Alberta Association of Optometrists
2017 Conference and Optifair
October 19-20, 2017

Child Development, Behaviour, and The Visual Process

Steve Gallop, OD
Some Basic Concepts:

- The primary purpose of the visual process is to direct action.
- The visual process is pervasive in human behavior.
- The visual process is a work in progress...as long as we are.
- Visual development and human development are intimately related.
- Posture and movement are inseparable from visual processing and visual development.
- Vision therapy is a safe and effective way to affect development, performance and comfort.
- Computers are best used only as an adjunct to movement oriented vision therapy.
- The primary purpose of computers is to suppress action.
What does seeing have to do with child development?
20/20?

The visual process
A new study, published in *Psychological Science*, found that children in highly decorated classrooms are more distracted and make smaller learning gains compared to a minimally decorated classroom.

Children’s accuracy on the test questions was higher in the sparse classroom (55 percent correct) than the decorated classroom (42 percent).

Children also spend more time off-task in the decorated classroom (38.6 percent) compared to the sparse classroom (28.4 percent).
Vision is the result of a simple eye and a complex brain.
The deriving of meaning and the directing of action as a product of the processing of information triggered by a selected band of radiant energy entering the eyes.
What does seeing the visual process have to do with child development?
Dr. Arnold Gesell
Pioneer of Child Development
Dr. Arnold Gesell
the 1950s

“To understand the child, we must understand the nature of his vision.”
Eye Care Professionals

• Opticians
• Ophthalmologists
• Optometrists
• Developmental Optometrists
Eye Exam vs. Visual Evaluation
Eyesight related conditions

- Nearsightedness/myopia
- Farsightedness/hyperopia
- Astigmatism
Other visual conditions

• Eye movement deficits
  – Pursuit eye movement/tracking problems
  – Saccadic eye movement problems

• Eye teaming issues
  – Strabismus
  – Amblyopia
    • “Lazy Eye”

• Focusing deficits
Basic Aspects of The Visual Process

• Eye Movements
  – Fixation
  – Pursuits/tracking
  – Saccades/shifting
• Eye Teaming
• Focusing
• Peripheral Awareness
• Visual Acuity
Developmental Optometry

- The primary purpose of the visual process is to direct action.
- Visual behavior begins in the womb.
- Visual development is not complete at birth.
- The visual process is pervasive in human behavior.
- Visual development is intimately linked with overall development.
- The visual process develops throughout our lives.
- The visual process is amenable to therapy.
It has long been known that eye movements begin in the womb...
There is typically a progression from mouth to hands to eyes as the leading explorer of our world...
Neither the visual system (apparatus) nor the visual process (development/function) is fully developed at birth. For example, the newborn does not have 20/20 distance visual acuity - there is no need for it. Most of the important deriving of meaning and subsequent direction of action is close up.
The primary purpose of the visual process is to direct action.
The primary purpose of the visual process is to direct action.

- Crawling
- Walking
- Reading
- Writing
- Playing games
- Sports
- Driving
“An impairment in one area of a performance spreads to the total performance; the impaired organism comes to terms with its total environment as best it can, but when it cannot come to terms with its total environment, it shrinks the environment into one in which it can function optimally. When the impaired organism does shrink the environment, it happens suddenly, without the knowledge of the patient, and it is not product of learning.”
My young patients’ typical issues

• Developmental delays
• Learning difficulties
• Poor eye movement skills
  – Tracking problems
  – Scanning problems
• Eye teaming problems
  – Double vision
  – Suppression
  – Poor eye contact
• Fine motor delays/Poor handwriting
• Visual-perceptual issues
• Poor general coordination
• Reduced attention span
• Autism spectrum behaviors
My less young patients’ typical issues

• Reduced visual efficiency
  – Eye discomfort from prolonged visual work
  – Drowsiness from reading or computer
  – Reduced visual acuity

• Reduced visual comfort
  – Headaches
  – Tired eyes
  – Double vision
  – Dry eyes
The "Kitten Carousel" Experiment  
(Held & Hein, 1963)

The objective of this study was to investigate the role of experience in perceptual-motor development. Kittens were kept in the dark for a period of eight weeks from birth except for an hour per day when they were kept in a 'Kitten Carousel'. The kittens were given appropriate names. 'Passive Kitten' and Active Kitten' were their names. The Active Kitten was given the ability to move freely at its own discretion when in the kitten carousel. As he propelled himself through space, visual experience tied to his motions occurred. The Passive Kitten received an equal amount of visual experience but these experiences were not related to movements the Passive kitten made. Both Kittens were later released into the light. The Passive Kitten showed no evidence of perceiving depth. The Active Kitten was indistinguishable from normally raised kittens.
What is a visual problem?
Most visual stress is within arm’s reach

- Biologically unacceptable
  - 2-dimensional
  - Absence of movement
  - Puts stress on focusing and eye teaming
  - Neurologically confusing
    - Parasympathetic vs. Sympathetic

- Socially compulsive
  - Absolutely necessary
  - Prolonged and chronic
Visual Development Milestones
Visual Development Milestones

• **Birth to 6 weeks**
  – Stares at surrounding when awake
  – Eyes and head move together
• **8 to 24 weeks**
  – Eyes begin to move independently of the head
  – Begins to watch own hands and other objects
• **30 to 48 weeks**
  – May turn eyes inward when looking close
  – Visually inspects toys being held
  – More visually curious in general
Visual Development Milestones

• 12 to 18 months
  – Using both hands with visual guidance
  – Points to objects or people
  – Looks for and identifies pictures in books

• 24 to 36 months
  – Visually inspects without needing to touch
  – Likes to watch movement of wheels, fans, etc.
  – Watches and imitates other children
  – Can begin to keep coloring on the paper
I suppose you're wondering why I'm wearing this eye patch, eh Linus?

You probably have amblyopia ex anopsia. The vision in your right eye is dim so the doctor has patched the left one, thus forcing the right eye to work...

Actually, treatment of amblyopia is one of the most rewarding in medicine...without medication or surgery or hospitalization a child can be given eyesight in an eye which otherwise might have no sight...

You drive me crazy!!
Compensating Lenses
Address that which has already taken place

vs.

Therapeutic Lenses
Based on where we would like to go
LENSES

• To “improve” acuity
  – Nearsightedness
  – Farsightedness
  – Astigmatism

• To “improve” alignment
  – Lenses
  – Prisms

• To prevent problems
• To reduce stress
• To enhance performance
• To positively influence development
Compensating Lenses
Address that which has already taken place

vs.

Therapeutic Lenses
Based on where we would like to go
Vision Therapy/Visual Training

Eye exercises?

Training the brain to use the eyes more effectively and efficiently

Dangerous consequences?

Completely non-invasive; totally interactive; 99% risk-free

Controversy?

Entirely fabricated.
Eye muscle surgery

Eye muscle problem?
Damaged eye muscles are extremely rare (prior to surgery).

Dangerous consequences?
Scar tissue, reduced function guaranteed; emotional problems and multiple surgeries very common; Outcome in developmentally delayed population less predictable

Controversy?
Poor research, little or no long-term follow-up; Multiple surgeries very common
Questions to ask your surgeon before undergoing strabismus surgery:

- Do you expect permanent success after one surgery, or do you expect 2 or more surgeries will be needed?
- What are the chances that my child’s eyes will function together in a normal way after the surgery? Will there be improved eye teaming and depth perception? Or is the goal only for cosmetic improvement?
- If the eyes are straighter after the surgery, will the eyes remain straight or is there a possibility that the eye will turn in or out at a later time?
- If amblyopia is present, will surgery improve acuity or just straighten the eyes?
- Do you recommend any kind of follow-up treatment or therapy after surgery?
Points to remember:

- Surgical intervention often slows visual development and reduces the degree of success of a Vision Therapy program.
- The possibility of a successful therapeutic/functional outcome decreases with each successive surgery.
- Vision Therapy prior to surgery increases the possibility of a successful surgery. Therefore, it is much more logical to undergo a program of vision therapy first, before strabismus surgery is done.
- Vision Therapy after surgery is the best way to maximize the potential of the person to end up with a truly functional cure.
- No studies show that surgery is more successful at any particular age. A few studies show greater success if surgery is performed before one year of age, but other studies contradict this.
What are the problems with strabismus surgery?

• Anesthesia
• Scar tissue
  – Felderstruktur fiber damage
  – Eye muscles are not what we thought they were
• Brain “damage”
Optometric Vision Therapy

• Training the brain to use the eyes more efficiently

• Setting up conditions for learning to occur
  – Allows immediate feedback
  – Promotes global performance changes

• Provides a safe environment in which to make mistakes

• Optimally involves lenses prescribed therapeutically/developmentally
Visual Hygiene

• Proper lenses are important
• Proper working distance is important
• Good Posture
• Proper Lighting
• Taking Breaks
To recap...

• The primary purpose of the visual process is to direct action.
• The visual process is pervasive in human behavior.
• Lenses are powerful therapeutic devices that can stimulate the brain and enhance development.
Realistic Hope

• I prefer to err on the side of hope with anyone who wants to try.

• It is very rare that someone wearing therapeutic lenses and doing vision therapy does not see improvement.

• My only professional regrets are those few people I talked out of trying.
Thank you for your time.

Steve Gallop, OD
7 Davis Avenue
Broomall, PA 19008
610-356-7425

GallopinIntoVision.com
GallopinIntoVision@comcast.net