

What is Visual Motor Integration?

Visual Motor Integration (VMI) is commonly known as hand-eye coordination. VMI is a complex skill that allows us to complete complicated tasks by using our eyes and hands together, such as completing a puzzle or inserting a key into a key hole. It is the combination of visual perception and motor skills. Motor skills are a learned sequence of movements that combine to produce a smooth and efficient action to master a particular task. Visual perception is the ability to attend to and interpret what we see by scanning the environment through controlled eye movements. Visual perception allows us to think about how we can manipulate objects. It also allows us to recognize and remember patterns to master a familiar skill. For example, putting together puzzles becomes easier for a child as he/she practices and learns to look for the straight edges, color matches, and accurate shapes.

How does VMI develop?

VMI is a learned skill that improves with development, experience, practice, and through stimulation from the environment. Children need to move around and explore the world to make sense of what they see and touch; this begins in infancy.

As early as *3 months*, an infant begins to coordinate eye movements. The developmental process continues as the infant explores objects in his/her hands (*5-6 months*) and transfers objects from hand to hand while becoming interested in geometric patterns (*6-9 months*). By *12 months*, an infant uses his/her eyes to motivate and monitor movement toward a desired object, such as following a ball after watching it roll under the table. As the child ages, movement becomes better coordinated with his or her increased ability to concentrate on tasks (*2 years*) and remember the process to complete the same or similar tasks more easily in the future (*3 years*).

Although the learning process does not necessarily have to follow a developmental sequence, a child typically first learns how to manipulate larger objects before smaller ones, as well as imitate a simple drawing (circle, cross, square, etc) before copying and drawing from memory.

How can you detect problems with VMI?

As the name suggests, a student may have difficulties with visual perception, motor performance, or with the integrated use of visual perception with motor skills. VMI influences a child's successful participation in activities in the classroom, home, playground, etc. Activities dependent on the quality of a child's VMI include:

- Drawing basic strokes and pictures
- Using scissors
- Solving mazes
- Completing dot-to-dot pictures
- Printing/Writing by hand
- Catching a ball
- Putting together puzzles
- Tying shoes
- Stacking blocks

(Please scroll down to view each age description)

Age: 1½ Years VMI Development

By 1½-years-old, a child is expected to:

Block Design/Puzzle Skills

- Build a tower of 3 blocks
- Place round and square shapes in form board



Graphomotor Skills (scribbling)

- Scribble with little control

Bilateral Hand Skills (using two hands)

- Hold a toy or object with one hand while the other hand manipulates
- Turn 2-3 pages at a time while one hand holds the book

Age: 1 ½ Years—Activities to Help Promote VMI Skills

To help improve visual motor integration skills for children who experience difficulties in any of the above areas and are older than the above age, have your child...

Activities that promote “Block Design/Puzzle” skills:

- Put-in/pull-out shapes from containers
- Complete a simple individually spaced geometric (variety of shapes) puzzle
- Build a tower out of blocks
- Stack rings from big to small

Activities that promote Graphomotor (Drawing) skills:

- Scribble on a large sheet of paper on the floor, wall, refrigerator, and/or easel using a variety of thick crayons, paints, and markers
- Explore finger painting with paints, shaving cream, sand, etc.

Activities that promote “Bilateral Hand” skills:

- Help open/close non-glass containers
- Roll and flatten “Play-Doh” with commercial accessories, such as rolling pins, cookie cutters, etc.
- Roll a ball back and forth to you
- Play with pop-up toys (jack in the box, etc)
- Play musical instruments, such as a toy key board, xylophone, cymbals, and drums
- Play with pots, pans, and spoons
- Open and close Velcro on sneakers
- Clap hands and give double high fives
- Push a toy wagon or stroller

Activities that promote both “Bilateral Hand” and “Block Design” skills development:

- Build creatively using mega blocks, large legos, large styrofoam, or cardboard boxes

References

- Dankert, H. L., Davies, P. L., & Gavin, W. J. (2003). Occupational therapy effects on visual-motor skills in preschool children. *American Journal of Occupational Therapy*, 57,542–549
- Breitner, W. & Farrell, A. (2006). Healthy Development: Health and Wellness for Families Westchester Institute for Human Development
- Danto, A. & Prunzansky, M. (2011). *1001 Pediatric Treatment Activities: Creative Ideas for Therapy Sessions*. Thorofare, NJ: SLACK Incorporated.
- Parks, S. (2004). HELP Strands: *Curriculum-Based Developmental Assessment, Birth to Three Years*. Palo Alto, CA: VORT Corporation.

Age: 2 Years VMI Development

By 2-years-old, a child is expected to:

Block Design/Puzzles skills

- Build a tower of 4 blocks or more
- Complete simple, individually-spaced geometric puzzles



Graphomotor Skills (drawing/painting)*

- Scribble spontaneously
- Imitate a vertical stroke
- Paint within limits of paper

*Developmental sequence: 1) imitating

Bilateral Hand Skills (using two hands)

- Turn 1 page at a time while one hand stabilizes the book
- Thread and pull out one-inch beads using a pipe cleaner or lace/string

Age: 2 Years-Activities to Help Promote VMI Skills

To help improve visual motor integration skills for children who experience difficulties in any of the above areas and are older than the above age, have your child...

Activities that promote “Block Design/Puzzle” skills:

- Organize shapes in a shape sorter
- Complete a simple geometric (variety of shapes) inset puzzle or 2 piece interlocking puzzle (include puzzles that make sounds)



- Build a tower out of blocks, boxes, or Legos
- Stack rings from big to small
- Play with nesting cups
- Clean-up using picture cues where toys go

Activities that promote “Graphomotor” (Drawing) skills*:

- Have fun and imitate vertical strokes on an easel using a variety of crayons, paints, and markers
- Imitate vertical lines on steamed shower doors or tub walls using pointer finger

- Use big arm movements to draw on large paper on the floor or taped on the wall
- Chalk draw on sidewalk
- Explore and imitate vertical strokes by finger painting with paints, shaving cream, sand, etc.

**Developmental sequence: 1) imitating*

Note: Drawing lying down propped on elbows or working on a vertical surface promotes grasp development.

Activities that promote “Bilateral Hand” skills:

- Hold a piggy bank with one hand while the other hand inserts coins or put coins into a slit on the lid of an empty coffee can
- String large beads
- Tear paper (use junk mail)
- Hold a cup in each hand and practice pouring water from cup to cup in the bath tub or use sand in a sandbox
- Roll, flatten, and manipulate “Play-Doh” to make a snowman (rolled balls) or worms. Use commercial accessories, such as rolling pins, cookie cutters, etc.
- Find hidden objects in “Play-Doh”
- Toss a large ball back and forth on the playground
- Help with cooking activities (stir, roll, pat, and pour)
- Help load a front load washer machine with clothes
- Play with resistive tubes (rapper snappers)



- Play musical instruments, such as a toy key board, xylophone, cymbals, and drums
- Yoga: Walk like a “dog” on all fours
- Yoga: Give him/herself a hug and self massage/rub arms and legs

Activities that promote both “Bilateral Hand” and “Block Design” skills:

- Build creatively using “mega blocks”
- Push together and pull apart large pop-beads



- Clean-up with visual a model (picture on shelf)

References

Dankert, H. L., Davies, P. L., & Gavin, W. J. (2003). Occupational therapy effects on visual-motor skills in preschool children. *American Journal of Occupational Therapy, 57*,542–549

Breitner, W. & Farrell, A. (2006). *Healthy Development: Health and Wellness for Families* Westchester Institute for Human Development

Danto, A. & Prunzansky, M. (2011). *1001 Pediatric Treatment Activities: Creative Ideas for Therapy Sessions*. Thorofare, NJ: SLACK Incorporated.

Parks, S. (2004). *HELP Strands: Curriculum-Based Developmental Assessment, Birth to Three Years*. Palo Alto, CA: VORT Corporation.

Age: 3 Years VMI Development

By 3-years-old, a child is expected to:

Block Design/Puzzles Skills

- Build a tower of 6 blocks or more
- Imitate 3-block designs, such as a bridge
- Complete 3-4 piece interlocking puzzles

Graphomotor Skills (Drawing)*

- Imitate horizontal lines and a cross
- Copy a circle
- Begin drawing purposefully and controlled, which looks like a picture or letter

**Developmental sequence: 1) imitating; 2) copying; 3) drawing*

Bilateral Hand Skills (using two hands)

- Begin to manipulate simple fasteners (e.g., large buttons, zipper up/down, Velcro fasteners)
- Disassemble/assemble toys
- Put on shoes without laces
- Dress self with adult help
- Wash hands

Age 3 Years-Activities to Help Promote VMI Skills

To help improve visual motor integration skills for children who experience difficulties in any of the above areas and are older than the above age, have your child...

Activities that promote “Block Design/Puzzle” skills:

- Complete a 2 piece interlocking puzzle and gradually increase to 3-4 pieces
- Build a tower out of blocks, Legos, Styrofoam blocks, cardboard boxes, etc.
- Imitate a simple 3-4 block design, such as a train or wall (make the task more challenging by knocking the model down to strengthen visual memory)

Activities that promote “Graphomotor” skills:*

- Draw shapes (lines, circles, plus signs) on a easel or floor table using a variety of crayons, paints, markers, and pencils
- Draw shapes by finger painting with paints, shaving cream, sand, etc.
- Have fun finger ice skating with salt or flour on tin foil (draw lines and shapes) or tray
- Complete simple paper mazes
- Complete simple dot-to-dot pictures
- Draw a cage over a picture of their favorite zoo animal to prevent the animal from escaping
- Trace hands
- Enjoy leaf or shape rubbing

**Developmental sequence: 1) imitating; 2) copying; 3) drawing*

Note: Drawing lying down propped on elbows or working on a vertical surface promotes grasp development.

Activities that promote “Bilateral Hand” skills:

- Hold a piggy bank with one hand while the other hand inserts coins
- Pop bubble wrap (use large bubbles and progress to small bubbles)String beads, cheerios, or pasta to make a necklace or bracelet
- Lace hole punched paper or sewing cards
- Use scissors to cut paper in half and/or tear paper (use junk mail)

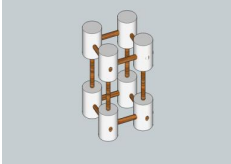
- Practice opening and closing different fasteners, such as Velcro, hooks, buckles, snaps, buttons
- Use a spray bottle with one hand and a towel in the other hand to wipe a table
- Help with baking activities
- Hold a cup in each hand and practice pouring water from cup to cup in the bath tub or sand in a sandbox
- Roll, flatten, and manipulate “Play-Doh” using rolling pins, cookie cutters, or squeeze through a garlic press, etc.
- Find hidden objects in “Play-Doh”
- Use small tongs to pick-up objects to place in a cup or bowl
- Toss a ball back and forth or play balloon volley ball
- Play zoom ball outside



- tend play with a toy simulated kitchen, such as wash dishes, cook, put dishes away, etc
- Play with pretend play sets, such as garage, farm, and playground with figurines
- Play with a baby doll
- Play musical instruments, such as a toy key board, xylophone, cymbals, and drums
- Yoga poses: Walk like a dog on all fours, walk like a crab, jump like a frog, and slither like a snake

Activities that promote both “Bilateral Hand” and “Block Design” skills:

- Build a model 3-dimensional house or box with an adult using pretzel thins and marshmallows or popsicle sticks and glue



- Create a caterpillar by gluing pompoms together
- Play with wooden Velcro sliced fruit, vegetables, and pizza (Use a pretend knife or pull apart and then put them together)
- Put together a simple toy train track
- Build creatively or by following a simple model using Legos, blocks, Magna Tiles, etc.



- Build with Velcro blocks
- Push together and pull apart large Zoobs



References

- Dankert, H. L., Davies, P. L., & Gavin, W. J. (2003). Occupational therapy effects on visual-motor skills in preschool children. *American Journal of Occupational Therapy*, 57,542–549
- Breitner, W. & Farrell, A. (2006). *Healthy Development: Health and Wellness for Families* Westchester Institute for Human Development
- Danto, A. & Prunzansky, M. (2011). *1001 Pediatric Treatment Activities: Creative Ideas for Therapy Sessions*. Thorofare, NJ: SLACK Incorporated.
- Parks, S. (2004). *HELP Strands: Curriculum-Based Developmental Assessment, Birth to Three Years*. Palo Alto, CA: VORT Corporation.

Age: 4 Years VMI Development

By 4 years-old, a child is expected to:

Block Design/Puzzles Skills

- Build a tower of 9-10 blocks
- Reproduce a two-dimensional block design on a flat surface



- Complete 10-piece interlocking puzzles

Graphomotor Skills (Handwriting)*

- Copy a square
- Draw a face with eyes, nose, and mouth
- Draw person with 2 to 4 body parts (e.g. stick figure)
- Color within the lines of a circle/curves
- Begin to trace or copy capital letters

**Developmental sequence: 1) imitating; 2) copying; 3) drawing/printing from memory*

Bilateral Hand Skills (using two hands)

- Copy a simple pattern by stringing small beads
- Uses scissors to cut across paper following a curved line/circle, square, triangle (developmentally in that order)
- Begin to engage zipper and zip up clothing
- Dress and undress independently using pullover clothing

Age: 4 Years-Activities to Help Promote VMI Skills

To help improve visual motor integration skills for children who experience difficulties in any of the above areas and are older than the above age, have your child...

Activities that promote “Block Design/Puzzle” skills:

- Complete simple interlocking puzzles and gradually increase to 10 pieces
- Copy 2-dimensional block designs (make the task more challenging by having the child rebuild the design from memory)



- Copy a 2-dimensional design out of different shapes using colored paper or wooden shapes

Activities that promote “Graphomotor” skills:

- Copy or trace capital letters, numbers, and shapes on a easel or table using a variety of crayons, paints, markers and pencils
- Copy or trace capital letters, numbers, and shapes by finger painting with paints, shaving cream, sand, etc.
- Copy or trace capital letters, numbers, and shapes by finger ice skating with salt or flour on tin foil or tray
- Make a rainbow of capital letters, numbers, and shapes by using an ice cube on a popsicle stick over powder drink mixes
- Copy or trace capital letters, numbers, and shapes using a Magna Doodle
- Color pictures and encourage to stay within the lines
- Use his/her index finger to make letters, numbers, and shapes in the air
- Complete simple paper mazes and dot-to-dot pictures
- Draw stick figures of family members

**Developmental sequence: 1) imitating; 2) copying; 3) drawing/printing from memory*

Activities that promote “Bilateral Hand” skills:

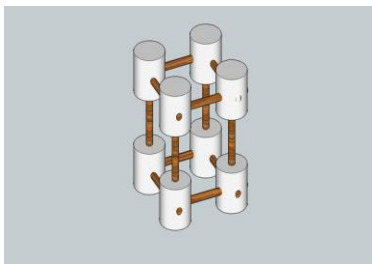
- Create letters using “Play-Doh” or pipe cleaners
- Fold dinner napkins using fun creative ways (visit <http://www.napkinfoldingguide.com>)
- Pop bubble wrap (use large bubbles and progress to small bubbles)
- Lace hole punched paper or sewing cards
- String beads, cheerios, or pasta to make a necklace or bracelet
- Use scissors to cut out simple shapes and pictures (progress from a straight line, curved line, circle, square, and triangle respectively)
- Use a spray bottle with one hand and a towel in the other hand to wipe a table
- Help with baking activities
- Play pretend dress-up to practice dressing skills (princess, police officer, construction worker, etc.)
- Practice opening and closing different fasteners, such as Velcro, hooks, buckles, snaps, buttons
- Hold a bottle in each hand with a wide spout and practice pouring water from bottle to bottle in the bath tub
- Toss a ball back and forth or play balloon volley ball
- Play zoom ball outside



- Pretend play with a toy simulated kitchen, such as wash dishes, cook, put dishes away, etc
- Play with pretend play sets, such as garage and farm with figurines
- Play with a baby doll
- Yoga poses: Walk like a dog on all fours, walk like a crab, jump like a frog, and slither like a snake
- Yoga pose: Twist on a chair with feet on the floor (opposite hand holds on to the edge of the seat that the child turns towards, while the other hand grabs the back of the chair to help create a gentle stretch)

Activities that promote both “Bilateral Hand” and “Block Design” skills:

- Build a model 3-dimensional house or box with an adult using pretzel thins and marshmallows or popsicle sticks and glue



- Create a paper chain link
- Play with wooden Velcro sliced fruit, vegetables, and pizza (Use a pretend knife or pull apart and then put them together)
- Put together a toy train track
- Build creatively or by following a simple model with picture instructions using Legos, blocks, Magna Tiles, etc.



- Build with Velcro blocks
- Push together and pull apart small pop beads



References

- Dankert, H. L., Davies, P. L., & Gavin, W. J. (2003). Occupational therapy effects on visual-motor skills in preschool children. *American Journal of Occupational Therapy, 57*, 542–549
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Age: 5 Years VMI Development

By 5 years-old, a child is expected to:

Block Design/Puzzles Skills

- Complete complex interlocking puzzles (10+ pieces)
- Build 5-block designs

Graphomotor Skills (Handwriting)*

- Imitate drawing a diamond*
- Draw a complete stick figure (body, head, arms, and legs)*
- Draw picture with at least three recognizable objects*
- Colors within heavy or faint outlines*
- Begin to print own first name with model to copy*
- Begin to write numbers one through five*

*Developmental sequence: 1) imitating; 2) copying; 3) drawing/printing from memory

Bilateral Hand Skills (using two hands)

- Begin to cut more complex shapes
- Begins to learn how to tie shoes with step-by-step demonstration
- Begin cutting with a table knife (supervised)

Age: 5 Years-Activities to Help Promote VMI Skills

To help improve visual motor integration skills for children who experience difficulties in any of the above areas and are older than the above age, have your child...

Activities that promote “Block Design/Puzzle” skills:

- Complete interlocking puzzles (gradually increase to 15+ pieces)
- Copy complicated 3-dimensional block designs, such as a pyramid or 5 block bridge (make the task more challenging by knocking the model down and rebuilding same design from memory)

Activities that promote “Graphomotor” skills:

- Imitate or copy the spelling of first name on an easel or table using a variety of crayons, paints, markers and, pencils
- Imitate or copy the spelling of first name with paints, shaving cream, sand, etc.
- Imitate or copy the spelling of first name using a Magna Doodle
- Imitate or copy the spelling of first name by finger ice skating with salt or flower on tin foil or tray
- Make a rainbow of three letter words by using an ice cube on a popsicle stick over powder drink mixes
- Color pictures and encourage to stay within the lines
- Use his/her index finger to write three letter words and numbers in the air
- Complete simple paper mazes and dot-to-dot pictures
- Draw scenes, such as flowers outside or a car on a road

*Developmental sequence: 1) imitating; 2) copying; 3) drawing/printing from memory

Activities that promote “Bilateral Hand” skills:

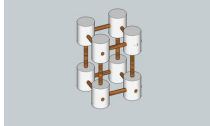
- Create letters using “Play-Doh” or pipe cleaners to spell his/her name
- Pop bubble wrap (use large bubbles and progress to small bubbles)
- Use scissors to cut out jig saw pictures or make snow flakes
- Practice to open and close different fasteners, such as Velcro, hooks, buckles, snaps, buttons
- Play pretend dress-up to practice dressing skills (princess, police officer, construction worker, etc.)
- Fold dinner napkins using fun creative ways (visit <http://www.napkinfoldingguide.com>)
- Hold a bottle in each hand with a small spout and practice pouring from bottle to bottle in the bath tub or over a sink
- Help with baking activities
- Toss a ball back and forth or play balloon volley ball
- Play zoom ball outside



- Pretend play with a toy simulated kitchen, such as wash dishes, cook, put dishes away, etc
- Play with pretend play sets, such as a garage, farm, and doll house with figurines
- Play with a baby doll
- Yoga poses: Walk like a dog on all fours, walk like a crab, jump like a frog, and slither like a snake
- Yoga pose: Twist on a chair with feet on the floor (opposite hand holds on to the edge of the seat that the child turns towards, while the other hand grabs the back of the chair to help create a gentle stretch)

Activities that promote both “Bilateral Hand” and Block Design” skills:

- Build a model 3-dimensional house or box using pretzel thins and marshmallows or popsicle sticks and glue



- Create a paper chain link
- Put together toys or play sets, such as help to build a doll house or wooden car
- Put together a toy train track
- Build a simple design using picture instructions or a model using Legos, blocks, Magna Tiles, small pop beads, etc.



References

Breitner, W. & Farrell, A. (2006). Healthy Development: Health and Wellness for Families Westchester Institute for Human Development.

Dankert, H. L., Davies, P. L., & Gavin, W. J. (2003). Occupational therapy effects on visual-motor skills in preschool children. *American Journal of Occupational Therapy*, 57,542–549

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