Glass (Collects and Focuses Light)
- Iris/Pupil - Shutter/Aperture (Controls incoming light)
- Lens - Zoom/Auto-focus
- Retina - Projection Screen
- Optic Nerve - HDMI Cable
- Visual Cortex - Graphics Card
- Rest of the Brain - Motherboard

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### BORING - THE IRIS AND THE PUPIL (Shutter/Aperture)

- The iris is a very beautiful sphincter
- The pupil is the iris-hole

The sphincter contracts and relaxes to optimize light input for conditions.



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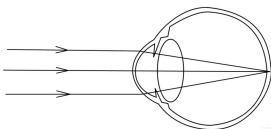
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### WHAT WOULD HAPPEN IF THE EYE ACTUALLY WORKED LIKE THIS?



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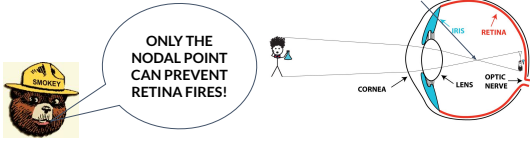
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## NODAL POINT

The point where all incoming rays of light need to cross to form the clearest possible image on the retina.




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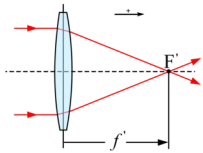
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## THE CORNEA (Magnifying Glass)

43 diopters of power

Focal Length = 1/43 of a meter

- 2.32 cm/0.91 inches



- The distance at which PARALLEL rays of light cross/converge
- Implication - Rays are coming from optical infinity (aka 20 feet or beyond)

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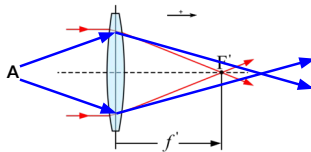
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## WHAT IF WE WANT TO FOCUS ON SOMETHING CLOSE?

- What if the origin is up close?
- How would that appear?



The cornea is a one-trick pony. We need more than that. We need some auto-focus ability




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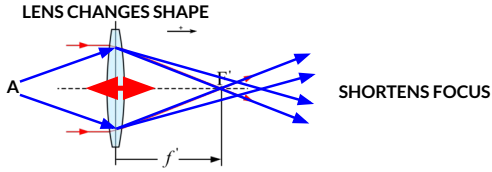
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**THE CRYSTALLINE LENS (Zoom/Auto-focus)**

Changes from 17-21 diopters of power  
 Focal Length =  $\sim 1/17 - 1/21$  of a meter

- adjustable from 4.7 - 5.8 cm




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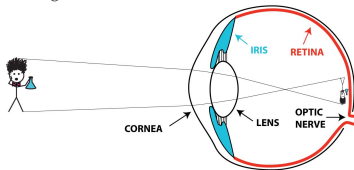
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**DYNAMIC DUO - CORNEA & CRYSTALLINE LENS**

- Allows us to focus from optical infinity to right in front of our noses.
- All light passes through the nodal point, creating a clear image on the retina




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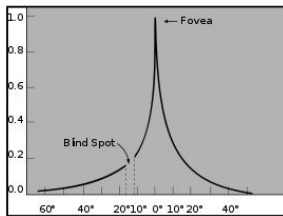
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**THE RETINA - THE COLLECTOR OF ALL THE THINGS(Projector)**

- Optimized Data Collection
- Wherever your eyes are directed is where the most data is collected




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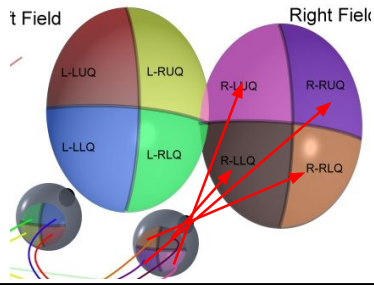


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IMPORTANT POINT #1

- It's all flipped.
- It's transmitted as quadrants
- Are you sure we're not robots?



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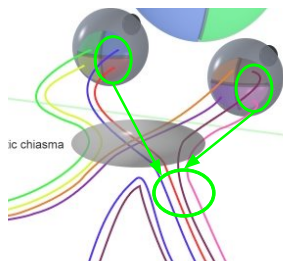
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IMPORTANT POINT #2

- The cables get sorted out at the optic chiasm
- The right side data is now on the left side of the brain
- The left side data is now on the right side of the brain



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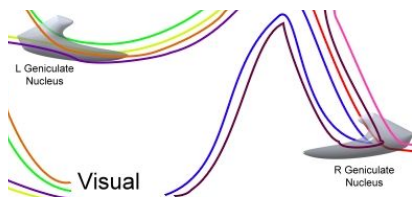
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IMPORTANT POINT #3 (Weird Motherboard Stuff)

- About 1/3 of the data transmitted gets dropped off at the Lateral Geniculate Nucleus, never to be "seen"



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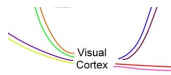
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IMPORTANT POINT #4

- Two separate images are delivered to the visual cortex
- How many of me do you see?



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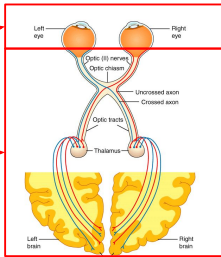
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TYPE OF ISSUES VS. HOW WE PERCEIVE THEM

CAN SEE THEM

CAN'T SEE THEM



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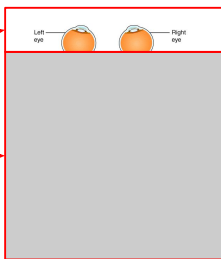
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TYPE OF ISSUES VS. HOW WE PERCEIVE THEM

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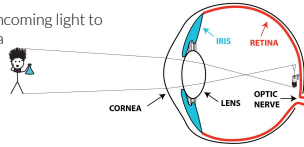
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### MYOPIA, HYPEROPIA, ASTIGMATISM

The cornea/lens don't focus in a way that produces a clear image on the retina

Latent hyperopia - Patient IS farsighted, but the lens focuses at distance to create a clear image

Glasses or contacts adjust the incoming light to focus a clear image on the retina



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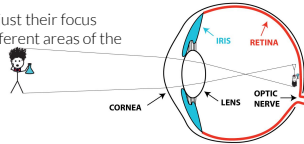
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### PRESBYOPIA

The range WAS 17-21 diopters of power, but can't get all the way to 21 diopters anymore.

The lens loses its focusing power, resulting in the inability to adjust focus for near.

Multifocals allow the user to adjust their focus manually by looking through different areas of the lens.



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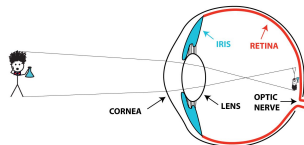
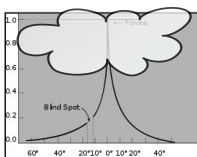
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### CATARACT

The crystalline lens clouds up, and visual acuity is gradually reduced as the cloud gets thicker



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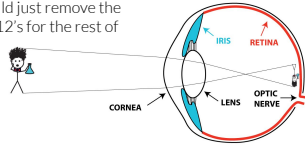
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## CATARACT

The crystalline lens clouds up, and visual acuity is gradually reduced as the cloud gets thicker

Cataract Surgery removes the lens and replaces it with an intraocular lens.

Back in the day the surgery would just remove the lens and patients would wear +12's for the rest of their lives.



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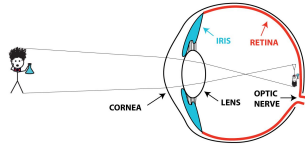
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## FLOATERS

Years of life choices leave their remnants in your vitreous and their shadow projects onto the retina



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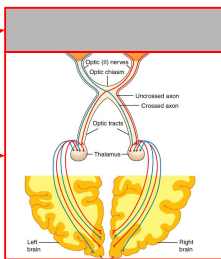
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## TYPE OF ISSUES VS. HOW WE PERCEIVE THEM

CAN SEE THEM



CAN'T SEE THEM



9/6/2023

CHADWICKOPTICAL.COM

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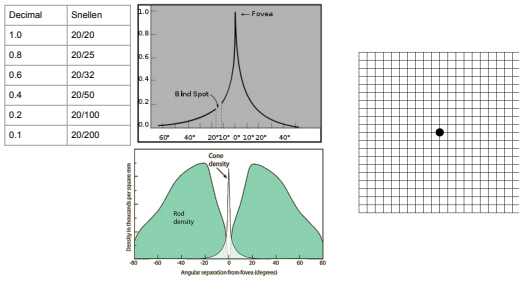
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### DATA TRANSMISSION ERRORS - MACULA




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### DATA TRANSMISSION ERRORS - PERIPHERAL VISION

- Retinitis Pigmentosa
- Glaucoma
- Diabetic Retinopathy

How would these conditions be perceived by the patient?

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### A COUPLE MORE DATA TRANSMISSION ERRORS

- Retinal Detachment
- Optic Neuropathy (swelling of optic nerve)

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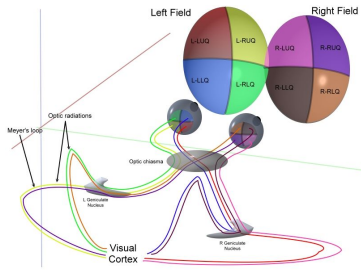
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### DATA PROCESSING ERRORS POST-RETINA



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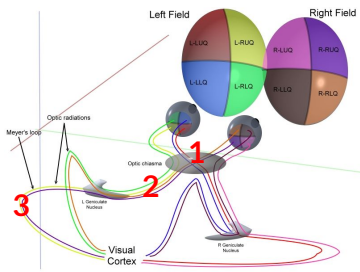
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### STROKE/TBI RELATED VISUAL FIELD LOSS



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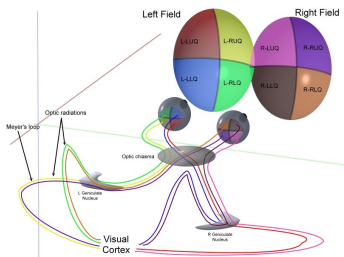
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### POST-CONCUSSIVE ISSUES

Balance Issues  
Binocular Vision Issues



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Simulation of How the Brain Works without the eye's data



Fill in the blanks




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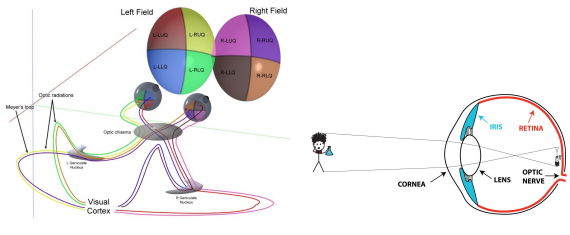
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There's a whole lot more going on than we typically consider.




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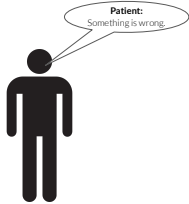
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Consider the possibility that this doesn't tell the whole story.



1875 Massachusetts  
 State Board of Registration  
 for Opticians  
 100 State Street  
 Boston, MA 02109

**SPECTACLE PRESCRIPTION ONLY**

FOR: [Handwritten Name] DATE: 3 OCT 94

ADDRESS: \_\_\_\_\_

Rx	SPHERICAL	CYLINDRICAL	AXIS	PRISM	BASE
D.V.	O.D. -3.25	-2.25	180		
	O.S. +5.0	-1.00	80		
	O.D. +2.00	add			
	O.S. +2.00				

REMARKS: \_\_\_\_\_ P.D. 22-60

DATE OF EXAM 3 OCT 94 EXPIRATION DATE 3 OCT 95

DR. [Handwritten Signature] LIC. # [Handwritten Number]

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Questions?  
Comments?  
Uncontrollable Emotions?

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**On behalf of Vision Expo, we sincerely thank you  
for being with us this year.**

**Vision Expo Has Gone Green!**

We have eliminated all paper session evaluation forms. Please be sure to complete your electronic session evaluations online when you login to request your CE Letter for each course you attended! Your feedback is important to us as our Education Planning Committee considers content and speakers for future meetings to provide you with the best education possible.



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