

CLINICIAN'S CORNER 

My Middle Eastern Touch

By Nargis Khan Das, PT, C/NDT

The idea of leaving my country behind and moving to a new place always appealed to me. But when my husband told me that we were leaving Mumbai, India (an absolute hub for pediatric physiotherapists), and moving to Muscat, Oman (where the majority of therapists still do passive techniques for pediatrics), I must admit that I had mixed emotions.

My initial struggle was to find a job, not just any job but a center or institute that catered to the pediatric population. There were times when everyone was telling me to take up any PT job that came my way, but my strong determination to do only pediatrics bore its fruits, and I got a job as a pediatric therapist in a rehabilitation center.

I was the first NDT certified therapist in that center (probably in the entire city of Muscat), and I was so proud of it, although no one there knew the importance of this feat. When I would excitedly talk to my employers about the various things we could do, various changes that I felt needed to be *(continued on page 23)*

Challenges and Opportunities

USING THE NDT FRAMEWORK FOR PATIENTS WITH SEVERE INVOLVEMENT

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INTRODUCTION

In today's healthcare environment, many caregivers are challenged *to do more with less*. Patients presenting for rehabilitation services are sicker and expected to complete services and return home more quickly than in years past, and healthcare facilities are challenged to show excellent outcomes in shorter amounts of time. This time frame is especially difficult when evidence suggests that rest is an important factor in the recovery of those with neuropathology.¹ Today's clinicians need to be goal directed and knowledgeable about the various sequelae that follow many different neurological diagnoses. In the case of the patient who is severely involved, this is exceptionally challenging.

DEFINING SEVERELY INVOLVED

How is an individual with neurological pathology identified as severely involved? In healthcare today, there are many different stakeholders who approach the issue of severity from vastly different vantage points. For the patient, severely involved may mean

a significant change in the roles played in his or her community, family, or workplace. For the care partner, this may be determined by the hours and intensity of physical and / or cognitive assistance required to safely bring a loved one back home after a long hospitalization. For the employer, this may refer to the individual's ability to return to a previous position, fulfilling all job requirements. For the insurer, the tools used to measure severe involvement may vary depending on multiple factors such as age, employment status, and covered services. For the ancillary staff providing intervention to the patient, severe involvement may refer to the size, location, and etiology of the neurological event, the time since the onset of the event, or the number of people or amount of assistance needed to care for the individual. For those who work in healthcare, having an understanding of each of these varying viewpoints helps to construct a complete picture of the individual and his or her specific needs.

Patients with multiple *(continued on page 8)*

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system impairments present an overwhelming challenge to even the highly skilled therapist. The problems seem countless, and they occur in many different systems. Often, the high acuity of these patients leads to greater caregiver burden with a resultant increase in the resources necessary to provide adequate care when compared to their peers with single system impairments. These patients with severe involvement also demonstrate a need for increased assistance for basic functional daily living skills as measured by the FIM (Functional Independence Measure).^{2,3}

For the purpose of this article, the term severely impaired will refer to patients who demonstrate impairments in multiple body systems. As length of stay and the number of authorized therapy visits continue to decrease, clinicians are challenged to quickly deduce underlying impairments, prioritize the most crucial impairments, and work toward the greatest functional improvement in the shortest amount of time.

NDT AS A GUIDE

The NDT approach is a particularly effective way to manage this challenge, especially for those with severe involvement, since it guides the clinician in a comprehensive problem-solving and clinical decision-making process leading to development of a very specific treatment program for each individual served.^{4,5}

Recently the NDTA Instructor's Group published a definition to help clinicians better understand the clinical foundation and framework of this approach (*see inset*).

CONSIDER THIS BRIEF CASE STUDY

In order to provide examples of the benefit of using NDT to manage the individual who is severely involved, we will consider the example of DK. She is an adventurous young woman in

her 40s who was hit by a car, sustaining a traumatic brain injury as she was riding her bicycle across the United States on one of her many exciting ventures. She had been through acute care and a short stay at a transitional facility and had just been admitted to the inpatient rehabilitation brain injury unit. She was relatively medically stable at this point but had severe motor, sensory, perceptual, and cognitive deficits.

THE NDT/BOBATH (NEURO-DEVELOPMENTAL TREATMENT/BOBATH) APPROACH

NDT is a holistic and interdisciplinary clinical practice model informed by current research and evolving research that emphasizes individualized therapeutic handling based on movement analysis for habilitation and rehabilitation of individuals with neurological pathophysiology. Using the ICF model, the therapist applies a problem-solving approach to assess activity and participation to identify and prioritize relevant integrities and impairments as a basis for the establishment of achievable outcomes with clients and caregivers. An in-depth understanding of typical and atypical development, and expertise in analysis of postural control, movement, activity, and participation throughout the lifespan, form the basis for examination, evaluation, and intervention. Therapeutic handling, used during evaluation and intervention, consists of a dynamic reciprocal interaction between the client and the therapist for activation of optimal sensorimotor processing, task performance, and skill acquisition for achievement of participation in meaningful activities.⁶

NDT ASSESSMENT

The First Step. The NDT assessment process begins, as does any assessment, with a detailed medical record review to gather pertinent medical information. It is important for the clinician to be a wise investigator, understanding the neuropathology and its clinical presentations. Care must be taken to know precautions for each patient — lines, leads, drains, swallowing status, positional restrictions — since all factor in to the physical assessment and eventually to the plan of care for the patient. Whenever possible, talking with other care team members (nurses, physicians, team members from other disciplines, and the patient's family and friends) can provide valuable information, especially when the patient is unable to speak for him or herself. This information can guide the therapist to develop a comprehensive picture regarding the patient's roles, likes, dislikes, interests, and recovery to date, which are important in designing a very specific treatment plan. Essential to development of an effective treatment plan based on NDT is an understanding of the goals of the individual and of those who are important to him or her.

Therapists using the NDT approach begin to pay close attention to *contextual factors*,⁷ (environmental and personal factors that impact the individual). These factors may not be able to be significantly altered, but will impact the development of the treatment plan and the overall outcome. Contextual

factors that may be learned through the records review include such things as cultural preferences, level of education, support system, work history, and similar information.

In reviewing the medical record, the team learned that DK had been relatively healthy until the accident and had been physically very active. In addition, she had a PhD, spoke a number of languages, and had lived in several different countries. Although she had not been living near her family, she did have family members who were concerned and involved, even though they lived several hours away.

Gathering Information through Observation and Handling.

As soon as the clinician makes visual contact with the patient, the physical assessment process begins. The NDT clinician has specialized training in recognizing typical movement and in understanding the development of atypical movements after a neurological event. Skilled clinical observations of the patient’s position in bed or chair, level of arousal or attention to surroundings, and random or purposeful activity of head/neck/trunk/extremities in different situations all help to begin identification of preferred and possible postures and movements, abilities, and limitations.

The NDT assessment also includes therapeutic handling to gather information regarding the patient’s posture and movement strategies and to rule in / rule out the possible role of impairments in various systems. It is here that the clinician begins to compare what is observed to what is being felt. Through handling, the clinician determines areas where there are excessive muscle activation, joint tightness, active resistance to a particular direction of weight shift, muscle inactivity, etc. This assessment is guided by the clinician’s awareness of the relevance of these movement components to the patient’s current and previous level of function.

Understanding the dynamic interplay between the various segments of the body helps a clinician be very directed in his or her qualitative movement analysis. A thorough investigation of a patient’s ability to sustain a posture as well as produce movement sequences is critical to the assessment process. This assessment includes various transitional movements that occur during functional activities that are important or meaningful for the patient in his or her daily life. The patient who is severely involved requires a methodical approach to movement analysis, directed by a thorough understanding of movement components that are necessary for specific functions, to determine

trends or patterns of movement that are either effective or ineffective for potential activity and participation goals.

On initial observation, DK was seen to be moving constantly without specific purpose. She was in a tilt-in-space wheelchair, leaning forward, and frequently calling out. On further observation, it was noted that DK moved her right extremities but not her left and usually had her head turned to the right. During the transition from wheelchair to mat, although she was slim, she required maximal assist due to using only her right side, having little postural control, and being very impulsive. She demonstrated awareness of the transfer (demonstrating some cognitive ability) by reaching toward the mat with her right hand but did not seem aware of her lack of control of balance during the transfer.

The patient who is severely involved often appears overwhelming to the clinician because many impairments are simultaneously present in multiple body systems. To determine areas of strength and impairment as well as to organize and prioritize clinical findings obtained during assessment, the NDT therapist uses a systematic process based on the systems approach framework.⁸ While everything matters during the search to understand the *whole* person, the NDT trained clinician now begins to critically analyze. “So, what *really* matters?” to this patient at this time in order to facilitate the most significant functional gains. The clinician uses this active problem-solving to identify the most significant underlying strengths and impairments that are affecting the patient’s movement and function. This process guides the design of an effective treatment intervention that will direct the clinician



PHOTO 1: DK and her PT perform an assisted transfer to the mat table.

Challenges and Opportunities (continued)

to address the patient’s relevant impairments without being overwhelmed by a long list of problems within multiple body systems.

In order to understand DK’s movement (*how* she moves), the team members continued to make observations in order to determine specific system strengths and impairments (*why* she moves the way she does). Some of their observations included:

- DK was difficult to direct, but could move. When moving, she tended to use only the right extremities and ignore the left, even to the point of failing to protect the left arm when performing transitions.
- She led with her right side and appeared to have adequate strength to control that side of her body.
- She moved a lot but did not sustain muscle activation; she was almost always moving.
- She appeared to have some control of her dynamic posture in some positions and transitions, but was often incorrect in control of her mass over her base of support as she moved in and out of positions with assistance.

Since she was relatively mobile, a variety of movements, positions, and transitions were able to be assessed.

The team initially focused on DK’s global strengths and impairments. DK demonstrated impairments in the following systems: sensory, perceptual, neuromotor, social-emotional, and cognitive. The integumentary system (healing head wound) and urogenital system (incontinence) were also impaired. At this point in time, her



PHOTO 2: DK is determined to lie down and is aware of the position of the pillow (although not aware of her position on the mat). In addition to not using her left upper extremity to assist, she demonstrates lack of awareness of its position.



PHOTO 3: After an initial failed attempt to facilitate DK into a hands and knees position (transitioning over the left side in order to attempt to elicit automatic responses), DK rested for a moment then began to initiate the transition herself, although in an unsafe manner. Therapists attempted to control her impulsivity and help her learn better management of her body over her limbs during the transition.



PHOTO 4: DK was assisted to shift her body back over her knees, and her trunk was supported so that her left UE could have the feedback of touching the mat, although it was not aligned well enough for the therapists to allow it to begin to support weight. By this time, DK had become distracted by the pillow, and was impulsively attempting to lie down without regard for her balance or the position of her left extremities, so she was quickly and safely lowered onto her right side.

cardiovascular and respiratory systems were adequate for her current function. Her musculoskeletal system was also adequate — muscle length, joint motion, etc. were adequate, and she had not sustained any fractures in the accident. The decreased activation on the left was felt, at this point, to be primarily a neuromotor system impairment versus a problem related to the muscles themselves (e.g. atrophy and other secondary impairments).

The team then continued to observe and feel DK’s movements in order to begin to determine specific strengths and impairments within the systems that were most significantly involved. Some of their initial determinations are summarized in Table 1.

Pain can be a multisystem impairment, since initially its underlying cause is not known. Some initial hypotheses regarding the source of DK’s left upper extremity (LUE) pain included:

- disturbance of the sensory system causing “sensory pain” and hypersensitivity
- mechanical pain from malalignment of musculoskeletal structures
- cognitive impairment involving attention and perseveration to “something wrong” with her arm
- soft tissue pain from lying on it, having it in awkward or prolonged positions, etc. secondary to her sensory deficit

For DK, the initial hypothesis was that the primary underlying cause was sensory, with some possible secondary involvement of the musculoskeletal system. This theory would continue to be investigated and revised as treatment

TABLE 1. BODY SYSTEMS OBSERVATIONS AND HANDLING ASSESSMENT

STRENGTHS	IMPAIRMENTS
<p style="text-align: center;">NEUROMOTOR SYSTEM</p> <p>Ability to activate right side of body</p> <p style="padding-left: 40px;">Some trunk control</p> <p>Overall lots of movement present</p>	<p style="text-align: center;">NEUROMOTOR SYSTEM</p> <p>Little to no movement of LUE</p> <p style="padding-left: 40px;">Decreased control of LLE</p> <p>Does not sustain activation of muscle groups in tasks where this ability is necessary (e.g. transfer)</p> <p>Faulty timing and sequencing of muscle activity during performance of functional tasks</p> <p style="padding-left: 40px;">Faulty interlimb coordination</p>
<p style="text-align: center;">SENSORY PERCEPTUAL SYSTEM</p> <p>Appears to have sensation on right side</p> <p style="padding-left: 40px;">Apparently could see to the right side (demonstrated during functional activities)</p>	<p style="text-align: center;">SENSORY PERCEPTUAL SYSTEM</p> <p>Apparent visual deficit - eyes closed much of the time, did not look to left (visual vs. perceptual deficit?)</p> <p style="padding-left: 40px;">Inattention to left side of body and of environment</p> <p style="padding-left: 40px;">Decreased sensation left extremities</p>
<p style="text-align: center;">COGNITIVE SYSTEM</p> <p style="padding-left: 40px;">Arousal</p> <p style="padding-left: 40px;">Language Skills</p> <p style="padding-left: 40px;">Intellect</p> <p>Some insight / Intellectual awareness</p> <p style="padding-left: 40px;">Does follow some commands</p>	<p style="text-align: center;">COGNITIVE SYSTEM</p> <p>Decreased focused attention</p> <p style="padding-left: 40px;">Impulsivity</p> <p style="padding-left: 40px;">Distractibility</p> <p style="padding-left: 40px;">Perseveration</p> <p style="padding-left: 40px;">Restlessness / Agitation</p> <p style="padding-left: 40px;">Memory deficit</p>

progressed. The rationale for going through this process of hypothesizing is that each of the single system impairments listed above (in relation to DK’s pain) would be addressed differently in treatment and management.

The process of developing hypotheses is an important part of the NDT problem-solving process. Many of the impairments listed in the chart above will require further and ongoing assessment, both to identify more details about the impairment (e.g. DK’s apparent visual impairment that was not able to be tested further at this point due to her limited ability to follow directions) and to develop a better sense of how significant the impairment is to her function (e.g. is her memory somewhat

impaired or severely impaired, and how will this affect the treatment plan).

In addition to the chart review, interview of vested care partners, skilled observation, and movement analysis, the clinician may opt to also utilize objective tests for further data to support the need for ancillary services and to provide an objective measure of improvement over time. There are multiple objective scales that may be useful, depending on the presentation of the patient. Discussion of specific details of outcome measures is beyond the scope of this article.

At this point DK demonstrated characteristics of Rancho Level IV (confused, agitated response).^{9,10} Since DK was in an

Challenges and Opportunities (continued)

inpatient rehabilitation facility, she was evaluated using the FIM.^{2,3} She was also evaluated using the JFK Coma Recovery Scale – Revised.¹¹

Sorting Out the Details While Staying Focused on the Big Picture. The NDT trained clinician now has a great deal of information to assimilate. “Using the ICF model, the therapist applies a problem-solving approach to assess activity and participation to identify and prioritize relevant integrities and impairments as a basis for the establishment of achievable outcomes with clients and caregivers.”⁶ Every system is important to the overall functioning of the individual, and every one system has bearing on every other system. Therefore, literally, to quote Thelen and Smith, “everything matters.”¹²

NDT INTERVENTION

Keeping the Goals Functional and Meaningful. Identifying tasks that are relevant to the patient is key to maximizing the patient’s participation and motivation in the rehabilitation process in order to ultimately enhance his or her functional abilities. The patient’s needs, desires, current abilities, and limitations form the basis for creation of all treatment strategies by the NDT trained clinician. This focus ensures that treatment activities are meaningful and that individual functional goals are addressed and hopefully met.

DK was motivated to move, and she frequently cried and complained of discomfort, primarily in her left arm. Her attention span was only seconds long, so that her ability to retain and follow through with instructions (e.g. find your left arm before you move) was very limited. In addition, her short and



PHOTO 5: DK’s arm over the therapist’s shoulder was her choice, and it was decided that changing it to a less supportive form of control was certainly possible and preferred at this point, but since it was not the primary goal and would be likely to cause a distraction, it was not changed. The therapist decided that the priority should be teaching DK to transfer weight correctly over her base of support. Emphasis in handling was placed on alignment of the body over the base of support and transition of weight forward and diagonally over each foot. DK was assisted when needed to move her left leg forward (to focus DK’s attention on walking without stopping and starting), and the therapist was prepared to stabilize the left knee if necessary. Input to the left hip and knee for better extension in stance would have been desirable, but DK was restless and somewhat agitated, so handling cues were kept relatively constant to provide consistent sensory input. Placement of hands for providing cues did not change, although amount and direction of pressure was varied as needed to achieve the desired facilitation of weight shift.



PHOTO 6: Later in the short walk (about 15 feet), DK was assisted more but allowed to keep going without excessive additional input even though the quality of her walking was deteriorating. At this point, addressing her emotional and cognitive systems took priority, and she was allowed to complete the walk and congratulated on her progress.

long term memory were significantly impaired, so frequent changes in activity were one way in which the team attempted to address her current needs (i.e. short attention span, perseveration). The team worked closely together to find different activities to engage her throughout the day. In addition, they followed her behavior management plan and addressed her cognitive deficits by keeping instructions consistent and simple. She was often near the nurse’s station where the nurses and anyone passing by could engage her in conversation or activities to help redirect her. She could occasionally understand that small activities (e.g. standing) would help her to achieve a bigger goal (e.g. walking) but due to her limited attention span, memory, and insight, interventions to address such goals often needed to be immediate to capitalize on her intrinsic motivation to walk.

Setting the Right Demand and Therapy Intensity to Get the Best Outcomes. It is crucial to create the *just right* challenge for each patient. The challenge needs to be difficult enough to foster a change in a patient’s motor behavior, but not so difficult that the patient cannot succeed. For example, for a client with poor sitting balance due to the neuromotor, sensory-perceptual, and cognitive impairments, a treatment strategy that involves sitting on the edge of the bed may need to be designed to address one primary impairment at a time. The individual could be asked to look at pictures of specific family members by name but may need to be supported in sitting (decreasing effort of the neuromotor system) while attention is drawn to the cognitive and perceptual aspects of the

task. For this individual, the *just right* challenge at this point is limited to addressing only one or two primary impairments.

In facilitating walking with DK early on, many decisions were made regarding how to assist her safely, how many movement components to address either verbally or with facilitation, what kind of verbal commands to give, what kind of errors to allow, etc. These decisions relate to the multiple systems that were impaired and to the ongoing decisions of the therapists regarding what the *just right* level of challenge for her was at that point (physically, cognitively, perceptually, and emotionally). For the patient with severe involvement, treatment strategies must be modified on a second-to-second basis to best meet the individual's needs. See examples in photos 5-6.

Building on Strengths. NDT has incorporated, from the very beginning, a strong philosophy of building on the individual's strengths. While this philosophy is now a part of every therapist's best practice, the NDT trained clinician incorporates this concept into every moment of interaction with the patient. After the initial assessment, which produces an almost incredible amount of detail regarding strengths and impairments in multiple systems, it may be helpful for the therapist to step back and review the big picture as he or she begins to design treatment strategies.

In DK's case, systems that were relatively strong that could be used to the team's advantage included her ability to communicate, her overall flexibility and mobility (musculoskeletal system), and her cardiovascular and respiratory systems' stability. Sensory-perceptual system involvement was severe, and neuromotor system involvement was severe on the left but a relative strength on the right. A visual representation such as the graphs shown in Figure 1 and Figure 2 might help the team stay on track and prioritize to address the most significant impairments and also to remember to use the relatively stronger systems to assist with achievement of goals and outcomes. One notices initially (*Figure 1*) that there are some systems that have a lot of problems, but when one views the reverse graph (*Figure 2*), the strengths become apparent.

As an example of application of this concept, a primary goal for DK was to involve her left side in activities and provide graded sensory stimulation to address her significant sensory-perceptual impairments. Treatment strategies that were designed included facilitated rolling onto her left side and sitting with facilitated weight shift onto the left hip while guiding the left

FIGURE 1: RELATIVE IMPAIRMENTS IN SYSTEMS

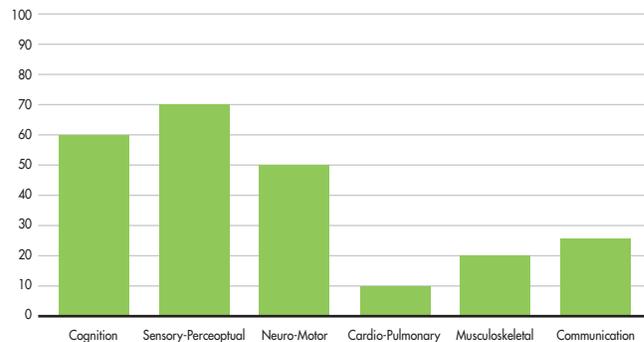
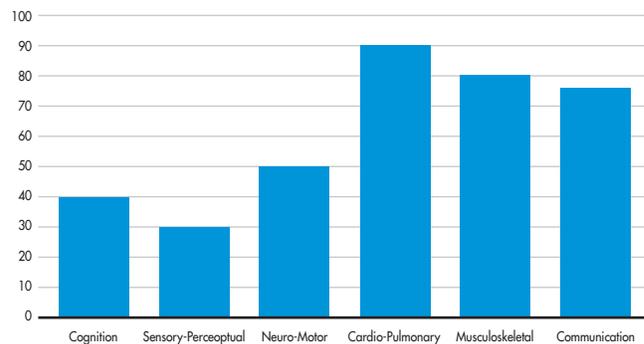


FIGURE 2: RELATIVE STRENGTHS IN SYSTEMS



hand, (with the LUE in good alignment) to slide out to the side on the mat and back to her side. These activities were uncomfortable for DK due to the irritability of her sensory system, but the therapists recognized that DK loved to talk and had a vast amount of knowledge in many areas. It was discovered (somewhat by accident!) that engaging DK in conversation and asking questions distracted her so that she could tolerate necessary movements and stimulation much longer than if her attention was focused directly on the movements. The therapist had a difficult time keeping up with her conversation due to DK's vast experience and knowledge. What was even more amazing was that during one of these activities, in spite of her distractibility and continued crying while she talked, DK said to the therapist, "Keep asking me questions, it helps!" Patients, even those with severe involvement, can offer strong insights into their own experiences.

Treatment strategies can be designed to address one or more impairments but will be most successful if they also incorporate making the most of system strengths. In addition, singling out any one system for direct treatment may not lead to significant

Challenges and Opportunities (continued)

change, but a focus by all disciplines on the systems that are most significantly impaired may speed up progress toward functional goals of all disciplines.

Integrating the Task, Environment, and Individual in Development of a Treatment Strategy. The clinician needs to consider the task, the environment, and the individual in each treatment intervention. Varying even a part of any one of these components changes the strategy and the possible outcome, offering a vast array of possibilities for grading an activity to make it easier or more difficult as needed for that patient in that particular moment. By modifying the complexity of the task and environment (within a session or across multiple sessions), treatment strategies can focus on addressing just a few selected primary impairments or address multiple impairments within different body systems simultaneously based on the patient's needs and response to treatment. For example, a more advanced patient may perform a sorting task in which he must identify various categories of kitchen items (cognition) and place them in correct locations in cabinets above and below waist height (visual, neuromotor, and sensory-perceptual systems). The clinician then uses this concept to effectively and efficiently link multiple systems and to advance treatment strategies, working toward restoration of function.

Goals. In this case study, the initial photos depict two physical therapists working together to help DK safely transition from one position to another and attempt to walk. Walking and moving were motivating to DK in the early stages of her recovery; therefore, those functional activities were not only key to DK's participation in her rehabilitation process, but were also critical for her return to independent mobility.

Given the severity of DK's cognitive, sensory, perceptual, and neuromotor system deficits, her OT and SLP also developed goals for self-care, communication, social interaction, memory, and safety. DK's interdisciplinary team worked closely together to integrate her cognitive, perceptual, and motor abilities during familiar activities. This team work allowed truly meaningful repetition that included practice with slight variety in treatment activities developed by all three disciplines to reinforce DK's strengths while also addressing her impairments. As DK was able to attend for greater periods of time and showed greater awareness of her situation, she was better able to move safely through transitions

and move through her perceived discomfort on her left side. Over a brief period of time, DK showed significant progress as demonstrated by post treatment photos 7-13.

Although the FIM format is usually used in inpatient rehabilitation, an important aspect of the NDT approach involves understanding the individual's underlying specific system impairments and addressing them directly in order to achieve the functional activity goals. Listed below are sample one week goals developed by each discipline, along with the therapist's understanding of how these goals would be achieved through addressing the individual systems.

PT: DK will safely perform all basic transfers with moderate assist of one (due to improved motor control and the ability to sustain her posture for 30-60 seconds at a time, increased awareness of her position in space, and ability to sustain attention for one to two minutes).

OT: DK will put on her pullover T-shirt while sitting in her wheelchair in ≤ 5 minutes with occasional minimal assist (due to her improved attention to familiar functional task, ability to sustain sitting posture with her back away from the back of the chair for 30-60 seconds at a time, and improved proprioceptive awareness of her left arm).

Speech: DK will sustain her attention for 1-2 minutes during a social exchange with a friend with minimal cueing for redirection / topic maintenance (due to improved attention, improved emergent awareness, and decreased impulsivity).

This case study illustrates the team's use of the NDT problem-solving approach in a patient with involvement of many systems. Prioritization of systems and functional needs, and awareness of system strengths and functional abilities lead to the development of a comprehensive treatment plan. The dynamics and the shared focus of the care team helped to establish the foundation for improved pre-functional and functional activity and participation.

FURTHER FOLLOW-UP OF DK

DK successfully completed her inpatient rehabilitation stay and was transferred to a transitional inpatient facility closer to her family's home after five weeks. Plans were for her to complete the transitional program, possibly progressing to a day treatment program that included vocational rehabilitation so that she could eventually transition to her independent lifestyle.



PHOTO 7: DK demonstrates how she can move her arm 5 weeks later. In addition to the obvious improvement in her left arm, consider the improvement not only in the individual systems that were addressed but also in the integration of those systems. She demonstrates improved postural control, awareness of midline, attention to her left, and visual guidance of her left arm as she raises it.

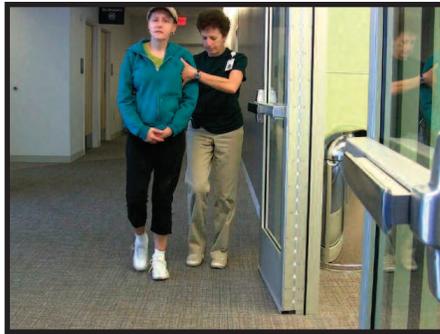


PHOTO 10: DK was now able to walk with minimal assist, demonstrating improved postural control and balance. During this walk, intermittent facilitation was provided from the rib cage for correct management of her mass over her feet as she walked. DK had chosen to hold her left hand with her right, again indicating greater awareness of that extremity.



PHOTO 12: The previous strategy was successful, but the therapist felt that adding an even greater demand would result in increased activation in the pelvis, left arm, and trunk as long as DK did not respond to the demand with compensatory movements. In addition, the reach with the right arm, now in an upward direction, was designed to increase activation of the lateral trunk flexors on her left to further address her asymmetrical trunk activation.



PHOTO 8: Here, DK spontaneously uses her LUE to assist with scooting forward on the mat, demonstrating not only that she can move it and activate it, but also that her attention to and awareness of the position and movement of her left arm has greatly improved.

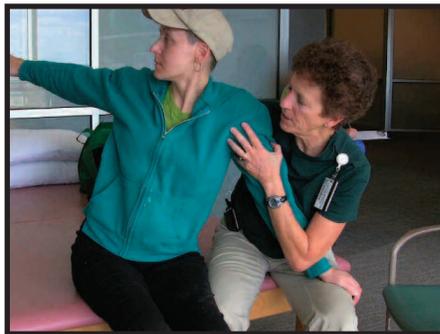


PHOTO 11: DK continues to work on the postural control she needs for effective activation and movement of her left arm. She still tended to have inadequate alignment and activation of the muscles of her left hip, which caused her to have difficulty activating her left arm. She had developed asymmetry in her trunk with rotation of her ribs backward on that side. This weight-bearing treatment strategy involves activation of her left hip and trunk with the ability to realign the shoulder girdle complex more effectively on the rib cage for better activation. The weight shift to the left and the reach and turn with the right arm and head added demand to the strategy for optimal activation.



PHOTO 13: Another way to increase the demand on DK's left arm in preparation for her to use it for an activity such as sit to stand (or to facilitate muscle activation in preparation for reaching and other open chain tasks) is to have her push against the therapist's shoulder with her right hand. The direction of the weight shift is critical in this activity as is the need for the therapist to provide just the right amount of resistance with her body. The therapist must guide DK to shift her mass diagonally forward and left over her left hand and foot. Intermediate joints in this closed chain activity (trunk, shoulder girdle, elbow) must be well aligned by DK or assisted by the therapist so that the effort to push against the therapist is initiated from the base of support, activating the entire left side of the body through small gradations and variations of motion. The therapist uses her legs to assist the left lower extremity components of alignment and weight shift.

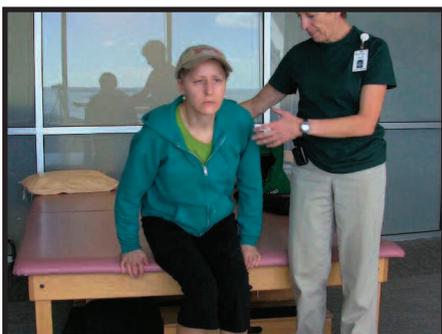


PHOTO 9: Again, DK spontaneously uses her left UE to assist in sit to stand. She was not given cues to use it and required only contact guard assist for balance during the activity. Her left hand stayed in contact with the mat almost as long as the right hand did, indicating also that the direction of the weight shift was effective, her body was fairly symmetrical during the transition, and that DK's left arm was actively producing force against the mat — it was not just passively resting there.

How Use of the NDT Approach Can Guide Management of the Patient with Severe Involvement

TOP 10 CONSIDERATIONS

1. BE THOROUGH. Be sure to consider all of the individual's systems – are they relatively intact, moderately involved, or very impaired?

2. BE INCLUSIVE. Systems that are relatively better can be used to connect with the individual, even for a few moments at a time. This connection can provide an opportunity to get through the other barriers to reach them to begin to facilitate increased activity, alertness, etc. Begin to measure objectively to show progress; e.g. eyes open for x seconds, sat without support with supervision as long a feet were flat on floor, turned head to left without loss of balance in response to mom's voice 3/5 trials, etc.

3. FEEL IT! Recognize the benefit of using therapeutic handling for assessment and treatment. A clinician can learn so much more by feeling the individual's alignment and movement than by just watching that individual. During treatment, facilitation of more optimal responses through handling can often be much more effective than explaining them.

4. THINK BEFORE SPEAKING. Clinicians need to choose words/verbal input very carefully. In individuals with significant involvement of cognitive and/or perceptual systems, verbal input can be disruptive or over stimulating. A clinician has the ability to directly influence a patient's response by changing the tone of his or her voice to soothe, to excite, to motivate, or to stop unwanted motor behavior.

5. HANDLING IS POWERFUL! Handling entails more than putting hands on to direct or interpret movement. Handling can be a powerful influence to calm an agitated patient, encourage a frightened patient, alert the groggy patient, or stimulate increased involvement of the patient who is ready to do more.

6. PRIORITIZE. Recognize that it is not possible to address everything immediately. Almost invariably, individuals classified as severely involved usually have involvement of many systems. Consider all of the impairments (as well as the individual's strengths) and prioritize. Think about addressing and trying to change just one thing at a time (e.g. addressing a multi-system problem such as lack of mobility at the hip joint resulting from multiple impairments OR addressing an impairment of severe left inattention, but possibly not both at once). Direct the treatment interventions primarily toward that impairment, and based on the pre- and post- treatment tests over several days, review the treatment plan and goals to see if progress is being made. Then consider changing the prioritization, modifying the treatment, etc.

On the other hand, as the individual improves, effective prioritization might mean that two or more impairments are addressed at the same time, in order to begin to simulate challenges the individual may encounter at home and in the community.

7. BE PATIENT. One of the hardest things for therapists to deal

with is the individual who is making very slow gains, especially if this is in contrast to the other patients in the facility. Fine-tuned evaluation skills (observation and handling for assessment, careful assessment of posture and movement) allow the clinician to notice even the smallest changes and recognize the importance of improvements in components or building blocks of movement and function. (i.e. "If he has this small amount of control, he might be able to use it to . . ."). Consider focusing on smaller goals to eventually achieve larger gains.

8. BREATHE! Be sure to understand the importance of respiration. Remember that the drive to breathe is likely to outweigh any other goal the individual may have and will outweigh any request made of the individual if he or she cannot also breathe during the activity. Watch and learn about the individual's breathing patterns and variability at rest and during movement. Understand that positions that are desirable to teach control of movement or improvement in function may compromise breathing, and breathing must win! Provide breaks and pauses as needed and reassurance and facilitation to help re-education of more optimal breathing patterns in order to continue to facilitate progress toward improved posture, movement, and function.

9. HEAD'S UP. Don't underestimate the significance of the head! The human adult head weighs about 10 pounds (imagine a 10 pound bowling ball or two 5# bags of sugar.) The location of the head in relation to the individual's base of support may require that he or she adopt compensations to counteract this weight. Be sure to consider the head as well as the body when facilitating alignment of body parts for movement and function.

10. BE FUNCTIONAL AND FLEXIBLE. Because individuals with severe involvement are likely to have involvement in many systems, there are a lot of potential day-to-day variables. In addition to reassessing at every treatment for medical stability and/or possible issues, be sure to reassess (consider items 1, 2, and 3 above) at each session. A system that is a relative strength during the morning session (e.g. cognitive system) may turn out to be a barrier during the afternoon session when the individual is sleepy and difficult to arouse. A treatment strategy that capitalizes on automatic movement may get the individual started and may help to facilitate increased participation of the arousal and cognitive systems for more optimal participation during the session. While the NDT trained clinician is always striving to improve function, every session may not include actually working within a functional task. At times, components of a task or a movement sequence inherent to a functional activity may be highlighted and addressed in part to be later pulled back into the functional activity.

AND TODAY

DK was recently contacted in regard to this case study. It has been 1 ½ years since her inpatient rehabilitation stay, and she reports that she is currently doing “freelance writing consultation on scholarly manuscripts” based on her experience as a biomedical scientist and writing instructor. We continue to wish her the best!

SUMMARY

The patient with severe involvement presents great challenges and tremendous opportunities for creative problem-solving for the NDT trained clinician. Use of a systematic thought process to identify positive and negative influences on posture, movement, and function can guide the clinician to develop a focused treatment plan. Thoughtful analysis of clinical findings as well as effective prioritization of impairments can lead to productive interventions. The NDT treatment framework serves as an excellent guide for all clinicians and is especially suited to helping to address the dilemmas inherent in providing care to even the most challenging patients. ■

“We have what we seek. It is there all the time, and if we give it time, it will make itself known to us.”

– Thomas Merton

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