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Issues in Cerebral Palsy
Part 1: Physical Handling Assessment
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Learning Outcomes

The Participant Will be able to:

1. Describe the importance of a physical handling assessment.
2. List the major considerations of a physical handling evaluation.

Disclaimer

The information in this article is not a substitution for qualified professional training, it is for educational awareness only. Physical handling requires experience and training. Numerous training courses and seminars are available for therapists interested in physical handling techniques. Treatment requires the consultation and prescription of the child's physician or primary care provider.

Preface

Physical handling is a therapeutic approach that essentially matches the clinician's nervous system to that of the client. Through various key points of control the clinician is able to feel and observe the quality of the child's movement and how the child reacts to subtle changes to shifts in the center of gravity. Additionally, the clinician can feel and observe how the child's posture relates to movement. What compensations the child uses to move and most importantly how the child initiates those compensations. Through various handling techniques it is possible to determine what cues and levels of intermittent support are most successful in achieving a more efficient activation of movement that allows the child to actively initiate improved quality and control of his posture and movement.

Part 1 deals with how to perform a physical handling assessment. Part 2 deals with specific treatment techniques to achieve identified goals. Part 3 deals with promoting functional skills.

Physical handling is a process of restoring dynamic balance to posture and movement. The first and most important step is to establish alignment and promote efficient kinesiological selection of muscle groups to achieve dynamic postural maintenance that supports more normal movement components.

Issues in Cerebral Palsy

Part 1: Physical Handling Assessment

Direct physical handling to determine the child's posture and movement potential and reaction to various types of handling input allows the therapist to actively assess the child's ability to control posture and activate movement. A physical handling assessment provides valuable information to assist the therapist in identifying specific treatment objectives. This form of assessment identifies the child's current level of ability and through the child's reactions to handling uncovers various compensatory habit patterns interfering with efficient motor control. Through a physical handling assessment, the therapist feels and sees how the child tries to move, what interferes with efficient activation of movement, the child's postural alignment and how that alignment contributes to inefficient motor control. A physical handling assessment is a dynamic assessment that demonstrates how the child attempts to control his movement and posture. Developmental assessments may identify areas of dysfunction or delay, however, physical handling assessment identifies the "why" by feeling how the child reacts to specific handling cues and how the child attempts to control his movement and posture. It helps the therapist identify how the child initiates movement, what postural misalignments interfere with that initiation, and how the child tries to compensate for his inefficient postural base. This goes beyond a "level" of developmental assessment. Knowing the "how" and the "why" of a child's movement and posture dysfunction identifies very specific treatment objectives.

The primary purposes of physical handling assessment include:

- Identifying the child's strengths and weaknesses in postural control and movement. What components of posture and movement are present and what compensatory process does the child initiate.
- Finding the point of intervention with the best potential for positive change.
- Assigning priorities for treatment.

Understanding the child's compensatory initiation of movement allows the therapist to identify the most efficient starting point for treatment. The point of intervention will determine the level of success in changing the child's movement potential. Utilizing habit or compensatory patterns to "practice" function will lead to decreasing movement potential, while facilitating more efficient movement components will lead to a greater variety of movement and more efficient function.

A child with neuromotor disorders will use his or her own unique compensatory habit patterns. Their "self-initiated" movement, due to the neuromotor impairment in musculoskeletal organization, utilizes selectivity of muscle groups in abnormal ways, often using the musculature primarily designed for moving limbs for both stability and movement, thus not adequately activating postural stability musculature to support efficient movement. This is why asking or providing "practice" of a function without changing the child's movement and postural base (alignment, activation of more efficient kinesiological selectivity) re-enforces the child's compensations and embeds the abnormal patterns reducing the opportunities for variety and variations of functional movement and success.

Reactions to the physical handling cues will be specific to the child's movement repertoire and how the child reacts will guide the therapist in modifying their cues to determine what is necessary to change the child's movement potential. Different handling cues are required for different types of problems. Children with a lot of high tone or tightness need more deep pressure inhibition and techniques to reduce tightness to allow activation of more normal deep postural stability musculature. This allows for facilitation of active righting and equilibrium reactions and the possibility of more efficient movement of the limbs. Children with low tone require handling cues that provide initial support and active stimulation of muscle groups to increase stability. Once stability is increased intermittent support cues allow for more active postural control and alignment to support limb movement.



Providing initial trunk support and shifting the weight forward with a cue to the thoracic area upward allows the therapist to feel if the child can activate trunk extension with an anterior pelvic adjustment. Once this is determined the therapist uses intermittent support cues to achieve more active responses of the child in controlled mid-range alignment.



It is important to determine mobility of the trunk to the pelvic girdle. Mobility for dynamic adjustment of the pelvis is critical as a base of support for the trunk to activate postural holding in alignment and active trunk extension. Laterally shifting the child allows the therapist to evaluate a number of responses, including pelvic mobility through feeling the ease or difficulty as the pelvis is moved anterior-posterior, the degree of initiation of lateral flexion on the non-weight bearing side, and any activation of elongation on the weight bearing side. Again, intermittent support can be used to determine if the child can initiate responses when positioned properly.



Shifting weight over each leg and foot allows the therapist to evaluate the child's ability to sustain weight over the foot, how the weight is distributed over the foot laterally or medially, degree of difficulty or ease of knee extension, ability to maintain alignment through righting the head-neck, active or passive trunk reactions, and any compensatory elevation of the shoulders.

How the child reacts to shifts of the center of mass over the base of support is critical information. It provides insight into how well the child can adjust and maintain alignment and initiate transitional movements.

Additionally as the therapist changes the COM over the BOS to gauge the degree of resistance or passivity to the change in the center of gravity, the therapist is able to feel if certain muscle groups are inactive or tend to tighten. The general mobility of the shoulder girdle to trunk and trunk to pelvis can be accessed through this process. Indications and determinations for any preparatory soft tissue or joint mobilization can be initially noted.

Shifting the child's weight laterally can help identify how or if the child is able to maintain alignment and what compensatory initiation if any is used. How the weight is distributed and controlled throughout the body can be a clear indication of the child's ability to maintain dynamic positions and what types of physical handling techniques will be most effective in assisting the child to initiate more efficient postural control.

Habit patterns develop from postural alignment. Functional organization of posture improves the quality of any movement that is subsequently initiated. For good quality motor learning, emphasis is placed on the active response of the client. Working for alignment and then evaluating changes in initiation of movement of the limbs, reactions to weight shift, and smoothness in transitional movements, provides key information to the therapist for treatment emphasis.



Specific restrictions can be assessed by determining how easily the soft tissue moves over an area. Soft tissue restrictions can influence structural mobility, particularly over the rib cage which is essential for the ability of the shoulder girdle to maintain alignment and provide mobile-stability for shoulder alignment and limb function.



Therapists trained in cranialsacral treatment may evaluate the child's cranial rhythm and if cranial treatment can be effective in reducing neuromuscular tension and assisting in improving respiration or ocular mobility for better visual function.



Careful assessment of the alignment and mobility of the structures of the feet and tightness in the ability to elongate the hamstrings is important in terms of emphasis for changing or introducing orthotics and other knee extension assists for standing or using walkers.

Specific issues that need investigation during a physical handling assessment.

- **Nature of head-trunk interaction.**

Axial skeletal responses are important to identify for assessing whether flexion and extension are dynamic against gravity, if trunk rotational factors occur only in horizontal positions or also in upright alignment positions, and the use of the limbs.



Physical handling to gauge the mobility of the spine and active trunk rotation in horizontal and vertical planes allows the therapist to feel and observe if there is active rotation, what spinal areas (particularly in the thoracic spine) adapt to rotational cues, and if the head and neck follow the movement. It is important to understand how the child's posture adjusts to changing in axial rotation. Inability of the shoulders to maintain stability with scapular adduction and the thoracic spine to extend and rotate inhibits head righting and active rotational patterns.



Changing positions and providing physical handling cues and support allows the therapist to determine what type of support is required to facilitate a more active response. This helps specify what areas need to be prioritized in treatment.

- **Use of the limbs for support and in movement.**

How the child uses his limbs provides insight into the relationship of the head to trunk and the core stability required to control the limbs in space and for purposeful movement. Physical handling variations can determine if the child's use of the limbs are merely for general movements in space, or if the limbs are volitionally controlled, as well as how the limbs contact objects or a surface, and how or if the child uses the limbs to support weight. It is also important to assess the mobility of the shoulder, how the limbs follow trunk movement and if the body can move over the limbs while in weight bearing.



Determining how to facilitate better upper body support against the surface identifies areas that need attention for activating limb use for body support and how to activate better alignment.

Righting reactions influence postural control through proprioceptive information derived from weight bearing on a supporting surface. The absence of efficient organized responses of head-neck righting reactions, limits the development of postural control. The emphasis that this brings to the interaction of various body parts, and the changes of tone that occur with changes of position, provide an important conceptual basis for treatment planning.

- **Relationship of respiration to movements of the trunk and pelvis.**

The therapist can observe and feel the quality of the child's reactions to physical handling. Laterally displacing the trunk requires the ribcage and therefore respiration, to adapt to various changes in alignment. When there is holding of breath during displacement, or the child's respiration becomes more shallow or interrupted, it is an indication that the ribcage lacks sufficient mobility to align to various trunk positions.

The spine requires mobility to adjust to changes in lateral displacement from one side to the other. The pelvis must also be able to tilt and adjust to changes in weight bearing to provide a base of support that allows the trunk to orient laterally without collapse. By changing the degree and excursion of lateral placement, and varying the degree and amount of support provided to the child, the therapist is able to assess these interactions and determine specific areas of treatment that need to be prioritized.



Any pelvic tightness or lack of active adjust to lateral displacement, and what type of handling cues can provide more mobility and activation of pelvic adaptability can be determined through changes in lateral displacement, level of support required and types of cues needed. The head-neck, trunk, shoulder girdle and pelvis must be able to achieve dynamic interaction for maintaining alignment to allow activation of efficient movement. Feeling where the first restriction or compensation occurs is key to understanding specific blocks to efficient initiation of transitional movements and dynamic interaction of the upper body.

In the presence of trunk weakness or lack of active support against gravity, it is common to observe increased tension in the limbs. in a compensatory attempt to provide central stability and take over the functions of the trunk. Limb tension typically increases with increased attempts to move and is often correlated with inadequate respiratory patterns.



Changing the center of gravity by moving the child laterally side to side provides the opportunity to observe how the child adapts to various

alignments of the trunk. In cases where there is a lack of core stability there is a jerkiness to the movement and the shoulders and arms may increase in tightness. The pelvis may not adapt to the movement further causing the upper body to compensate by tightening. In children with low tone there is often a collapse of the trunk in the direction of the movement. Where the child loses control is important. Is it at initiation of the movement or somewhere within the movement sequence. If dynamic alignment cannot be maintained, there can be no efficient activation of righting reactions or smooth movement transitions.

It is often more difficult for the central nervous system to resolve slight differences in the control of the two sides of the trunk, than marked differences. Difficulties of the trunk to integrate both sides of the body result in compensatory postural alignment and therefore inefficient movement potentials. This also results in a lack of control of the vertical midline and interrupts the smooth ability to control lateral weight shifts.



In a seated position with the legs out of weight bearing, differences in trunk reactions to changes in the center of mass over the base of support can be identified. In addition the therapist is able to feel reactions of the legs to trunk displacement. Increased tension in the legs limits pelvic adaptation.

- **The interaction of posture and vision**

Forward and backward shifts of the body over the base of support is closely related to visual processing since spatial relationships change from closer to further away.

Problems in visual acuity or the ability of the eyes to maintain control over divergence and convergence may inhibit body reactions and cause compensatory holding or posturing of the head-neck and shoulder girdle due to visual disorganization in space.



The therapist is able to feel resistance to certain spatial orientations in order to maintain a particular orientation of the eyes the child has developed to maintain binocularity to a target or visual orientation in space.

Understanding the multiple factors interfering with postural control is the essence of a physical handling assessment and is critical to developing an effective intervention strategy.

- **Identifying any tissue restrictions.**

A key finding in assessment is whether there are any soft tissue restrictions that inhibit adaption of dynamic posture and movement, particularly in the neck, ribcage and pelvis.

Restrictions in musculature of the pelvis will limit the degree and elongation of the trunk musculature necessary to support lateral weight shifts. To maintain dynamic postural control the trunk must actively elongate on the weight bearing side and lateral flexion on the opposite side. Failure of the pelvis to adapt to lateral tilts results in the trunk leaning or collapsing to shifts in the center of gravity.

Dynamic qualities of trunk movement must be considered in light of what is happening with respiration. Immobility in the tissues of the ribcage will inhibit the alignment of the shoulders as well as the ability of the trunk to elongate.

Restrictions in the neck and asymmetry of the neck musculature inhibit head righting and therefore trunk adaption, along with misalignment of the shoulder girdle. Asymmetry of alignment will result in compensatory activation of selective muscle control. A priority of treatment will always be to establish dynamic alignment to allow efficient activation of movement.



The relationship of the cervical and lumbar curves is anatomically important and translates clinically to common compensatory patterns. In the presence of soft tissue restrictions in the neck and thoracic inlet or the base of the neck, the low back compensates for a lack of trunk activation, due to the lack of cervical-thoracic adjustments. This results in avoidance of alignments that require elongation of the upper thoracic and cervical areas affected by tissue restrictions.



A lack of mobility in the pelvis limits the opportunity for the upper trunk to develop active control in postural transitions.



Placing the child in a supported upright position on the elbows, restrictions in the shoulder and neck to very slight movement can be felt. Assisting slight movement of the shoulders in this alignment can decrease the tightness in the neck and the arms as ease of proximal over distal movement increases. This is a precursor to achieving pushing up in sitting with weight supported by the hands, as well as preparing the shoulders to adapt to vertical trunk rotation while weight bearing over one hand.

Interactive patterns of the neck, shoulder girdle and pelvis must be carefully checked and any identified soft tissue restrictions need to be addressed as a preparation to more dynamic treatment.

- **Respiration adaptation to movement.**

Respiration must adapt and support movement of the body. When automatic respiratory patterns briefly halt or are interrupted during postural shifts, it is an indication that postural shifts will not be voluntarily initiated in ranges that compromise respiratory rhythm. Compensations in both postural alignment and speed and quality of movement will develop. Assistance must be given to organized respiratory-postural control.



Improvement of the respiratory pattern is best accomplished in anti-gravity alignments. Elongation of the trunk with movement of the trunk over the pelvis in small ranges helps the child make the respiratory adaptation to various postural alignments. The therapist can "feel" changes in respiration and a gradual organization of respiration to movement.

- **Dissociation of movement.**

For organized movement to take place, particularly in rotational transitional patterns, there must be graded dissociation of the trunk, pelvis, and shoulder girdle. Dissociation of movement of parts of the body in an organized fashion grades the amount, quality, and interrelationship of flexion, extension, and rotation. These organized and graded components of movement allow for dynamic maintenance of alignment as well as, stability and mobility required to support and perform functional patterns.



Placing a hand under the pelvis, ribcage or shoulder and initiating a rotational movement allows the therapist to assess the degree of dissociation of movement. The therapist can determine any tension or tightness to being moved or whether there is a lack of tone and the degree of passivity. It is important to determine if the child initiates any control or increase in stability to support the movement and whether the child follows with the head once the transitional movement is passively begun.



Maintaining control of one body part while shifting the child's center of gravity reveals how the uncontrolled areas respond. Maintaining control of the pelvis and lower extremities allows more specific observation of trunk reactions. How the trunk responds, whether collapsing or whether there is increased tension with shoulder elevation for compensatory stability will

indicate areas requiring more activation and strength or more reduction in tone and mobility.



Stabilizing the child in sitting while maintaining the arms and shoulders in alignment allows observation of how the head and neck react to a stable alignment.



Elevating the leg in extension with the child is in prone, while moving the pelvis anterior-posterior, allows the therapist to gauge the degree of mobility or immobility of dissociation of the pelvis to the leg and trunk, as well as the degree of elongation of the hamstrings that is available.

A physical handling assessment is a multi-dimensional approach to discovering the interrelationships of posture and movement and how alignment and compensatory postural tone inhibit the development of efficient sensorimotor function. It is specific to each individual. It is important to realize that regardless of whether children have the exact same diagnosis, the degree of disability, distribution of tone, inter-relationships of movement to posture, dissociation of body parts, selective kinesiology, potential for movement and activation, and habit patterns are unique to each client. The responses to handling are also unique and therefore treatment cannot be a simplistic or uniform protocol based only on diagnosis.

The reactions of the client are in direct response to the input provided by the clinician. This input through physical handling allows the clinician to discover what types input and handling will be most successful in achieving more potential for positive change in the client.

Physical handling is an important step in understanding an individual child's movement potential and problems. There are no shortcuts to a firm understanding of normal movement components and the necessary experience and training for handling children with neuromotor disorders. Physical handling provides insight into how the child moves, how the child initiates movement, how alignment and habit patterns interfere with movement and most importantly what type of handling cues and techniques are most effective in helping the child develop more efficient movement patterns and therefore more independent function.

**Physical Handling Assessment Demonstration: Garrett age 9.
Diagnosis of Spastic Cerebral Palsy.**

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**Physical Handling Assessment Demonstration: Sara age 5.
Diagnosis of Low Tone Cerebral Palsy.**

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**Physical Handling Assessment Demonstration: Sebastian age 5.
Diagnosis of Athetoid Cerebral Palsy.**

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These are the verification exam questions to be answered when you click on Take Exam. For ease of completion select your answers prior to clicking on Take Exam.

Issues in Cerebral Palsy Part 1: Physical Handling Assessment

CEU Verification Exam

1. Children with low tone require handling cues that provide initial support and active stimulation of muscle groups to increase stability.
 - a. True
 - b. False

2. When automatic respiratory patterns briefly halt or are interrupted during postural shifts, it is an indication that postural shifts will not be voluntarily initiated.

- a. True
- b. False

3. Input through physical handling allows the clinician to discover what types of handling will be most successful in achieving more potential for positive change in the client.

- a. True
- b. False

4. Maintaining control of one body part while shifting the child's center of gravity has no influence on other body movements.

- a. True
- b. False

5. Dissociation of movement of parts of the body grades the amount, quality, and interrelationship of flexion, extension, and rotation.

- a. True
- b. False

6. Restrictions in musculature of the pelvis allows more freedom of movement and elongation of the trunk musculature.

- a. True
- b. False

7. Problems in visual acuity or the ability of the eyes to maintain control over divergence and convergence may inhibit body reactions and cause compensatory holding or posturing.

- a. True
- b. False

8. In the presence of trunk weakness or lack of active support against gravity, it is common to observe increased tension in the limbs.

- a. True
- b. False

9. How the weight is distributed and controlled throughout the body can be a clear indication of the child's ability to initiate and maintain dynamic positioning.

- a. True
- b. False

10. Asking or providing "practice" of a function without changing the child's movement and postural base re-enforces the child's compensations and embeds the abnormal patterns.

- a. True
- b. False