STRENGTHENING STUDENT'S FUNCTIONAL VISION AND VISUAL PERCEPTUAL SKILLS TO IMPROVE SCHOOL OUTCOMES

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LEARNING OBJECTIVES

Following this presentation, participants will be able to:

1. Identify student behaviors that may indicate undiagnosed vision or oculomotor challenges that may be impeding the student’s ability to access and participate in the curriculum

2. Learn strategies and interventions to implement in the classroom that focus on improving functional vision and visual perceptual skills

3. Collaborate with the educational team to utilize practical strategies that will enhance development of functional vision and visual perceptual skills
AGENDA

8:30 - 9:00  Registration
9:00 – 10:00  Overview of Visual Skills Development
10:00 – 10:45  Observation guides, screening and assessment tools, and sample data collection strategies
10:45 – 11:30  Make-It-Take-It Activities/ Oculomotor screening instruction
11:30 – 12:00  Environmental Modifications
12:00 - 12:45  Lunch
12:45 - 02:30  Intervention Strategies for Multiple Environments(Classroom, Therapy, Community)
02:30 - 03:00  Summary: Implications for school-based therapists, Q&A
AN EYE-BODY COORDINATION ACTIVITY
THE “P CHART” (MOVEMENT ACTIVITY #1)
P-CHART 1 REVIEW

What did you think?

How could you introduce that activity into your classrooms, the home, or the clinic?

How could you grade the activity?

What skills can you work on with that activity?
DANGEROUS ASSUMPTIONS ABOUT VISION

Here are just a few of the dangerous assumptions we can make about our students and their vision:

Parents assume their child has “perfect vision” because he/she passed the vision screening done by their pediatrician or school nurse

Teachers assume that if a student can see letters on a whiteboard or chalkboard easily, then he/she will be able to read letters on a worksheet or in a book for extended periods of time without difficulty

Students assume that if their teachers and parents tell them they have perfect vision and they are experiencing vision problems, they must be stupid

Parents assume that their child with 20/20 eyesight has already developed the visual skills needed for good reading

Teachers assume that a child with glasses has “perfectly corrected vision” and has all the visual skills needed for good reading

Students assume they should learn and perform the same as their classmates...and enjoy the learning experience
SOCIAL OBSERVATIONS ASSOCIATED WITH POOR EYE TRACKING AND VISUAL PERCEPTUAL PROBLEMS

Short attention span
Low self-esteem
Easily Distracted
Temper tantrums
Class clown
Extremely shy
Daydreaming

Frequent crying
Frustration
Clumsy
Confused
Lack of hand preference
Developmental lags

(Remick, 2000)
LABELS ASSOCIATED WITH POOR EYE TRACKING AND VISUAL PERCEPTUAL PROBLEMS

Lazy
Slow learner
Dyslexic
Juvenile delinquent
Attention Deficit Disorder

Working below potential
Immature
At Risk
Behavior Problem
Learning Disabled

(Remick, 2000)
EYESIGHT MEANS SEEING CLEARLY
THE ABILITY TO SEE AND THE EYE’S RESPONSE
TO LIGHT SHINING INTO IT.
WHAT IS 20/20 EYESIGHT?

*Visual acuity* is often measured on a Snellen chart: a measure of the sharpness of sight, based on size of letters on the chart. (Dr. Snellen created this chart in the 1800’s) The test is done with each eye evaluated separately.

Standing at a distance of 20 feet from the eye chart, you can see the same row of letters that the average person can see at this distance.

Near vision is evaluated with a card provided 14 inches from the face.
WHAT IS 20/20 EYESIGHT?

If you have 20/50 vision:

you must be as close as 20 feet to see what a person with normal vision can see at 50 feet.

However, 20/20 eyesight does not tell you anything about how your brain is processing what you see!
VISION IS LEARNED

“VISION”: THE ABILITY TO INTERPRET AND UNDERSTAND INFORMATION THAT COMES THROUGH THE EYES.
IMPACT OF VISUAL-PERCEPTUAL DEFICITS ON OCCUPATIONS AND PARTICIPATION IN MEANINGFUL ACTIVITIES

- IADL’s
- ADL’s
- Education
- Work
- Play
- Leisure
- Social Participation
VISUAL PERCEPTUAL DEFICITS CAN HAVE AN IMPACT ON MANY SKILLS USED THROUGHOUT THE SCHOOL DAY

Navigating the School Environment

Tool use (scissors, writing tools, classroom manipulatives)

School work (reading, spelling, math, writing, etc.)

Coloring/ Drawing/ Graphing

PE Activities
75%-90% OF CLASSROOM LEARNING COMES THROUGH THE VISUAL SYSTEM

It **begins** with **light** entering the eyeball through the cornea, hitting the retina

**Identify:** light brings visual information about our environment, objects, textures, shapes, to the occipital lobes of the brain for processing

**Store:** the visual information is stored for later retrieval, comparison and use

**Integrate:** the visual information is integrated with our other senses: auditory, tactile, kinesthetic, gustatory, olfactory
EARLY CHILDHOOD DEVELOPMENT

1. Early childhood experiences “build” the architecture of the brain
   - our genes are the “blueprint”
   - circuits are built through sensory experiences, connecting them with emotions and memories and promoting health and learning abilities

2. Interactions “shape” the circuitry of the brain
   - interactions that take place between the baby and his/her environment is the fundamental process for wiring of the brain in the early years
   - the reciprocal interaction between parent and child influences both the rate and extent of development
   - both stimulation and deprivation of experiences have potential for influencing the rate of development

Gallahue and Ozman, 1998)
Toxic stressors:
- Lack of opportunities to move, explore, play and interact
- Extreme conditions of environmental deprivation may disrupt both the sequence and rate of movement skill acquisition (Gallahue and Ozman, 1998)
- Environmental stressors such as high noise levels, background commotion with interruption of sleep, poor nutrition, sensory deprivation

*Toxic stress exposure over time can impede the acquisition of developmental milestones, the development of cognitive and social skills, as well as affect a child’s self-esteem and self-confidence over time*

NORMAL VISION DEVELOPMENT IN BABIES

Birth to 4 months:

May look intently at a highly contrasted targets, but have not yet developed the ability to easily tell the difference between two targets or move their eyes between the two images.

Primary focus is on objects 8 to 10 inches from their face or the distance to parent's face.

By eight weeks, babies begin to more easily focus their eyes on the faces of a parent or other person near them.

For the first two months of life, an infant's eyes are not well coordinated and may appear to wander or to be crossed. This is usually normal.

Babies should begin to follow moving objects with their eyes and reach for things at around three months of age.
NORMAL VISION DEVELOPMENT IN CHILDREN

5 – 8 months:

During these months, control of eye movements and eye-body coordination skills continue to improve.

Depth perception, which is the ability to judge if objects are nearer or farther away than other objects, is not present at birth.

around the fifth month that the eyes are capable of working together to form a three-dimensional view of the world and begin to see in depth.

Although an infant's color vision is not as sensitive as an adult's, it is generally believed that babies have good color vision by five months of age.

Most babies start crawling at about 8 months old, which helps further develop eye-hand-foot-body coordination.

Early walkers who did minimal crawling may not learn to use their eyes together as well as babies who crawl a lot.
NORMAL VISION DEVELOPMENT IN CHILDREN

Nine to twelve months

By 9 months of age: babies begin to pull themselves up to a standing position.

By 10 months of age, a baby should be able to grasp objects with thumb and forefinger. When babies use this grasp to eat finger foods, this helps to further develop their eye-hand coordination.

By 12 months of age, most babies will be crawling and trying to walk. Parents should encourage crawling rather than early walking to help the child develop better eye-hand coordination.
One to two years old

By two years of age, a child's eye-hand coordination and depth perception should be well developed – but do continue to develop throughout childhood.

Children this age are highly interested in exploring their environment and in looking and listening. They recognize familiar objects and pictures in books and can scribble with crayon or pencil.

NORMAL VISION DEVELOPMENT IN CHILDREN

2 – 3 years old

Continued development of eye/hand/body coordination

Eye teaming and depth perception are critical at this stage and continue to develop

Interacting with objects is critical to develop coordination of vision with fine motor system:

- Block building
- Scissors/cutting
- Rolling a ball back and forth
- Coloring and drawing with crayons
NORMAL VISION DEVELOPMENT IN CHILDREN

3 – 6 years old

**Formal vision exam:** before enrolling in school, rule out vision challenges

Focus, depth perception and tracking abilities continue to develop during this time

**Binocular vision** operates smoothly by 6 years old

**School vision exam:** Snellen Chart from 20 feet away (vision at a close distance is not screened)

*Does not examine* eye health, binocular function, or tracking across one row of text

**Convergence:** fully developed by 7 years old: ability of both eyes to focus on an object/person.
DECREASING VISUAL STRESSORS – ACTIVITY #1
CUPPING EXERCISE

1. Rub hands together
2. Cup hands
3. Cover eyes with hands in “x” formation
4. “Snuggle” so no light can get in
5. Take three deep breaths blinking gently looking into the darkness
COMMON VISION PROBLEMS
AMBLYOPIA: “LAZY EYE”

- Term used for when a child’s vision is not corrected to 20/20 vision with glasses

- Usually caused by *strabismus*

- Can be caused by increased *astigmatism* in one eye

- Corrected with patching

- Patching is usually very effective up until the age of 10 years old
STRABISMUS: EYES TURNING OR CROSSED

- Considered normal during the first 4 months of life

- The vision in the eye that drifts “in” or “out” does not develop normally

- Treatment for mild/moderate strabismus is patching of the stronger eye, along with body work

- Treatment for severe strabismus may require surgery to realign the muscles of the turning eye plus vision therapy to retrain the brain to use the affected eye
ASTIGMATISM

When the cornea or lens has an uneven curvature

Can be hereditary, often present at birth

As light from different directions hits an uneven surface, it focuses unevenly on the back of the eye, blurring vision

**Myopia** (nearsightedness) – eye is too long and light focuses in front of the retina

**Hyperopia** (farsightedness) – eye is too short and light focuses behind the retina

Treated with eyeglasses, contact lenses, or refractive laser eye surgery
VISUAL IMPAIRMENTS

Other Causes:

- Trauma
  - TBI
  - CVA
  - Eye Injury

- Congenital Eye Defects
- Agenesis of the Corpus Callosum
DYSEXIA

Severe reading disability
Child must be at least 2 years below grade level (lower 4% of population in reading)
A truly dyslexic child is uncommon

Often, once a child’s visual attention skills and oculomotor skills are addressed, reading efficiency can be greatly increased

VISUAL IMPAIRMENTS

Impede visual input to the brain

Impede visual information processing in the brain

Impede speed of processing visual information

Impact dynamic activity performance, especially in children
It’s tough to find the answer when you can’t see the question!
VISUAL ATTENTION
OUR BRAINS PAY ATTENTION TO NOVELTY

• Initially, babies visually attend to the familiar
• As they get older, they begin to visually attend to novelty (8 weeks or so)
• As the preschool years begin, they begin to develop controlled visual attention
Around the **age of 4**, children develop the ability to scan their environment actively, rather than being drawn by novelty or salience of a stimulus.

This internally driven attention is believed to be well established by **5 or 6 years of age**.
TRAINING VISUAL ATTENTION

Areas of Visual Attention:

**Focused Attention** – Ability to respond discretely to specific visual, auditory, or tactile stimuli

**Sustained Attention** – Refers to the duration of time over which a given level of performance can be maintained and the consistently of performance over that period

**Shifting Attention** – ability to rapidly shift visual attention from one target to another (saccadic fixations)

**Selective Attention** – ability to maintain a behavioral or cognitive set in the face of distracting or competing stimuli

**Divided Attention** – ability to respond simultaneously to multiple tasks or multiple task demands

Motor and Right Hemisphere Training – The right hemisphere has an important role in attention. The coordination of the direction of distributing and shifting attention is an adaptive anticipatory function (anticipatory tool under cerebellar control)

(Lane, 2012)
WHAT IS VISUAL PERCEPTION?

A cognitive skill

A dynamic interaction between the person and the environment

The result of the development of Sensory-Motor Integration!
VISUAL PERCEPTION – WHERE?

Occurs in the Visual Cortex

located in the occipital lobes of the brain

visual information is processed across more than 50% of the brain
VISUAL PERCEPTION – WHAT?

The ability of the brain to:

- Understand and interpret visual information
- Analyze and give meaning to information taken in through the eyes
- Learn, remember, and integrate visual information

A cognitive skill integrated with:

- Memory, judgement, reasoning which all influence the visual perceptual process

Occurs as a result of:

- Sensory motor integration development which starts with tactile manipulation of the physical world and visual exploration of the environment

A dynamic process:

- An interaction between the person and the environment
- Compares the visual information with past experiences
VISUAL PERCEPTUAL DEFINITIONS

**Visual Discrimination** – the ability to see differences and similarities in shapes, patterns, and objects

**Visual Spatial Memory** – the ability to recall, identify, or reproduce a design or dominant feature of an object, or recall an object’s location in space

**Visual Sequential Memory** – the ability to remember and immediately recall or reproduce a sequence of visual images such as pictures, shapes, letters, numbers, or objects in the correct order after seeing it for a short period of time

**Figure Ground** – the ability to attend to, or search for, a specific form or feature while simultaneously ignoring irrelevant information such as the background
VISUAL PERCEPTION DEFINITIONS

Form Constancy – The ability to perceive orientation of objects in space or forms on a page, including recognizing them in a different format or orientation,

Visual Closure – the ability to recognize an object or form (letter or number) without seeing all the object or form, such as when some part is missing.

Visual Spatial Relations – the ability to recognize the position in space of objects or forms

Visual Motor Integration – the ability to coordinate visual information processing skills with moto skills by visually “steering” the hand to form letters/numbers
VISUAL PERCEPTUAL USES

Visual Discrimination – used when matching and categorizing information, aligning letters on lines, proofreading, distinguishing differences between similar letters, and math symbols

Spatial Relations – used in understanding directional concepts, writing with even spaces between letters, recognizing letter and number reversals, graphing skills, following a map or diagram, planning and organizing space on paper, right/left discrimination

Visual Closure – used when recognizing an object even though it is partially hidden (recognizing a pen from a pencil when it is partially hidden under papers), spacing when writing, letter formation, breaking words into syllables, copying from near and far point, reading full test questions and stories for reading comprehension, visualizing end product when completing a construction activity
MORE VISUAL PERCEPTUAL USES

**Figure Ground** – used when separating visual information that is important from other distracting information (attending to whiteboard during school instruction, finding eraser in a messy desk or pencil box, keys in a cluttered home), keeping one’s place when copying from board or a text book, looking up words in a dictionary or on a map

**Visual Memory** – used when attending to, storing, and processing visual information, letter and number recognition, learning sight words, reproducing letters, shapes, numbers without a model

**Visual Sequential Memory** – used when following multi-step directions, remembering the motor patterns for letter formation when writing, spelling, following routines/schedules, remember sequences like days of the week, months of the year, alphabet, phone numbers, addresses, zip codes
WARRENS HIERARCHY OF VISUAL PERCEPTUAL SKILL DEVELOPMENT

Mary Warren described the development of visual perceptual skills as a spiral, where visual skills interact with one another and each builds upon the previous skill. In the hierarchy.

Each level is dependent upon the development of the skills that precede it. Based on this pattern, if there is a dysfunction at lower levels, the high level skills will also be impaired

**OCULOMOTOR CONTROL, VISUAL FIELDS, VISUAL ACUITY**

**ATTENTION = ALERT AND ATTENDING**

**SCANNING**

**PATTERN RECOGNITION**

**VISUAL MEMORY**

**VISUOCOGNITION**

**ADAPTATION**

**THROUGH VISION**

PRIMARY VISUAL SKILLS THAT FORM THE FOUNDATION FOR ALL VISUAL FUNCTION

OCULOMOTOR CONTROL – enables efficient eye movement and ensures the “scanpath” is complete

VISUAL FIELDS – registers the visual scene and makes sure that the CNS receives all of the visual information

VISUAL ACUITY – ensures the visual information sent to the CNS is accurate
**NEXT LEVELS OF THE SKILL HIERARCHY**

**Visual Attention:** The ability to attend to a stimulus and perceive its detail
  - requires an optimal level of arousal
  - influenced strongly by global attention

**Visual Scanning:** The ability to move the eyes from one object to another, includes:
  - Saccadic eye movements
  - Visual pursuits

**Pattern Recognition:** The ability to recognize, match and categorize objects
  - Helps us identify features that make an object an object

**Visual Memory:** The ability to store the image that is perceived

**Visuocognition:** The ability to mentally manipulate visual information and integrate it with other information in order to solve problems
EYE-BODY COORDINATION
THE “P2 CHART” MOVEMENT ACTIVITY #2
OCULAR MOTOR SKILLS:

Visual Fixation

Visual Saccades

Visual Pursuits (Tracking)

These are the **Foundation Skills** for Visual Perception and Ocular Control
OCULAR MOTOR SKILLS: VISUAL TRACKING

Smooth Pursuits

Coordination of both eyes

Following and tracking a moving object

Integrated with body coordination
SYMPTOMS OF VISUAL TRACKING DYSFUNCTION

- Excessive head movement during reading
- Poor performance in sports
- Jerky eye movements
- Midline tremors as the eye crosses its midline
OCULAR MOTOR SKILLS: VISUAL SACCADIES

Saccadic eye movements – rapid, accurate eye movement from fixation point to fixation point

Appears to develop during 2 – 5 months of age, and continue developing.

Most 5 years olds have difficulty performing saccadic eye movements, however marked progress usually occurs between 5 and 7

After 7, improvement usually slows down

There is no visual perception during these movements, visual acuity decreases to 20/1000 (saccadic suppression) so that we don’t see blurred images between the two points
SYMPTOMS OF SACCADIC DYSFUNCTION

Most have to do with reading:
- Loss of place
- Omission of words
- Skipping lines
- Head movements
- Slow reading speed
- Poor comprehension

Also:
- Difficulty copying from blackboard
- Difficulty solving math problems with columns of numbers
OCULAR MOTOR SKILLS: FIXATION

Visual Fixation – the act of directing the eyes to the object we are looking at so that the image of the object can be centered on the fovea.

Coordinating the eyes to stay focused on a static target.
SYMPTOMS OF FIXATION DYSFUNCTION

Poor reading speed

Poor reading efficiency

Most dyslexic children have very poor saccadic fixations
OCULAR MOTOR SKILLS

The sole purpose of the ocular motor system is to keep the image that we are looking at on both foveas at the same time.
For every **20 minutes** of close-up activity, shift your eyes to look at an object at least **20 feet away**, for at least **20 seconds** while taking slow, deep breaths and gently blinking eyes.
SO NOW WHAT DO WE DO??

Observe the environment

Observe the child’s behavior

Gather information about the child’s performance in the school and home environments

Understand what we can do as an occupational therapist to enhance child’s performance with regards to visual skills – *we are not providing visual therapy*

Collaborate with the educational team to make a comprehensive plan enabling the child to participate in activities to help them access the general education curriculum
"THE CLASSROOM ENVIRONMENT OBSERVATION CHECKLIST" - WE LOOK AT THE ENVIRONMENT
CHECKLIST OF STUDENT BEHAVIORS FOR VISION REFERRAL – WE OBSERVE THE STUDENT

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Checklist of Student Behaviors for Vision Referral

Student: ___________________________ Date of Birth: ___________ Grade: ___________

Date of Referral: ___________ Teacher: ___________ School: ___________

**Classroom Observations:**

- **Reading Observations:**
  - Short attention span while reading
  - Difficulty keeping place
  - Must use finger to keep place
  - Directs words in sentence
  - Slow/word by word reading
  - Lip reads or says words aloud
  - Difficulty remembering new words
  - Holds face close to page
  - Turns head to see sides
  - Lays head down on arm or hand
  - Tires easily
  - Sits close to desk to read

- **Writing Observations:**
  - Holds face too close when writing
  - Restlessness while writing at desk
  - Avoids writing
  - Difficulty getting started
  - Turns head when writing
  - Tires easily
  - Difficulty copying from the board
  - Reversals in letters/numbers

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73
SYMPTOMS OF POOR EYE TRACKING SKILLS

- Avoids near-point work
- Holds book too close to eyes
- Loses place when reading
- Repeats letters within words
- Avoids reading aloud
- Poor reading comprehension
- Does not look directly into speaker’s eyes
- Poor posture while reading
- Homework requiring reading takes too long
- Uses a marker to keep place
- Reads big words, but misreads/misses smaller words (and, but, if...)
- Enjoys being read to/ avoids self-reading
- Comprehension declines as reading continues
- EASILY DISTRACTED
- Head tilting when reading/writing
- Poor attention during work period
- Omits, re-reads words/letters
- Difficulty copying from board (loses place)
- Whispers to self when reading
- Misaligns numbers in math

(Remick, 2000)
SYMPTOMS OF POOR VISION PERCEPTION

- Letter reversals
- Number reversals
- Repeatedly confuses right/left direction
- Word reversals
- Grips pencil too tightly/poor pencil grasp
- Poor spacing when writing
- Uses other hand as “spacer” when writing
- Writes uphill or downhill
- Orient draws/ing writing poorly on page
- Poor shape recognition
- Difficulty copying shapes
- Confuses similar words
- Difficulty with sports/poor motor skills
- Poor visualization / spells words based on sounds alone
- Poor comprehension
- FRUSTRATION WITH SCHOOLWORK

(Remick, 2000)
ASSESSMENT TOOLS – VISUAL PERCEPTION

**MVPT-4** (Motor – Free Visual Perception Test, 4th ed)

**TVPS-3** (Test of Visual Perceptual Skills, 3rd ed.)

**SASP** (Spatial Awareness Skills Program)

**SDUSD** Checklist of Visual Behaviors and Visual Efficiency Screening

**DTVP-3 / DTVP-A** (Developmental Test of Visual Perception, 3rd ed and Adolescent edition)

**WRAVMA** (Wide Range Assessment of Visual Motor Abilities)

**BOT-2** (Bruininks-Oseretsky Test of Motor Proficiency, 2nd ed.)
MVPT-4

Assesses spatial relations, visual discrimination, figure ground, memory

Ages: 4 – 80+ years

Administration time: 20 – 30 minutes to administer and score

Multiple choice format: individuals can point, use eye gaze, or say the letter associated with the answer of their choice

Scoring – very easy – no basals or ceiling required, simply count number of correct responses, convert raw score to standard percentile rank, and age equivalent

There are no subtest scores; scores reflect overall visual perceptual functioning
TVPS-3

Assesses 7 subscales: visual discrimination, visual memory, visual spatial relations, form constancy, visual memory, figure ground, visual closure

Ages: 4 – 18.11 years

Administration time: 5 – 10 minutes per subtest (varies)

Scores – individual scores for each subscales calculated by number or correct responses. Ceiling is reached when 3 consecutive incorrect responses are given
SASP

Assesses spatial awareness skills

Includes a program for improving spatial awareness skills, the assessment determines where to start in the sequential curriculum

Ages: 4 – 10 years

Administration time: approximately 5 minutes
SDUSD CHECKLIST OF VISUAL BEHAVIORS AND VISUAL EFFICIENCY SCREENING

**Purpose:**
Screening tool used to assess a student’s ocular motility and eye teaming to determine visual challenges.

**Population:**
5.0 years and older

**Time to Administer:**
5-10 minutes

**Format:**
*SDUSD Checklist of Visual Behaviors & Vision Efficiency Screening* includes school and clinical observations of the student’s eye teaming and eye tracking abilities.

The *Checklist of Visual Behaviors* is an informal checklist for school staff who are familiar with the student and/or parents to complete, to assist in guiding discussions and determining if the student’s academic skills and school performance is being impacted by vision skills. It addresses:

- Does the student have/wear glasses?
- How is student’s performance impacted?
- When does the student demonstrate difficulty in the classroom environment?
- What is the student’s behavior that indicates that vision may be affecting school performance?
- What strategies have been tried?
DTVP-3 DEVELOPMENTAL TEST OF VISUAL PERCEPTION 3RD ED.
DTVP-A (ADOLESCENT/ADULT VERSION)

DTVP-3
Purpose: Assess visual perceptual skills and visual motor integration
Population: DTVP-3 4.0-12.11 years
Time to administer: 30 minutes; 15-20 minutes to score
Format: 6 subtests: 2 subtests require motor response, others completed by finger point, eye gaze or verbalizing letter associated with response
   Eye-Hand Coordination
   Copying
   Figure-Ground
   Visual Closure
   Form Constancy

DTVP-A
Purpose: Measures visual perceptual and visual motor abilities
Population: 11.0 – 74.11 years
Time to administer: 25 minutes
Format: 6 subtests: 2 subtests require motor response, others completed by finger point, eye gaze or verbalizing letter associated with response
   Copying
   Figure-Ground
   Visual – Motor Search
   Visual Closure
   Visual Motor Speed
   Form Constancy
WRAVMA
WIDE RANGE ASSESSMENT OF VISUAL MOTOR ABILITIES

Purpose: Measures 3 important aspects of visual motor functioning
Population: 3 – 17 years
Format: 3 subtests: Drawing Test and Matching Test are workbooks; Pegboard Test contains a wooden pegboard with small pegs

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<th>Subtest</th>
<th>Ability Measured</th>
<th>Time to Administer</th>
<th>Time to Score</th>
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<td>Drawing Test</td>
<td>Integrated visual-motor ability</td>
<td>5 – 10 minutes</td>
<td>5 – 10 minutes</td>
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<tr>
<td>Matching Test</td>
<td>Visual-spatial ability</td>
<td>5 – 10 minutes</td>
<td>5 minutes</td>
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<tr>
<td>Pegboard Test</td>
<td>Fine Motor ability</td>
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BOT-2
BRUININKS-OSERETSKY TEST OF MOTOR PROFICIENCY

**Purpose:** Assesses visual motor control, including fine motor precision, fine motor integration, manual dexterity and upper limb coordination, manual coordination and body coordination skills

**Ages:** 4.0 – 12:11 years

**Administration time:** 5 – 10 minutes per subtest

**Format:** 8 subtests:

- **Fine Motor Form:**
  - Fine Motor Precision
  - Fine Motor Integration
  - Manual Dexterity
  - Upper Limb Coordination

- **Gross Motor Form:**
  - Balance
  - Bilateral Coordination
  - Running Speed and Agility
  - Strength
DATA COLLECTION STRATEGIES

Accuracy Data sheets
Work samples
Make sure that data focus on the functional outcome you are looking for
**Name:** ____________________________  **Observer:** ____________________________

**Annual Goal:** Student will demonstrate improved visual motor skills by copying 2 sentences far point with 100% accuracy at the rate of 65 letter per minute or better over two consecutive opportunities.

**Objective:** Student will demonstrate improved visual motor control by finding 18/18 correct responses within 90 seconds or less independently in two out of three data consecutive biweekly data collection points.

**Baseline:** Finds 12 correct responses in 3 minutes

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<td>Letter find #4</td>
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Let’s Do It-Write Activity Progress Sheet:
Student Name:
Activity Name:

<table>
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<th>Dates</th>
<th>Successes / # trials</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1 trials</td>
<td></td>
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<tr>
<td>Level 2 trials</td>
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<td>Level 3 trials</td>
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<tr>
<td>Level 4 trials</td>
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</table>
DECREASING VISUAL STRESSORS – ACTIVITY #3
LAZY 8 EYES (FROM BRAIN GYM®)

1. Use the bridge of your nose as the center

1. Close your eyes

1. Using your middle and ring finger, gently rub a “lazy 8” pattern around your eyes

1. Try completing 3 times in one direction and then 3 times in the other direction
MAKE – IT – TAKE – IT

Materials:
- Two popsicle sticks
- Two pairs of different color targets
- Glue
VISION SCREENING FOR THE OCCUPATIONAL PHYSICAL THERAPY PRACTITIONERS

Fixation:

Have partner stand on marked spot

Examiner holds one visual target 16 – 20 inches from partner’s face at eye level

Instruct partner to keep both eyes on target and blink normally as they stare at target

Count up to 30 second or until partner’s eyes deviate from target

Identify at how many seconds the partner’s eyes deviated from the target

5 – 8 years old = 10 seconds

9 – 12 years old = 30 seconds
VISION SCREENING (CONT’D)

Saccades:

Have partner stand directly in front of examiner

Examiner holds 2 visual targets 16 – 20 inches from partner’s face at eye level between the ears and shoulders

Instruct partner “When I say (color) look at the (color) stick. And when I say (color) look at the (color) stick. Remember don’t move your eyes from (color) until I tell you.”

Begin calling out each color and repeat until partner makes 10 saccades (5 on each color)

Observe the saccades and rate the following: ability, accuracy, head/body movement

*Ability* – Can the person move eyes from point A to point B and back to point A (1 round trip)

*Accuracy* – Can the person accurately fixate so that no noticeable correction is needed?

*Head/body movement* – Can the person accomplish saccades without head or body movements?
VISION SCREENING (CONT’D)

Visual Pursuits:

Have partner stand on marked spot directly in front of examiner

Examiner holds one visual target 16 – 20 inches from partner’s face at eye level

Instruct partner “Watch the (target) as it goes around. Keep your eyes on the (target) and blink normally”

Move the target in a path around of the perimeter of the face/head and between the shoulders – move clockwise 2 times, move counter clockwise 2 times

Observe ability, accuracy, and head and body movements
Convergence/Divergence

Have partner stand directly in front of examiner

Examiner holds one visual target 16 – 20 inches from partner’s face between the eyes

Instruct partner “Focus on the (target) and blink normally as it moves in and out toward your face”

Slowly move the target in toward the student and out again (2 – 16 inches)

Repeat 5 times and observe how both eyes are moving in and out together

Observe for endurance and repeat if necessary

Drift is any movements of the eyes away from the center (nose) – your student should be able to converge and hold
MODIFYING THE ENVIRONMENT
CLASSROOM MODIFICATIONS

Allow for visual breaks during near point work

Provide learning materials that are well-spaced and well-organized on the paper

  Instruct students how to cover up parts of the page with blank pieces of construction paper

  Discourage unnecessary visual information on worksheets

Slantboards

Provide rulers for students when taking standardized tests (scantron sheets)

Provide color overlays or guided reading strips

Standing desks

“Wiggle” cushions/ ball seats

Use natural lighting when possible (classroom light filters can be used when this is not possible)

Desk organizers
HARMON DISTANCE

Considered the optimal distance for reading

Measured by taking note of the length between the wrist held at the chin, and the tip of the elbow
The Work Site

**A Quiet Work Space:** Available for any student to use, when copying.

**The Word Wall:**
2 Visual Strategies:

1. **Decreased Density:** space between words.
2. **High Contrast** background
The Writing Process Chart

An Executive Writing Strategy

A visual schedule for students.

Students monitor own progress across 6 steps, daily.

Students are self-empowered in the learning process.

They can see all the steps (big picture), as well as the current step in the process, for that day (details).
DOES THIS LOOK FAMILIAR? - SUGGESTIONS??

Weekly Puzzle +25 (+5 attempts) serious
Genius Challenge +50 (+10 attempts)

No sharing answers
Spelling counts?

100 pts = 10 E.C. points
150 pts = HW 3 days late pass
250 pts = HW excused (non-reading)
500 pts = CW excused (teacher permission)
750 pts = Quiz excused
STUDENT WORK SPACE:
TEACHING SELF-ORGANIZING STRATEGIES

What does a clean desk look like?

1. All papers in folders or binders
2. All other school supplies in box/bag between books or on top of them
3. Two sharpened pencils and an eraser in desk lip
4. Name tag left alone
5. Books and folders in two neat stacks
6. No trash in desk
7. Backpack tucked under desk or on back of chair
8. Nothing on the floor

THE CLEAN DESK DIAGRAM

Angela Watson
THE WORK TASK

**Directions** support child’s communication skills – provide them with clear directions

**Supports** verbal reminders, visual cues, peer buddies

**Tools & Supplies**: make tools students use accessible, organized, visible

**Resources**: expectations should be appropriate for child’s physical and cognitive capabilities – help student/teacher adjust as needed

**Success**: find times for students needing extra time to organize that don’t punish them – but support them
RED YARN “TRACK JUMPING ACTIVITY” FROM “EYES ON TRACK”
EARLY CHILDHOOD INTERVENTIONS TO ENHANCE FUNCTIONAL VISION AND VISUAL PERCEPTUAL SKILLS
A child’s first perception of the world develop from tactile, kinesthetic, and vestibular input.

As these sensations become more integrated, vision and audition gradually take over.

Typically developing children become “visual” learners until around the 3rd grade, learning through auditory means becomes more efficient around the 5th grade.

EARLY CHILDHOOD INTERVENTIONS TO DEVELOP VISUAL MOTOR/ VISUAL PERCEPTUAL SKILLS

● Core Strength
● Crossing Midline
● Eye-Hand Coordination
● Combine Tactile Input with Visual Motor Activities
● Work on Tactile Discrimination
● Work on Spatial Organization
INTERVENTIONS
CORE STRENGTH

Wiggle cushions
Ball chairs
Standing desks with balance boards
Yoga activities
Swimming
Prone work – coloring on floor with clipboards/books

Balance board activities
Therapy ball activities
Prone work
Swing
Scooterboard
PRESCHOOL INTERVENTIONS
CROSSING MIDLINE

Cross crawl activity from Brain Gym
Twister
Sit n Spin
Weighted ball pass in circle activities
Puzzles on the floor
Therapy ball activities
Platform swing activities ("use your left hand to grab the red bean bag behind you")
PRESCHOOL INTERVENTIONS
EYE-HAND COORDINATION

Work on eye-hand coordination
  Eyes on track - Track jumping
  Brain Gym Lazy 8 chart
  Tracing Activities
  Magnetic Fishing Game

Ball play
Balloon play
Target games
PRESCHOOL INTERVENTIONS – COMBINE TACTILE INPUT WITH VISUAL MOTOR ACTIVITIES

Combine tactile input with visual motor activities

- Place screens or sandpaper under writing/coloring pages
- Make shapes/letters with a variety of materials (playdough, putty, pretzel sticks, Bendaroos, thick pieces of yarn, etc.)
- Draw letters in tray of salt
- Finger painting activities
- Bubble wrap shapes/letters
PRESCHOOL-AGE INTERVENTIONS
WORK ON TACTILE DISCRIMINATION

Work on tactile discrimination

Rice bin
Have students take turns drawing shapes or letters on a peer’s back with their finger or eraser of their pencil – have the other student guess the shape/letter

Games like “What’s in Ned’s Head?”

Draw shapes on child’s palm with their eyes closed

Sensory bins (have child find an object in a bag of items, or sensory bin matching a picture without looking at what they are feeling

Have student find objects hidden in theraputty or playdoh with their eyes closed
PRESCHOOL INTERVENTIONS – WORK ON SPATIAL ORGANIZATION

Work on spatial organization
  Twister
  Connect Four
  Body Maps Activity
  Find the difference activities
  Color, cut, sequence activities
  Puzzle activities
  Obstacle Course Activities
  Stepping Stone Activities
LET’S DO IT – WRITE: WRITING READINESS

Workbook developed by Gail Kushnir (an Occupational Therapist and Special Educator!)

Breaks down activities into the following areas:

- Strengthening muscles
- Sensory awareness and enjoyment
- Eye-hand coordination and visual tracking
- Pencil grasp and finger coordination
- Basic shapes of lines and letters
- Problem-solving activities
- Spatial organization

*Excellent resource for school or home!*
LEARN TO MOVE – MOVE TO LEARN PROGRAM

Preschool theme based activities

Each theme includes music, gross motor, and fine motor activities

Uses a sensory – integration model for the basis of all activities

Theme and literature based – suggestions for storybooks included with each lesson to incorporate literacy skills

Can be used easily in specialized classroom settings as well as inclusive settings

Book includes a DVD with more ideas, as well as preschool-age appropriate checklists to use to screen for possible sensory processing dysfunction
EYES ON TRACK

Guide designed to help educator’s improve their student’s eye tracking skills and visual perceptual skills

Some activities can be graded to be used with younger children

Most activities are designed to be used in large group format to work within the classroom setting; can be easily adapted into homework activities

Written by an optometrist, teacher, and vision therapist
HANDS-ON ACTIVITIES - EARLY CHILDHOOD

Missing Links Activity – Eyes on Track

Magnetic Wand / Car activities

Preschool Body Parts Game

Bean Bag – Back to Back Pass
INTERVENTIONS TO ENHANCE FUNCTIONAL VISION AND VISUAL PERCEPTUAL SKILLS
(6-7 years and up)
HOW DO WE START??
TYPES OF ACTIVITIES USED TO ADDRESS VISUAL SKILLS

Ocular motor
Gross motor
Visual motor perception
Visual memory
Laterality
Reversals
CHILDREN CAN BE TAUGHT TO MAKE SENSE OF SEEING...

Vision is learned and trained

Ocular motor skills is one of the easiest areas of the visual system to train, and it has the most impact on school performance, especially in reading!

And we can start right now.......
INTERVENTION – TIPS FOR A SUCCESSFUL OCULAR MOTOR THERAPY PROGRAM

Start with smooth pursuit training

Always start monocular

Watch for head or body movements (take notes on this) – demonstrates maturity of separating gross and fine motor movements

Start saccadic fixation training in open space (switch to paper activities once the student is doing well in open space)
FOCUS OF OCULAR MOTOR SKILLS TRAINING

Smooth pursuits
Saccades
Convergence/Divergence

*Remember – The sole purpose of the ocular motor system is to keep the image that we are looking at on both foveas at the same time*
LET’S DO IT – WRITE: COPYING FROM THE BOARD

Book of exercises written by an OT

Meant to be used in a one-on-one instructional setting

Each activity has multiple levels, making it easy to grade each activity to each individual student

Aim of the exercises to improve:

- Ocular-motor control
- Eye-hand coordination
- Directionality
- Problem solving skills
BAL-A-VIS-X

Rhythmic Balance/Auditory/Vision exercises for Brain and Brain-Body Integration

Exercises require full-body coordination and focused attention

Bean bag and ball exercises using a balance board

Individual, partner, and group exercises
LEARNING BREAKTHROUGH PROGRAM – BALAMETRICS, INC.

Program designed to help the student use the two hemispheres of the brain in an efficient coordinated manner in order to improve reading, studying, problem solving, and memory accuracy

Kit includes:

- Belgau Balance Board
- Visual Motor Control Stick and Pendulum Ball
- Target Stand and Target Pins
- Bean Bags
- Super Ball Toss Back
- DVD and Instructions for all activities
EXAMPLES OF ACTIVITIES THAT WORK ON SMOOTH PURSUIT

Scarf / Balloon Toss Activities
Eye trail activities - Eyes on Track
Maze activities
Dot-to-dot activities
Alphabet plate activity – Let’s Do It Write
Lazy 8 Activity – Brain Gym
Marsden ball activities
EXAMPLES OF ACTIVITIES THAT WORK ON SACCADIES

Activities that require quick shifting eye movements – start monocular, then binocular, then add movement

Topsy Turvy Activity – Let’s Do It Write

Copy patterns from vertical surface to table

Four Squares Saccades Activity – www.eyecanlearn.com
EXAMPLES OF ACTIVITIES THAT WORK ON CONVERGENCE/DIVERGENCE

Zoomball

Prone ball roll

Ball and bean bag tosses

Ball bouncing activities on balanceboard
GROSS MOTOR SKILLS AND READING

A study showed that 95% of dyslexic children had motor instability (Moretti, 2002)

Symptoms of children with cerebellar – vestibular dysfunction include:

- Ocular fixation difficulty
- Visual-motor difficulty
- Difficulty catching, throwing, and kicking
- Visual-spatial or perceptual difficulty
- Awkward holding of pencil
- Clumsy and/or awkward coordination
- Difficulty with fine motor coordination
- Graphomotor incoordination (poor letter formation and spacing)

TIPS FOR A SUCCESSFUL GROSS MOTOR THERAPY PROGRAM

Use mental imagery

Begin with deep breathing

Keep sessions/activities brief (3-5 min)

Start with simple static images

Do activities that train cerebellar and vestibular areas

Balance activities

Work on spatial and temporal skills (tying knot, putting beads in sequence on string)

Dual tasks (walk on rail while calling out letters on a chart)

Sequencing activities that require several parts of the body

Timing activities (use metronome or music)

Ocular motor activities

Visual motor coordination activities

(Lane, 2005)
INTERVENTION EXAMPLES
GROSS MOTOR ACTIVITIES

Balance beam activities
Trampoline activities
Balance board activities
Bal-Vis-X program
Learning Breakthrough Program – Balametrics, Inc.
INTERVENTION EXAMPLES
VISUAL MOTOR PERCEPTION

Linear and circular order patterns (colored bead activities)
Eye-hand and fine motor control worksheets
Practice drawing shapes same and different sizes
Geoboards
Set
Izzi2 (puzzle/pattern activities)
INTERVENTION EXAMPLES – VISUAL MEMORY

Concentration game

Visual memory worksheets (have child look at picture for 30 seconds, then remove picture and give points for questions answered)

Teach the child the sign language alphabet

Teach chunking techniques
INTERVENTION EXAMPLES – LATERALITY/DIRECTIONALITY

P Chart Activity

Eye Opener arrows – Eyes on Track

Tricky Hands game – commercial game

Free flow game on IPad – IPad app

Perfection – commercial game

Tricky Fingers game – fine motor coordination/visual perception activity
A LITTLE BIT ABOUT REVERSALS...

Children need a “mental age” of 5.5 – 6.5 to overcome vertical reversals

Children need a “mental age” of 7.5 to overcome horizontal reversals

By the age of 9 or 10 children are said to code spatial location in adult-like fashion, enabling them to understand how the relationship among objects would appear at various angles.
REVERSALS - TYPES

Static
  Reading reversals

Kinetic
  Printing and writing reversals
**REVERSAL REMEDIATION**

1. Discrimination Activities (diagonals, lines/curves, shape orientation)
2. Matching to Sample Task (Match sample b with d b p d p)
3. Matching from memory (Have child look at letter for five seconds, then match letter from memory)
4. Letter Names (have child name the letter, then find among samples)
5. Train in Pairs (have child point to side the circle is on bb bd db dd)
6. Train in Context (have child find letters in magazines/books and then state the letter name)
7. Color Coding (have child color code the letters: e.g color all b’s red, d’s blue, p’s green, q’s yellow)
8. Scanning Patterns (have child call out numbers in sequence starting a top and working counter clockwise, then name the letter – see sample above)
9. Teach Phonics Rules
10. Word reversals - practice calling out letters of words in left to right sequence

BRAIN GYM®
15 MINUTES/DAY:
INCREASES STUDENTS’ TEST SCORES IN READING

Year long project, 1998 – 1998

Third, Fourth, Fifth grade classrooms use Brain Gym® activities as an aid to learning

15 minutes per day, minimum, were incorporated into the classroom curricula

Students’ improved concentration and better classroom focus were reported

Of students using Brain Gym® Ex.:

55% of third grade students improved standardized reading scores by 20%-ile points, or more

89% of fifth grade students improved standardized scores by 20%-ile points, or more.

Teachers reported students seemed to learn more easily, they exhibited more self-esteem in their attitudes and learning habits
HANDS-ON ACTIVITIES – SCHOOL-AGE

Flying Balloon Game – Let’s Do It Write

Four Square Saccades Game – www.eyecanlearn.com

Bal-A-Vis-X activities

Learning Breakthrough activities

Tap Me, Touch Me activity – Let’s Do It Write

Near and Far – Let’s Do It Write
EYE-BODY COORDINATION
THE “P3 CHART”  MOVEMENT ACTIVITY #4
ONE TEACHER, ONE CLASSROOM, AT A TIME
REFERENCES


