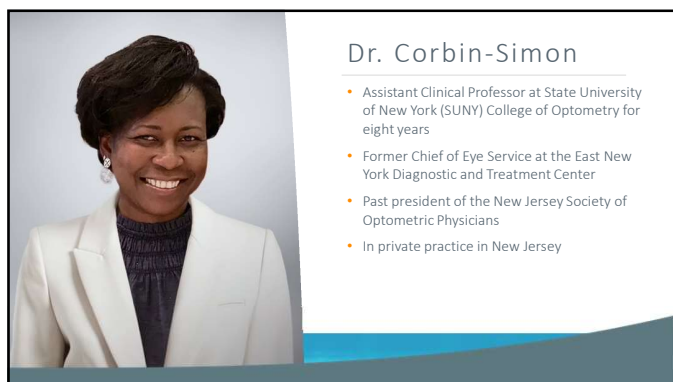




**Reducing Neural conflict
Headache Masquerades
Why Prism may be
the missing link**

Ray Corbin -Simon, O.D.
In Focus Vision Center
1100 Centennial Ave
Piscataway, NJ 08854
drcorbinsimon@powerpractice.com

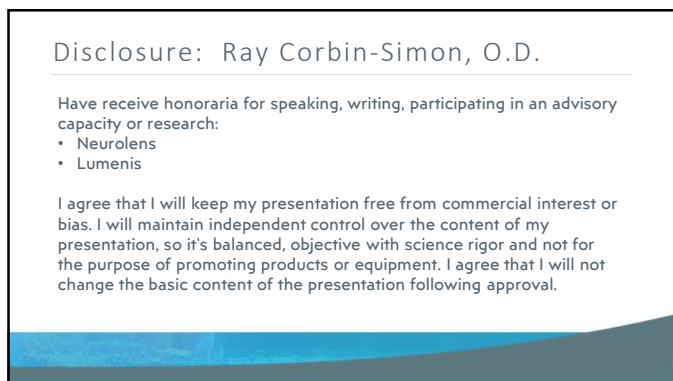
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Dr. Corbin-Simon

- Assistant Clinical Professor at State University of New York (SUNY) College of Optometry for eight years
- Former Chief of Eye Service at the East New York Diagnostic and Treatment Center
- Past president of the New Jersey Society of Optometric Physicians
- In private practice in New Jersey

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Disclosure: Ray Corbin-Simon, O.D.



Have receive honoraria for speaking, writing, participating in an advisory capacity or research:

- NeuroLens
- Lumenis

I agree that I will keep my presentation free from commercial interest or bias. I will maintain independent control over the content of my presentation, so it's balanced, objective with science rigor and not for the purpose of promoting products or equipment. I agree that I will not change the basic content of the presentation following approval.

3

**Reducing Neural conflict
Headache Masquerades
Why Prism may be
the missing link**

- Changing eye alignment has an affect on symptoms, either good or bad.
- Prism can affect pain receptors or effect dry eye sensation.

4

"People report more headaches and migraines during Covid-19."
-Forbes, March 2, 2021


New study shows an increased prevalence of headaches in adolescents during COVID-19 pandemic
by The European Academy of Neurology




Increasing (visual) stress and strain for both adults and kids


5

CHANGE IN VISUAL DEMANDS




Distance
Vision
Dominated

Herding, gathering




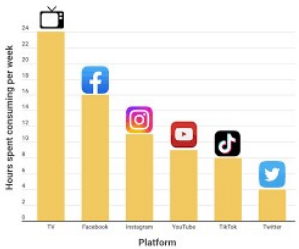
Today

Transition to Near Work



6


Over 144 looks a day


Platform	Hours spent consuming per week
TV	24
Facebook	18
Instagram	14
YouTube	12
TikTok	10
Twitter	8

Average over 11 hours per day on digital devices

7





2/3 of adults experience the symptoms of eye misalignment: headaches, dry eye sensation, and more.




1 out of 10 report their symptoms to their eyecare provider.

Population study, 2019-2020 (n=110,000)

8

Is there a link between headaches, binocular vision and dry eyes?



9



10

Cranial Nerve 5 Trigeminal Nerve

- Changing Eye Alignment has an affect on symptoms, either good or bad.
- Prism can affect pain receptors or effect dry eye sensation.


11

- Proprioceptive fibers in the EOMs 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.


American Optometric Association (AOA Clinical Care Group). The Effects of Computer Use on Eye Health and Vision. April 1997.
Laugh R, Zisk D. The Neurology of Eye Movements. The Ocular Motor Paralysis. *Wor C, Journal of Neuro-Ophthalmology: An International Journal of Ophthalmology*. Vol. 26, No. 2. 2006. The Vision Council. [DOI:10.1097/00006123-200602000-00001](https://doi.org/10.1097/00006123-200602000-00001). Accessed April 2018.
J Neuro-Ophthalmol 2018; 38: 237-243

12


MOST COMMON COMPLAINT “TIRED EYES”




In normal health, one does not experience eye fatigue or visual failure despite the execution of 170,000 saccades in the course of an ordinary day.



76 percent of workers say they feel tired at work, 53 percent feel less productive, and 44 percent have trouble focusing., OHS, 2017

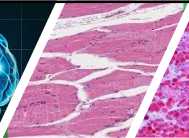


When an individual is suffering from an overload of cortical input, there is consequent stress. In extreme cases, our systems shut down.

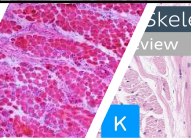


Can we reduce this overload or stress? **Prism** may be the solution

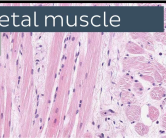
13



skeletal muscle
view



smooth muscle
view



smooth muscle
view

OUR EYES DON'T GET TIRED

- Anatomists state that the extrinsic muscles of the eye (striated) are 60 to 100 times as strong as need be, thus providing “a mechanism for prolonged activity without fatigue” (Walter B. Lancaster, M.D., physiologist).

14

EXTRA OCULAR VS SKELETAL MUSCLE

Attributes	Oculorotators	Limb skeletal muscle
Motor unit (muscle fibres/neuron)	10-20 10x more accurate	100-2000
Maximum motor neuron discharge rates (Hz)		
Phasic (burst)	> 600	125
Tonic (sustained)	> 200	50
Time to peak contractile tension (msec)	4.5	15-35
Fibre types	6	3-4
Proprioceptors	Majority peculiar to the ORMs	Muscle spindles & tendon organs
Stretch reflex	Absent	Important feature
Mode of contraction	Twitch and tonic	Twitch
Fatigue resistance	High	Variable

Table 1. Some of the differences between the oculorotator muscles (ORMs) and ordinary skeletal muscle.

15

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18

More of our neurons are dedicated to vision than the other four senses combined.

VISION TOUCH TASTE HEARING SMELL


Proprioception?
Over Responsive, Under Responsive, and Sensory Seeking

Bonus Question:
What is sometimes considered our "6th" sense?

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DRY EYE SYNDROME

- Typically characterized by stinging/burning sensation, ocular irritation, redness, blurred vision, and easily fatigued eyes
- Treatment depends on the underlying cause
 - decreased tear production
 - increased evaporation (usually MGD)
 - contact lens wear
 - post-refractive surgery
 - inflammatory/autoimmune disorder



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Peer Reviewed Linkage

ORIGINAL ARTICLE

Can Binocular Vision Disorders Contribute to Contact Lens Discomfort?

Eric M. Raft¹, P. Ewan King-Smith², and Melissa D. Bull³

ABSTRACT
Purpose: To determine the relationship between binocular vision (BV) disorder and dry eye symptoms and the frequency of BV disorders in subjects with contact lens-related dry eye symptoms.
Methods: Subjects included in a larger dry eye study (n = 108) completed the Ocular Surface Disease Index (OSDI) and Concomitant Dryness Inventory (CDI) for assessment of symptoms associated with contact lens use. Subjects completed the OSDI and CDI in seven centers of the eye and BV disorder symptoms. Best BV analysis regarding eye performance was used.
Results: Severity of symptoms associated with OSDI and CDI was found to be significantly correlated in the larger subject group and in an OSDI-CDI sub-group. This suggests an overlap in symptoms between BV disorders and dry eye symptoms and that subjects with BV disorders may experience more contact lens-related symptoms. An association between BV disorder and contact lens-related symptoms was found in the larger study group and in the OSDI-CDI sub-group. The association appeared to be higher than previously reported for subjects with BV disorders. An association between BV disorder and OSDI-CDI was found in the larger study group and in the OSDI-CDI sub-group. An association between BV disorder and OSDI-CDI was found in the larger study group and in the OSDI-CDI sub-group. An association between BV disorder and OSDI-CDI was found in the larger study group and in the OSDI-CDI sub-group.
Conclusions: Symptoms related to dry eye and BV disorders overlap. Subjects with symptoms of the contact lens-related dry eye and BV disorder may be experiencing a combination of symptoms. Accommodative insufficiency and presbyopia may contribute to contact lens discomfort in the context of contact lens-related dry eye symptoms. Clinicians should consider BV disorder when evaluating contact lens-related symptoms in subjects with BV disorders. *Ocular Surface Disease Index, Concomitant Dryness Inventory*

Conclusions:
Symptoms related to dry eye and BV disorders overlap. (Optom Vis Sci 2015;92:e214Ye221)

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Frequency of Headaches and Dry eye sensation

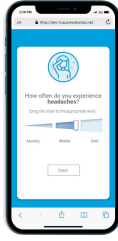
Results from **thousands** of patient lifestyle surveys
1= Never, 2= Rarely, 3= Sometimes, 4= Very Often, 5= Always

50% of respondents indicated both 3+ Dry Eye Sensation and 3+ Headaches

77% Headaches 3+, Dry Eye Sensation <3
60% Dry Eye Sensation 3+, Headaches <3

18% of respondents indicated both 4+ Dry Eyes and 4+ Headaches

48% Headaches 4+, Dry Eye Sensation <4
32% Dry Eye Sensation 4+, Headaches <4



22

Dry Eye is not always Dry Eyes

iovs Investigative ophthalmology & visual science
an ARVO journal



Conclusions:

Correction of non-strabismic binocular visual dysfunction in patients with multifactorial dry eye disease, along with traditional dry eye treatment modalities, results in a **statistically significant decrease in OSDI scores** ($p = 0.03$).

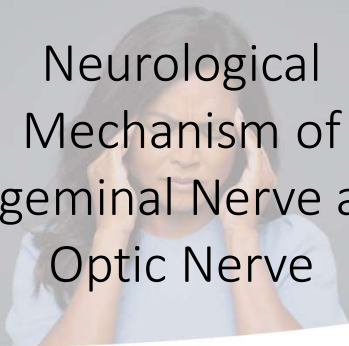
No change was noted in the corneal or conjunctival staining ($p = 0.34$).

Improvement in OSDI scores without change in conjunctival or corneal staining suggests that **correction of misalignment, rather than any modulation of the ocular surface with additional treatments, improved symptoms.**

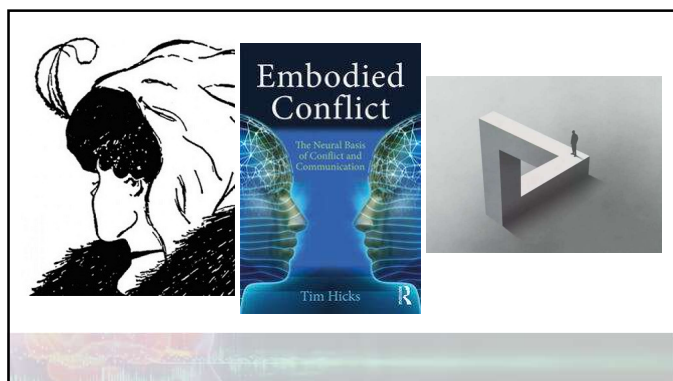
Correction of accommodative and non-strabismic binocular visual dysfunction in the treatment of multifactorial dry eye disease - Angela Satya Gupta, Brian Jonathan Nguyen, Di Zhu, Laura Lehman, Melissa Richard, Julia Zymla, Vatsinee Y. Bunkya, Mina Massimo-Gordano

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Neurological Mechanism of Trigeminal Nerve and Optic Nerve



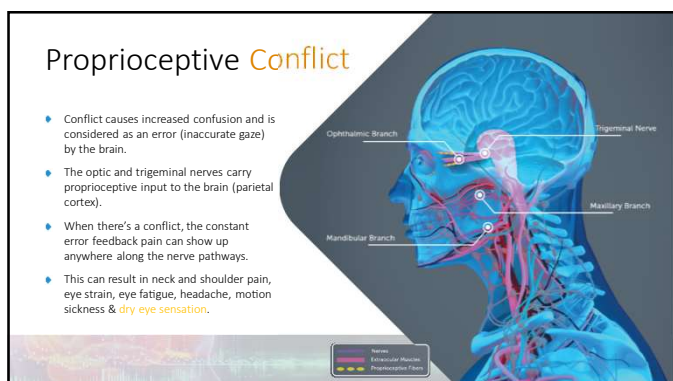
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STANDARD PRISM VS CONTOURED PRISM



- Over 90% of patients experience a larger misalignment when fusing at near than at distance, so linear prism is not always the answer.
- Contoured prism increases BI prism as you progress down each lens

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Chronic Headache Study, MD Neurology HA Clinic (n=179)

93%

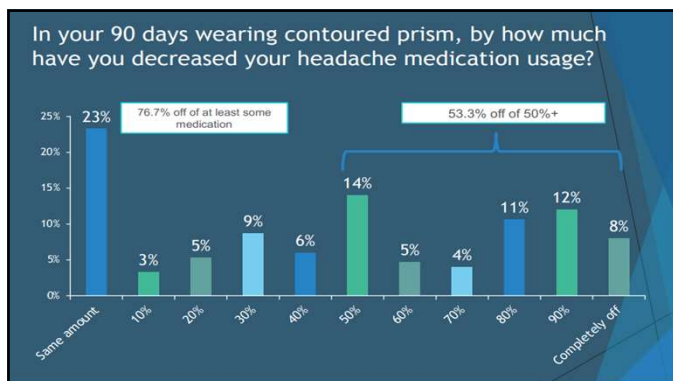
of patients have had a **positive response** to wearing contoured prism

82%

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

Miles, C, Krall, J, Thompson, V, Colvard, M. A New Treatment for Refractory Chronic Daily Headache. The study included 179 patients who suffered from chronic daily headaches and was conducted from September 2012 to June 2013 by Neurology Associates, LLC, and the offices of Dr. Jeff Krall in Sioux Falls, South Dakota.

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Prism Calculation Challenges

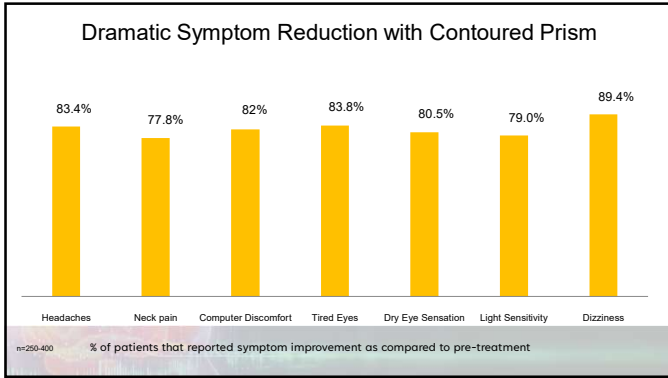
- Cover test
- Phorias
- Fixation Disparity
- Percival's Criteria
- Sheard's Criteria
- Maddox Rod

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Leading edge testing and measuring technology includes:

- Heterophoria
- Vergence conditioning
- Binocular peripheral fusion
- Fixation disparity
- Accommodative convergence response
- Alternating monocular central fixation

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Patient Case Study

Synopsis: 36-year-old female. Complains of headaches, and neck pain. Has worn glasses since early childhood for high myopia.

Lifestyle Index:

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

Measurement Device:
1.99 EXO Distance
4.30 EXO Near

Manifest Refraction:
-8.00-0.25x018
-8.50-0.50x152

**Prescribed: SV with contoured prism
PLANO with 1.2 BI contoured prism**

Result: Headaches are GONE! Wears glasses over contact lenses 7 days a week with excellent comfort and vision!

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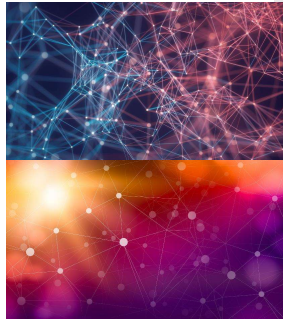
Case Study: Follow Up

"My vision just feels stable!" Patient says he has never had glasses that have made his vision feel so stable in his whole life. He is thrilled to see his computer work with ease, and in much greater detail throughout the day. He was so used to needing an afternoon break from the computer just to let his eyes rest prior to contoured prism, that he is able to put in more hours during the day to have more free time with his family at night.

Lifestyle Index		Before vs After	Lifestyle Index	
Headache	4		Headache	2
Neck Stiffness	5	Neck Stiffness	1	
Computer Discomfort	4	Computer Discomfort	1	
Tired Eyes	4	Tired Eyes	1	
Dry Eye	3	Dry Eye	1	
Light Sensitivity	5	Light Sensitivity	2	
Dizziness	4	Dizziness	1	

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THANK YOU



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ANY QUESTIONS ?

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What is Proprioception?

It is the sense of self-motion, force and body position in the real world

It is essential for motor coordination of the body

Accurate eye movements in different gazes to foveate the object of interest

Proprioception

The Brain receives and interprets information from multiple inputs:

- Vestibular organs** in the inner ear send information about rotation, acceleration, and position.
- Eyes** send visual information.
- Stretch receptors** in skin, muscles & joints send information about the position of body parts.

