Certification Training Manual

MANUAL COMPETENCE

The Developmental Sequence takes us through a series of ever more complex functions that build upon each other, supporting manual functions from the earliest grasp reflex to complex fine motor skills. In utero, the hand will frequently brush by the mouth as the baby seeks to establish the 'center of the universe', his/her mouth, into which the thumb will be inserted. The hand's earliest job is dependent upon the thumb, which will trigger the mouth to do the sucking that will be necessary for survival once the baby is born. Mouth/hand connections come on board early, before birth, and support the later development of eye/hand functions.

Stage I – Medulla/Spinal Cord Level: Grasp Reflex

Babies put on their tummies in the first weeks of life will place their hand in a position near their mouth, prompting hand to mouth awareness necessary for eating. As they spend more time on their tummies, the mouth/hand prompt becomes an eye/hand prompt as they realize they have fingers and notice the wiggling and movement of fingers within their field of vision. It is an early positioning of the baby's body that benefits the child's later learning skills. As we put babies on their stomachs less, we have found a correlation to learning disabilities, which we suggest should be further researched.

Once born, the baby's hand/mouth connection continues. The newborn has the thumb tucked inside the fisted fingers and the end of the thumb puts pressure on digestion reflex points for oral function on the inside of the hand. This reinforces the functions needed for good sucking.

The grasp reflex of the neonate is so strong that one can put a finger in the palm of the hand and nearly lift the baby, due to the strength of this early grasp reflex. Please note that this is not indicative of strength, but is rather a reflex. The baby has to grip as long as something is touching the palm. They simply cannot let go.

Stage II – Pons Level: Vital Release

By about two and a half months, as the pons level brain is coming online by the process of myelination, you can still evoke the grasp reflex by putting your finger in the baby's hand. But now, if you put much pressure or try to lift the baby up using the strength of the grasp reflex ,the baby would let go. This is known as vital release.

One of the signs of a potential pons level issue is seen in the hand. If the hand is in a grasp reflex after the first six months of life, you are looking at either a specific injury to the pons or high levels of anxiety. The grasp reflex resulting from specific brain injury may be extremely difficult to release. However, the anxious individual can release the hand at will, but feels comfort by keeping the thumb tightly wrapped

in the fisted palm. Please see the information on crawling for more discussion of how the grasp release might relate to Attachment Disorders, or to a neurological-based anxiety disorder.

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Stage III – Midbrain Level:

Within the second half of the first year, the baby develops a skill called supination/pronation. Supination/pronation is the ability to rotate two bones of the lower arm around the one bone of the upper arm, so that the lower arm can rotate while the upper arm is stable. You see this in the child who can twist apart two objects that are screwed together, who can screw the lid off of a jar, etc.

We test this when we ask the child to hold their palms up, then flip them over first slowly, then quickly, then one arm, and finally both. Children who do not have this skill may have difficulty with fine motor, with rotations of the arm required for turning a faucet off and on, for jumping rope, etc. Overall, it indicates a neurological immaturity.

This introduces us to a larger concept of self-regulation. The test for supination/pronation provides a window into general self-regulation skills. The supination and pronation of the lower arm against the stability of the upper arm is one of many examples of the body's ability to maintain stability in one area, which supports mobility in other areas of the body. One of the hallmarks of maturity and self-regulation is the ability to do one focused activity against a background of general stability and calm.

On the other hand, one of the signs of immaturity and dysregulation in children and adults is the inability to remain reasonably calm while also performing a stimulating task.

For example: these are the children who, when asked to put on their coat and shoes to go outside, start running around the house with so much excitement, even flapping and screaming, sometimes falling on the floor in tears, so that simply leaving the house becomes a challenge.

In our testing, when we ask the radius and ulna to rotate against the more stable humerus, we are testing a simple manual skill, but we are also observing a kind of regulation of the nervous system as a whole. This simple test gives us an indication of the client's ability to maintain calm while under stress/speed. This observation, together with other observations about regulation, gives us some evidence that the client has a neurological basis for their dysregulation.

Prehensile grasp emerges when the baby is able to pick up an object with all five fingers, wrapping the whole hand around a block or a ball. We often see this skill continuing past the appropriate age when the child holds a pencil in a full or modified grasp reflex rather than maturing into a thumb to forefinger 'pincer grasp' that is a function of the higher cortex.

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Stage IV – VII – Cortical Level: Cortical Opposition in Either Hand, Fine Motor Skills, and Hand Dominance

Finally, as the cortex comes on board, our hands mature so that we can create the rounded 'cortical opposition' or 'pincer grasp', which consists of the forefinger and thumb meeting point to point, making a circle. This is the ideal hand for fine tool use. A pen, grasped between the thumb and forefinger is tremendously flexible due to the shape that causes efficient manipulation of the small joints of the fingers. Once the thumb and forefinger flatten, flexibility is reduced and movement has to involve the entire wrist, making writing and other fine motor skills more challenging and tiring.

In working with children with IQs under 50, it was our finding that those children had no ability to create a relationship between the forefinger and the thumb.

Over the span of the first year, the Developmental Sequence unfolds so that each stage of movement acquisition creates new functionality in the hand. By the time we have reached the cortical level of integration, we have the skills to create whole civilizations with the incredible, refined, detailed use of a mature hand.

Manual Competence

Stage I – Medulla/Spinal Cord Level: Grasp Reflex

Test process:

Information at this level may come primarily from parent or client reporting:

- Were the hands flaccid and unable to grasp in the first weeks of life?
- Was only one hand able to grasp in the first weeks of life?

What to note on your chart:

- If the client has a history of limp hands in early life, note that.
- If the client hand one limp hand, note which one.

Stage II – Pons Level: Vital Release

Test process:

- If the hand is locked in a grasp reflex, hold the hand to discover the degree of resistance and if you can open that hand.
- Observe whether the hand is not locked in a grasp reflex but goes into a grasp when the child is feeling stress.
- When the child is crawling look for the grasp reflex to appear.

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What to note on your chart:

- If the client has a brain injury related grasp reflex, such as from cerebral palsy, note that.
- If the client can release the hand when relaxed but goes into a grasp reflex when under stress or crawling, note that.

Stage III – Midbrain Level: Supination/Pronation

Test process:

- Ask the client to stand in front of you, with arms at their sides with the lower arm lifted to a right angle, palms up. You will demonstrate this for them.
- Rather than giving instructions, tell them 'do this' and model the movement correctly.
- Ask them to go faster and faster, and as fast as they can go.
- Tell them 'Now, just the right hand', then 'Now, just the left hand'.
- Observe the child picking up small objects and note whether they pick them up with a 'pincer' grasp or using the whole hand, five fingers pulling the object into the fist.

What to note on your chart:

- If the child cannot rotate and flips the hands up and down by 'flapping' the whole arm articulated off of the shoulder (this looks like they are trying to fly), note that.
- If they pin the arms against the body to try to stabilize the upper arm, but the lower arm still has difficulty turning up and down, note that.
- If the lower arm makes a serpentine shape as the child attempts the task, lead by the hand and wrist rather than by the elbow joint, note that.
- If, when done faster, the child starts to engage the whole body, even to the point of jumping up and down, if standing, or nearly falling out of their chair, if seated, note that.
- Note if the child uses a grasp reflex (whole hand), or a 'pincer' grasp to use a pencil or pick up a small object.

Note: The child who has to involve their whole body to simply flip their hand palm up, then palm down, is probably the same child who responds to everything with a whole-body response. Stress for this child is the enemy of compliance and effective follow through.

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Stage IV – VII – Cortical Level: Cortical Opposition in Either Hand, Fine Motor Skills, and Hand Dominance

Test process:

- Ask them to stand, and to bring the thumb and forefinger together on both hands simultaneously.
- You will demonstrate this movement for them correctly and tell them 'do this'.
- Ask them to go faster and faster, and as fast as they can go.
- Tell them 'Now, just the right hand', then 'Now, just the left hand'.

What to note on your chart:

- If the child cannot meet forefinger to thumb on either or both hands, note that.
- If they can meet forefinger and thumb but either or both fingers are flat, note that.
- Sometimes on speed, the whole hand will become involved and they may start with reasonable cortical opposition that devolves into a 'prehensile grasp": the use of the whole fist instead of discreet fingers. If so, note that.
- If, when done faster, the child starts to engage the whole body, even to the point of jumping up and down, if standing, or nearly falling out of their chair, if seated, note that.