# Psychologically Informed Physical Therapy for Children and Adolescents With Functional Neurological Symptoms: The Wellness Approach

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Children with functional neurological disorder (FND) present with motor and sensory neurological symptoms that impair health and physical functioning and that create an ongoing clinical burden for caregivers and hospitals worldwide. Treatment programs for these children involve a multidisciplinary approach with physical therapy as a fundamental component. However, standard musculoskeletal approaches to physical therapy are ineffective or may even exacerbate symptoms because they are unresponsive to the biopsychosocial context in which FND emerges: FND typically occurs in the context of stress, either physical or emotional; symptoms are amplified by attention; and presentations are complicated by psychological factors. Informed, in part, by published guidelines for physical therapy with adult FND patients, this article examines common challenges that arise when working with children: overcoming previous negative encounters in the medical system; avoiding amplification of symptoms by drawing attention to them; and managing comorbid pain, falls, faints, nonepileptic seizures, dizziness, fatigue, and breathlessness, plus psychological symptoms such as anticipatory anxiety and panic attacks. What emerges is a psychologically informed therapeutic approach to physical therapy for children with functional neurological symptoms. This approach prioritizes interpersonal processes and physical therapy techniques that establish a therapeutic relationship and create a safe space for physical therapy, that use indirect physical therapy approaches redirecting the focus of attention away from symptoms and emphasizing the completion of tasks and activities engaging the sick body part indirectly, that tailor the intervention to address the needs and presentation of each particular child, and that integrate psychological interventions to manage common challenges.

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## CLINICAL VIGNETTE

"Mary," a 13-year-old girl, was admitted into the pediatric ward of her local hospital with hand twitching and with pain and weakness in both legs. The pediatric team made a diagnosis of functional neurological disorder (FND). Treatment involved a time-limited physical rehabilitation intervention to facilitate discharge. A junior therapist ran Mary's physical therapy sessions, using a standard musculoskeletal approach. She focused on Mary's hands and worked with Mary to address the hand twitching. She assessed Mary's functional impairment in the arms and legs using objective measures such as strength and range of motion. On daily ward rounds, the pediatric team asked Mary about her symptoms, and her parents, who were continually at her bedside, incessantly inquired about her pain levels. In response to this intervention, Mary's twitch worsened, progressing from the hands into the entire body (nonepileptic seizures [NES]). The pain and weakness in the legs also worsened; consequently, she moved around only by using a wheelchair. Mary's family became very distressed.

Following transfer to a tertiary care children's hospital, a video EEG was performed, and the neurology team confirmed the diagnosis of FND. Mary was referred to the Mind-Body Program for FND and related problems. This rehabilitation program, run by a consultation-liaison psychiatrist on the adolescent medicine ward, also included a psychologist and psychiatry resident as well as a physical therapist, an occupational therapist, and members of the nursing staff and hospital school's teaching staff. The family assessment involved a detailed developmental history, history of Mary's symptoms and the context in which they had arisen, education about FND neurobiology (including the role of attention), a co-constructed formulation that integrated Mary's story and the team's understanding of FND into a joint understanding of the problem, and a therapeutic contract setting the terms for Mary's acceptance into the program (1, 2). Treatment involved attendance at hospital school, psychology sessions, and physical therapy sessions (all daily), and weekly family meetings. Mary's parents were asked to stop inquiring about Mary's pain and other symptoms and to focus on engaging Mary in pleasant activities when they spent time with her (only after her completion of each day's program).

The physical therapy intervention was task focused, engaged Mary in what she was currently able to do, and

prioritized indirect approaches that included the sick body parts but did not directly focus on them, thereby drawing attention away from those parts. In progressive order, the tasks included the following (often supplemented by distractions such as conversation, games, or secondary goals or tasks): to transfer between bed and wheelchair; to walk with a frame from bed to corridor; to sit in a standard chair at school (focused on school work); to participate in ball games while sitting in the wheelchair (focus on the game); to walk part of the way, and then all the way, to school using a frame (with distraction); to walk all the way to school with no frame (with distraction); and eventually to box and play games of basketball in the hospital gym. When Mary's twitching threatened to progress into an NES, Mary was encouraged to lower herself to the floor and to practice the de-arousal strategies that she had learned in her psychology sessions—in this case a slow-breathing exercise with visualization—to settle herself. Once Mary was settled, the session was resumed.

Mary's psychotherapy sessions focused on building up a toolbox of mind-body strategies that she could use to settle her body. The intervention included a safety plan for managing NES. Unhelpful cognitive processes typical of anxiety (rumination, anticipatory anxiety, catastrophizing) were also identified. The family began to work on addressing factors identified during the assessment as contributing to Mary's presentation. Arrangements were discussed and finalized for her postdischarge return to school.

After 2 weeks Mary was discharged. The family was asked to continue the rehabilitation program at home with support from local services. Because Mary was walking independently, she returned to normal sporting activities at school (no further outpatient physical therapy was needed). The psychological work begun in the hospital was continued with local services.

## INTRODUCTION

Children and adolescents with FND (conversion disorder) present to hospitals around the world because of significant functional impairment. Motor symptoms—motor weakness or loss of function, abnormal movements, and dystonia—are the most common neurological symptoms, followed by NES, sensory symptoms, and cognitive symptoms (3, 4). Presentations are typically complex, involving more than one neurological symptom along with comorbid chronic/complex pain, anxiety and depression, and nonspecific somatic symptoms such as dizziness, fatigue, or breathlessness. Physical therapy, delivered as part of a multidisciplinary approach, is a fundamental component of the treatment intervention for children disabled by motor symptoms (5).

Over the last two decades, neuroscience studies have expanded our understanding of the neurobiology of FND and complex/chronic pain. The working hypothesis from these studies is that FND symptoms emerge when stress—physical or emotional—triggers excessive activation of the brain stress systems (regions processing salience, arousal, and emotional states), which, in turn, disrupt motor-, sensory-, and pain-processing regions (6–10).

Another body of work has confirmed the importance of attention in symptom amplification and in the treatment process more generally. Attention to FND symptoms, comorbid pain, and other comorbid somatic symptoms makes them worse (11–13). By contrast, research about physical therapy shows that it builds resilience (14, 15), modulates mechanisms involved in chronic/complex pain (16), and improves comorbid anxiety, depression, and disturbed sleep (17).

Key principles articulated in published consensus guidelines for adults with FND (18) also inform physical therapy with children functionally impaired by FND (Box 1) (2, 19–30).

### Key Challenges That Face the Physical Therapist When Working With Children With FND

Key challenges for the therapist include the following: engaging a child who has experienced negative encounters in the medical system; managing comorbid pain, falls, faints, NES, dizziness, fatigue, and breathlessness; and managing comorbid psychological symptoms such as anticipatory anxiety or panic attacks that emerge during therapy.

### Setting Things Up: Physical Therapy as Part of Multidisciplinary Treatment

The stepwise multidisciplinary assessment process—the neurology assessment (which provides a diagnosis) and family assessment (which provides a formulation)—that takes place prior to referral for physical therapy is described in the opening vignette (1, 13). In subsequent sections we confine ourselves to a detailed description of the physical therapy component of the multidisciplinary treatment. Unlike many other programs, our treatment program—in what our mind-body team refers to as the wellness approach—is designed to implement the physical therapy intervention alongside treatment for the full range of FND symptoms that a particular child is experiencing.

## THE PHYSICAL THERAPY ASSESSMENT

### Establishing a Therapeutic Relationship

The tasks of establishing rapport—a therapeutic relationship with the child and parent(s)—and creating a safe space for the child in therapy are the primary goals of the first session with the therapist. The therapeutic relationship involves trust, mutual respect, and a sense of hope, and it lays the foundation for a collaborative approach in which the child and therapist work together as a team. Sometimes the physical therapist may make this collaboration explicit—"Okay, from now on we are Team Nicola" (Nicola being the name of the first author).

**BOX 1. Key principles of physical therapy for children with functional neurological disorder**

1. Communication that the symptoms are real and understood (19, 20).
2. A clear, positive diagnosis of functional neurological disorder (FND) by a pediatrician, along with the cessation of medical investigations and the elimination of uncertainty (21, 22).
3. Education/explanations to enhance the child and family's understanding of FND and to generate shared expectations of regaining physical function and returning to health and well-being (2, 19, 20, 23, 24).
4. Emphasis on the therapeutic relationship, positive expectations, and open communication (19, 21, 24).
5. A multidisciplinary approach in which physical therapy plays an integral role (19–21, 24, 25–28).
6. Rehabilitation through goal-directed physical therapy that focuses on function and that retrains movements with diverted attention, including attention to goals, to what the child can do, and to well body parts (20, 29, 26, 24).
7. Addressing maladaptive patterns of behavior (including thoughts, emotions, states of high arousal, and child and parent interactions) that trigger and maintain symptoms (24, 26, 28).
8. Use of play and playful techniques that are developmentally appropriate (30).

### Subjective Assessment (What the Child and Parents Report)

The therapist takes a brief history and asks the child and parent(s) to describe their subjective experience of the illness and the child's symptoms. The therapist demonstrates active listening and acknowledges that the child's FND symptoms are real and disabling. The therapist also acknowledges that any of the child's possible comorbid symptoms—pain, dizziness, fatigue, and so on—may make the therapy intervention more challenging. What is important is that the child feels heard and understood and that this initial assessment process helps to build rapport. During this subjective assessment, the therapist also makes a mental note of the toys and materials around the child's hospital bed as a way of gauging the child's interests and hobbies.

### Objective Assessment (What the Physical Therapist Observes)

The objective assessment begins outside the room, even before the therapist has been introduced to the child and family. It also involves observation of the child's functional capacity—including posture, use of limbs, abnormal movements, and signaling of pain—while the child is engaged in and distracted by another task. The physical therapist might observe the child's use of the hands and feet while the therapist is talking to a parent and compare that to the child's use of the hands and feet when attention is directly focused on them and on what the child can or cannot do with them. Likewise, the therapist might play a game with the child and use this opportunity to observe the child's function and movements. In addition to such indirect assessments, which will yield the most accurate information, the therapist may complete any relevant and more traditional objective assessments or measures of physical function to help track progress over time. In a deconditioned child, a walking test may be useful; in a child with dystonia, intermittent examinations of range of movement may be indicated.

### Educating the Child and Family About the Role of Physical Therapy

The therapist educates the child and family about the role of physical therapy in treating FND and about the role of exercise in health and well-being (see Box 2). The therapist provides details about the sessions, the role of homework, and what the child should expect in physical therapy: hard work, pain during the sessions, and muscle soreness and fatigue afterward. The therapist also reassures the child that progress will be made gradually—in tiny steps that the child can manage—and communicates that the sessions will be fun.

## THE PHYSICAL DIMENSION OF THE PHYSICAL THERAPY INTERVENTION

Each treatment session aims to facilitate improved physical function by engaging the child in specific behavioral goals or activities. The activities are tailored to the physical needs of each child. They focus on what the child can do, and they address the symptoms or areas of dysfunction without drawing attention to the symptoms themselves. They are implemented in a graded fashion, with the therapist supporting the child in a gentle progression—"a little bit further every day."

### Weakness or Loss of Coordination in the Lower Limbs

The therapist uses interventions that aim to gradually increase the distance traversed on any particular day—for

**BOX 2. Talking points pertaining to the importance of exercise**

Exercise:
- Activates the motor system in healthy ways.
- Prevents long-term physical complications.
- Helps switch off the pain system.
- Promotes good sleep.
- Improves coping and resilience to stress.
- Regulates the autonomic nervous system.
- Helps with learning.

example, to the door, to the fish tanks down the hall, to the main lobby, and to the playground outside. During these tasks, the therapist uses distraction techniques to manage the child's focus of attention and draw it away from the symptoms. As the child becomes more mobile, the program is adapted to include the child's individual interests and more dynamic games and tasks.

**Tics, Tremors, and Other Abnormal Movements**

The therapist encourages games that require some actual control of the affected limb, but without placing attention directly on the limb. The goal of the activity is participation in the activity, game, or task, such as balloon tennis to develop upper limb control. Direct treatment of the affected limb is precluded because that would tend to exacerbate symptoms.

**Focusing Away From the Nonfunctional Part (Paradoxical Interventions)**

Sometimes the therapy intervention has no immediate connection to the nonfunctional part. For example, rather than trying to get a child to extend or use a limb that is paralyzed, fixed in a dystonic position, or not used because of pain or weakness, various forms of hydrotherapy can be used as presenting an alternative environment in which to move. Playing water volleyball may require the child to bear weight, jump, and move and extend his or her limbs, including the affected one, all while enjoying the activity. In the pediatric setting, many paradoxical interventions draw on the work of the Milan School of family therapy (31).

**Managing Dizziness**

If the child is experiencing dizziness with standing (orthostatic intolerance) (32) and is deconditioned because of inactivity, one of the goals may be to increase tolerance of sitting or standing through graded practice (with distraction and encouragement). Positions may progress from raising the head tilt in bed, to sitting up in bed or on the side of the bed, to standing with assistance beside the bed, to standing unassisted. During these tasks, the therapist uses distraction techniques to manage the child's focus of attention away from the symptoms. As another intervention, toe tapping helps to combat dizziness by increasing circulation and directing attention away from the symptoms of dizziness.

**Beginning Physical Therapy in the Bed**

Some children may be very physically deconditioned due to a period of immobility secondary to FND, comorbid pain, or discontinuation of exercise and physical activities because of recurring NES. Other children may have leg paralysis with no voluntary movement. In these cases, the therapist may need to strengthen some specific muscle groups before moving on to activities that focus on restoring physical function. The therapist commences reconditioning by focusing on whatever muscle activity is available and by using distraction to encourage progression (e.g., to stretch out the leg in order to touch a balloon at the end of the bed).

If this type of approach is not possible, the intervention may start (when necessary, with the use of equipment) with remedial efforts, using distraction and games throughout, to improve the range of motion by facilitating joint movement and increasing muscle length (e.g., by using continuous passive motion machines). An added benefit is that these efforts will reduce the risk of secondary complications, such as pressure areas and contractures. As improvement takes place, a more active approach is implemented—one that focuses on specific behavioral goals, life skills, and activities.

**Using Aids to Restore Physical Function**

Whenever possible, therapy is done without any equipment or mobility aids, because they decrease opportunities for the child to practice activities of daily living independently and increase the possibility that the child will become dependent on the aid. Sometimes, aids are needed temporarily to facilitate any form of movement and as a gateway to progress. For example, if a child is bed- or wheelchair-bound due to leg weakness or loss of coordination, the therapist will first work with the patient to master standing transfers and then progress to using a walking frame—starting with a walking frame of a large size and then moving to smaller ones. The focus is always on restoring capacity for movement in the context of a specific goal. Likewise, for children with dizziness and fainting due to autonomic system dysregulation (e.g., severe orthostatic intolerance), a tilt table can be used, if necessary, to improve autonomic regulation until the patient is well enough to engage in upright tasks and games.

**Managing Falls**

Parents are understandably always concerned about the risk of falling; children who present with NES or motor symptoms of the lower limbs are at heightened risk of falling and hurting themselves. Parents are informed that the therapist will not be able to catch the patient but will try, if possible, to ease or break any fall and to facilitate the child's efforts to lower himself or herself to the floor, to return to a standing position independently as soon as feasible, and to resume engagement in the prior activity (see also section on NES below). A walking aid may have to be used temporarily to enable mobility and to push forward with the program. Ongoing assessments of safety will then determine when it is safe for the child to progress to handhold assist, standby assist, supervised standing, and independent mobility.

## THE PSYCHOLOGICAL DIMENSION OF THE PHYSICAL THERAPY INTERVENTION

The physical therapy intervention for children with FND is delivered in the context of a therapeutic relationship and a

therapeutic space—the safe space—that is created for the child in physical therapy. The therapist makes use of various psychological interventions that help to create and maintain the therapeutic space and that also support the physical dimension of the intervention. These psychological interventions powerfully shape the specific physical interventions; without them, the overall physical intervention will not be successful.

**Active Listening**

The practice of active listening involves listening to and validating the child's experience, both within the health system and in relation to his or her own symptoms. The therapist demonstrates active listening, acknowledges the child's experience, and provides support and reassurance at the beginning of each session when the child updates the therapist about his or her current state of ill health or well-being, as well as fears and worries about the session or other components of the program.

**Shifting the Focus of Attention**

Because attention to functional somatic symptoms amplifies the symptoms, managing the child's focus of attention is a key element of the intervention. As the session shifts to treatment, the therapist actively shifts the focus of attention to the task or game that the child is asked to engage in and thus away from any functional somatic symptoms. Having a goal in mind ensures that the child's attention is directed toward the outcome of the action (external focus) rather than toward movement production itself (internal focus), thereby maximizing performance (33). If a child continues to focus on pain in the leg or on difficulties in walking, the therapist may say, "See if you can catch and throw this ball back to me while we walk," thereby directing the focus of attention to the ball. Alternatively, if the child is using the handrail and does not require it, the therapist might say, "Give me a high five!" to indirectly encourage the child not to hold on to the rail. Other techniques for shifting the focus of attention include conversing about a topic that interests the child, listening to music or moving in time with it, using cognitive tasks such as those involving addition or subtraction, counting in a different language, catching and throwing a ball, playing a game of "I spy with my little eye," using other toys, and going outside and drawing attention to what is to be seen or smelled there.

**Using the Therapist's Attention to Encourage Healthy Motor Patterns and Discourage Unhealthy Motor Patterns**

Therapists need to manage their own focus of attention very carefully—to notice and comment on, bring attention to, and therefore reinforce healthy motor patterns—and they need to avoid commenting on, bringing attention to, or reinforcing unhealthy motor patterns. In this way therapists use language alongside physical interventions to train healthy behaviors.

**Using Language to Set Up Positive Beliefs and Expectations**

The therapist uses language that is positive, understanding, and supportive to communicate and establish confidence in the physical program and to plant positive suggestions for improvement (2). All small shifts in physical function and all the child's efforts to work at improvement are celebrated. For example, the therapist might help motivate the child by saying, "Anything is better than nothing," followed by further positive encouragement of the child's effort. In this way therapists use language that helps children strengthen their beliefs in themselves and in their ability to get well.

**When Positive Language Backfires**

In some children, positive language and attention to any progress backfires: the child's physical function decreases in response to positive statements. When that occurs, the therapist and broader team need to adopt a different approach to the child. All team members, including the parents, are coached to use a more matter-of-fact approach (no praise; just task-focused communication), to restrain themselves from noticing and verbalizing gains in physical function, and to simply get on with things as if they did not notice. These adjustments take the pressure off the child and create space for the child to make progress without feeling anxious about the expectations of those around.

**Goal Setting**

Insofar as possible, goals are set collaboratively with the child. Small, achievable, short-term goals are used to guide treatment on a daily basis. They are often worked out when the broader weekly goal is broken down into small daily goals. By having short-term goals, the child is able to see some progress, and the child will begin to feel more confident that the long-term goals can actually be achieved. Programs treating children with less diverse symptoms, as in functional gait abnormalities, can use a set hierarchy of goals (28).

**Fostering Mastery, Pleasure, and a Sense of Control for the Child**

Because FND symptoms are not under voluntary control, the child often feels helpless on presentation to hospital. To counteract this sense of helplessness, the therapist uses the treatment process to enhance the child's sense of control and pleasure. The therapist may offer an activity that the child is known to enjoy or a range of activities from which the child can choose. In neurobiological terms, pleasurable exercise activates brain-body states antithetical to the negative arousal state in which the child has presented (8, 30).

**Using a Behavioral Program**

Sometimes children do not comply with homework that is important for their return to normal function. Children with allodynia (a condition in which nonpainful stimuli to a limb cause pain) dislike the sensory tasks—for example,

twice-daily cream massages—that are part of their treatment regimens. In such situations, a behavioral program in which the child's compliance accumulates rewards can be helpful. For example, as a reward for the child completing the program for the day or for the week, the therapist might give the child an opportunity to engage in an activity that the child especially enjoys or may use hydrotherapy as a "Friday reward" for a successful week in therapy.

### Using Mind-Body Strategies to Manage NES, Pain Exacerbations, and Panic Attacks

In their daily psychology sessions, children learn regulation strategies for managing NES, pain, panic attacks, and other somatic symptoms (34, 35). When these symptoms emerge, the physical therapist will ask the child to implement his or her preferred strategy. Once the child has become settled, the session is resumed. For example, children with NES will lower themselves to the ground and implement a regulation strategy—as per their safety plans—when they notice their warning signals. In high-risk cases, the child may need to wear a helmet while moving from place to place, until the child is able to demonstrate an improved capacity to recognize an approaching NES.

## CONCLUSIONS

Physical therapy is an important component of multidisciplinary treatment interventions for children presenting with FND. In this article we have provided an overarching therapeutic framework that melds general principles of physical therapy and an understanding of the psychological dimensions of pediatric FND.

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