Handwriting Development and Intervention

Aurora Public School’s Occupational Therapy Department
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General Handwriting Tips **Draft**

Basic Letter Formation

• Start all letters and numbers using a top down approach
  – See attached sample formation page from the “Handwriting Without Tears” program
• Group letters by similar formation styles. Examples:
  – F,E,D,P,B,R,N,M (Starts in left hand corner)
  – H,K,L,U (Starts in left hand corner and jumps to right)
  – V,W,X,Y,Z (Diagonal letters that start in left hand corner)
  – C,O,Q,G,S (Letters that start in the center that include curves)
  – A,I,T,J (Letters that start in the center)

Activity Ideas Emphasizing Proper Formation

• Drawing letters in the air
• Draw letters in a variety of medias
  – Shaving cream/Finger paint
  – Sand/Rice
  – Sandpaper/Carpet square
  – Ziploc bag filled with paint/hair gel
  – Trace on a partners hand
• Rainbow writing - Draw letter in 1 color and continue to trace multiple times in other colors
• Final steps incorporate paper and pencil use
Occupational Therapy Pre-referral Intervention strategies

For Handwriting due to Sensory Motor Problems

• Difficulties with Letter Formation:
  – Provide visual cues to identify top and bottom lines when starting letters (smiley face at top, airplane on top and grass on bottom, top green line and bottom red line, etc.)
  – Model verbal path (L = Big line down, little line across) during demonstration of letter formation and encourage student’s to repeat verbal path during practice
  – Provide a reference card of correct letter formation for the student’s desk/draft book
  – Engage with student in multi-sensory letter formation tasks one-on-one in order to monitor formation
  – Position activity on a inclined/vertical surface to reinforce wrist extension and the concept of up and down
  – Keep a “cheat sheet” of commonly reversed letters on the child’s desk using the same color for all letters that begin on the left (b,h,p) and another color for the right (d,q,g,z)
  – Record data on the letters that the student has difficulty forming in order to find error patterns and relay them to the Occupational Therapist

• Difficulties with spacing, alignment or letter height:
  – Use graph paper asking the student to leave one box open as space between words.
  – Use spacing stick, popsicle stick, or index finger between words.
  – Use exaggerated spaces between the words of a model for the student to copy.
  – Use paper with visual cues, raised or highlighted/darkened lines or shaded/ highlighted spaces.
Developmental Sequence of Drawing/Writing

• Scribbling
• Tracing
• Imitating:
  – Child is asked to copy after given a demonstration
• Copying
  – Child copies without a demonstration
• Writing from Memory
Developmental Sequence of Drawing/Writing

- **Scribbling** 12-16 months
  - Randomly
  - Spontaneously
    - Vertical then horizontal
    - Circular direction

- **Imitates scribbles** 16 – 20 months
  - Vertical, horizontal

- **Imitates circular scribbles** 20-24 months
- **Imitates vertical and horizontal lines**
- **Imitates single circle** 2-3 years
- **Copies vertical and horizontal lines**
- **Imitates cross, square, diagonal lines** 3-4 years
- **Copies cross, square, diagonal lines** 4-5 years
- **Imitates and copies “X”**
- **Imitates some letters and numbers**
- **May begin imitating and copying name**
- **Copies a triangle and most letters** 5-6 years
- **Writes name and some letters from memory**


Developmental Sequence of Letter/Word Formation

- *Trace letters*
- *Imitate letters*
- *Copy letters*
  - a a a a a
  - a________
- *Copy words from text above writing*
  - apple
  __________
- *Copy words from text to the left*
  - apple ________
- *Copy from a seat copy*
- *Copy from a distance*
- *Write from memory*

*** Letters are best learned large and then graded to be smaller.
Seating Position for Handwriting

Desk surface is at a correct height to support arm, about 2 inches above the level of the elbows when elbows are bent and child is sitting in an upright chair. Upper arms are never less than a 30-degree angle from the child’s truck. Feet rest flat on the floor and knees are bent approximately 90 degrees.
Positioning for Handwriting

Proper Posture: Overall Seating

- Chair and table right size for child
- Bottom on chair all the way back
- Chair pushed in towards table

Proper Posture: Lower Body Detail

- Hips and knees bent at 90 degree angle
- Feet flat on floor
- May use a foot rest

Proper Posture: Upper Body Detail

- Upper arms on table
- Paper angled the same direction as writing hand
- Paper held down by non-writing hand
Pencil Grasp

• Functional Grasps

**Tripod Grasp with Open Web Space**

The pencil is held with the tip of the thumb and index finger and rests against the side of the middle finger. The thumb and index finger form a circle.

**Quadrupod Grasp with Open Web Space**

The pencil is held with the tip of the thumb, index and middle finger and rests against the side of the ring finger. The thumb and index finger form a circle.

**Adapted Tripod or D'Nealian Grasp**

The pencil is held between the index and middle fingers with the tips of the thumb and index finger on the pencil.
Pencil Grasp

- Immature Grasps

**Fisted Grasp**

The pencil is held in a fisted hand with the point of the pencil on the little finger side of the hand. This is typical of a very young child.

**Pronated Grasp**

The pencil is held diagonally within the hand with the tips of the thumb and index finger on the pencil. This is typical of children two to three years of age.
Pencil Grasp

• Inefficient Grasps

Five Finger Grasp
The pencil is held with the tip of all five fingers. The movement when writing is primarily on the little side of the hand.

Thumb Tuck Grasp
The pencil is held in a tripod or quadrupod grasp but the thumb is tucked under the index finger.

Finger Wrap or Interdigital Brace
The index and middle fingers wrap around the pencil. The web space is completely closed.

Flexed Wrist or Hooked Wrist
The pencil can be held in a variety of grasps with the wrist flexed or bent. This is more typically seen with left hand writers but is also present in some right-handed writers.
Pencil Grasp

- **When to intervene**
  - **Teacher**
    - When the child is in pain
    - When the child has low writing endurance
    - When writing is illegible

***Early intervention is the key!***
- After the 2nd grade, motor patterns are set and pencil grasp is difficult to change!

- **Strategies**
  - **Modeling**
    - Put “stop” fingers in your palm (4th/5th fingers)
    - Hold pencil with “go” fingers thumb, 2nd and 3rd fingers
    - Place pencil at the “big” knuckle on the index finger
  - **Increasing strength and dexterity**
    - Rolling play dough between thumb and index finger
    - Spin a top with index finger and thumb
    - Use a small piece of crayon and a slanted or vertical surface
  - **Store bought grips**
    - Make sure they are on correctly!
Help Your Child to Better Handwriting

Handwriting is a complex process of managing written language by coordinating the eyes, arms, hands, pencil grip, letter formation, and body posture. The development of a child’s handwriting can provide clues to developmental problems that could hinder a child’s learning because teachers depend on written work to measure how well a child is learning.

Occupational Therapists can evaluate the underlying components that support a student’s handwriting, such as muscle strength, endurance, coordination, and motor control....

What can an Occupational Therapist do?

- Demonstrate proper posture to support the proper use of arms, hands, feet and eyes.
- Measure the level of physical strength and endurance.
- Analyze fine motor control, such as the ability to hold a writing utensil.
- Determine visual and perceptual ability that influences a child’s ability to form letters and shapes using a writing tool.
- Help develop and evaluate handwriting curriculums and collaborate with teachers on effective strategies.
- Suggest home activities that promote the development of skills needed in good handwriting.

A child’s inability to master good handwriting skills could indicate a more serious problem such as developmental or learning disabilities.

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• **Typical Handwriting Problems**
  – Illegible Handwriting
  – Cannot keep up with written assignments (laborious)
  – Avoids written assignments

• **Underlying Causes**
  – Lack of direct teaching of handwriting at school
  – Maturity of student
  – Cognitive or Speech/Language delay
  – Medical diagnosis such as ADD, ADHD, PDD, Aspergers syndrome
  – Hearing impairment
  – Psychosocial dysfunction
  – Visual and/or visual perceptual difficulties
  – Motor impairments
  – Sensory processing difficulties

• **Ergonomic Factors**
  – Writing posture
  – Paper position
  – Pencil grasp

• **Components of Handwriting Contributing to Legibility**
  – Letter formation
  – Alignment
  – Spacing
  – Letter size and height differentiation
  – Slant
**Research Findings**

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<th>Frequent and explicit handwriting instruction that helps students automatize letter production and retrieve letterforms rapidly from memory also increases the possibility that students will become writers who use the building blocks of written letters to construct quality written compositions.</th>
<th>Berlington, et. Al (1997) Zaner-Bloser Handwriting: Opens the Door to Communication, Teaches Handwriting as a Literacy Tool, Research Review: Handwriting Within the Context of Literacy</th>
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<td>According to Benbow, children generally fall into one of 3 classification groups in response to handwriting instruction. Group A children learn to write well regardless of the methods used in teaching. Group C children are unable to learn handwriting, no matter what interventions are used in teaching. Group B children fall between the two extremes and will learn to write legibly with good teaching strategies. Appropriate intervention or compensatory strategies should enable most children in groups A and B to learn to write legibly. For Group C children, compensatory strategies must be considered to allow for functional communication.</td>
<td>Benbow, M, (1995) Hand function in the Child: Foundations for Remediation (pp255-281) St. Louis, MO: Mosby</td>
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<td>“By the beginning of the second grade, changing a child’s grasp pattern may be so stressful that the effort should be abandoned.”</td>
<td>Amundson, S.J. and Weil, (1996) Prewriting and handwriting skills. I J. Case-Smith, A.S&gt; Allen, &amp; P.N. Pratt (eds). Occupational Therapy for Children (3’d ed., pp. 255-281) St. Louis, MO: Mosby</td>
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<td>Burton and Dancisak (2002) found that increasing the diameter of a pencil led to lower grip levels (using Schnecks 1-5 rating levels)</td>
<td>Burton, A.W., &amp; Dancisak, M.J. (200) Grip form and graphomotor control in preschool children, American Journal of Occupational Therapy 54, 9-17</td>
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<td>Observed 51, 23-24 month old children with typical development. Observed drawing with a marker, colored pencil, and a small piece of crayon on a table and on an easel. Children used a more mature grasp when drawing with a piece of crayon than with a pencil. No difference with pencil vs. marker. More mature grasp was noted when drawing on the easel compared to the table, using the crayon, but not the marker or pencil.</td>
<td>Yakimishyn, J.E. &amp; Magil-Evans, J. (2002). Comparisons among tools, surface orientation, and pencil grasp for children 23 months of age. American Journal of Occupational Therapy, 56 564-572</td>
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