

Knots & Knuckles

Sola Zaccheus, MAT, Ed.S

What is FMD (Fine Motor Development)?

What:

“small” muscles; Manipulation of the fingers, eyes, mouth, and toes.

The Problem:

- Children as early as 2 years and 9 months are being expected to write at least their first name as an end of year goal in many public and charter schools throughout the United States.

FMD's Importance

- Fine motor skills are the precursors for early development in math, literacy and self help skills
- Poor fine motor development effects attention & literacy skills
- Strong fine motor skills produces higher success in science
- Fine motor development affects cognitive development
- Attention & fine motor skills measured at kindergarten are important developmental skills that predict later achievement

Resolution:

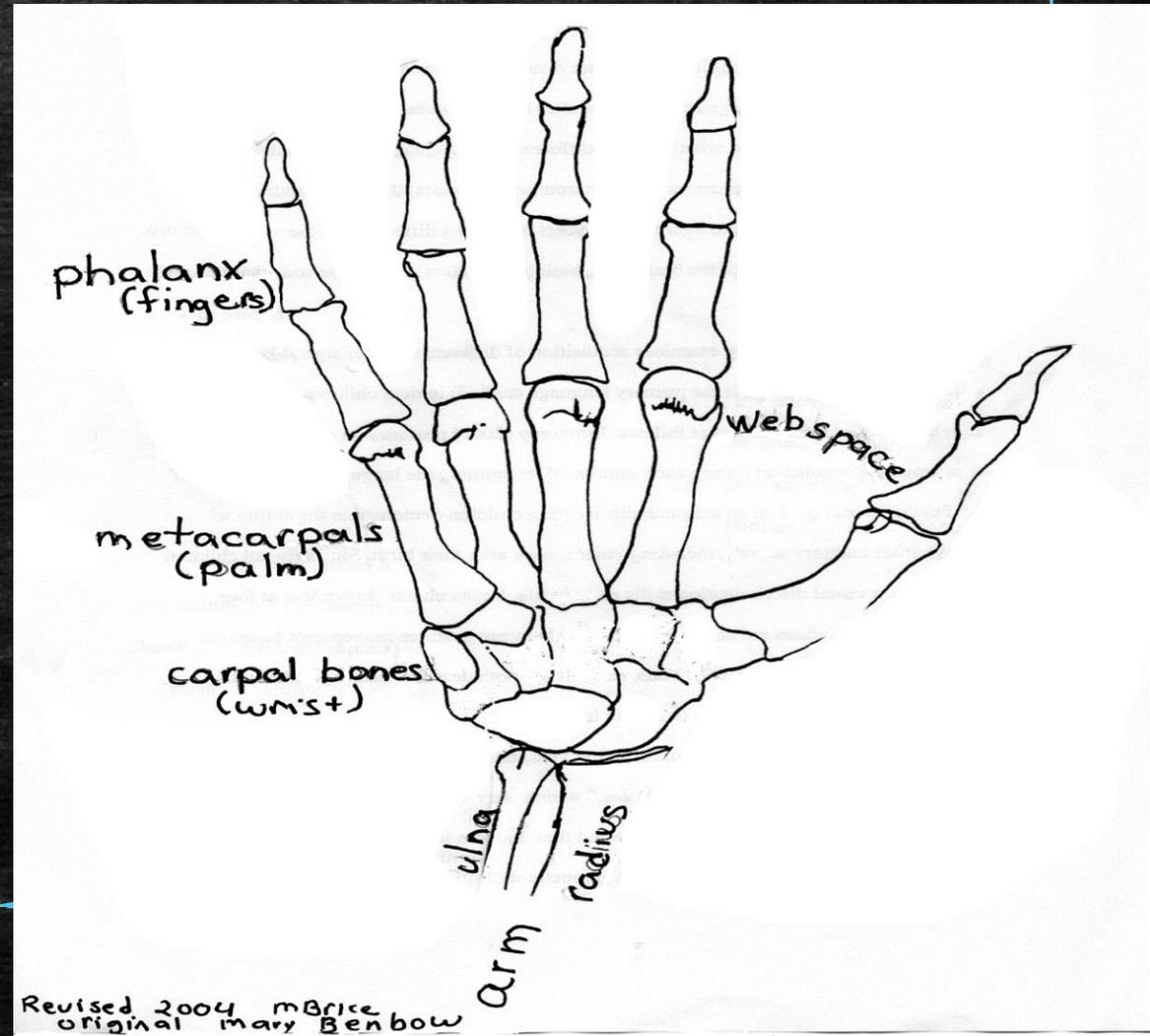
Opportunities for exposure
&
Early Intervention

Ice Breaker



Knots & Knuckles

Parts of the Hand

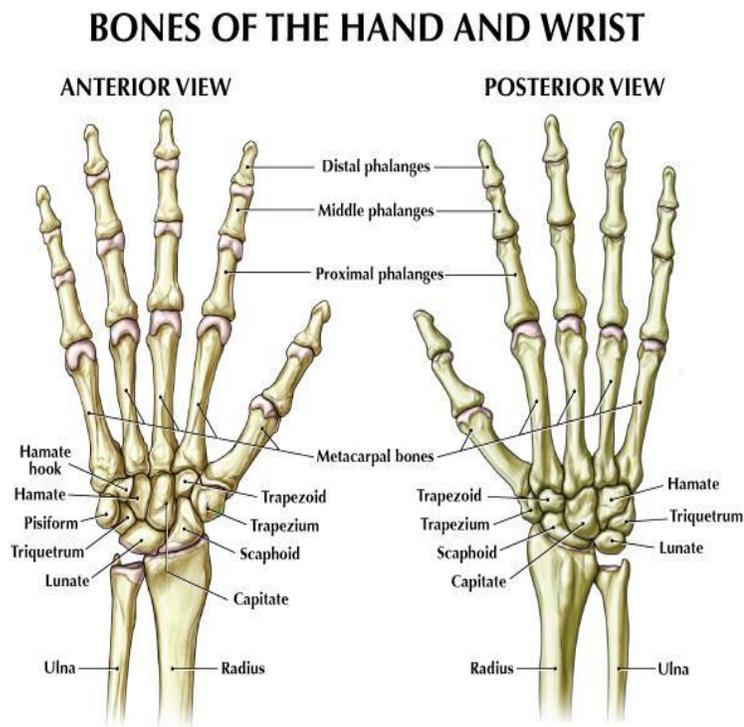


Start: Hand Anatomy

- 19 bones in palms & fingers: 19 joints where bones meet bones

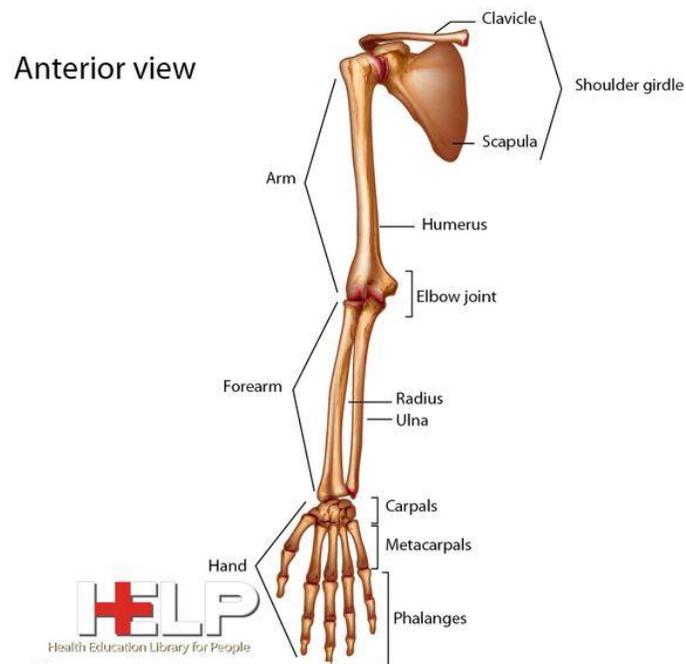
Over 15 muscles

- “Intrinsic” small muscles in the palm and fingers; needed to shape the hand and hold small objects
- “Extrinsic” larger muscles originate at the forearm and cross to the hand in order to stabilize the wrist and provide gross movement of the fingers and thumbs, like flexing and extending .



Add: WRIST, FOREARM & SHOULDER

Shoulder, Arm, Forearm, Hand



- Before the hand can work the wrist, the arm and shoulder need to have: **STABILITY**

Focus!



- Web space between thumb and fingers
- Arches to give shape and form
- Midline of the hand to promote separation of the busy and quiet side
- Finger Isolation—the ability to move each digit on its own

Awareness

- Awareness of the hand
- Awareness of individual fingers
- Sensory discrimination-texture, weight, temperature, etc.

Hand Manipulation Techniques



-“Translation”: Bringing objects to and out of the hand like picking up coins from a table (finger to palm translation)

or

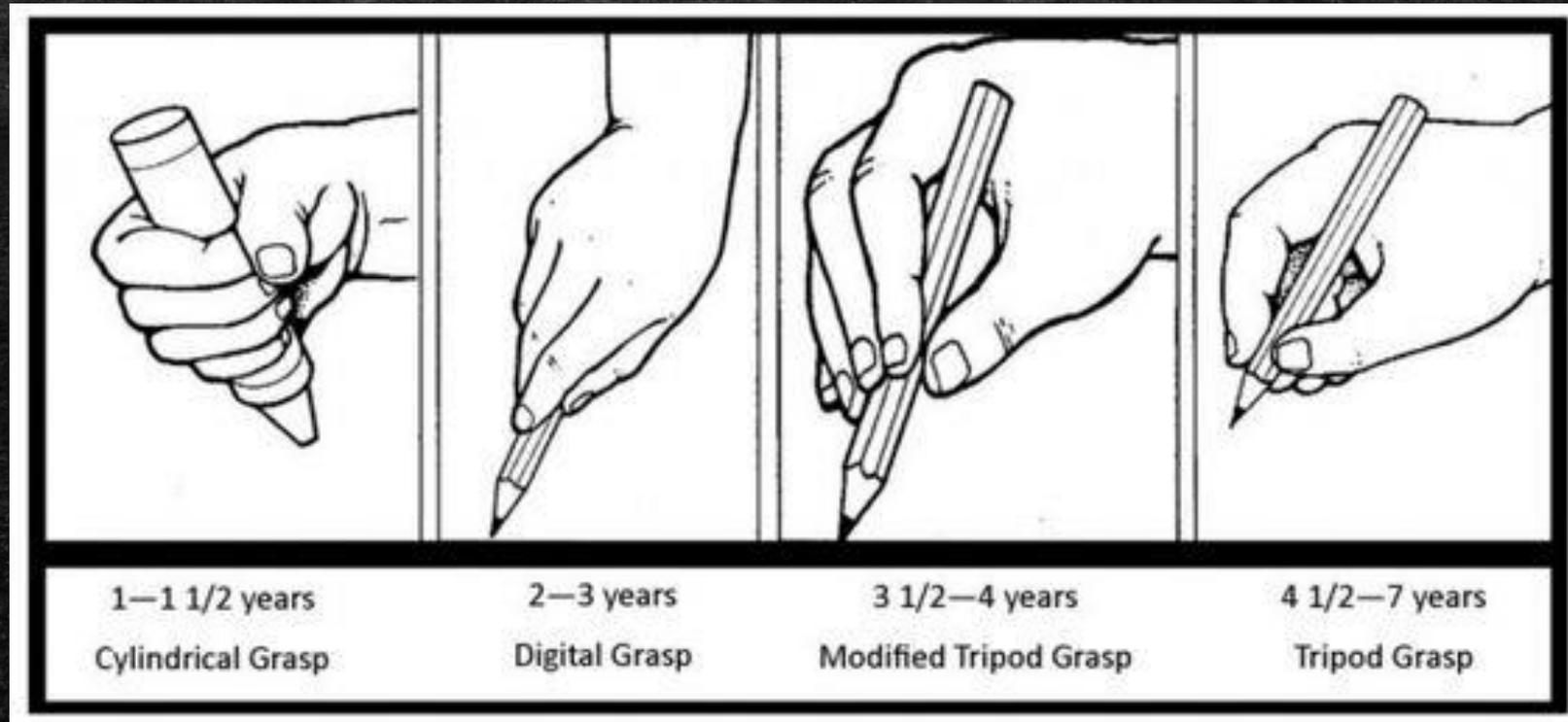
coins into a bank (palm to finger translation)

-“Shift”: Lacing a cord through beads

-“Simple Rotation”: Unscrewing a jar, rolling a clay ball

-“Complex rotation”: Rotating a coin or paper clip

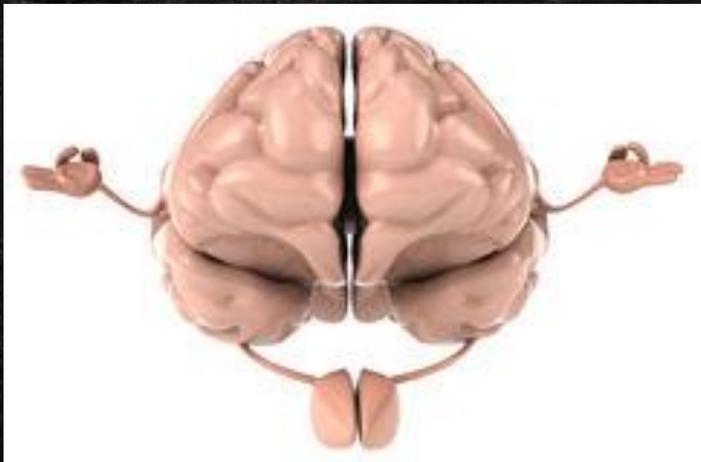
Grip Progressions



9 Components of FMD:

- Bilateral integration
- Shoulder and postural stability
- Wrist extension stability
- Arches of the hands
- Thumb opposition/open webspace
- Separate function of the two sides of the hand
- In-hand manipulation skills
- Hand and finger strength
- Grasp patterns

Bilateral Integration

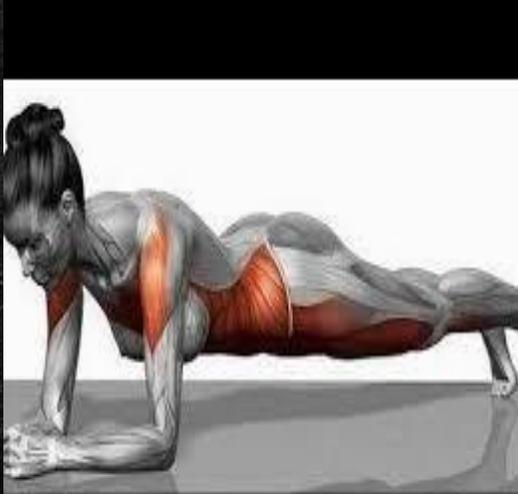


- Coordination between the right & left sides of the body
- Frequent ear infections are said to be related to bilateral integration problems
- Attained by about $5\frac{1}{2}$ years of age for tool use.
- Indications of developing dominance should be present by 3 years (reaching and holding more with one than other hand).
- Children learn to use 2 hands together for a symmetrical activity

Activity!



Shoulder and Postural Stability



- Problems with handwriting can stem from problems with seated posture & shoulder positioning
- Lack of muscle strength to sit upright in a chair is a sign of deficit
- Ability to place & control his hand & fingers will be compromised

Activity: Egg race



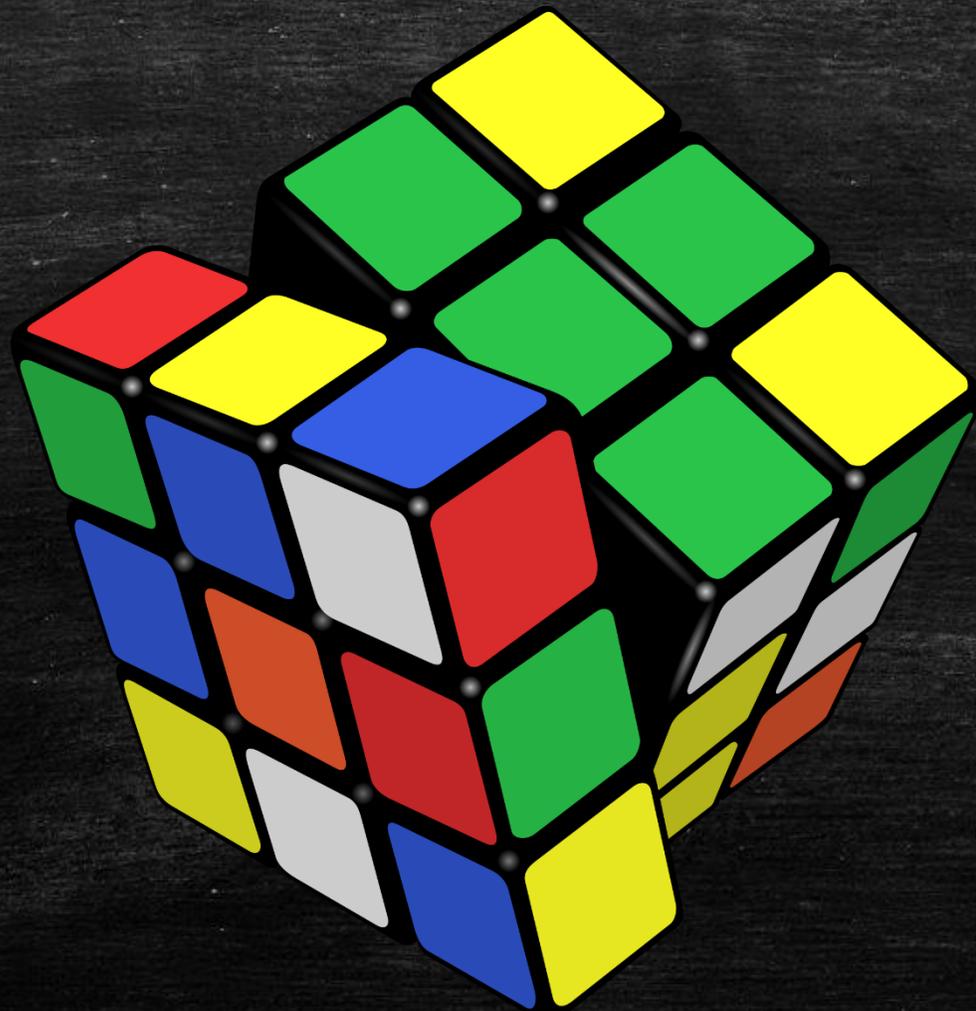
- We will break into groups. Each group will be given a spoon and an egg. Team members will take turns relaying, holding the spoon and egg WITH ARM FULLY EXTENDED. Your efforts are to move as fast as you can without dropping the egg.

Wrist Stability in Extension:



- No other upper extremity can compensate for wrist limitations. Children with fine motor delays often compensate for inadequate stabilization of the wrist by flexing the wrist (bending it forward so palm gets closer to forearm) to "lock" it into a stable position

Rubik's Cube



Activity: Upside Down Drawing



- Everyone will be given:
 - Paper
 - Tape
 - Writing implement
- You will find a table where you can tape your paper underneath. You will then try to draw a picture with the provided time.

Palmar Arches

- These arches shape the hand to grasp differently-shaped object and direct the skilled movements of the fingers.

When we weight-bear on our palms (crawling and scooting), we strengthen the muscles that pull the pinky side of our hand up into an arch.



Activity: Jacks!



Thumb-Index Web-Space

For effective movement within the hand, the thumb should be able to so that the thumb-tip can touch each fingertip



- 25-50% first graders don't have good stability and strength through these three muscles and the base of the thumb.

Marbles!



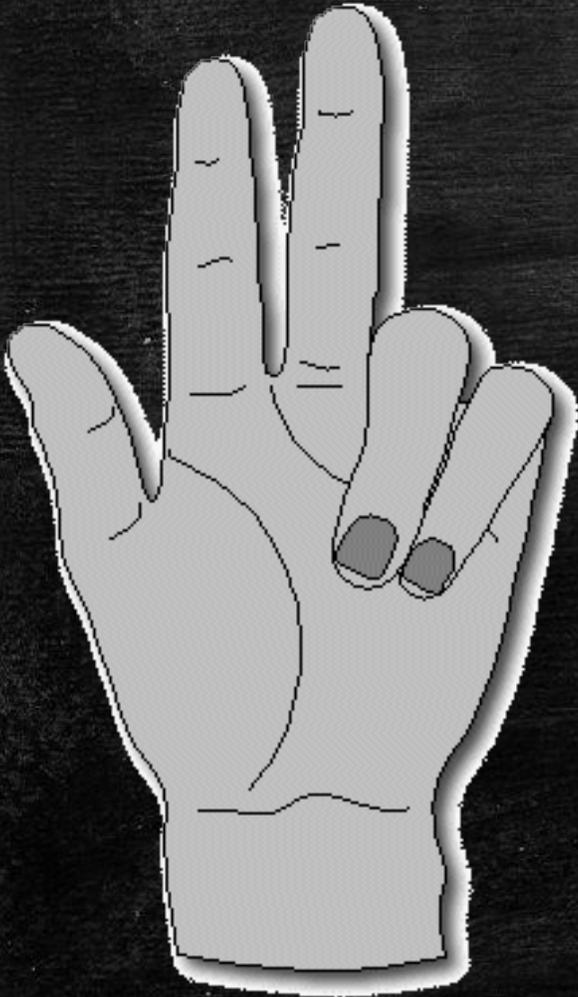
- Draw a circle on a piece of paper
- Put all but **1** marble in the circle
- Use one marble and “flick” it to knock **1** marble out of the circle at a time.

Let's Think: Which one would you initially use with a child?

Tweezers vs. Clothespins



Separating Two Sides of the Hand



Dodge, Jane

Develops when an infant crawls & bears weight on the pinky side of the hand while carrying toys with the thumb and index side.

Look for curling in:

- Cutting
- Snapping
- Threading a large needle
 - Moving pegs
- Flipping pennies over
- Spinning a top and winding a toy are amongst the other activities where this separation should be observed

Activity: Flip That!



- Line up ten pennies in a row. As quickly as you can try to pick up each penny and flip it with your fingers...into the cup. (Adult difficulty☺)

In-Hand Manipulations

The ability to shift objects within the fingers of one or both hands.

- Children lacking these developmental fine motor skills often appear "*fumbly*" when trying to use their fingers to maneuver small objects.



Questions, Comments, Concerns?

References

- Brice, Miram.(2004) *Developmental Scissor Curriculum Guide*, Washington, DC
- Dodge, Jane. "Fine Motor." Fine Motor 101 School- OT, 4 Aug. 2012. Web. 2 Dec. 2013. <http://www.school-ot.com/>
- Erdie-Lalena, C, Gerber R, Wilks, T. (2010) *Developmental Milestones: Motor Development*. Pediatrics in Review: American Academy of Pediatrics
- Gardner M.F, (2003) *Test of Handwriting Skills Manual*. Novata,CA:Academic Therapy Publications
- Grissmer, David, et al. "Fine Motor Skills and Early Comprehension of the World: Two New School Readiness Indicators."*Developmental Psychology* 46, no. 5 (September 1, 2010): 1008-1017. *ERIC*, EBSCOhost (accessed July 10, 2016).
- Huffman, J. Michelle, and Callie Fortenberry. 2011. "Helping Preschoolers Prepare for Writing: Developing Fine Motor Skills." *Young Children* 66, no. 5: 100. *ERIC*, EBSCOhost (accessed July 9, 2016).
- Stewart, Roger A., Audrey C. Rule, and Debra A. Giordano. 2007. "The Effect of Fine Motor Skill Activities on Kindergarten Student Attention." *Early Childhood Education Journal* 35, no. 2: 103-109. *ERIC*, EBSCOhost (accessed July 9, 2016)
- Suggate, Sebastian P. Do Nimble Hands Make for Nimble Lexicons? Fine Motor Skills Predict Knowledge of Embodied Vocabulary Items. *First language* 34, no. 3 (June 01, 2014), (accessed July 09, 2016).
- Zaccheus, Olusola. (2014) *Fine Motor Development*, George Washington University
- Brook's Rehabilitation. A Guide To Your Childs Gross and Fine Motor Development . www.brooksrehab.org

Complete the Breakout Session Evaluation on the Mobile App

