

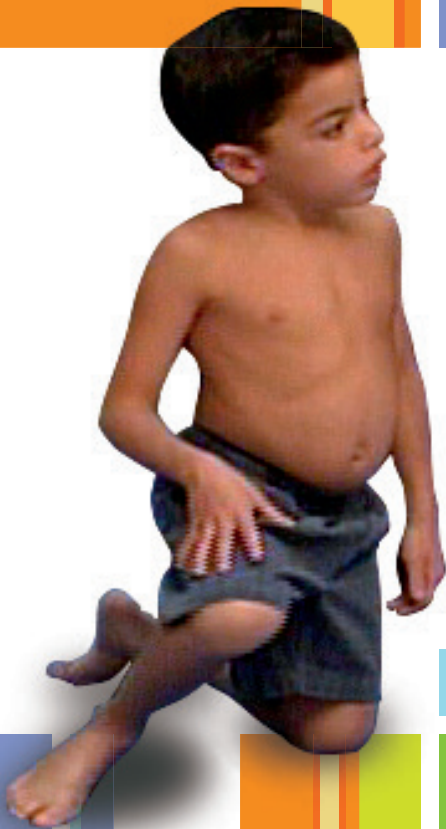


Evaluating Movement & Posture Disorganization

A Criteria-Based Reference Format for
Observing & Analyzing Motor Behavior
in Children with Learning Disabilities

By W. Michael Magrun, MS, OTR

3 R D E D I T I O N



EVALUATING MOVEMENT AND POSTURE DISORGANIZATION

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About the 3rd Edition

This 3rd edition of the Evaluation of "Movement and Posture Disorganization," condenses and modifies some of the observational criteria in each subtest. The subtests are reorganized to reflect specific criteria for the movement sequences in the categories of starting position, initiation, transition, and final position. This assists the examiner in identifying more specifically the critical components that result in disorganization, such as, alignment, initiation of compensatory patterns, poor grading and weight shifting during the transition of the sequence to the final posture, and asymmetries between body sides. In addition, examples of disorganized responses are presented for each subtest.

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INTRODUCTION

One of the challenges in the assessment of motor behavior is the determination of the quality of motor behavior and performance. In children with movement and posture disorganization, the clinician is often faced with making judgments about the child's level of performance and the underlying difficulties that impact on motor organization and coordination.

There is a growing emphasis on establishing efficacy of assessment and treatment through research that depends on statistical analysis and standardized measures. Whereas this approach has merit to professionalism and establishing the effectiveness of therapeutic intervention, it is important to remember that we are dealing with a dynamic process. When we consider movement it is clear that it can never be fully understood by studying isolated or individual variables based on calculated "standard deviations." There is a lack of depth of consideration into the underlying factors that contribute to the performance deficit.

Standardized testing of specific motor skills may be helpful in establishing a level of performance in relation to a normal population of similar age. Standardized tests, however, do not explain the "reason" for failure or below average outcome of a particular performance skill. They provide a standard deviation from a statistical norm. They are essentially meaningless in terms of developing effective intervention strategies.

Variables of performance are difficult to isolate because normal movement and motor function is dynamic and ever changing, incorporating numerous components required for a normal performance outcome. The "reasons" for a child's poor performance therefore cannot be fully understood through standardized testing. Insight into the child's difficulty requires good observational skills to determine how the child's performance is attempted and carried out from a functional point of view. The "reasons" for the child's performance problems are what the clinician wants to know so that appropriate treatment strategies can be determined to remediate the underlying dysfunction.

The use of standardized testing is appropriate for establishing base-line data on specific skill performance prior to treatment. Treatment however, if it is to be specific to the child's needs, must be determined through good clinical observation of the underlying characteristics of dysfunction that are present and must have some relationship to the performance being measured.

Ultimately the most important result of any assessment is that it provides the clinician with an understanding of the underlying problems of the child and directly leads the clinician to treatment priorities. The criteria-based format of this assessment, if used properly with a knowledge of normal movement and clinical experience, should be effective in guiding the clinician to an understanding of the child's functional inefficiencies and to specific treatment priorities.

Observing Quality In Motor Performance

The intent of the criteria-based design of this assessment is to assist the clinician in the observation of specific movement and posture characteristics that may be contributing to inefficiency in performing the movement sequences of each subtest presented.

Disorganized movement "looks" different than smooth coordinated movement. It may first appear to the observer as labored or inefficient. Disorganized movement lacks fluidity and adaptability. It is often characterized as stereotypic or recurring because the child's effort to move through a sequence does not demonstrate a smooth grading of flexion, extension and rotation. The child usually does not efficiently activate rotary patterns in transition. Flexion or extension may dominate a movement or posture with the child activating extension too forcefully (jumping up or thrusting up) or sinking into flexion rather than grading into gravity with stability. All disorganized movement is comprised by a disharmonious combination of flexion, extension and rotation. Understanding normal movement allows the clinician to appreciate the components of movement that are dysfunctional and that lead to dyspraxia or poor coordinated motor patterns.

There are several guides that can assist the clinician in observing and analyzing quality in movement and posture. They are:

1. Starting Position
2. Initiation of Movement
3. Transition
4. Final Position

The **starting position** determines a great deal in the outcome of control of a movement. Movement initiation changes with a change in starting position and the sequence of movement is therefore different in terms of the cooperation of flexion, extension and rotation that is required to perform the movement.

The patterns used to stand up from supine require a completely different sequence than the patterns required to stand up from a sitting position. The particular patterns required are dependent entirely on the starting position. The alignment of the body and its relationship to gravity, bias what movement patterns are used to accomplish the movement.

The distribution of weight influences, and is influenced by, the alignment and postural tone of the body. An imbalance in alignment, whether structural or postural will result in an imbalance in the distribution of weight and the ability to shift weight smoothly from one side to other. Postural tone will be unevenly distributed to compensate for alignment or weight distribution imbalances.

For instance, lying in supine with the shoulders, hips and lower extremities in a straight alignment allows the body to symmetrically assume standing from an alignment that is prepared to support symmetrical movement. If the starting position is initially misaligned with one side out of alignment, the movement initiation would be biased and therefore the body would need to make some type of compensatory adaptation to come to stand. This might include propping to one side or even roiling to one side to gain support for moving against gravity. The starting position and its relative alignment is therefore important in terms of how the motor plan is initiated. Alignment is determined by the distribution of weight, postural tone and structural characteristics of the child. Any imbalance between body sides of these factors will inhibit a smooth initiation of the movement attempted.

Initiation of movement refers to what part of the body begins the movement first; initiates the movement pattern of intent. Most movement is initiated by the head and neck lead by, or

supported by, the visual system. To move the body through space it is necessary to initiate inertia. In many movement sequences, if not most, inertia is created through an initial flexor component. Standing up from a chair for instance, requires the initiation of flexion before extension. It is nearly impossible to stand up using only extension. Flexion therefore, serves as a catalyst or a preparation for extension. By activating flexion, the body is tensing for support against gravity to provide the stability to activate extension.

Simultaneously with initiation of movement there is weight shift to allow freedom for the body to move. Weight shift is an integral part of the initiation of movement. It provides the interplay of stability-mobility that is required during movement.

If the initiation of movement is compromised by poor alignment from the starting position there will be difficulty in smoothly executing a motor plan without compensatory adjustments or disorganization. Imbalances in postural tone and the distribution of weight can also interfere with the initiation phase. Difficulties in the initiation of movement will cause additional movement disorganization in the transitions required during movement from posture to posture.

Transitions during movement, primarily through rotational components grade extension and flexion and provide organization to movement. Rotational components of transition also grade weight shifts through midline and integrate bilateral cooperation between body sides. Transitions in movement refers to the movements that are used between postures and link into a sequence of functional motor patterns. Transitional components include rotational patterns of the trunk, spine, and shoulder girdle, rotational components help to grade weight shift laterally, forward and backward, through a sequence of movements. Normal movement does not just include flexion or extension and is not limited to symmetrical straight plane movements.

Children with movement and posture disorganization do not efficiently use transitional components of rotation. They have difficulties therefore controlling weight shifts during dynamic movement patterns and this affects smooth balance reactions. Transitional movements can be inhibited through poor starting alignment and/or inefficient initiation of movement.

The final position is the final or ending posture of the movement sequence. The ending posture serves as the new starting posture for the next series of movement components that are initiated. Motor planning depends on good kinesthetic feedback and good kinesthetic targeting of the pattern, or feed-forward information. If motor function is continually disorganized from the starting position through initiation and transitions to the ending posture, then there is little opportunity for the child to gain consistent sensory-motor constancy to establish the kinesthetic mechanisms required to perform a smooth movement sequence.

Clinical Observation

Movement consists of a series of postures chained together by organized components, or synergies, of flexion, extension and rotation. All movement has a starting and ending posture and at any point during the sequence the movement can be stopped and the posture at that point revealed. For a posture to be functional and organizational it must be maintained with normal alignment and normal distribution of postural tone and weight. Before analyzing the child's movement it is important to observe any structural or alignment asymmetries and any compensatory habit patterns in the distribution of weight and postural tone.

Children with movement and posture disorganization often show misalignments of the body and compensatory postural patterns. Observed in standing, the shoulders may be uneven, with one shoulder lower than the other. The neck may be shortened on one side as a consequence to shoulder misalignment. The scapula may be abducted and protracted with inactivity of the mid-trunk. The lateral trunk may also be shortened on one side corresponding to the lower shoulder. The arms may hang in passive traction. The legs may be internally rotated, knees in hyperextension and the feet medially collapsed with poor arch support. The hands may also suffer from poor arch structure and weak stability at the wrist. There may be a definite preference to take more weight on one side of the body and not the other. In sitting the child may also be observed to sit with more weight on one side of the body with a consistent posterior pelvic tilt and the trunk in passive flexion. These are typical postural findings in children with movement and posture disorganization.

Neck-Shoulder-Trunk-Pelvis Asymmetry

In this example it can be observed that the right shoulder is slightly higher than the left. There is poor stability around the scapula with passive mid-trunk postural tone. As a result of the uneven alignment of the shoulders, the neck is shortened on the left, which tilts the head slightly to that direction. Due to the lower alignment of the right shoulder, the trunk is shortened on the right and the pelvis is slightly higher on the right side.



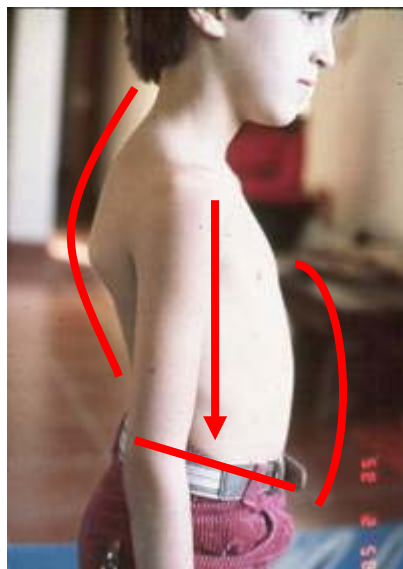
Inefficient Sitting Posture

This sitting posture is characteristic of children with movement and posture disorganization. The weight is distributed more to the right side. The neck is shortened and the trunk is in passive flexion with the pelvis tilted posterior. It is a stable position but does not allow a readiness to move or smoothly activate weight shifts, extension, or rotational patterns.



Passive Traction Of The Upper Extremities

Poor proximal stability of the shoulder girdle and general low tone support of the trunk results in a passive traction posturing of the arms. The arms appear long and there is not a good readiness to move or initiate distal movement from a stable proximal point of control. The abdominals also appear inactive and the head is positioned slightly forward of the shoulders as a postural compensation for the lack of shoulder girdle stability. The pelvis is anteriorly tilted and there is lumbar lordosis.



Postural Characteristics In Standing

These children show some typical postural characteristics seen in children with movement and posture disorganization. Shoulder misalignment, inactive abdominals, pelvis anteriorly tilted and corresponding lumbar lordosis. The knees are hyperextended. There is an imbalance of flexion and extension and consequently there is poor mid-range control at the pelvis. The weight is often distributed more on one side of the body.



Distribution Of Weight In Standing

Postural alignment in children with movement and posture disorganization is often asymmetrical and due to these compensations there is often a corresponding imbalance in the distribution of weight in various postures. In these examples it can be observed that there is a slight preference to take more weight through one side or the other, usually to the same side as the lower shoulder. This effectively results in a postural midline shift. In addition, the child has more difficulty shifting weight and maintaining balance on the side that is used less in weight bearing.



Weight distributed more to the left



Weight distributed more to the right

CLINICAL OBSERVATION OF MOVEMENT AND POSTURE DISORGANIZATION

- Subtest 1: Supine To Stand***
- Subtest 2: Supine To Flexion Hold***
- Subtest 3: Prone Reach***
- Subtest 4: Alternating Prone Reach***
- Subtest 5: Long Sit To Side Sit***
- Subtest 6: Kneel Standing To Side Sit***
- Subtest 7: Kneel Walking Forward And Back***
- Subtest 8: Alternating One Foot Kneel***
- Subtest 9: Alternating Half Kneel To Stand***
- Subtest 10: One Foot Balance***
- Subtest 11: Squat Pick. Up***



Child's Name:

Age:

Date of Assessment:

Examiner:

Referred by:

Reason for Referral:

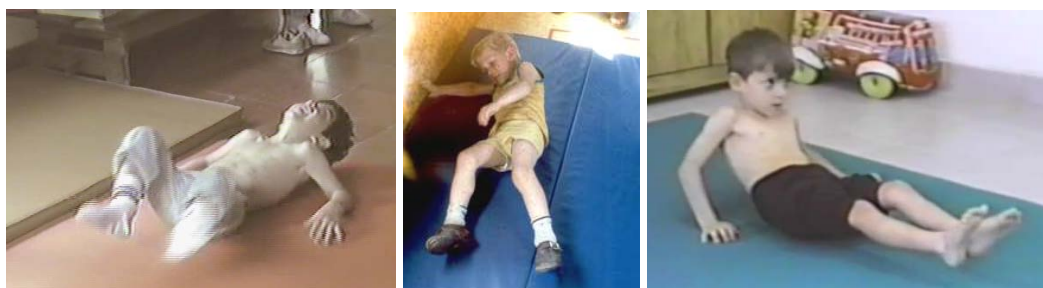
SUBTEST 1: SUPINE TO STAND

This subtest is designed to evaluate the movement sequences of the child as he comes to standing from a back-lying position. The examiner demonstrates the movement sequence and asks the child to duplicate the sequence. As the child initiates standing from supine the examiner observes the sequence and answers the criteria questions of the subtest.

Some children may rotate to one side, which if done smoothly and without undue effort, is acceptable and a normal preference for some children. However, if there appears to be effort or difficulty, the side rotated to should be noted and cross referenced with other subtests to determine if the child repeatedly relies on one side for other movement sequences in the assessment

Children who have disorganization in motor behavior often show difficulty in initiating the sequence. They show effort in raising the head off the surface, sometimes with slight head lag and facial grimace or distress from effort. Their legs may lift off the surface in extension in an effort to recruit one side to assist in raising the head. Additionally disorganizing factors include rolling to one side and propping for support or even moving into a four-point position and pushing against the legs for stability to stand.

Disorganized Examples



Key Observations

- Is the starting position symmetrical?
- How is the movement initiated?
- Is the movement symmetrical?
- Does the child maintain good body alignment during movement?
- Is the end position symmetrical?

This movement sequence is initiated from the head and neck. Note if the head moves forward in capital extension and neck flexion. Observe the symmetry of coming forward with the upper body and bringing the weight over the hips and legs. Note any compensations such as:

- One side leading the movement and one side lagging behind.
- Rotating toward the lagging side to prop for standing.
- Legs elevating before the upper body flexes forward.
- Asymmetrical standing.

Administration

Starting Position: Child starts in supine after demonstration.

Command: "Now you do the same thing, Lie down and stand up."

Subtest Observations

Starting Position

a.) Does the child appropriately assume a symmetrical starting position? Yes___ No___

If No:

b.) Is the asymmetry to the right or to the left? Right___ Left___

c.) Is the right or left leg internally rotated in the starting position? Right___ Left___

d.) Are the shoulders elevated in the starting position? Yes___ No___

Initiation

a.) Does the child appropriately initiate the movement with capital extension and neck flexion? Yes___ No___

If No:

b.) Does the head lag or is the neck in hyper extension? Yes___ No___

c.) Do the legs extend off the surface as the head attempts to raise? Yes___ No___

d.) Is there evidence of facial grimace or extreme effort? Yes___ No___

e.) Does the child fist his hands? Yes___ No___

f.) Do the shoulders elevate? Yes___ No___

g.) Do the elbows flex with shoulder elevation? Yes___ No___

Transition

a.) Does the child appropriately sit up symmetrically with the legs flexed ready to stand over the feet? Yes___ No___

If No:

b.) Does the child lean to the right or left? Right___ Left___

c.) Does the child rotate to the right or left and forearm prop? Right___ Left___

d.) Does the child go to side sit or four-point right or left? Right___ Left___

Final Position

a.) Does the child stand up appropriately with equal weight on both feet? Yes___ No___

If No:

b.) Does the child stand with more weight on the right or left? Right___ Left___

Repeat Several Times

Repeat the sequence several times. If the performance becomes more disorganized, it is an indication of significant neuromotor disorganization. If the performance shows initial disorganization and either stays the same or improves slightly, it is an indication of a more mild neuromotor disorganization.

Subtest 1: General Level of Disorganization

Adequate response with no indication of disorganization or difficulty.

Slight indication of disorganization seen in several disorganized criteria initially seen but improving or remaining the same over repeated attempts.

Mild disorganization as identified by presence of a number of disorganized criteria and not substantially improving over repeated attempts.

Significant disorganization as indicated by numerous disorganized criteria and remaining the same or becoming more disorganized over repeated attempts.

Interpretation of Subtest 1

When interpreting the child's performance of **Supine To Stand**, it is important to determine the initiation of the movement and any preference for a reliance of one side over another. Critical to the performance of this subtest is whether the child can easily initiate forward flexion of the neck to start the movement pattern against gravity. Any head lag or compensatory responses such as extending the legs or elevating the legs indicates a problem with initiating flexion. This may be due to weak neck co-contraction, a lack of proximal stability of the shoulders or poor abdominal support. Additionally it is important to identify whether the child relies on one side in an attempt to flex against gravity. If the child leans to a side and appears to struggle with effort such as facial grimace due to straining against gravity, or has difficulty bringing the side initially relied upon into symmetry for coming to stand, then it indicates an imbalance in the use of the two body sides. If the child simply rotates to a side and then smoothly comes to stand it is a motor preference which does not imply disorganization without the presence of undo effort. Keep in mind the need to use one side to prop even if there is no obvious appearance of effort, since in the administration phase of the subtest, the child was shown and then instructed to come up symmetrically.

SUBTEST 5: LONG SIT TO SIDE SIT

This subtest is designed to evaluate the child's ability to use rotational components and the ability to organize bilaterally to cross midline from a symmetrical starting position. The child starts in long sitting and is asked to side sit to each side, always coming back to long sitting before moving into side sit. This movement pattern requires rotation with trunk extension and lower extremity flexion. The child also must shift weight laterally and activate elongation on the weight bearing side and lateral flexion on the opposite side of the trunk.

Children with movement and posture disorganization may have difficulty in the starting position of long sitting. They may tend toward posterior pelvic tilt which will inhibit good rotation and weight shift. They may need to prop with a hand to the surface and they may not easily return to long sitting as a transitional posture, preferring to maintain lower extremity flexion and simply shifting weight side to side. There may also be difficulty in maintaining and alternating trunk elongation and lateral flexion from one side to another.

Disorganized Examples



Key Observations

- Is the starting position symmetrical?
- How is the movement initiated?
- Is the movement symmetrical?
- Does the child maintain good body alignment during movement?
- Is the end position symmetrical?

This movement sequence is initiated from long sitting and requires alternating rotation from one side to the other while grading lateral weight shifts. Note any compensations such as:

- Lateral shifting better to one side.
- Knees flex without full weight shift or rotation.
- Arms flex and shoulders elevate.
- Loses balance to one side or both sides.
- Trunk collapses on the weight bearing side.

Administration

Starting Position: Child starts in long sitting after demonstration.

Command: "Now you do the same thing. Extend your arms and sit with your legs straight. Now sit with both legs to one side and then go back to long sitting and then sit with both legs to the other side."

Starting Position

a.) Does the child start from a symmetrical position? Yes___ No___

If No:

b.) Is the pelvis in posterior tilt? Yes___ No___

c.) Are the legs internally rotated? Right___ Left___

d.) Does the child lean to one side? Right___ Left___

Initiation

a.) Does the child shift easily to the left side, rotate to side sit and maintain good alignment with elongation on the weight bearing side, and lateral flexion on the opposite side? Yes___ No___

If No:

b.) Does the trunk flex forward? Yes___ No___

c.) Does the trunk lean over the hip so the shoulder and hip are not in alignment? Yes___ No___

d.) Do the arms excessively flex and shoulders elevate? Yes___ No___

Transition

a.) Do arms remain extended during side to side shifting? Yes___ No___

If No:

b.) Do the arms excessively flex while rotating? Yes___ No___

c.) Do the hands prop for support to either side? Right___ Left___

d.) Do the shoulders elevate during rotation? Yes___ No___

Final Position

a.) Does the child return to long sitting between each side rotation? Yes___ No___

If No:

b.) Do the legs only partially flex and move side to side without returning to long side? Yes___ No___

c.) Do the legs remain extended as the child shifts side to side? Yes___ No___

Repeat Several Times

Repeat the sequence several times. If the performance becomes more disorganized, it is an indication of significant neuropostural disorganization. If the performance shows initial disorganization and either stays the same or improves slightly, it is an indication of a more mild neuropostural disorganization.

Subtest 5: General Level of Disorganization

Adequate response with no indication of disorganization or difficulty.

Slight indication of disorganization seen in several disorganized criteria initially seen but improving or remaining the same over repeated attempts.

Mild disorganization as identified by presence of a number of disorganized criteria and not substantially improving over repeated attempts.

Significant disorganization as indicated by numerous disorganized criteria and remaining the same or becoming more disorganized over repeated attempts.

Interpretation of Subtest 5

When interpreting the child's performance of **Long Sit to Side Sit**, it is important to observe the key components of elongation, lateral flexion and rotation of the trunk and shoulder girdle. The child should be able to flex the legs and laterally shift weight to the side with forward weight shift over the hip. The trunk should elongate on the weight bearing side and laterally flex on the other side. The arms should remain extended with the trunk and shoulder girdle rotating for counter balance. The pelvis should align in neutral or in slight anterior tilt and laterally tilt with the weight shift.

Children with movement and posture disorganization often show a better ability to one side. They may perform side sitting from a long sit starting posture with good lateral shift and trunk reactions, however, when shifting to the opposite side there may be a need to prop or to eliminate long sitting transition and there is often difficulty maintaining good elongation on the weight bearing side. Some children experience difficulty to both sides due to a poor pelvic starting position of posterior tilt and a tendency to keep the trunk flexed forward which inhibits good lateral shifting and rotational components. If the child has more difficulty to one side, make a note and reference with other subtests to determine if there is a consistent presence of difficulty to a particular side.

IMPLICATIONS FOR TREATMENT PLANNING

A comprehensive treatment program should include a progressive approach of establishing a neuromotor base. In order to provide a child with movement and posture disorganization a chance to succeed, a firm relationship with gravity that supports organized motor planning must be established. Further, the child must be able to refine those skills which are critical to the learning process. These are the functional skills by which children demonstrate, and to a large extent, develop their cognitive abilities.

Once the child has been assessed for movement and posture disorganization by using the subtests included in this assessment, the clinician should carefully consider the child's postural characteristics and movement trends before planning specific intervention activities. By referring back to the interpretation suggestions of each subtest and looking for trends in the child's performance, it should be possible to determine initial treatment priorities.

Generally the goal of physical handling is to facilitate functional control of flexion and extension against gravity combined with functional rotation. Treatment must center around the following parameters.

- Establish alignment of body parts to each other.
- Establish equal distribution of weight.
- Establish graded weight shifts in all directions.
- Establish controlled upper and lower body organization.
- Establish bilateral control throughout movement transitions.
- Establish graded control of flexion, extension, and rotational movement components.

Critical to this approach is the understanding that comprehensive sensory motor organization is dependent on specific facilitation through physical handling. Sensory stimulation is not an integrating force for these complex motor patterns.

Misalignments need to be identified and corrected. The use of techniques for changing tone are effective in reestablish normal body alignment. Establishing normal alignment is the first goal. Without normal alignment other aspects of motor function and control cannot be efficient.

Another important issue is to determine if the child has more difficulty unilaterally. This can be observed initially in the standing alignment if the child tends to take more weight over one side than the other. If this observation is a specific problem it will also be observed in the child's attempt at other movement sequences in the assessment. The child may lean consistently to one side during **Supine to Flexion Hold and Prone Reach**. This type of somatic preference can also be easily observed in **Alternating One Foot Kneel, Kneel Standing to Side Sit, and One Foot Balance**. Obviously a tendency to over rely on one side somatically indicates that the child has more tolerance for proprioceptive weight bearing on one side of the body. This unilateral imbalance in somatic tolerance for weight will influence the internal perception of the body midline and the ability of the child to grade weight shifts across midline from side to side.

Intervention strategies need to include specific guiding of the body weight over the "less" normalized side, first through direct facilitation of weight shifting and then through