Functional Movement Disorder in Children

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Case Vignette

A 15-year-old boy with a history of mild autism spectrum disorder, developmental delay, and asthma was seen by his pediatrician for concerns about "tightness" in his throat, coughing, and voice changes. These were initially attributed to asthma exacerbated by seasonal allergies. However, his symptoms worsened, soon evolving such that he felt he could not catch his breath. He could not speak above a whisper and his voice was strained. A few days later, he developed abnormal movements consisting of violent flinging of his arms and legs, forceful shoulder jerks, and a feeling that his neck was locked in place. He was evaluated by multiple specialists, including otolaryngology, neurology, and speech pathology. He was seen in the Emergency Department on multiple occasions for breathing concerns, always with normal oxygen saturation. Although a functional neurological etiology was suspected within a month of symptom onset, he continued to undergo workup by multiple specialists over the next 10 months. Multiple diagnoses were suggested, including spasmodic dysphonia, tic disorder, and myoclonus. His symptoms continued to worsen, especially his large-amplitude flailing movements of the arms, and he developed an abrupt loss of muscle tone in his legs that led to many near-falls. His family, concerned for his safety, switched into a home-school option. Multiple medications were tried, including benzodiazepines and agents targeting tics and increased muscle tone, all with limited and only temporary success.

Ten months after symptom onset, the patient was referred to our Pediatric Functional Neurological Disorder Clinic. A review of records revealed that multiple specialists had suspected a functional neurological disorder, and findings consistent with a functional symptom etiology had been demonstrated on multiple laryngoscopies, but this diagnosis had never been shared with the patient or family. On physical exam, his thought content was normal with a realistic appreciation of the limitations imposed by his symptoms. His speech was strained, low volume but with normal articulation. He described his throat as feeling "clenched" at the level of his larynx. His movements were distractible and entrainable. He and his mother described a rapid onset of symptoms which then remained consistent over months. There was no premonitory urge and he had no sense of relief following the movements. The diagnosis of functional neurological disorder with mixed features was confirmed and explained to the family. They were provided with

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educational resources, referred for physical therapy and family counseling, and recommended for close follow-up.

Characteristics of Functional Movement Disorder in the Pediatric Population

Patient Demographics

Functional neurological disorder (FND) can occur through most of the lifespan. While FND is uncommon in young children prior to school age, they have been reported in children as young as 3 years of age [1]. They become more common with increasing age, and prevalence in adolescence approaches adult levels [2, 3]. A population-based study in Australia found a mean age of diagnosis in pediatric patients of 11.8 years [1]. That same study estimated an annual incidence of 2.3/100,000 but acknowledged this may have been an underestimate. In the hospital setting, FND is relatively common. One study found that FND diagnoses accounted for 11% of psychiatry consult-liaison requests in an urban pediatric hospital [2]. Sex ratios are roughly equal before puberty. In adolescence, females begin to outnumber males, for reasons that remain uncertain but are potentially related to the higher rates of emotional, sexual and physical abuse suffered by girls and women [4, 5]. While sex differences in FND have been studied to some degree, research on gender diversity in FND is exceedingly limited, and little attention has been paid to transgender and gender nonconforming patients [2, 3].

Phenomenology

Children are more likely than adults to present with multiple functional symptoms [1, 2, 6], and will frequently manifest both a functional movement disorder (FMD) and additional functional neurological symptoms, such as weakness, sensory loss, and functional seizures. Though patients can manifest any form of movement phenomenology as a functional neurological symptom, in our pediatric FND clinic the most common presentations are (in order of frequency): functional gait (either with buckling of knees or astasia-abasia), myoclonus, and tremor. These three types of FMD account for 91% (20 out of 22) of our pediatric FMD presentations. Intriguingly, two other reports of pediatric FMD found overlapping but distinct patterns of phenomenology. Schwingenschuh et al. [7] reported that dystonia and tremor were the most frequent manifestations. Ferrara and Jankovic [8] found that tremor dominated functional movement presentations in children, followed by dystonia and myoclonus. This range of presentations underscores the wide range of functional phenomenologies possible in children, but may also reflect the local referral and recognition practices that lead a patient to be transferred to tertiary clinics. It is also important to recognize that this range of symptoms extends beyond the scope of FND as well, potentially including other types of functional somatic disorders (e.g., functional abdominal pain).

Comorbidities

Patients with FND of all ages have increased rates of somatic symptom disorder and related functional somatic disorders [9], including chronic pain and fatigue [1]. Hypothesized mechanisms include a shared pathophysiology, primed physiological responsiveness and parental sensitivity to physical symptoms facilitating patient distress by otherwise benign somatosensory information. Parents may inadvertently reinforce this tendency by fretting over the child's symptoms. This may underscore that children may be predisposed to develop FND symptoms through genetic or environmental factors (including child-family member interactions). Physical illness and higher levels of healthcare utilization are risk factors for the development of somatic symptoms. For example, patients with functional seizures comorbid with epilepsy (estimated to occur in 10–20% of patients) [10] had worse outcomes 2 years later compared to functional seizure patients without

epilepsy [11]. Other neurological comorbidities, including developmental delay, have not been associated with worse response to inpatient intervention [12, 13].

Pediatric patients with FND also have increased rates of psychiatric comorbidities. Anxiety disorders are highly comorbid with FND in pediatric patients [2]. A study investigating different components of emotional distress in pediatric patients with FND found that sensitivity to cognitive symptoms of anxiety (e.g., worrying about losing control of one's mind) predicted severity of physical symptoms [11, 14]. The authors theorized this was related to catastrophic thinking in response to stress. In the same study, severity of depression was also found to predict severity of physical symptoms, even when controlling for anxiety levels [11, 14]. However, psychiatric comorbidities are not limited to internalizing disorders. About half of an inpatient sample of pediatric patients with FND had a history of a disruptive behavioral disorder, most commonly ADHD [2]. Whether such medical comorbidities are the proximate risk factor for FND, or whether the coexistence of these conditions simply reflects a shared predisposing factor (e.g., adverse childhood events such as neglect and family trauma) [15], remains uncertain. The course of a child's comorbid psychiatric disorder can be intertwined with the course of their FND. Comorbid psychiatric disorders that do not respond to treatment have been associated with worse outcomes for FND in pediatric patients [12, 13]. Thus, a comprehensive approach to managing affective and behavioral functioning is recommended. In our experience, infantile behavior or excessive regression during episodes – that is, beyond the expected developmental regression seen in illness – may indicate the coexistence of a possible factitious disorder (voluntary control of some symptoms with amplification for secondary gain [16]) alongside their FMD. Importantly, these features alone do not indicate that symptoms are factitious in nature; such findings must be weighed with other symptoms to determine an overall consistency with the diagnosis. Such coexistence of factitious disorder and FND in children is uncommon in our experience, making up no more than 10% of our pediatric FND clinic population. The parsing of motivation and deception is challenging and relies heavily on clinical judgement, therefore the relationship between factitious disorder and FND remains unclear and understudied [17].

Predisposing Factors

There are a number of risk factors that increase a child's chances of developing FND. Considering the biopsychosocial model for FMD (see Chap. 3 for details), some predisposing factors are innate to the child, while others are linked to adverse life experiences and other external circumstances. Certain personality and temperamental factors can increase a child's vulnerability to developing FND. Children with FND tend to be more anxious and score higher on measures of perfectionism. They are more likely to internalize negative emotions and use coping skills that are passive and solitary [3, 18]. A sensitive, perfectionistic child who struggles to express their emotions and work through distress will be at higher risk for expressing distress through physical symptoms, particularly if there are other risk factors in their environment.

Certain family characteristics can also predispose a child to developing FND. Malas and colleagues [3] described higher rates of both physical and mental health diagnoses in families of children with prominent somatic symptoms compared to controls. They speculated that this could be due to a combination of factors, including genetic predisposition and social learning of the "sick role". Another study found that parents of children with functional seizures were more likely to also manifest somatic symptoms than parents of children with epilepsy [19]. Children and adolescents with FND rated their families as less supportive than did typically-developing children. These same children rated their friends and significant others as just as supportive as typically-developing children did. This suggests that a child's family is particularly important for emotional support and the development of coping

skills [14]. Children and adolescents with FND are more likely to show insecure attachment compared to typically developing children [20].

A child's social environment can also be a source of acute precipitating factors for the development of FND. Family-related stressors are a common antecedent to symptom onset [2]. A retrospective study found that children often experienced family conflict (including domestic violence) and loss (separation from a parent, death of a family member) prior to developing functional symptoms [1]. School-related stressors are also frequent precipitating events, including both academic and peer-related (e.g. bullying) concerns [21].

Adults with FND often have a history of childhood trauma – neglect, abuse (sexual, physical, or emotional), or family disruption. However, a history of trauma is less common in pediatric FND patients [2, 22], with frequency similar to the rates of trauma in the general population. However, patients who have experienced trauma tend to have worse outcomes than those that have not [3]. FND in children is associated with a history of stressful life events. For example, compared to their siblings, youth with functional seizures were more likely to have experienced exposure to domestic or community violence, bullying, or serious medical events. They were not more likely to have experienced physical or sexual abuse [18]. Other common stressful events include loss of a family member, parental divorce, school problems [23], and peer conflict [1]. There are many children, however, for whom the clinician is unable to identify a discrete stressful event prior to developing functional neurological symptoms [22].

Prognosis

Overall, children with FND tend to have a more favorable prognosis compared to adults, with both shorter symptom duration following onset (mean 52 ± 7 days) and greater likelihood of remission 6 months following onset [22]. Other authors have reported FMD series in which children improved more than adults, but by smaller margins [23]. However, early diagnosis and treatment is key. Children whose FMD symptoms have been of sufficient duration and severity to require care at tertiary centers may have a less favorable outcome than the full population with pediatric FMD (as depicted in the clinical vignette in this chapter) [8]. An investigation of an inpatient family-based mind-body intervention for children with functional seizures found that those patients with recent onset of symptoms (<3 months) responded best. Patients with a chronic course (>12 months) were less responsive. Nonetheless, the majority of patients in that study (73%) had complete resolution of functional seizures 12 months after intervention. Another 11% had improvement in both symptoms and functioning without complete resolution [12]. Similarly, a retrospective study of pediatric patients with functional seizures showed that 55% were symptom free, and an additional 30% were improved after 2 years. Patients with a chronic course (>12 months) prior to diagnosis were more likely to continue showing significant symptoms 2 years later [11].

Diagnostic Assessment of Pediatric FMD

Increasing emphasis on coordinated multidisciplinary care is placed across different healthcare settings, including pediatrics. In our center and others, multidisciplinary care has facilitated successful treatment of pediatric FMD. Coordinated care among different healthcare professionals – such as pediatric neurology, child and adolescent psychiatry, neuropsychology, physical and occupational therapy, and social work – has shown to be effective at both inpatient and outpatient levels of care. A typical team approach to FMD treatment addresses education, psychotherapy, rehabilitation therapies, and medication management [6]. It has become increasingly clear that multidisciplinary teams are also highly useful at the assessment stage of FMD [24, 25]. A specialized team can be a helpful resource to medical providers in other disciplines who worry about missing something in the differential diagnosis of FND,

lack training in how to best describe these conditions to families or to elicit sensitive histories. Indeed, the framing of the initial diagnosis is a key factor in improving engagement in future treatment. A multidisciplinary approach allows for normalization of behavioral health services and facilitates communication among healthcare professionals, but also helps families to feel they are receiving coordinated care rather than being handed off from the medical world to the psychological world [3]. The family's "buy-in" to a mind-body conceptualization of FND has been demonstrated as helpful to patient response to treatment [13].

Assessment

Building a collaborative relationship with families begins even before the first encounter. It is common for children with FMD to seek evaluation from multiple specialists before receiving a diagnosis of FMD. Since a prolonged, multidisciplinary assessment is not the norm, clear communication about what an FMD-informed visit will include, who the patient will meet, and how the visit may be different from prior encounters are key to building in trust from the outset. We encourage a "no surprises" model of care. Forming an alliance with the family is important to promote belief in the diagnostic process and engagement in treatment. Increased healthcare utilization is typical for these patients and families; therefore, they may have encountered prior medical staff who were dismissive, equivocal in the diagnosis, or even argumentative. Even well-trained and well-meaning healthcare professionals often lack the specific training needed to diagnose and manage FND. As a result, it is not uncommon for patients and families to experience stigma and become defensive or skeptical of the traditional healthcare system over time. Use of empathy, validation and focus on the physical symptoms can help strengthen the alliance between medical professionals, patients, and caregivers [3].

The first step in the evaluation (aside from any record review) is typically an interview with the patient and family (Table 15.1). In many ways, the interview process is similar to other new patient visits. In our experience, first interviews with FND families require roughly double the length of time needed for a typical pediatric neurology visit. In addition to these longer interviews, we incorporate neuropsychological testing for new FND evaluations and – when necessary – physical therapy assessments. These visits therefore require 2–4 h for patients, though the physician can typically see patients in parallel during other portions of the assessment. For example, the physician and psychologist may spend 60–90 min with the patient during an initial assessment, after which the patient and family complete neuropsychological testing (40–60 min). During testing, the physician can see 1–2 other patients. After the neuropsychologist scores the testing (15–20 min), the team develops a consensus plan of care (10–15 min) and returns to the patient for discussion of the plan (15–30 min). It would be difficult to integrate these intensive visits into a rapid-turn-over clinic session; in our own practice this was only possible in clinic sessions dedicated to pediatric FND. A focus on the neurological symptoms as well as medical comorbidities is recommended [26], as this grounds the conversation in concrete

Table 15.1 Factors we consider in the evaluation of children with a suspected functional movement disorder

Factors to include in clinical interviews for pediatric functional movement disorder
FMD clinical history (duration, distribution, site of onset and spread, triggering factors)
Additional physical symptoms of concern
Additional psychiatric symptoms of concern
School and extracurricular performance
Development History
Explicit investigation of bullying and/or hazing (in-person and on-line)
Psychosocial screen for risk-taking behaviors
Medications/Allergies
Household history of social, educational, and workplace disruptions and conflict
Family history of Medical/Psychiatric disease
Medical/Neurological comorbidities

and demonstrable examples. It is crucial that the patient and family feel understood and have an opportunity to voice all concerns about physical symptoms and their impact on daily activities. The physician should convey their belief that the symptoms are real and troubling to the patient.

As the interviewer begins to inquire about temperament, possible stress factors, and mental health history, it is important to maintain a neutral and open-minded approach. The family should experience these questions as a regular part of the clinical interview, not unfounded probing, or insistence on a purely "psychogenic" or traumatic cause that must be pinpointed. It can be helpful to explain why certain questions are being asked, and a focus on the presenting symptoms is again important. For example, we might say, "Many kids who have these kinds of symptoms also have anxiety or depression. Have you been feeling down or nervous?" [To parent:] "Have you noticed that he has been tense, sad, or cranky?" Many families will find these kinds of questions respectful and reasonable. However, others may be apprehensive of questions asking about mental health and stressful life events, especially if they had prior negative experiences in the healthcare system and felt that symptoms were dismissed. For those families, we recommend maintaining openness and curiosity, and simply explaining again the reasons for the inquiry before moving on. For example, "Not everyone has these kinds of problems, but we ask just in case, since it's common." This is another manifestation of our "no surprises" approach – families should never be left to question why we follow particular lines of inquiry, and the emergence of stress indicators should prompt the interviewer to slow the conversation and explain the need for such questions.

It is recommended that healthcare professionals explore stress within the family system, but also sources of resilience [3]. For example, we may ask, "These symptoms can be very stressful for families. How do you cope with the stress? What kind of supports do you have?" Most families will readily acknowledge the impact of FMD and related conditions on their lives. When sharing sources of strength, we can identify possible ways to leverage those resources to improve coping further. We can also identify ways in which the patient and family are not supported, and begin to explore other sources of stress. It is especially important to identify mismatches in resilience, when the child feels unsupported in a domain that their family regards as a relative strength (e.g., a child struggling with faith in a religious family).

It is unfortunately common that a parent leaves or changes their job in order to care for a child with FMD. This can lead to increased financial stress, but can also cause the other parent (in two-parent homes) to disengage in order to work additional hours. Further, the un- or underemployed parent may identify more strongly with a "caregiver of a sick child" role. Some children in this situation may feel guilty for the increased burden on the family, and some may experience non-conscious secondary gain from additional time spent with a parent or from less time spent with the disengaged parent. All of these can serve to perpetuate the cycle of stress on the family system.

In contrast to those working with adult patients, healthcare professionals working with children will almost always have ready access to a caregiver. This allows for the first-hand observation of the parent-child relationship, and sometimes the marital relationship. It is often helpful to conduct at least part of the diagnostic interview with children and parents separately, especially for adolescents. It is however also very informative to speak with everyone in the same room. Does one person answer for everyone? Do family members openly disagree or argue? Is the child quiet when parents are present, but talkative once they leave? While many families may be on the same page about most things, it is rare to not encounter differences in perspectives. It is also very helpful to observe how different family members respond to discussions of emotions and of the mind-body connection. The astute interviewer can gain insight into family system dynamics by observing interactions, not just through the responses provided. Additionally, for interviews where the parents or other caregivers are largely answering for the patient, it can be

helpful to transparently comment that the interviewer wants to specifically hear from the patient; one can also highlight, if necessary, that the kind of information the child is able (and not able) to provide can also have treatment implications which are helpful for the physician to understand. Having a mental health professional as part of the multidisciplinary team can also be particularly helpful to assist in navigating psychiatric and psychosocial factors relevant to the presentation.

Physical Exam

Framing the FMD diagnosis around observable patterns of abnormality on the physical exam is a crucial step in building trust in the process. For example, capturing a video of a functional tremor that demonstrates distractibility and/or entrainment, and then immediately reviewing those findings with the patient and family demonstrates the objective nature of the observation and the skill of the examiner. This is true for all positive features of FMD and other FND symptoms (reviewed by Drs. Carson, Hallett, and Stone [27, 28]). Contrasting a functional neurological symptom with other distinct neurological diagnoses is a very helpful demonstration of confidence in the diagnosis. It should be emphasized that FMD is not a "diagnosis of exclusion," but relies on typical features such as variability and distractibility of symptoms. This approach is in contrast with the outdated, and in our experience, highly ineffective method of saving up exam abnormalities to "catch the patient out" [28, 29] – that is, using FND-supportive physical exam features to prove to the patient that their symptoms are false or inconsistent with "real" neurologic symptoms. In our experience, such an approach is highly damaging to the clinician-patient relationship. We have often heard families ask a version of, "Why couldn't the other doctors see that?" Upon review of prior physician notes, it is our frequent observation that prior providers *did* observe the FMD-specific symptom and made an accurate diagnosis – but failed to communicate it effectively to the patient and family.

An effective physical exam for a child with suspected FMD should include a general neurological exam as well as a standardized movement disorder examination. Given the previously mentioned co-occurrence between functional and other neurologic disorders, it is not surprising that careful assessment may reveal additional neurological diagnoses. We estimate that 10% of our pediatric FND patients have a separate, previously undiagnosed neurological disorder that informs and influences their FMD symptoms, and in other cases we found that another neurological condition was a more accurate diagnosis than FMD. Examples include autoimmune encephalitis, chorea, tic disorders, and autism spectrum disorder. In short, patients with suspected FMD benefit from a thorough neurological examination, punctuated by specific teaching and explanation of physical exam features that support or fail to support the diagnosis of FMD.

Diagnostic Testing

Pediatric patients with FMD do not typically require additional testing such as brain imaging or electrophysiologic tests (e.g., MRI or EMG) to confirm a clinically-established FMD diagnosis. Additional diagnostic studies can sometimes be of help if clinical features are indeterminate or if a neurological comorbidity is suspected. In functional myoclonus, muscle activation occurs in longer-duration bursts (typically >70 ms), has a more variable stimulus-induced latency, and has a preceding Bereitschaftspotential that can be captured on a time-locked EMG-EEG recording [30]. When tremor is indeterminate, surface EMG can help to demonstrate entrainment and variability in frequency. We emphasize that the yield of additional diagnostic tests is low in the presence of positive features for FMD and the absence of other concerning abnormalities on neurological examination. The goal of building trust and reducing anxiety in the patient and family about missed alternative diagnoses can sometimes justify ordering diagnostic studies, however it is useful to set the expectation of normal test result in advance.

Neuropsychological Assessment

Neuropsychologists and child/adolescent psychiatrists can play an important role in the multidisciplinary care of children and adolescents with FMD [31]. Neuropsychologists contribute a unique perspective that encompasses both the neurological and the psychiatric aspects important for understanding and treating this condition. Incorporating neuropsychological assessment into the evaluation process of these patients is useful in identifying predisposing, precipitating and maintaining factors as well as targets for treatment interventions. Child psychiatrists can be important partners in understanding the family dynamic and developmental stresses that may influence a child's FMD presentation and treatment. If a child has known or suspected abuse (emotional, physical or sexual) or neglect, we consider the involvement of child psychiatry to be especially helpful, if available in a timely manner.

Several themes have emerged from research on the neuropsychological functioning of individuals with FND. In adults with FND, overall intelligence, executive functioning, and memory (word retrieval tests) have been found to be modestly impaired [32]. However, IQ does not appear to affect prognosis [33], and when FND patients with pre-existing intellectual disability are excluded, such group-level differences in intellectual function appear to resolve. Similarly, children with FND have demonstrated more difficulties on measures of intellectual ability, academic skills, memory, and executive functioning [3]. Difficulties have been observed in executive functioning and memory as well as processing of emotional stimuli for the children with FND. Taken together, these findings may indicate that information processing resources are being over-utilized in hypervigilance to threat [20]. In our clinic, 17% of patients had estimated IQ below the average range, nearly equal to the expected distribution for IQ, and 18% had problems with verbal memory skills. Interestingly, there was very little overlap between those with below-average IQ and those with limitations in verbal memory.

Assessment of emotional functioning is crucial for children and adolescents with FND. Formal assessment allows for comparison to normative information, which can be helpful to gain information on individual strengths and weaknesses. Assessment of personality variables can also be helpful, especially for adolescents, as most of the commonly-used general personality inventories directly measure somatization tendencies. While concerns regarding the sensitivity and specificity of self-report questionnaires in this population have been raised [26], they can provide helpful information when combined with other sources of data, particularly clinical interviews and parent ratings. In our clinic sample, parents rated their children as more depressed or anxious than normal 46% of the time. For those parents who did not indicate concerns, two-thirds of their children reported emotional problems on self-rated questionnaires. Many of those children subsequently disclosed to their parents during the clinic visit that they had been trying to hide depression and/or anxiety. We recommend keeping the limitations of parent and self-rated questionnaires in mind, and to combine information gained through standardized testing and clinical assessment into a composite patient profile. In our clinic, a majority of patients (62–69%) self-reported a significant number of physical or neurological concerns. A third of patients (33–38%) rated significant emotional distress of some kind. These rates are likely an underestimate given that all patients were experiencing unusual physical symptoms and that anxiety and depression are highly comorbid conditions. However, rating scales can give valuable insight into the state of mind of the patient and parent, including awareness and willingness to disclose information.

Performance validity measures (a marker of internal test consistency) should be incorporated into neuropsychological assessments. Such tests have strong specificity (0.96–0.99) and relatively strong sensitivity (0.68–0.70) in pediatric populations [34]. Performance validity

testing must be interpreted in the context of the larger testing battery and clinical assessment – a recent review called into question the ability of such tests to distinguish between FND and other clinical populations [35], though notably, this study did not include pediatric patients. Performance validity tests can also be affected by the presence of pain and fatigue [36, 37], and clinicians should be mindful of non-volitional sources of error. Most of the children in our sample (all but one) were able to pass performance validity tests, although some gave other, more subtle, indications of inconsistency, such as incorrect answers on simple items but correct answers on more difficult items measuring the same skill.

Multiple validated measures of symptom validity can be useful in assessing patients with FMD. The Minnesota Multifactorial Personality Inventory, Adolescent Version (MMPI-A) has the most support among pediatric measures for symptom validity [37]. In our clinic, we use the Revised Form (MMPI-A-RF) for adolescents. About a third of our patients produce completely valid profiles (comparable to sex and age norms), while another third shows signs of over-reporting and the final third shows signs of under-reporting of symptoms. Patients who over-report symptoms will likely benefit from a different approach than those who under-report, both in terms of discussing the diagnosis and when planning treatment. Similarly, we assess symptom validity in parents. Approximately one third (31%) of the parents assessed in our clinic produced invalid profiles in which overt recognitions of stress were under-reported relative to their own indirect measures of stress. These parents' pattern of responding showed a strong unwillingness to acknowledge even benign, everyday parenting dilemmas as compared to a non-clinical normative group. This provides an important insight into the parent-child dynamic, especially when paired with the child's self-report. A family in which everyone under-reports is quite different from one in which a parent under-reports but a child over-reports.

Treatment of FMD in Children and Adolescents

A detailed discussion of treatment in pediatric FMD can be found in Chap. 31. Careful and thorough assessment, especially within a multidisciplinary approach, is helpful to inform the types of treatments selected for each patient and family. Children and adolescents with FMD are best managed within a coordinated team approach, with ongoing follow-up care by a neurologist, rehabilitation and mental health experts.

(i) Psychological interventions

Psychotherapy interventions are commonly recommended for individuals with FMD. Careful consideration should be given to whether individual therapy, family therapy, or both are recommended. Family therapy and cognitive-behavioral therapy (CBT) with a parent training component have shown to be effective in treating somatic symptoms in children [3]. When presenting therapy recommendations to the family, it is helpful to take patient- and parent-report findings and preferences into account. While some patients and families may readily accept a connection between emotional and physical symptoms after the diagnosis has been presented, others may be reluctant to accept mental health interventions. Building a good rapport and establishing the connection between physical symptoms and suggested therapy within the biopsychosocial framework can often be helpful.

(ii) Rehabilitation-focused interventions

Motor retraining is a mainstay treatment for FMD [38–40]. Cultivating a network of physical, occupational and speech therapists with experience in FMD and the willingness to work within a multidisciplinary team model is an essential step in building an effective FMD treatment program. Children with FMD may travel many hours to access specialized care, and experienced therapists are often not available in their local areas. It is sometimes feasible to accomplish the initial

assessment and development of a patient-specific treatment plan at specialized FND centers, that can then be carried out by therapists closer to home. A model of combined in-person and telemedicine physical therapy visits [38] holds promise for clinics that serve rural and remote patients.

(iii) Medication management for comorbid conditions

Anxiety and depression can often serve as triggers or perpetuating factors for functional movement symptoms and other FND presentations. Especially in patients whose symptoms are temporally linked to symptoms of anxiety and depression, we find that antidepressant therapy, often with a selective serotonergic reuptake inhibitor (SSRI) can be a helpful adjunct treatment.

(iv) Educational considerations

In addition to taking the family environment into account when planning FMD treatment, it is also crucial to consider the school environment for children and adolescents with FMD. These children often have prolonged absence from school or leave formal school in favor of home-based options [6]. Approximately 27% of the students in our clinic sample were being educated entirely at home. Absence from school can provide a source of non-conscious secondary gain that reinforces symptoms. Perfectionistic, high-achieving children in particular may find that the sick role offers an opportunity to escape the demands of school. Medical professionals can ease the transition back to school by communicating the diagnosis directly with the school and developing a concrete action plan for managing symptoms that emerge at school [3]. Many students require academic accommodations, such as extended time for test taking and a reduced workload. They may need physical accommodations, such as extra time to transition between classes or help carrying materials. In our clinic, 46% of students were receiving some type of formal support in school. Many schools express a reasonable concern for liability, especially for children who are perceived as at-risk for falls – for example, children with functional seizures or functional weakness. Educating school staff about the nature of functional neurological symptoms and their generally good prognosis can help alleviate anxiety about keeping the student safe, which can help prevent the loss of social contacts and schedule regularity that school provides.

Case Vignette Revisited

At the beginning of this chapter, we described an adolescent boy with functional speech and movement disorder symptoms. Although FND was diagnosed by a prior neurologist soon after symptom onset, the diagnosis was neither confirmed nor discussed with the patient and his family until approximately 1 year later when he was evaluated in our program. He was followed closely in our clinic, and while his family seemed generally accepting of the diagnosis, he continued to struggle. The patient was never able to participate in neuropsychological testing, as his speech was effortful and his movements near-constant during his clinic visits. As such, data on patient's mental health symptoms remained challenging to gather. Parent questionnaires revealed a tendency towards a defensive profile. His mother endorsed less stress than parents of children in a non-clinical sample, despite caring for a child who had significant functional impairment, needed to be homeschooled because of his symptoms, and had frequent visits to specialists and the Emergency Department. His mother rated him as showing significant somatic symptoms, but no other areas of concern. Again, this made the discussion of the importance of mental health interventions more challenging, as there was no objective evidence of prominent mood or anxiety symptoms while there was objective evidence that his mother was not particularly open to discussions of negative emotions.

The patient participated in physical and speech therapy, although his attendance rate was inconsistent. He established care with a psychiatrist and was prescribed an SSRI. He continued to be home schooled. Though our team and his psy-

chiatrist recommended both individual and family therapy, and reiterated this recommendation at follow-up visits, no formal counseling or therapy was initiated. He began experiencing brief periods of remission but has not had substantial improvement in his quality of life. He continues to have occasional emergency room visits for dyspnea (with normal oxygen saturation) and related difficulties.

As is typical for pediatric FMD, this patient experienced onset of symptoms in adolescence, and his presentation quickly evolved to include multiple symptoms. He had a pre-existing chronic medical condition (asthma) as well as developmental concerns (autism spectrum disorder and mild developmental delays). He did not have a known history of maltreatment or acute stressors, although he experienced some academic and social difficulties given his social and developmental challenges. Unfortunately, although FND was suspected early in his course (per chart review), the family was not educated on the diagnosis nor presented with a dedicated treatment plan until his symptoms had become more chronic. By that time, the family had a high degree of healthcare utilization and the patient had been removed from school and other opportunities for peer socialization. It is possible that his illness beliefs and non-conscious secondary gain provided by withdrawal from school reinforced his functional neurological symptoms. Evaluations from multiple specialists without a clear diagnosis may have contributed to parental hesitancy to fully embrace therapeutic recommendations and failure to establish care with a psychotherapist.

Nonetheless, his willingness to engage in physical and speech therapy, and to receive psychiatric care, provides reason for optimism. He showed some gains in function, such as being able to speak in a soft voice for several minutes at a time, albeit without much improvement toward his prior level of function. With continued close management, we are optimistic that the family's relationship with the treatment team can eventually help with willingness to commit to psychotherapy, and that this may provide additional therapeutic gains.

Summary

- FMD in children can present with many phenomenologies, and single patients often have multiple movement types.
- The most frequent FMD phenotypes in our series and those reported elsewhere are functional gait disorder, functional dystonia, functional myoclonus, and functional tremor.
- FMD in children appear to have a better prognosis than in adults, paralleling the general prognosis of functional neurological disorder in children.
- School and extracurricular stressors are frequent risk factors and proximate triggers in pediatric FMD. While clinicians should assess for a history of abuse, in our experience abuse is not frequently uncovered in pediatric patients with FMD.
- Multidisciplinary care teams are time-intensive for initial visits but provide the opportunity for comprehensive care by a team of experts, facilitating the most appropriate treatments for each patient.
- Neurologists should cultivate an ongoing relationship with patients, even while treatment is being provided by other healthcare professionals including physical and occupational therapists, child psychiatrists, and child psychologists.

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