Evaluation Skills: Hypotonia – Part 2

P.I.Q. – Postures in Positions, Initiation and Inhibition, Quality

Positions – Supine, Prone, Sitting, Standing, Quadruped, and Kneeling

SUPINE

Positions

- Look for thoracic kyphosis and flattening of rib cage with more horizontal orientation of ribs
- Frog leg position in supine
- Ability to maintain midline position of head

Initiation and Inhibition

- Do they reciprocally move LEs/UEs against gravity
- Can they bring hands to midline
- Do they initiate rolling supine to prone
- Can they track toys visually
- Can they transition from supine to sitting
- May be inhibited from getting chin tuck as increased cervical extension overlengthens cervical flexors

Quality

- Do they roll with trunk dissociation or log rolling
- Do they transition to sitting with trunk rotation pushing up from ground or through sagittal plane only
- Head lag during pull to sit

PRONE

Positions

- Use cervical hyperextension to lift head in prone then it rests on occiput (Cervical stacking)
- Uses eyes to lift and hold head up; May use tongue retraction to hold head up
- Frog leg position in prone
- Hyperextension of elbows when pushing up in prone

Initiation and Inhibition

- Push up through hands in prone (Are the hands open or closed?)
- Reach for toys in prone
- Do they initiate rolling prone to supine
- Do they transition from prone to sitting
- May initiate movement with phasic bursts of muscles (lifting head with cervical extension)

Quality

- Dissociation of trunk when rolling prone to supine
- Weight shifting when reaching for toys in prone
- Prone to sitting through straight plane movements with minimal rotation

SITTING

Positions

- How do they prefer to sit: W-sitting; long sitting; Criss-cross sitting; etc.
- Paraspinal weakness results in total kyphotic posture with posterior pelvic tilt and forward head posture (Limits anterior movement preventing normal pressures)
- Hip IR/ER; Look at foot position

Initiation and Inhibition

- Reach for toys on the ground or held off the ground
- Crossing midline in sitting
- Transition between sitting and prone/quadruped

Quality

- Transition over hip or with hips in abduction
- Place hand down to reach outside BOS
- Transfer toy between hands rather than crossing midline

STANDING

Positions

- Children assume WBOS and low COM: muscles placed in poor length-tension position
- Bony deformity of forefoot
- Pronated flat foot
- Calcaneal valgus
- Knee valgus
- Hip IR/ER

Initiation and Inhibition

- Squatting and returning to standing
- Reaching in all planes without LOB
- Raise on tiptoes to reach for toys overhead

Quality

- Ankle/hip strategy
- Knee alignment when squatting
- Push-off on metatarsals when raising on tiptoes

QUADRUPED

Positions

- Elbow hyperextension
- Lumbar lordosis
- Cervical stacking when lifting head
- Hip abduction/ER

Initiation and Inhibition

- Transitioning between sitting and quadruped
- Rocking in quadruped
- Reaching in quadruped
- Creeping over even terrain
- Creeping over small obstacles

Quality

- Weight shift when creeping
- Transition to sitting with increased hip abduction
- Endurance for creeping

KNEELING (HALF KNEEL / TALL KNEEL)

Positions

- Hanging on ligaments for balance
- Lordosis with decreased core activation
- Excess hip abduction/ER for widening BOS
- Poor ankle stability in half kneel
- Resting on heels

Initiation and Inhibition

- Transitioning from tall kneel to half kneel
- Pulling to stand at a support surface
- Transitioning to standing without support surface
- Reach and rotate head without LOB

Quality

- Weight shifting for transitioning tall kneel to half kneel
- Excess use of UEs to pull to stand
- Bear crawl to stand without support surface

Another thing that is valuable to check during an evaluation is range of motion (ROM). Check for tight pecs and lats as well as tight intercostal muscles.

Functional strength tests can also be performed with bridges (assess glut strength), squatting, floor to stand transitions, sit to stand transitions, jumping, hopping on 1 foot, and/or stair navigation. (The latter 3 for older children.)

A balance assessment should be completed as well. Assess static balance to include single leg stance (SLS) with eyes open (EO) and eyes closed (EC), Tandem stance with EO and EC, and balance on tiptoes. Assess dynamic balance with tandem walking on balance beam, walking backwards and laterally, and stairs without handrail.

Sensation and perception can be affected by hypotonia. Depth perception may be compromised in children with hypotonia; its development relies on convergence of the eye and self-initiated movement through space. Also, children with DS have increased incidence of hearing problems or may have increased sensitivity to sound so a hearing assessment is always recommended.

Proprioception should be assessed as well. As a reminder, proprioceptors are sensors in limbs that give information about joint angle, muscle length and tension to let the body know where limb is in space. Children with low tone have decreased proprioception because of the hypermobility in their joints they're not getting as much input in the joints to know where there body is in space. Proprioception can be assessed with the following tests:

Limb movement sense test

- Child keeps eyes closed while you passively move one limb; child imitates movement with opposite limb.
- Do in chair for UEs, supine for LEs
- Score as either can do or cannot

Limb-matching test

- Child's eye closed; you position one extremity and they must duplicate position
- Score (0-2)
    - 2 = no error in matched position
    - 1 = position approximately correct; joint angles incorrect up to 30 degrees total
    - 0 = one or more joint angles in error by > 30 degrees

PDMS-II Imitation of movement

- Have child imitate movements when UEs are out of visual field
- Allows you to get a quick screening without having to do a separate test
    - If more assessment is needed then you can use the Limb movement or Limb-matching test
- This test can also be used to assess functional strength without the need for other tests
    - If more assessment is needed then you can use specific functional strength tests