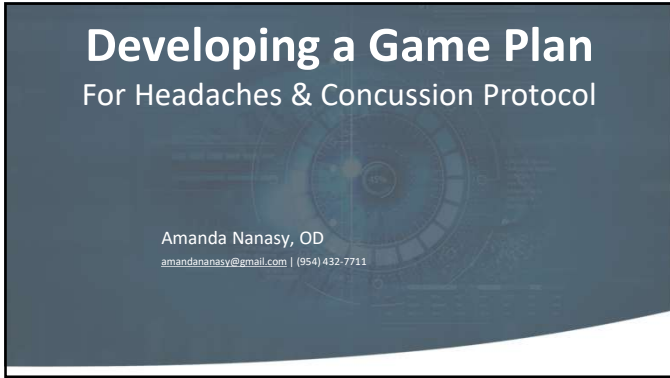


Developing a Game Plan For Headaches & Concussion Protocol



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- Past Chair, American Optometric Association, Sports and Performance Vision Board
- AOA TBI Task Force

Disclosures

Alcon faculty and speakers bureau
Sports Vision Pros, LLC Partner- sportsvisionpros.com
Allergan Speakers Bureau
NeuroLens KOL Advisory Board and Speaker
ABB Advisory Board
Thermamedx Advisory Board

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Joint statement from AOA sports vision, vision rehab and TBI task force

- According to the CDC, 1 in every 225 Americans sustain a TBI each year. From infants to the elderly, athletes and non-athletes, these people are members of our patient base. Based on these numbers, roughly 2 of your patients may have symptoms of a concussion each month.
- A mild traumatic brain injury may occur from any bump, blow or jolt to the head or body.
- These patients often present with headaches, balance problems, or even just say, "Hey doc, I'm not feeling so well." They may have difficulty with reading and concentration that stem from undiagnosed accommodative disorders. A high percentage of these patients will also have problems sustaining convergence. Without your involvement, these conditions can go untreated. This unnecessary prolonged recovery can lead to increased time away from school or work. Unresolved symptoms of mTBI can cause mental and behavioral health issues.
- Doctors of optometry have the ability to detect, identify, treat and sometimes refer these individuals to the care that they need to improve their quality of life. As the AOA works to gain optometry interprofessional recognition of what we bring to the table, it's our responsibility to provide the care that is necessary to help our patients.

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Goals for Today

- **Part 1:** Understand a concussion from a patient perspective
- **Part 2:** Give you details about how to evaluate a concussion and headache patients in your chair tomorrow; they can actually be quite similar!

There is a lot more to learn about visual-neuro evaluations and treatments that what you will learn today. But we will discuss what EVERY optometrist can do to help a large, underserved patient population

Return to Play... Return to Learn... Return to Work...
Return to Live Life!

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Understanding Concussions from a Patient Perspective



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How Many People Here Feel Comfortable Managing a TBI Patient?



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How Many People Here
Feel Comfortable
Managing a *Headache*
Patient?

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June 25, 2018

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The symptoms I knew to ask...

Headaches?	Difficulty with speech?	Difficulty sleeping?
Nausea?	Are you easily visually overwhelmed? (Grocery store)	Mood shifts?
Blurry Vision	Light sensitivity?	Dizziness?

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Headaches

- Location
- Duration
- Severity
- Quality
- Timing
- Modifying Factors
- Context
- Associated S/S

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Concussion Headache

Characteristics: Following a concussion, you can develop a headache that resembles a migraine headache. **Pain tends to be in the front of the head area of your forehead or temple.** It is commonly described as a 'pounding' or 'throbbing' pain. It is sometimes associated with nausea and sensitivity to light and noise.

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Tension Type Headache

- Bilateral squeezing headache
- Rare nausea/vomiting
- No light or sound sensitivity
- Better or no change with activity
- Mild to moderate
- 60-80% of population, most common

The vast majority of short-duration headaches belong to a specific category of headache disorder termed "trigeminal autonomic cephalalgia" (TAC).

Triggers may include:

- Stress
- Depression
- Anxiety
- Computer Posture
- Sleeping in an awkward position or in a cold room
- Eye strain
- Drugs or alcohol
- Fatigue
- Overexertion
- Skipping meals
- Head or neck injury, even years after the injury
- Clenching your jaw or grinding your teeth (bruxism)
- Medications, leading to rebound headaches
- Arthritis
- Hormonal changes

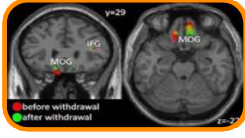


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Medication Overuse Headache

- Diffuse dull ache, pressure or discomfort
- Non throbbing
- No nausea/vomiting
- No light or sound sensitivity
- No change with activity
- Common HA waking you in the early morning
- Mild

Epidemiological data suggest that up to 4% of the population overuse analgesics and other drugs for the treatment of pain conditions such as migraine




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Migraine without Aura

- Unilateral
- Throbbing
- Nausea/vomiting
- Light and sound sensitive
- Worse with activity
- Severe
- Last 4-72 hours untreated
- 15% of population

The idea that dilation of cerebral vessels is a primary cause of migraine pain has been challenged by a variety of evidence. However, the "trigeminovascular system" continues to be widely accepted as an important component of the headache.

Triggers: Complex of stress, anxiety, hormonal changes, bright or flashing lights, lack of food or sleep, and dietary substances.




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Migraine with Aura

- Reversible neurologic symptoms that are fully reversible, 30% of migraine sufferers
- Usually last 20-30 minutes
- Can be visual, unilateral numbness, unilateral weakness or dysphasia
- Blind spots (scotomas)
- Zigzag lines that gradually float across your field of vision; shimmering spots or stars; flashes of light
- Changes in vision or vision loss
- Differential diagnosis: stroke or retinal tear

Migraine-specific therapies such as triptans, ditans, and gepants and other treatments such as neuromodulation.




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Sinus Headache

- Pain, pressure and fullness in your cheeks, brow or forehead
- Worsening pain if you bend forward or lie down, worsens with activity
- Stuffy nose
- Fatigue
- Achy feeling in your upper teeth

Sinusitis, however, usually isn't associated with nausea or vomiting or aggravated by noise or bright light — all common features of migraines.

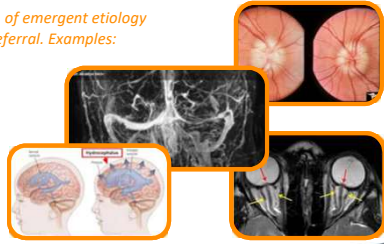


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Ominous Headache

Headache pain as a symptom of emergent etiology that needs neurology or ED referral. Examples:


- Tumor
- Venous sinus thrombosis
- Pseudotumor cerebri
- Hydrocephalus
- Thunderclap headache



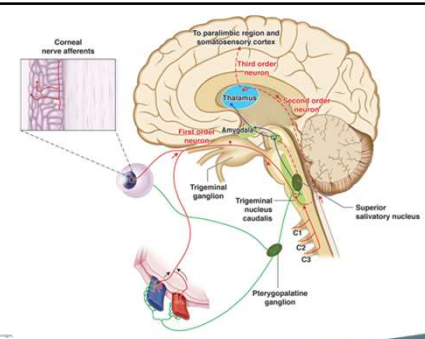
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Proprioceptive Conflict

- Bilateral occipital and neck pain that radiates to the retro-orbital regions
- Constant pressure or ache
- Dry eye sensation
- Fatigue
- Light sensitive
- Worse with reading and working on the computer

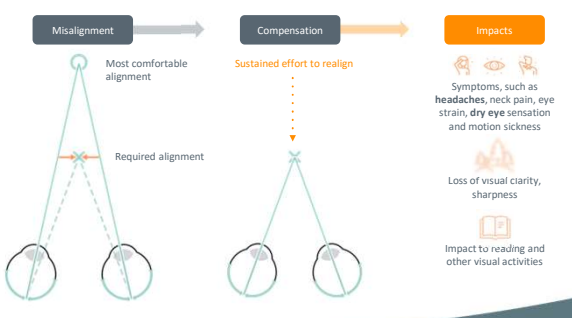


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Labels in diagram: Corneal nerve afferents, Trigeminal ganglion, Trigeminal nucleus caudalis, Pterygopalatine ganglion, Superior salivatory nucleus, C1, C2, C3, Amygdala, Second order neuron, Third order neuron, To parietal region and somatosensory cortex.

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Misalignment → **Compensation** → **Impacts**

Most comfortable alignment vs. Sustained effort to realign

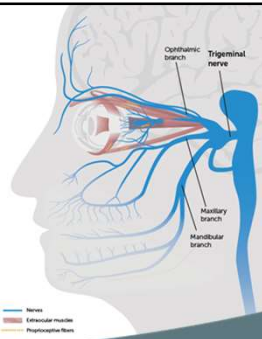
Required alignment

Impacts:

- Symptoms, such as headaches, neck pain, eye strain, dry eye sensation and motion sickness
- Loss of visual clarity, sharpness
- Impact to reading and other visual activities

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- Proprioceptive fibers innervating the extraocular muscles provide afferent feedback to the brain about the location of each eye.
- This feedback is required to avoid binocular misalignments.
- These proprioceptive signals are transmitted through the ophthalmic branch of the trigeminal nerve, which is responsible for detecting sensation and reporting pain.
- It appears that these signals play a large role in the stimulation of the trigeminal nerve, resulting in symptoms associated with this **overstimulation**.



Labels: Ophthalmic branch, Trigeminal nerve, Maxillary branch, Mandibular branch.

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What is this?



Seeing double can be disruptive in daily life.

Seeing double can be very disruptive in daily life.


Seeing double can be very disruptive in daily life.

Seeing double can be very disruptive in daily life.

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What is this?

- Ghost imaging
- Diplopia
- Focusing issue
- Eye misalignment issue
- Neural confusion/congestion in the Trigeminal area



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The Concussion Interprofessional Team

- Sports Med based internist (MD/DO)
- Psy.D
- Doctor of Physical Therapy
- Doctor of Optometry
- Chiropractor
- Certified Athletic Trainer

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Linking TBI and Visually Related Issues

Vision Anomaly	TBI (%)	Most Common Anomaly
Accommodation	41.1	Accommodative insufficiency
Versional	51.3	Deficits of saccades
Vergence	56.3	Convergence insufficiency
Strabismus	25.6	Strabismus at near
CN Palsy	6.9	CN III

Ciuffreda KJ, Kapoor N, Rulmer D, Sachdev R, Han ME, Craig S (2007). Occurrence of oculomotor dysfunctions in acquired brain injury: a retrospective analysis. Optometry, 78(6): 155-63

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The signs and symptoms of a concussion can be subtle and may not show up immediately. Symptoms can last for days, weeks or even longer.

Common symptoms after a concussive traumatic brain injury are headache, loss of memory (amnesia) and confusion. The amnesia usually involves forgetting the event that caused the concussion.

**Even today...
From Mayo
Clinic Website**

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Signs and symptoms of a concussion may include:

- Headache or a feeling of pressure in the head
- Temporary loss of consciousness
- Confusion or feeling as if in a fog
- Amnesia surrounding the traumatic event
- Dizziness or "seeing stars"
- Ringing in the ears
- Nausea
- Vomiting
- Slurred speech
- Delayed response to questions
- Appearing dazed
- Fatigue

**Even today...
From Mayo
Clinic Website**

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What does a TBI exam look like?

- Full Dilated Eye Exam?
- Cycloplegic Refraction?
- Pupils?
- Accommodative Testing?
- Vergence Testing?
- Accurate eye teaming/alignment testing?

What Else?

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Let's start from the beginning...

Histories are **HUGE**

Find the concussions they didn't know they had

-or- get to the core complaints of your patient (but beware the LONG chair time)

So rather than histories being first...

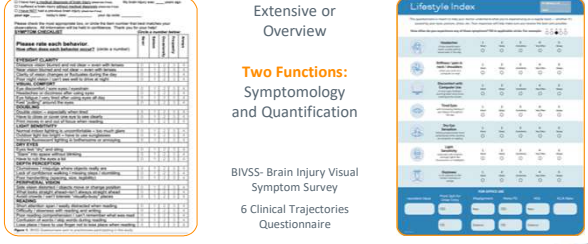
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The Power of Intake Surveys

Extensive or Overview

Two Functions:
Symptomology and Quantification

BIVSS- Brain Injury Visual Symptom Survey
6 Clinical Trajectories Questionnaire



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Kapoor's High Yield Vision Screening/Bedside Assessment

- Optic nerve function
- Visual acuity
- Confrontation visual fields
- Color vision testing
- Extraocular motility function
 - Fixation, saccades, and pursuit (*may be performed monocularly or binocularly*)
 - Near point of convergence (*performed binocularly*)
 - Stereopsis (*performed binocularly*)
 - Optic nerve function: pupils

- Distance Cover test
- Near Cover Test
- Versions and Pursuits
- Accommodation
- Refractive Status
- Saccades
- NPC/Repeated NPC
- Confrontation Field

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Clinically Addressing Binocular Vision Disorders



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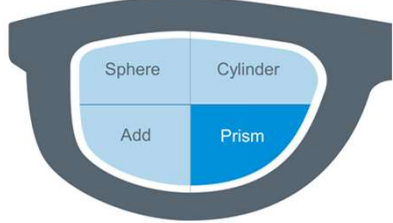
So, what do we do with the findings?

Start with the **low hanging fruit**

- Refractive or accommodative correction
Please don't do a progressive-binocular system
- Blue light filters/photochromics
- Prismatic Correction; exception to progressives; consider contour
- Educate about Harmon's distance
- Encourage good visual habits and consider some of our other suggestions from Part One
- Educate about bi-nasal occlusion

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The Components of a Prescription Lens



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Small Prism Can Have Big Impact

Can small prism corrections improve visual comfort? Yes! Here is why.
Frank Lathrop, MD, Optometry, MEd, PhD

Background

There is a growing body of evidence that small prism corrections can improve visual comfort in symptomatic patients. This is particularly true for patients with small eye misalignments (less than 10 PD) who experience symptoms such as headaches, neck pain, and eye strain. Small prism corrections can provide significant relief in symptomatic patients.

Subjective clinical diagnostic tools limit our ability to accurately detect small eye misalignments.

No correlation between amount of misalignment and severity of symptoms. A patient with 1PD exophoria and a patient with 10PD exophoria could experience same severity of symptoms.

Small horizontal prism corrections (< 1PD) can provide significant relief in symptomatic patients.

Subjective clinical diagnostic tools limit our ability to accurately detect small eye misalignments.

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The Evolution of Prism

Standard Prism



Slab-off Prism

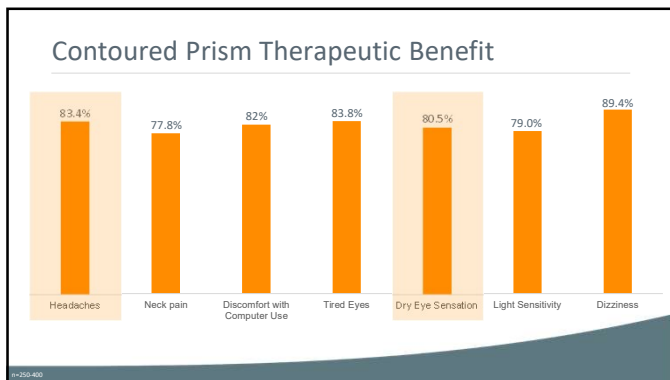


Contoured Prism



90% of people have a larger misalignment at near, so linear prism simply doesn't make sense for today's wearer.

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Chronic Headache Study

93%

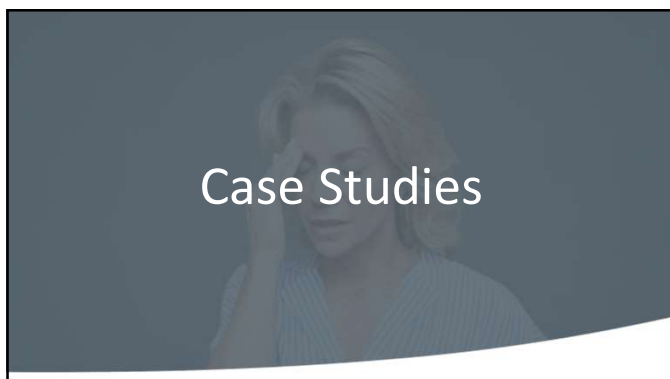
of patients have had a **positive response** to wearing contoured prism

82%

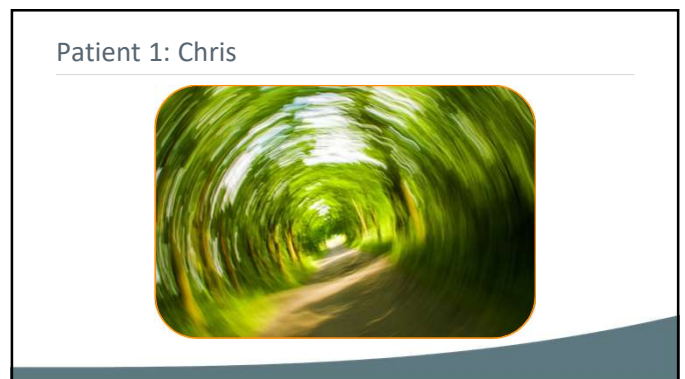
of patients suffering from chronic daily headaches reported their symptoms were **substantially reduced** or **"basically gone"** after wearing contoured prism for 90 days.

Millic, C., Kral, J., Thompson, V., Cobelli, M. A New Treatment for Refractory Chronic Daily Headache. MD Neurology (in press)

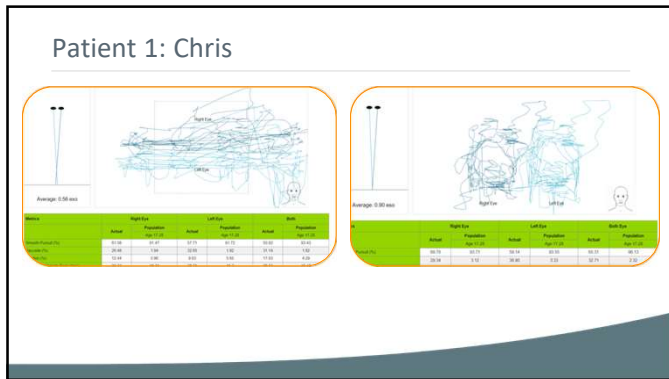
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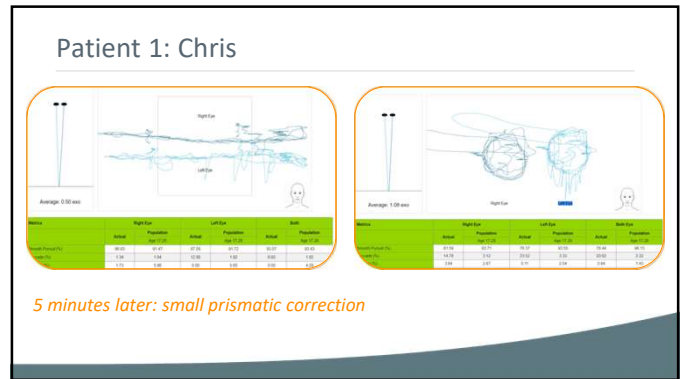
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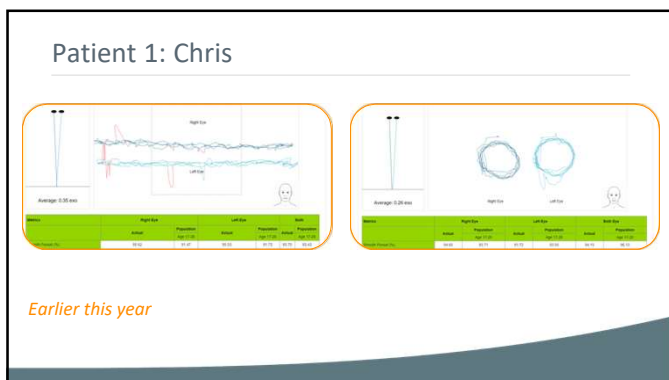
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Patient 2: Mollie

Synopsis: 13-year-old referral from children's hospital for concussion while cheerleading one month prior. (+)Dizzy, motion sensitivity, light constant HA worse with activity. After testing she said that she does have intermittent diplopia at near.

Exam Data:
 20/20 OD, OS, OU
 MRX: OD +0.50-0.50x160
 OS +0.50-0.50x 020
 NPC 18, worse with repeats. PO 24
 BCC +0.50
 Ocular Health WNL
 Phorias

Lifestyle Index:

Headaches	5
Neck Stiffness	1
Computer Discomfort	4
Tired Eyes	5
Dry Eye Sensation	1
Light Sensitivity	3
Dizziness	3

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Patient 2: Mollie

Patient Results
 Date: 4/30/2021 11:45 AM
 Patient ID: 114347
 Age: 12
 NeuroLens Value: 2.0 BI
 Symptomatic

Lifestyle Index:

Headaches	5
Neck Pain	1
Computer Use	4
Tired Eyes	5
Dry Eye	1
Light Sensitivity	3
Dizziness	3

Horizontal Alignment

The red dotted line represents your eyes' desired alignment; the green line is your actual alignment. The distance between the lines represents the work your eyes need to do to see a single clear image.

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Patient 2: Mollie

Synopsis: 13-year-old referral from children's hospital for concussion while cheerleading one month prior. (+)Dizzy, motion sensitivity, light constant HA worse with activity. After testing she said that she does have intermittent diplopia at near.

NeuroLens Measurement Device (NMD):
 5.5 EXO Distance
 10.89 EXO Near

Prescribed: NeuroLens SV
 MRX: OD +0.50-0.50x160
 OS +0.50-0.50x 020
 2BI

Lifestyle Index:

Headaches	5
Neck Stiffness	1
Computer Discomfort	4
Tired Eyes	5
Dry Eye Sensation	1
Light Sensitivity	3
Dizziness	3

Results: Molly began some basic therapy exercises and wore her glasses for one week. Mom reported back that Molly's headaches were completely gone and she was no longer dizzy, experiencing motion sensitivity or having double vision.

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Patient 3: Maddie

Synopsis: 16-year-old female presents with complaints of "shadowy" vision, headaches and eye strain. Saw a neurologist (had MRI) and saw previous doctor (OMD). Everyone said everything is normal. After testing reported double vision at near.

Lifestyle Index:

Headaches	5
Neck Stiffness	5
Computer Discomfort	4
Tired Eyes	3
Dry Eye Sensation	1
Light Sensitivity	5
Dizziness	4

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Patient 3: Maddie

Patient Results

Date: 5/29/2021 11:36 AM
 Patient ID: 114904
 Age: 15

neurolens Value: 1.5 BI
Plus BI is recommended by your doctor

Symptomatic

Lifestyle Index:

Headaches	5
Neck Pain	5
Computer Use	4
Tired Eyes	3
Dry Eye	1
Light Sensitivity	5
Dizziness	4

Horizontal Alignment

Distance Ideal: 2.15x EXO
 Near Ideal: 10.75x EXO

Distance MQI: 1.00
 Near MQI: 1.00

The red dotted line represents your eyes desired alignment, the green line is ideal alignment. The distance between the lens microscopes that work your eyes need to do to see a single clear image.

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Patient 3: Maddie

Synopsis: 16-year-old female presents with complaints of "shadowy" vision, headaches and eye strain. Saw a neurologist (had MRI) and saw previous doctor (OMD). Everyone said everything is normal. After testing reported double vision at near.

Neurolens Measurement Device (NMD):
 2.15 EXO Distance
 10.75 EXO Near

Prescribed: Neurolens SV
 -2.25-0.75x177
 -2.75-0.75x020
 2.0 BI

Results: Patient is doing great and has not been having headaches or double vision. Patient has begun a myopia control protocol and we will explore VT options so she can comfortably wear contacts in the future.

Lifestyle Index:

Headaches	5
Neck Stiffness	5
Computer Discomfort	4
Tired Eyes	3
Dry Eye Sensation	1
Light Sensitivity	5
Dizziness	4

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In Summary

- 1 in every 225 Americans sustain a TBI each year; these patients often present with headaches, balance problems, difficulty concentrating and more
- The signs and symptoms of a concussion can be subtle and may not show up immediately; it's important to *actively* uncover patient symptoms
- A high percentage of these patients will also have problems sustaining convergence
- Proprioceptive conflict from sustained convergence can overstimulate the trigeminal nerve, leading to symptoms like headaches and motion sickness
- Contoured prism effective in relieving these symptoms as a therapeutic offering

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"Only a small amount of Base-In prism will produce a **noticeable change** in the relation of fusional demand and reserve so that the average patient may require very limited amounts to restore comfort."

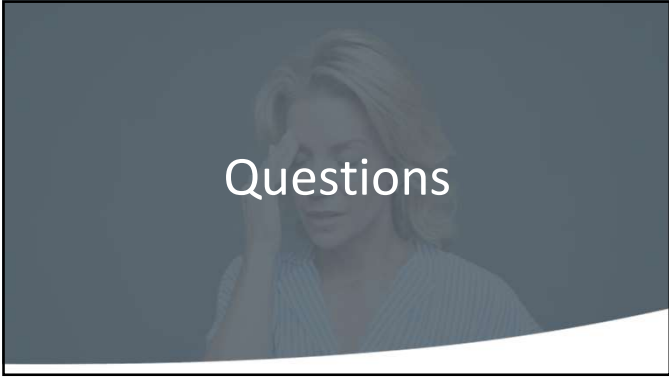
-Irving Borish

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Forever a Patient Advocate & Student

AOA Vision Rehabilitation
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 Vision

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