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Your Child's Vision Development

Everyone has senses. They are the "windows to our world." The big five are: seeing, hearing, smelling, tasting and touching. Of the five, vision is the dominant sense. It is estimated that more than 80 percent of all learning takes place through the visual system.

The techniques that professional athletes use to enhance their skills and performance are closely guarded secrets. I'm going to let you in on one of them. It's about tapping into their vision system and integrating what they see externally and internally with their other senses. This provides the blueprint for coordinating the movements necessary for the game.

Years ago, I had the opportunity of working with a Ladies Professional Golf Association (LPGA) golfer. Touted to be one of the best woman golfers of her time, she struggled her first few years on the Tour, failing to make the final cut for a golf tournament many times. Frustrated with her performance, which impacted her self-confidence, she began the journey to understand what was wrong. Eventually she was referred for a visual evaluation.

She was an excellent visualizer and would prepare for each putt by imagining her golf ball rolling over every blade of grass, flattening it and then imagining it springing back, as the ball traveled to the hole. Sounds good, but she had a significant difficulty coordinating her eyes. In other words, when she lined up for her putt, due to her visual coordination problem, she misjudged where the hole was.

What she was experiencing was a "Garbage In, Garbage Out" situation. When she saw it incorrectly (garbage in), she hit it incorrectly (garbage out). "My swing didn't feel the way it looked in my mind. There was a mismatch," she said.

When a sport involves eye-hand coordination, the motor movement is dependent on the accuracy of the visual information and the processing of that information. If my golfer misjudged the distance between the ball and cup, then her brain gave erroneous information to her motor system for the swing. The visualization she created prior to hitting her golf ball was inaccurate. Her body couldn't calculate the correct swing movement. Imagine the frustration that her putting created, not to mention all the tournaments and prize money she lost. She needed help.

Why 20/20 Vision Isn't Always Perfect

Contrary to the belief of many, vision and sight are not the same. Not only is there confusion within the general public, there is much confusion in the medical and education communities when it comes to sight and vision.

Here's the difference:

Sight merely refers to *eyesight* or *visual acuity*.

Vision refers to *seeing, processing and responding to visual information*.

Vision does not occur in the eyes, it occurs in the brain. The retina, which is the rear interior surface of the eyeball, is formed directly from brain tissue. It is here that the process of seeing begins. Many parts of the brain communicate with one another to create vision. There are different areas of the brain that respond, for example, to movement and to color. No one yet knows where or how all of the modules or pieces of vision come together into a unified picture. But we are sure of one thing: It doesn't happen in the eyes.



Most children are born with healthy eyes, brain and nerves, but they have to learn how to use their eyes and coordinate them with the rest of their body.



The problem with finding and diagnosing children with vision problems is that many of them see 20/20. You as the parent, are told in vision screenings in school or at the pediatrician's office that your child has "perfect vision." All the child really has is 20/20 eyesight. She can see a certain size letter at a certain distance. Good, but not necessarily good enough.

I frequently examine children who have passed the vision screening, yet they have double vision or poor ability to track objects. When I discover a double vision problem in my vision testing, I ask, "Do you see double when you read?" The child responds, "Yes." The mother is shocked and asks, "Why didn't you tell me?" and the child responds, "Why didn't you ask me?" If that's how the child has always seen, she doesn't know enough to even complain about it. These kids often have significant vision problems, undetected by the vision screening.

How Do You Define Good Vision?

When it comes to explaining what it means for someone to have good vision, most people respond with one of the following:

- Ability to see 20/20.
- Having healthy eyes and not needing glasses.
- Ability to pass the school screening tests.

Although a child with good vision would have all of the three answers above, there is so much more to good vision. Your child needs to not only see

clearly and have healthy eyes; he needs to be able to use his eyes comfortably, accurately and efficiently for long periods of time. In addition, he needs to be able to understand the information coming in and respond to that information.

Remember our LPGA golfer? Even though she could see 20/20, she couldn't accurately use her eyes together in a coordinated manner. This resulted in inaccurate hitting. She had a *vision* problem, even though she passed a typical vision screening. This illustrates the complex process of what we call *Vision*.

Think about what your child does on a daily basis. What are some of the signs of vision problems in kids? Most kids don't complain about a visual problem. They often just avoid activities or behaviorally act out.

The most obvious signs of vision problems you might see include: an eye crossing or drifting, squinting, covering an eye to see, funny head turn or tilt, rubbing his eyes, frequent blinking, or headaches after using his eyes.

Here are some possible consequences for a child with vision problems:

- Loses his place when he reads.
- Has difficulty remembering what she just read.
- Handwriting is sloppy with poor spacing.
- Struggles in sports; can't catch a ball, or is clumsy.
- Eye-hand coordination is poor.



Your child may have 20/20 eyesight and still have a *vision* problem.

Use the following checklist to see if your child has vision problems.



Vision Checklist

Carefully observe your child. Look for some of the more common signs of vision problems. If you check off several items, take your child for a thorough vision examination testing visual efficiency skills. Don't send your child to school without all the appropriate tools for learning success, especially visual skills!

Physical Observations:

- One eye drifts or points "in" or "out," in a direction different than the other
- Turns head to see
- Head is frequently tilted to one side
- Squinting, closing of one eye, or covering an eye
- Excessive blinking
- Poor eye-hand coordination
- Frequently bumps into things
- Fatigues easily

When Reading or Doing Homework:

- Holds the book unusually close
- Frequently loses place
- Uses finger or marker when reading (after 2nd grade)
- Rubs eyes during or after short periods of reading
- Unable to read for long periods of time
- Difficulty concentrating
- Avoids homework

Behavioral Signs:

- Headaches or eyestrain
- Dizziness
- Motion or car sickness
- Visual complaints (blur, double vision ...)



The American Optometric Association recommends that your child have his first vision examination by an optometrist by age 1, then again by age 3, before starting kindergarten and then every year thereafter.

Basic Development

Is it possible vision problems may be the source of kids' learning difficulties? The answer is, YES! Yet many of these children pass the school screening. How do we detect these kids, so that they can receive the appropriate help?

Let's start by understanding the "Model of Vision" which emphasizes that vision is a learned process, and it is related to your child's development. How does that work?

Remember, most children are born with healthy eyes, brain, and nerves. Their visual skills are learned through a developmental sequence of movement and processing skills, starting in infancy (and before). Your infant and toddler's development has tremendous impact on his performance and abilities in school years later.

For decades, health care, child development and education specialists emphasized the integration of development of vision and movement. One of the great leaders in developmental optometry, Dr. A.M. Skeffington, said,

Thinking is a movement pattern. Vision is a movement pattern.¹

Dr. Homer Hendrickson, also a developmental optometrist, wrote,

Movement has been called the key to learning, thinking and vision.²

Dr. Arnold Gesell, M.D., was a psychologist and developmental pediatrician. He authored several books including *The Child from Five to Ten*. His pioneering work created the Gesell Institute of Human Development in 1950. He created standards of predictable patterns of growth of development in young children. Today the Institute focuses on educating and supporting teachers and parents in a variety of areas including how children grow and learn. Dr. Gesell said,

Vision is so fundamental to the growth of the mind that the baby takes hold of the physical world with his eyes long before he takes hold with his hands.³

When your child was an infant, she was totally dependent on you, for safety, feeding, and survival. She couldn't hold her head up. She couldn't do much besides eat, wet her diaper, cry, and fling her arms and legs. She had a few reflexive movements, which didn't require thinking, but were just a reaction. For example, if you touched her cheek, she turned her head toward you seeking a nipple to put in her mouth.

Her eyes didn't always focus well, and they might drift. Eye coordination came together between the fourth and sixth months. Eventually, her eyes looked straight and you didn't notice any crossing. This happens with the majority of children. However, some children end up with crossed eyes. Vision treatment may be required even with infants. This visual condition is called strabismus. To get more information on it, visit the College of Optometrists in Vision Development (COVD) website www.COVD.org, or the American Optometric Association (AOA) website www.AOA.org.

It didn't take long until she started gaining control of her head, sat up, rolled over and started smiling. She would look, following you around with her eyes if you moved. Her muscle development and coordination improved daily. From a visual perspective, this was the start of her learning how to fixate and track.

Her babbling intrigued you as you knew she understood what you said. It was as though she had something so important to say, but just didn't have the words to say it yet. This was the start of language development.

Then she started grabbing and touching anything and everything within reach. She didn't know that an object could be sharp or hot; she would touch it anyway. It was apparent that she was learning and exploring her environment. This was the beginning of understanding what she sees, and the development of her eye-hand coordination.

As she grew, she would put many of these objects in her mouth, feeling the texture, shape and form of these objects. I know this is always a scary time for parents because even the dirtiest and unsafe objects aren't excluded! This is part of the learning process. As she moved to a high chair, she would drop her spoon, over and over again, listening for the clunk as it hit the floor (and all the food that spills with it). She has now introduced depth perception to her world. How far and how long does the spoon take to travel? Where is it in space compared to me?

Then your daughter was ready to really explore her world. She needed to make purposeful movements to get from one place to another. She started scooting on her belly; eventually crawled; and before you knew it, she was walking when she was a 1-year-old.

And then, off to the races! Every day brought new adventures, trials, and challenges. Your child grew, developed, and refined her skills as she approached the time to start school. She learned to hold a crayon, a marker, a pencil; how to cut with scissors. All of these milestones happen with most kids if normal development takes place. But what if some of these milestones don't occur?

It Takes Time

As you can see, higher level thinking and processing abilities just don't happen overnight. Jean Piaget, a giant in the field of cognitive psychology in the mid 1960s, studied how the child's mind develops. Piaget believed in general stages of development. He believed that there were certain points at which development "takes off" and moves into completely new areas and capabilities. He saw these transitions as taking place at about 18 months, 7 years and 11 or 12 years. This had been taken to mean that, before these ages, children are not capable

(no matter how bright) of understanding things in certain ways, and the idea has been used as the basis for creating school curriculum.

There are many, including Dr. Howard Gardner, a Harvard psychologist and author, who now questions the existence of general stages and structures. Rather, Dr. Gardner believes,

That humans possess a number of relatively independent intelligences and these can function and interact in idiosyncratic ways.⁴

Development does not always progress in a smooth manner.
All children develop at their own rate.



Dr. Gardner still considers Piaget to be the giant of the field; his questions and observations are well respected.

Generally, the development of movement skills is learned from a gross to fine motor sequence. It comes with repetition and practice. Development of eye movement skills, like tracking a ball, or having accurate eye jumps along the page for reading, is dependent on a strong foundation of these gross and fine motor skills. Good eye movement skills are critical for building visual perception, higher thinking and processing skills. The integration of eye movement and body movement skills builds the foundation for learning and excelling at sports, as well as every day eye-hand coordination activities.

Look at all the important learning that has taken place even before your child walks into the classroom. If for any reason, your child had difficulties in any of the sensory or motor systems during her first years of life, this could set the stage for difficulties in learning. The child who has chronic ear infections may have difficulty learning phonics since the ears were often clogged when

your child was first interpreting sounds. Or lazy eye might develop because your child had a significant difference in glasses prescription between her two eyes. Or, due to motor development delays, handwriting skills are difficult when it is time for school.

In my experience, these children often become frustrated, dislike school, avoid completing their work, and sometimes start showing behavioral signs, such as distracting others in class, not paying attention, cheating on tests, and not turning in homework. These kids often receive inappropriate labels in school such as, "slow learner," "attention deficit disorder," "learning disability," or "lazy."

Sending kids to school with vision problems is like going to work without the primary resources that you need for your job. Developmental visual skills are an essential part of school readiness.

The same thing can easily happen in sports. Watch the kid who is so excited to play but becomes frustrated very quickly. He can't seem to catch or hit the ball. Everyone tells him he sees 20/20. Then what's the matter? The coach jumps all over him for not paying attention, or swinging too soon, or just being a bad player. He feels stupid, not good enough, and might even want to quit the team (before he ends up spending most of his time on the bench). Or, he might develop inappropriate behaviors, like being the "class clown" to change the type of attention he receives. Little does he know that he has a vision problem that has not yet been diagnosed.

The Vision Model

Take a look at the illustration. This represents a Developmental Model of Vision. The outer circle represents the life activities that are important to your child: school, work, coordination/sports, play, relationships and success in life.

A strong *foundation* is required upon which to build. The *foundation* is represented as the central core of the concentric circles. This core includes the structural integrity of the vision system; that is, the physical health of the eyes, eyesight, and the visual pathways.



THE **DEVELOPMENTAL MODEL OF VISION**

The first concentric circle outside of the core represents *visual efficiency*; i.e. how well the eyes fixate (look), follow (track), fuse (coordinate together), and focus (make objects clear). These visual skills are movement-based.

The second concentric circle out from the core represents *visual information processing* (understanding what we see, where things are in space, integration of visual information with other senses, eye-hand-body coordination, visual memory, and *visualization*).

This Model of Vision represents the basis for the evaluation and treatment for your child when he is examined by a developmental optometrist. As you can easily see, there is so much more than 20/20 eyesight to consider. Even if one eye doctor says your child has 20/20, it doesn't mean all these other vision skills have been appropriately evaluated. Read more about developmental optometry in the Appendix.



How do you find an optometrist who can provide a developmental vision examination? Ask your eye doctor these questions:

- Do you do “near point testing?”
- Do you give academically related vision testing?
- Do you provide vision therapy or refer to someone who does so?

If your eye doctor is not clear or doesn't do this type of evaluation, then you can find a referral for a developmental optometrist at the “Locate a Doctor” section of the website: www.COVD.org

When Kids Continue to Struggle

Early in my optometric career, I had great success in vision therapy based on a more structured model of vision, that is, treating basic eye sight and visual

efficiency skills, but not including much work on *development, movement or visual information processing*. What changed my approach to vision care were the many children who were referred to me by excellent teachers, tutors, language therapists, and physicians as a "last resort." They referred kids who were still struggling in school, even though they received special academic assistance. These kids were frustrated and not performing well. They had difficulty just sitting in my exam chair long enough for me to do a vision evaluation.

I realized that all of my great, expensive instruments for vision therapy were useless because these children had such basic developmental and movement problems. To work with them, I expanded my model of vision, incorporating body movement and visual information processing into my vision therapy program. With this expanded vision perspective, I have now been able to treat many more types of patients, including:

- Those with basic developmental, learning and processing problems.
- Those who have poor vision efficiency skills: tracking, focusing and eye teaming.
- Gifted kids who have visual motor (eye-hand or writing difficulties) and often avoid completing their homework.
- Top athletes who want to enhance their performance.
- Children and adults who have visual problems after suffering a brain injury.

What happens if your developmental optometrist finds some difficulty in the above areas? There are a number of treatment options available, including glasses, contact lenses, vision therapy, ergonomic recommendations and other types of adaptations. Vision therapy is explained in more detail in the Appendix.

Here's an example of how appropriate vision treatment can impact a child.

Success Story

Everyone likes kudos. Imagine my pleasure when I opened the following letter which was sent to my office one day:

Kevin completed eight months of vision therapy and is no longer experiencing eye fatigue and headaches. He reports to me that the letters no longer "jump around" on the page. Words are no longer blurry. He likes to read now, and, although still behind in his grade level, he is only a few months behind rather than 1½ years behind.

I am a family practice physician and have realized how important developmental vision screening is for kids, not just simple vision screening. It is part of my routine now to really delve into school performance issues with my young patients to make sure they are progressing normally; otherwise they get referred to Dr. Hellerstein.

Since many children I evaluate have complex vision and learning issues, networking with other professionals has been a critical part of my practice; teachers, tutors, physicians, optometrists, speech/language therapists, occupational therapists, physical therapists, counselors, psychologists and others. I provide the best vision treatment possible, while utilizing referrals to other professionals when necessary. Maximizing your child's abilities is the goal!

It's no surprise that vision is our dominant system for learning. Look at the complexity of the visual system. Your child's eyes are truly essential in informing the brain about movement, and in using the mind for learning. And it's no surprise that kids struggle when there are unresolved vision issues.

Notice that the visual information processing part of the vision model includes *visualization*. If the foundation for vision and development are not solid, then your child's ability to *visualize* may be impacted.

Be preventative! Have your child visually evaluated.
If recommended, follow through on treatments your
developmental optometrist recommends.



The vision model is set. Now it's time to learn how to use the *See It. Say It. Do It! Model*. Let's move on to Chapter 3, *See It!* and have some fun.

