

Myopiagenesis and Glaucoma are NOT Causes of Optic Disc Cupping

Preschooler Cupping Acts as a Fail-Safe Mechanism

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Synopsis -1

- In 1974, 1980 and 1984 Ben Lane published evidence that a major risk factor for myopiagenesis is not so much the number of hours of closework, but rather the logarithm of the Diopter Hours of accommodative stimulus as measured by the Habitual Relative Add (HRA).
- Even so, myopiagenesis ONLY occurs when sustained detailed accommodative stimulus engenders OCULAR FATIGUE and when allowed by scleral DISTENSIBILITY.

Synopsis -2

- Otherwise, 4-year-olds have demonstrated that when the eyeball is unable to stretch, the FAIL-SAFE mechanism of optical disk cupping becomes the transitional result, because when the sclera won't stretch, the disc is the softest part of the eye available for invagination, transducing the energy of the stress without damaging the retina.
- Lane reported at the most recent two KISS symposia our measurements with the aid of Optical Coherence Tomography (OCT) and Spectral Analysis photography that demonstrate the reversibility of the cupping when we guide the child's behavior with appropriate one diopter (+/- 0.25 DS) reading lenses plus blue-light hazard protection with instructions "required only at home and not in preschool class and worn only for use with the hand-held interactive digital tablets or cell phones."

Synopsis - 3

- INSTEAD OF SEEING CUPPING AS A DEFECT, WE NOW CAN SEE CUPPING AS PART OF A REVERSIBLE FAIL-SAFE SYSTEM with the same vulnerabilities as a car bumper providing fail-safe protection for the car but with many limitations.
- Your comments and questions are welcomed.

Ben Lane's SUNY Thesis & 49 Years of Data Enriched by Preschoolers' Studies

1. Published 1980 & 1984:
2. Study of 200 patients Ages \geq 40 yrs old
3. Defined Measurement of **Habitual Relative Add (HRA)**
4. Defined Measurement of **Age-Adjusted HRA (AAHRA)**
5. Dr Lane coined the expression "**Diopeter-Hours**" key to myopia studies
6. How our Preschooler Studies enhanced our understanding of the role of IOP IN MYOPIA GENESIS VS OPTICAL CUPPING.
7. Our billing should help recompense OUR enhanced knowledge of the **VISION FATIGUE ANALYSIS (VFA)** so important as integral of OEP exams.

HRA, AAHRA, Diopter Hours

- **HRA = Habitual Relative Add**, represents relative Accommodative Stimulus as described in diopters, can be described as of Controlling or Non-Controlling or Equal -controlling eyes
 - A human eye with 2 Spherical equivalent Diopters of myopia has a +2 HRA when not wearing glasses or contacts.
 - A human hyperope with 2 Spherical-Equivalent Diopters of Hyperopia has -2 HRA when not wearing glasses or contacts.
 - One method of identification of the Controlling Eye is that it is the eye that maintains closework fixation at the Convergence Nearpoint Breakpoint.

Age-Adjusted HRA (AAHRA)

- **AAHRA** is arrived at by subtracting an “Age-Expected Median Add (AEMA)” from the HRA. We have published an “Age-Expected Table of Median Near-Vision Adds and AAHRA Subtrahends.”
- The concept is simple and logical. The effect of accommodative stimulus stress on a one diopter hyperope thirty years old is different than on a forty-year old working on detailed closework.
- {See Table 1 on page 48 of SUNY study.}

Lane SUNY Research + Preschooler Study (Continued)

6. Highest correlation with myopiagenesis is the logarithm , i.e., \log Diopter Hours of the stimulus of accommodation.

The highest correlation to myopiagenesis and easiest evaluated is (AAHRA-1)(\log DCH), where DCH=detailed closework Hrs).

7. Major trigger for myopiagenesis is eye-focusing stimulus FATIGUE.

8. Our expertise beyond autorefractors is Vision Fatigue Analysis (**VFA**).

Just a bit more about the calculations.

6. Highest correlation with myopiagenesis is log Diopter Hours of detailed closework stimulus, moreso than the actual accommodation.

7. For statistical purposes it is most easily evaluated as

$(AAHRA-1)(\log DCH)$, where DCH=Detailed Closework Hours).

Elevation of Intraocular Pressure—Good? Bad? Or Other? Answer comes from Preschoolers!

1. “The Body adjusts IOP to TRY to Control the Optics of the Eye.” ---
Hermann Cohn, MD 1867, 1883, 1892 ---
Ben C. Lane, OD 1973, 1984
2. **FOCUSING FATIGUE** is the major **Trigger** to **non-glaucomatous Episodic IOP**
Elevation in Adults and to Preschoolers working at Hand-held Tablets
3. Episodic IOP Elevation is a major factor in human Non-glaucomatous
myopiagenesis.
4. Statistically the myopic eyes over 10 diopters tend to have smaller, shallower
cups than emmetropes and low myopic eyes in persons engaging in long hours of
intense closework without adequate convex closework adds.
5. It’s as if the organism is saying to the preschoolers. “We see your closework at
the hand-held digital tablets is very important to you at eight inches from your
eyes. We’ will be trying to help you by episodically elevating the IOP.

Elevation of IOP and Fatigue Factors -- continued

8. Major trigger for myopiagenesis is eye-focusing stimulus FATIGUE.

When we engage in physical exercise do we usually get stronger?

If we have exercised vigorously to challenge gains in our resources, the gains are made while resting after the challenging exercise or work.

9. An important part of our expertise beyond autorefractors is Vision Fatigue Analysis (VFA).

10. Optic Disc Cupping is reversible, may act as a fail-safe mechanism.

Your comments and questions are welcomed.

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Nuanced Discussion Points

- Two persons may have the same spherical equivalence and this similarity is quite meaningful in our data. But the difference between an astigmat and a non astigmat of the same spherical equivalence are meaningful. Their visual experiences will be modulated by this kind of a difference as well as by difference in arms length, and stature in general. The SUNY study also was able to graph the statistical differences between persons with enhanced nutrition vs deprived nutrition, enhanced aerobic-developed fitness and sedentary lifestyle and poor movement skills.