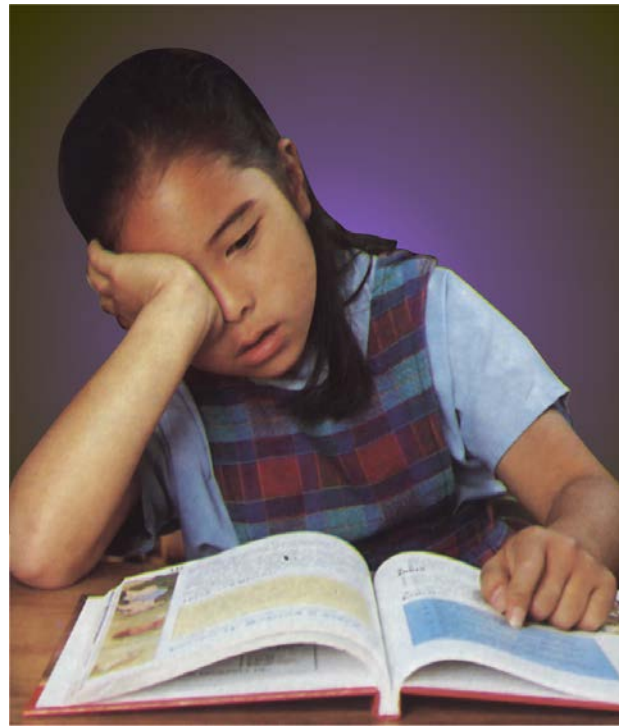


THE DOUBLE VISION DILEMMA: *Solving The Binocular Vision Pandemic*



By Tod R Davis, OD
Developmental Optometrist

DEVELOPMENTAL OPTOMETRY

A little about my own vision

- Poor reading comprehension in school and my style of study (underlining, note cards, etc).
- Discovered in OD school that my binocular vision difficulty caused the reading problem.
- Vision therapy successful.

What is Vision?

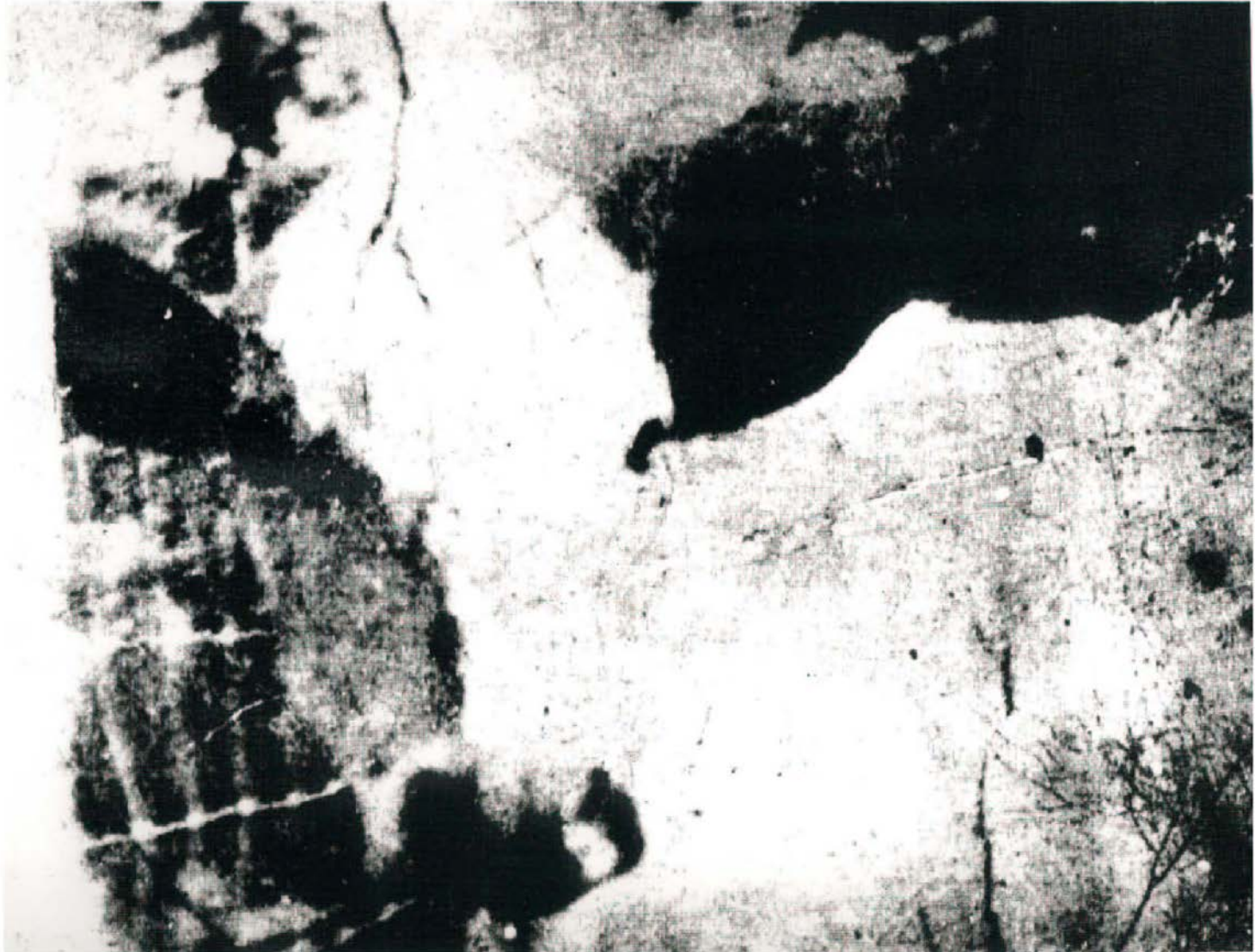
VISION IS MORE THAN “20/20”

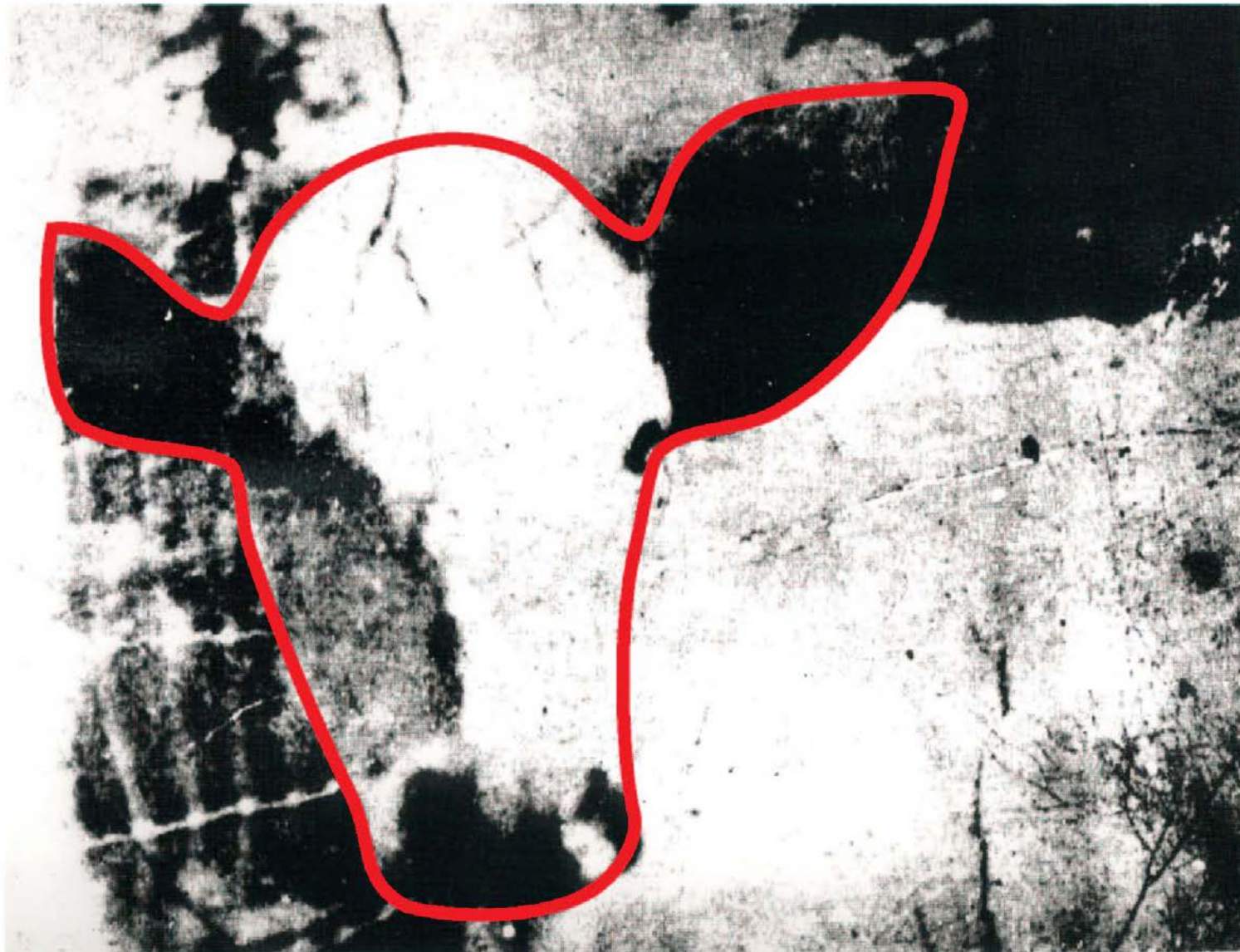
“20/20” clarity at 20 **feet**

BUT most classroom learning
occurs at about 20 **inches**.



What is this?





Moo!

What is Vision?

"Sight is what our eyes see.

Vision is what our **mind understands**
what we see."

From Ricki G. Robinson, MD, MPH,
Clinical Professor of Pediatrics USC (CA)
Co-director of the Descanso Medical Center
for Development and Learning.

What is Vision?

Vision is our Dominant Sense

“The brain receives about **3 million** bits of information at every moment, and **2 million** of these are processed by **vision**”.

From V. S. Ramachandran MD, PhD



What is Vision?

Acquiring a functional visual system
is a *developmental* process.”

From Ricki G. Robinson, MD, MPH,

Clinical Professor of Pediatrics USC (CA) &
co-director of the Descanso Medical
Center for Development and Learning.

What is Vision?

“Vision is the key to a child’s
whole development...”

From Vision: It’s Development in Infant and Child

By Arnold Gesell, M.D.

What is Vision?

“ When we open our eyes each morning,
it is upon a world we have spent a lifetime
learning to see.”

Oliver Sachs MD



What causes vision problems?

Birth history



Developmental history

Medical history



What causes vision problems?

Stress from long- term *comprehensive* near work, including computers. AOA estimates **80% +** of class work is visual.



Convergence Insufficiency



What is Convergence Insufficiency (CI)?

**Inability to converge both eyes
for near tasks**

- *or* -

**Inability to sustain convergence
during near tasks**

How common is Convergence Insufficiency?

About **8%** of population, or **1 in 12**

Affects over **21 million** in US alone

*More common than **glaucoma** in children*
Glaucoma in children is 1 in 43,575

*More common than **amblyopia** in children*
Amblyopia in children is 1 in 50.

Symptoms/Signs of CI

30 –item checklist

Standardized:

If 20 points or above,

suspicion of

vision problem.

Very reliable.

30 Question Predictive Checklist

Name _____

Date _____ Age _____

After you consider each question, mark the column that applies to the person you are assessing.

	NEVER	SELDOM	OCCASIONAL	FREQUENTLY	ALWAYS	SCORE
Blur when looking at near	0	1	2	3	4	
Double vision, doubled or overlapping words on page	0	1	2	3	4	
Headaches while or after doing near vision work	0	1	2	3	4	
Words appear to run together when reading	0	1	2	3	4	
Burning, itching or watery eyes	0	1	2	3	4	
Falls asleep when reading	0	1	2	3	4	
Seeing and visual work is worse at the end of the day	0	1	2	3	4	
Skips or repeats lines while reading	0	1	2	3	4	
Dizziness or nausea when doing near work	0	1	2	3	4	
Head tilts or one eye is closed or covered while reading	0	1	2	3	4	
Difficulty copying from the chalkboard	0	1	2	3	4	
Avoids doing near vision work such as reading	0	1	2	3	4	
Omits (drops out) small words while reading	0	1	2	3	4	
Writes up or down hill	0	1	2	3	4	
Misaligns digits or columns of numbers	0	1	2	3	4	
Reading comprehension low, or declines as day wears on	0	1	2	3	4	
Poor, inconsistent performance in sports	0	1	2	3	4	
Holds books too close, leans too close to computer screen	0	1	2	3	4	
Trouble keeping attention centered on reading	0	1	2	3	4	
Difficulty completing assignments on time	0	1	2	3	4	
First response is "I can't" before trying	0	1	2	3	4	
Avoids sports and games	0	1	2	3	4	
Poor hand/eye coordination, such as poor handwriting	0	1	2	3	4	
Does not judge distances accurately	0	1	2	3	4	
Clumsy, accident prone, knocks things over	0	1	2	3	4	
Does not use or plan his/her time well	0	1	2	3	4	
Does not count or make change well	0	1	2	3	4	
Loses belongings and things	0	1	2	3	4	
Car or motion sickness	0	1	2	3	4	
Forgetful, poor memory	0	1	2	3	4	
						TOTAL SCORE

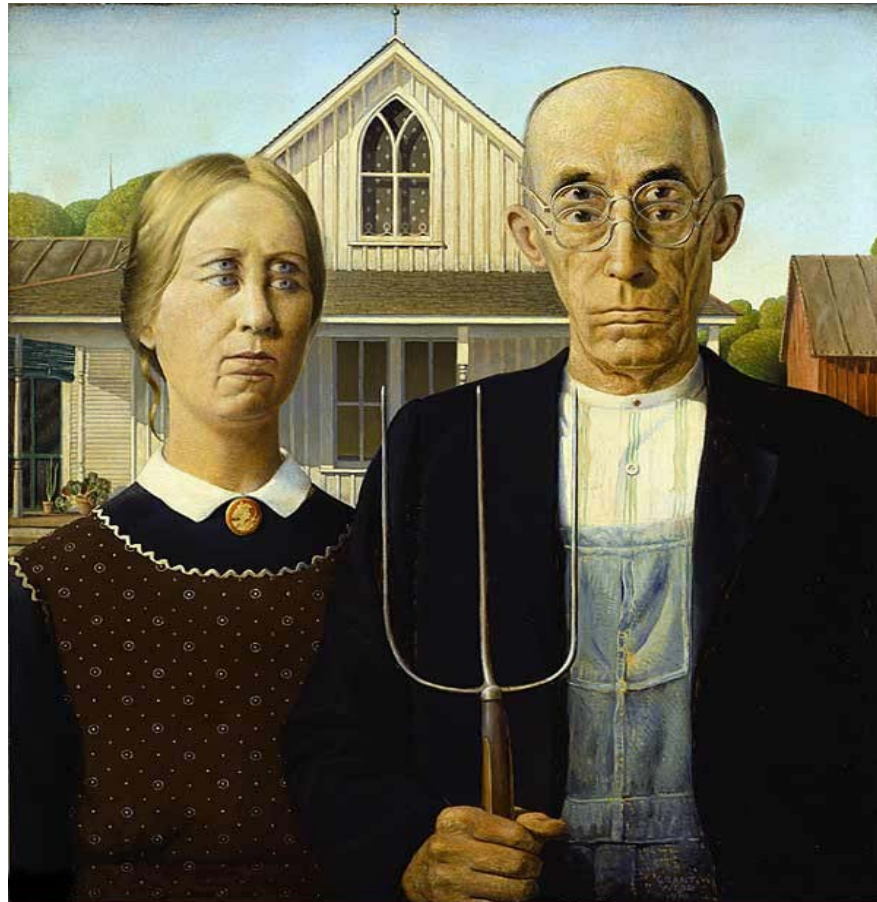
20-24 points = suspect

25 points or more=refer for care

Symptoms/Signs of CI

DOUBLE VISION

Words appear to run together, move.



Symptoms/Signs of CI

DOUBLE VISION

This is a demonstration of what it is like to see print the way someone with double vision would see it.

Symptoms/Signs of CI

**Not Autistic or Hyperactive. Just
Seeing Double at Times**

LAURA NOVAK

New York Times

September 11, 2007

Symptoms/Signs of CI



**Headaches,
especially after
near work.**

Symptoms/Signs of CI

Skips lines
Uses finger
past 2nd grade.





VISION IS LEARNED-EXPERIENCE IT

c e a d s e n s w n m g C a l
 r o y e r t i s e d t s h a r t o o n m . C a u s p
 f o u r t h i e e u t s h y e o r n i o s n s i p
 o t o u u l s e l o o n t w i d b e t t f e d r t n y v o c
 t t o y s e o D g i a h e a p e n i t d e m u l a c s
 d e m A i n k . s l l g o t s e s t e g e e f v a p n f r
 n o . k l l g o t e i e t n o n c u e e c h r a f r
 g v . k l l g o t e i e t n o n c u e e c h r a f r
 i e g n o f i t h d e l y e r h e t u l y e c e c m
 s e y o d s a t e r e c m o t e h p e s t e i a m t h e
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 s r r e t n t h m o f v e h g n t . n o v e g n c e
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 w e e c h m e y i w m e n t s t i o u t T h d p p i t a p t
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 s s i h l d m a y l b m a r A n o s p c t n c u l s
 i c i w d r e y e h a v e s k i l d n e r r w u e t n i
 c r n w d r e y e h a v e s k i l d n e r r w u e t n i
 r e y a n y e h a v e s k i l d n e r r w u e t n i
 x a w y e h a v e s k i l d n e r r w u e t n i
 e d w y e h a v e s k i l d n e r r w u e t n i
 s i t w i r v e t l l t l f r e r i s o y u y n i
 i f n t h o m e r ? f e q u y y o
 h f e r h o m e r ? f e q u y y o
 T e r p o r ? f e q u y y o



Symptoms/Signs of CI

**Head tilt
and/or
covers an eye.**



Symptoms/Signs of CI

**Poor visual
attention span**

**Poor reading
comprehension**



Symptoms/Signs of CI

Difficulty completing assignments.



Homework wars!



Symptoms/Signs of CI

Kids' eye problems often emerge in homework battle

Lauran Neergaard

The Associated Press Medical Writer

Symptoms/Signs of CI

Research found that children with CI reported the following symptoms “fairly often” or “always” while reading or doing close work.

Loss of place	50%
Loss of concentration	45%
Words blurring	36%
Headache	32%
Double vision	32%
Eyes feel sore	21%
Pulling feeling	11%

Symptoms/Signs of CI

Performance related symptoms

(e.g. loss of place, loss of concentration)

occur more often than eye related symptoms

(e.g. blur, headache, diplopia)

Symptoms/Signs of CI

Second most common symptom was loss of concentration, almost 50% reported this symptom fairly often or always.

Strong connection with ADHD-like symptoms

Symptoms/Signs of CI

High incidence of **poor self confidence** with CI as well as with visual processing disorders in general.

“I’m stupid”, “I can’t”



Impact Of Undiagnosed Vision Problems Including CI

The Relationship Between CI and ADHD

Summary:

3-fold incidence of ADHD
with presence of CI,
and a 3-fold incidence of CI
in ADHD patients.

**David B. Granet, MD FACS
FAAO FAAP,
Cintia F. Gomi, MD,
Ricardo Ventura, MD, and
Andrea Miller-Scholte, CO**
Ratner Children's Eye Center,
Department of Ophthalmology,
University of California, San
Diego, CA, USA

Impact Of Undiagnosed Vision Problems

Kids with untreated strabismus,

primarily exo deviations:

3 times chance of mental health problems

as adults.

Mayo clinic, 2008

The JOURNAL of
of PEDIATRICS



Not Autistic or Hyperactive. Just Seeing Double at Times

By LAURA NOVAK, Published: September 11, 2007

As an infant, Raea Gragg was withdrawn and could not make eye contact. By preschool she needed to smell and squeeze every object she saw.
Thor Swift for The New York Times

Raea Gragg, 9, needed therapy to help her eyes work together. "She touched faces and would bring everything to mouth," said her mother, Kara Gragg, of Lafayette, Calif. "She would go up to people, sniff them and touch their cheeks."

Specialists conducted a battery of tests. The possible diagnoses mounted: [autism](#) spectrum disorder, neurofibromatosis, attention-deficit hyperactivity disorder, anxiety disorder.

A behavioral pediatrician prescribed three drugs for attention deficit and [depression](#). The only constant was that Raea, now 9, did anything she could to avoid reading and writing.

Though she had already had two eye exams, finding her vision was 20/20, this year a school reading specialist suggested another. And this time the ophthalmologist did what no one else had: he put his finger on Raea's nose and moved it in and out. Her eyes jumped all over the place.

Within minutes he had the diagnosis: convergence insufficiency, in which the patient sees double because the eyes cannot work together at close range.

Experts estimate that 5 percent of school-age children have convergence insufficiency. They can suffer headaches, dizziness and nausea, which can lead to irritability, low self-esteem and inability to concentrate.

Doctors and teachers often attribute the behavior to attention disorders or seek other medical explanations. Mrs. Gragg said her pediatrician had never heard of convergence insufficiency.

Handout

Not Autistic or Hyperactive, Just sees Double

Impact Of Undiagnosed Vision Problems

Learning-Related Vision Problems Education and Evaluation

National PTA resolution

June 1999



Whereas

It is estimated that more than *10 million children* (ages 0 to 10) suffer from vision problems;

and

Whereas,

Typical “vision” screenings only test for a fewvisual skills (i.e. 20/20 eyesight) leaving most visual skill deficiencies undiagnosed;

Whereas

Learning related vision problems,
when accurately diagnosed, can be
treated **successfully and permanently**;

and

Resolved

That National PTA...urge schools to include
in their vision screening programs
tests for learning-related visual skills
necessary for success in the classroom.

Impact Of Undiagnosed Vision Problems

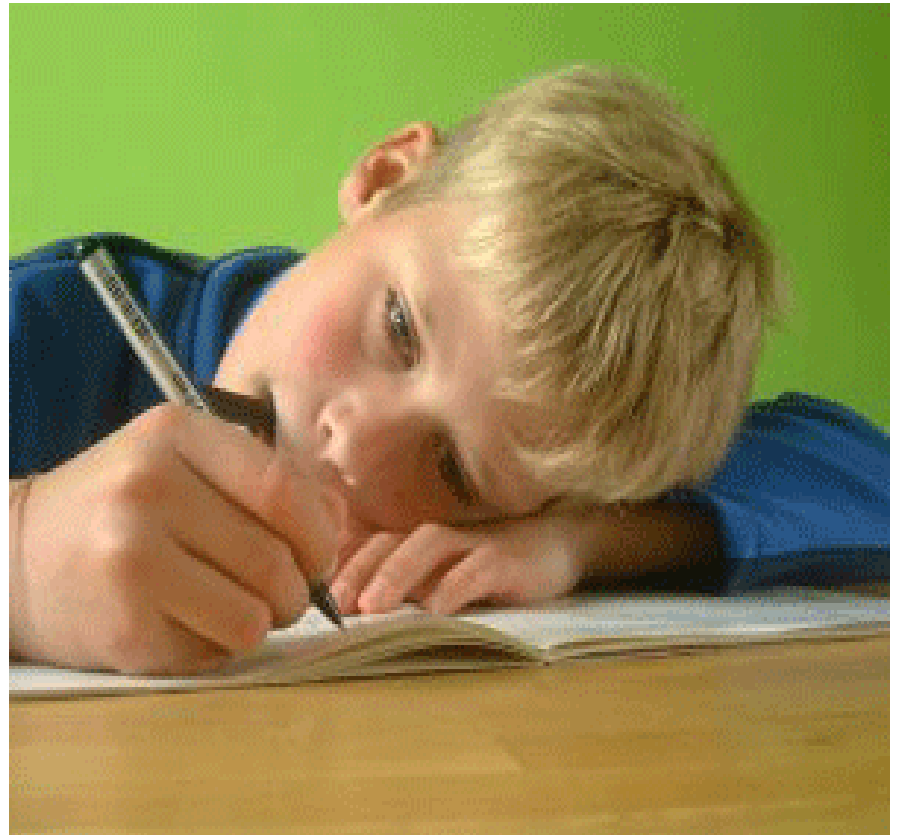
25% of all school children in the U.S. have a vision problem significant enough to affect learning.

*Vision and Learning,
American Foundation
for Vision Awareness.
June 1, 2002*



Impact Of Undiagnosed Vision Problems

**In special education,
at least 50% have
vision problems**



Impact Of Undiagnosed Vision Problems

More than **70%** of juvenile delinquents have untreated vision problems.

*The Prevalence of
Visual Conditions
in a Population of
Juvenile Delinquents*

Harris, Paul OEPPF 1989



Where's The Research?

More Effective Treatment Identified for Common Childhood Vision Disorder

Archives of Ophthalmology

October 13, 2008

Funded by

**National Institutes of Health
National Eye Institute**

Where's The Research?

More Effective Treatment Identified for Common Childhood Vision Disorder

Archives of Ophthalmology

- Pencil push-ups and related convergence exercises are **no more effective** than a placebo
- Home-based “vision activities” including computer-based programs, **are no more effective** than a placebo

Where's The Research?

More Effective Treatment Identified for Common Childhood Vision Disorder

Archives of Ophthalmology

- Prism reading glasses **no more effective** than a placebo
- Office-based VT in conjunction with home oriented activities **is effective** in treating CI.
- Subsequent research shows patients long-term success, thus defining the cure for CI with office-based VT.

Where's The Research?

Convergence insufficiency & its current treatment.

Curr Opin Ophthalmol. 2010 Jul 14.

Lavich, JB

Department of Pediatric Ophthalmology,

Wills Eye Institute,

Thomas Jefferson University,

Philadelphia, Pennsylvania

Where's The Research?

Convergence insufficiency & its current treatment.

Curr Opin Ophthalmol. 2010 Jul 14.

SUMMARY:

Intensive in-office orthoptic therapy is the treatment of choice for convergence insufficiency.

Where's The Research?

Improvement in Academic Behaviors After Successful Treatment of Convergence Insufficiency

Optometry and Visual Science 2012 Jan;89(1):12-8

Borsting, Eric; Mitchell, G. Lynn; Kulp, Marjean Taylor; Scheiman, Mitchell; Amster, Deborah M.; Cotter, Susan; Coulter, Rachael A.; Fecho, Gregory; Gallaway, Michael F.; **Granet, David; Hertle, Richard**; Rodena, Jacqueline; Yamada, Tomohiko; the CITT Study Group

CONCLUSIONS:

A successful or improved outcome after CI treatment was associated with a reduction in the frequency of adverse academic behaviors

and parental concern associated with reading and school work as reported by parents.



AMERICAN ACADEMY
of OPTOMETRY



American Optometric Association
241 N. Lincoln Blvd. • St. Louis, MO 63101 • (314) 991-4100
FAX: (314) 991-4101

VISION THERAPY

Information for Health Care and Other Allied Professionals

*A Joint Organizational Policy Statement of the
American Academy of Optometry and the
American Optometric Association*

INTRODUCTION

Society places a premium on efficient vision. Schools and most occupations require increasing amounts of printed and computer information to be handled accurately and in shorter periods of time. Vision is also a major factor in sports, crafts, and other pastimes. The efficiency of our visual system influences how we collect and process information. Repetitive demands on the visual system tend to create problems in susceptible individuals. Inefficient vision may cause an individual to slow down, be less accurate, experience excessive fatigue, or make errors. When these types of signs and symptoms appear, the individual's conscious attention to the visual process is required. This, in turn, may interfere with speed, accuracy, and comprehension of visual tasks. Many of these visual dysfunctions are effectively treated with vision therapy.

PERTINENT ISSUES

Vision is a product of our inherited potentials, our past experiences, and current information. Efficient visual functioning enables us to understand the world around us better and to guide our actions accurately and quickly. Age is not a deterrent to the achievement of successful vision therapy outcomes.

Vision is the dominant sense and is composed of three areas of function:

- Visual pathway integrity including eye health, visual acuity, and refractive status.
- Visual skills including accommodation (eye focusing), binocular vision (eye teaming), and eye movements (eye tracking).
- Visual information processing including identification, discrimination, spatial awareness, and integration with other senses.

Learning to read and reading for information require efficient visual abilities. The eyes must team precisely, focus clearly, and track quickly and accurately across the page. These processes must be coordinated with the perceptual and memory aspects of vision, which in turn must combine with linguistic processing for comprehension. To provide reliable information, this must occur with precise timing. Inefficient or poorly developed vision requires individuals to divide their attention between the task and the involved visual abilities. Some individuals have symptoms such as headaches, fatigue, eyestrain, errors, loss of place, and difficulty sustaining attention. Others may have an absence of symptoms due to the avoidance of visually demanding tasks.

Handout

Vision Therapy Information for HealthCare Professionals

Where's The Research?

**Pediatrics and
Ophthalmology
publish content that
IS NOT consistent with
current research**

Len Press, OD

[The VisionHelp Blog](#) 2011



Where's The Research?

“The American Academy of Pediatrics (section on Ophthalmology) current description of treatment for CI represents the most blatant disregard for research on treatment for CI. “

“The information supplied is not only incorrect, but woven into a document that also misleads the public by creating a “straw man” argument, trying to connect Dyslexia to vision therapy.”

Where's The Research?

“In this policy statement they advocate treatment that is proven no better than placebo therapy:

“Symptomatic convergence insufficiency treatment can be performed at home, and extensive in-office vision therapy is usually not required. Alternatively, for other patients, reading glasses with base-in prism or minus lenses can be used as treatment.”

This policy statement is also endorsed by:

*The American Academy of Ophthalmology and
The American Assoc for Pediatric Ophthalmology
and Strabismus.*

Where's The Research?

Another joint statement regarding learning disabilities, dyslexia, and vision, A rebuttal

Daniel Lack, O.D. Optometry Jan 2010

- *“Several medical organizations have published yet another joint statement **trivializing** vision therapy and vision disorders in the learning-disabled population.”*
- *“A review of the referencesfind that the joint statement is misleading because of **inappropriate citations and selected references**, as was the case with previous joint statements.”*

Where's The Research?

Daniel Lack, O.D. Optometry Jan 2010

- “The most current joint statement *ignores the results* of evidence-based research and makes recommendations regarding the treatment of CI that have *no scientific validity*.”
- “Ophthalmology should not allow professional rivalry to cloud its judgment regarding optometry’s involvement in the diagnosis and treatment of learning-related vision problems.”

Where's The Research?

Joseph Manley, MD

Medical-legal Expert Witness

*“The conclusions (particularly the failure to recommend optometric vision therapy for children likely to benefit from it) of the American Academy of Pediatrics report on Learning Disabilities, Dyslexia and Vision are based on **exclusion of the most relevant data** and inconsistent application of the Academy’s stated criteria for selecting evidence.”*

Where's The Research?

Joseph Manley, MD, (Continued):

- *“They fail to acknowledge abundant published and anecdotal evidence supporting the use of vision therapy. This overlooked evidence includes controlled trials, observational studies, case reports and consensus of experts – the same kinds of data that underpin the daily practice of medical professionals.”*

Where's The Research?

**The Number of Placebo Controlled, Double
Blind, Prospective, and Randomized
Strabismus Surgery Outcome Clinical Trials:
None!**

Dominick M. Maino, OD, MEd, FAAO, FCOVD-A

Editor Optom Vis Dev 2011;42(3):134-136.

Vision Therapy Referrals

Paul B. Freeman, O.D. Editor *Optometry*; Journal of AOA 7/2011

“When one looks at the services optometrists are uniquely qualified to render, ...it only makes sense to direct our patients...to those in the profession who have demonstrated the desire to help.

In the case of vision therapy, there are evidence-based protocols to support such intra-optometric referrals.”

Vision Therapy Referrals

“Finding a colleague in your area who specializes in binocular vision dysfunction is another important element in treating these patients. Depending on your diagnosis, you will often need appropriate subspecialty care....for patients with binocular dysfunction. The majority of that care comes from those who are dedicated binocular vision specialists.”

“Those specialists are valuable assets to the comprehensive practitioner because they can provide VT that will treat the vast majority of issues that are not organic in nature.”

James Thimmons OD,
OPTOMETRY TIMES 12/2010

Screening of Convergence Insufficiency:

To minimize chair time:

1. 30 –item checklist for *all* school-age children
prior to your examination. *Time: 5 minutes*
2. Measure the near point of convergence
(NPC) by you or tech *Time: 1-2 minutes*
3. Assess vergence facility with a 3 BI / 12 BO
prism flipper by you or tech *Time: 1-2 minutes*

Screening of Convergence Insufficiency: Near Point Of Convergence

- Very good sensitivity and easy to perform in a short period of time.
- A penlight or transilluminator is presented directly in front of the patient along their midline, slightly below eye level, at a distance of 24 inches. Aim light at patient's forehead, not directly into their eyes.
- Ask the patient "How Many Lights Do You See?" If the patient has normal convergence to that distance, the expected response is "one."

Screening of Convergence Insufficiency: Near Point Of Convergence (cont)

- Now tell the patient that you are going to slowly move the pnlt toward their nose and ask them to report if they ever see two lights instead of one.
- At some point, while you are slowly moving the pnlt inward, note when one eye turns out. This is the **convergence break point**. The patient may not see 2 if suppression present, or has poor observation skills.

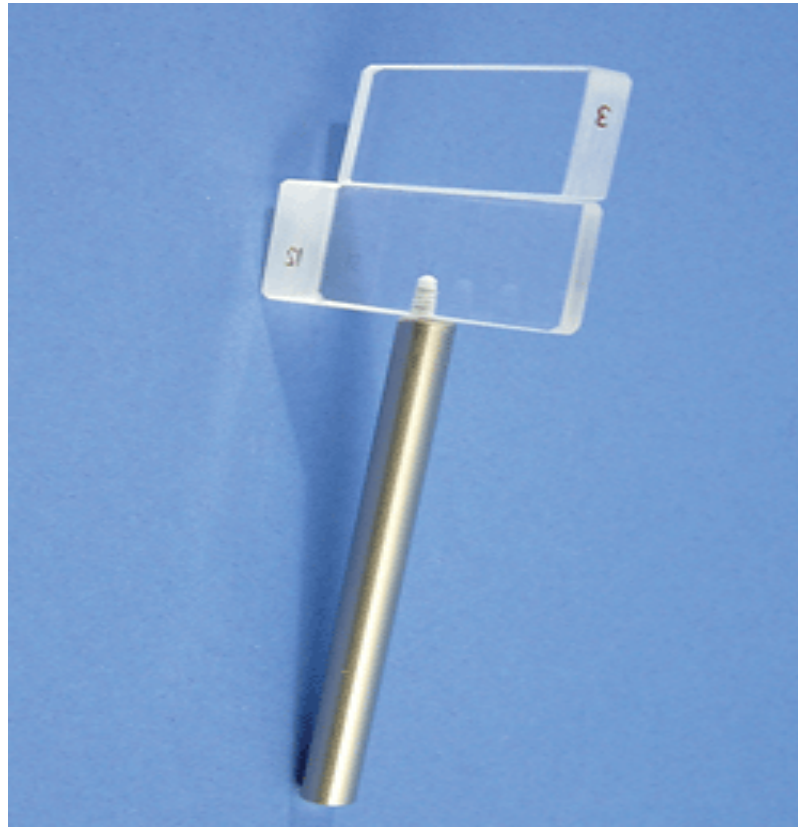
Screening of Convergence Insufficiency: Near Point Of Convergence (cont)

- The pnlt is then moved slowly away from the nose until convergence re-establishes. This is the **convergence recovery point**. The patient may report seeing one light again.
- **Expecteds are approximately two inches break, and 3 to 4 inches recovery.**

Screening of Convergence Insufficiency: Near Point Of Convergence (cont)

- Now hold a red lens over one of the patient's eyes, or have them put on red/green glasses.
- Repeat the procedure. If the patient's convergence is susceptible to fatigue, the break/recovery points with the filters will be more receded compared to no filters.
- Whenever the break/recovery are receded, ask the patient if they ever see double (or "funny looking words") sometimes while reading.

Screening of Convergence Insufficiency: Vergence Facility



Screening of Convergence Insufficiency: Vergence Facility

- Purchase 3 Base In / 12 Base Out prism flippers (Bernell.com \$22.00)
- Hold a 20/30 test card at 14 to 16 inches from patient's face.
- Patients should cycle through prism at 15 cycles per minute (one cycle is BI then BO), letters always clear and single.
- In presence of convergence insufficiency:
BO more difficult (double vision?), and patient will exhibit facial stress e.g. furrowing of brow.

Communicating with Parents

If NPC and/or vergence facility testing positive,

AND vision history is POSITIVE:

1. If you suspect double vision, use double vision demo. Ask child if the doubled image is how they see at school or reading. If yes, explain to parent, “Can you imagine how hard it is to sit through school seeing like this?”

Can show parent double vision problem using 12 BO prism in front of parent’s eye while looking at print, may need to angle prism slightly to produce diplopia. Usually hurts eyes.

Communicating with Parents

2. Use of up/down reader: easiest way to show link between vision and comprehension. Have parent read it aloud. After 3rd or 4th line, ask what they just read, very few can do so. Explain that eye movement and /or eye teaming problems disrupt comprehension.
3. Discuss with parent VT referral. Our website provides information including You Tube videos describing in more detail vision diagnoses and VT process.

Communicating with Parents



Vision Therapy (VT)
is a form of
neurological training
similar to speech or
physical therapy.

.

Communicating with Parents

Do not discuss VT fees with patient!!

Let VT office handle those questions.

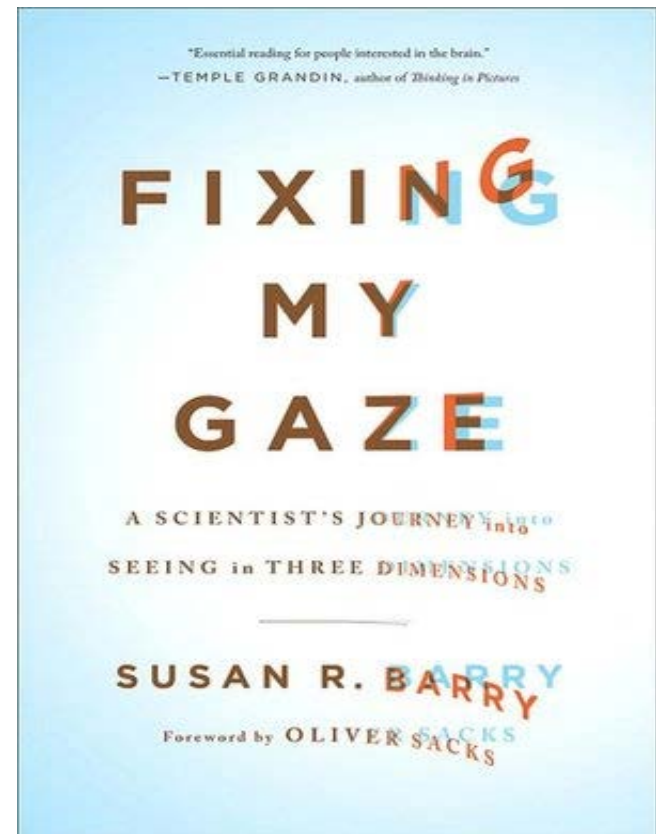
We do not discuss fees until after the initial exam; if parents must know ahead of time, we tell them fees similar to costs of braces.

Our VT-only office has a triage phone call system; about ½ hour is spent with parent on initial phone call reviewing patient information and about 20% of these calls are referred elsewhere for primary care, etc.

We do not dispense glasses or contacts nor provide primary care.

Result of a primary care optometrist referral to a VT specialist

FIXING MY GAZE: A Scientist's Journey into Seeing in 3-D by Susan R. Barry, Ph.D.



Result of a primary care optometrist referral to a VT specialist

From 2-D to 3-D Sight: How One Scientist Learned to See

*Sue Barry discusses what it's like to
live in a 2-D world and explains how
she learned to see in stereo*



Scientific American
August 4, 2009

FIXING MY GAZE:

From *New England Journal of Medicine* (7-2-09):

"Barry benefited from orthoptics — a hidden corner of restorative medicine.

With contrived ocular exercises, specially trained and imaginative optometrists treat patients whose eyes are cosmetically aligned but imperfectly foveated."

FIXING MY GAZE:

From *New England Journal of Medicine* (7-2-09):

“The simplicity of the exercises and of the apparatus (such as beads on a string, papers taped to walls, and strips of film) is bracing for a profession enamored with technology.”

“Several visual scientists have now demonstrated the reversibility of infantile loss of vision and stereopsis, but blindness to these findings and under appreciation of the solutions offered by orthoptics still persist.”

For more information,
please visit our website

www.davisvisiontherapy.org

The screenshot displays the website for Dr. Tod R. Davis, Developmental Optometry & Therapy Services. The header features the logo on the left and the phone number 703-753-9777 on the right. A navigation menu includes links for Home, Vision Exam, Vision Therapy, Why Dr. Davis, Success Stories, Location, and Patient Forms. A prominent 'Contact Staff Member Today' form is on the left, with fields for Name, Email, Phone, Comments, and Security Code. To the right of the form are two photos: one of a boy with an eye patch and another of a child using a vision therapy tool. Below the form is a 'Get Started' button. The bottom section has a 'Learn more about...' sidebar with links to various topics and a main area titled 'Vision Therapy makes a difference for children and adults' featuring a video player for 'Convergence Insufficiency -- on NIH--ep'.

Dr. Tod R. Davis
Developmental Optometry & Therapy Services

Call us now at :
703-753-9777

Home | Vision Exam | Vision Therapy | Why Dr. Davis | Success Stories | Location | Patient Forms

Contact Staff Member Today

Name :

Email :

Phone :

Comments :

Security Code :

Please type in the as seen in the image below

Get Started

Learn more about...

- Who benefits from vision therapy?
- Vision problems
- Dyslexia
- AD/ID
- Reading Problems
- Eye Tracking Binocular Vision

Vision Therapy makes a difference for children and adults

Convergence Insufficiency -- on NIH--ep