

Understanding and Managing Adolescents with Conversion and Functional Disorders

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PRACTICE GAPS

1. Many child health professionals lack comfort and competence in dealing with adolescents with functional disorders.
2. Adolescents with functional disorders often see multiple care providers before understanding their diagnosis in such a way as to initiate helpful treatment.

OBJECTIVES *After completing this review, readers should be able to:*

1. Understand and be able to explain differences among structural, psychiatric, and functional disorders.
2. Describe physiologic correlates of functional disorders.
3. Enumerate and apply communication techniques that are helpful in caring for adolescents with functional disorders.

ABSTRACT

A functional disorder is a constellation of bothersome physical symptoms that compromise regular function but for which there is no identifiable organic or psychiatric pathology. Functional disorders can present with various symptoms. Common forms of functional disorders include functional neurologic symptom disorder (also referred to as "conversion disorder"), functional gastrointestinal disorders, chronic pain syndromes, and chronic fatigue. One-third to one-half of outpatient consultations in many practices are due to functional disorders. Functional disorders must be distinguished from structural and psychiatric disorders but should not be considered diagnoses of exclusion. Recovery is facilitated by good relationships between patients and practitioners, with good explanations of the pathophysiology of functional disorders and effective encouragement and education of patients.

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INTRODUCTION

A 15-year-old boy seemed to be recovering from chronic fatigue. He returned to school but then started having trouble walking. During a 2-week hospitalization, all tests yielded normal results. He required a walker to ambulate and was transferred to a rehabilitation unit. Now, 3 weeks into attempts at rehabilitative therapy, he requires a wheelchair.

A 13-year-old missed 60 days of school last year due to abdominal pain and nausea. Thorough gastroenterology evaluations at 2 different medical centers were negative. This year, he struggles to keep up in school and is considering online education.

A 17-year-old competitive dancer was on homebound instruction after multiple episodes at school and dance practice where she fell and began to have jerking movements in all extremities. Her neurologic examination findings were normal, and electroencephalographic monitoring captured a typical episode that had no epileptic correlates. Attempts to maintain typical activity resulted in increased spell frequency and multiple ambulance transports.

A 16-year-old former athlete and honor roll student is now missing more days of school than she is attending because of headaches. All medical testing has been negative for any pathology, and a psychiatrist identifies no psychopathology. Still, she can hardly exercise, and she is barely passing her classes.

A 14-year-old girl has dropped out of elite swimming, honors classes, and most social activities due to chronic fatigue and positional dizziness. A comprehensive medical evaluation reveals postural tachycardia but no other abnormality. Her family is considering homeschooling, and her friendships are suffering.

Patients such as these can be frustrated and frustrating, for families and physicians alike. Nonspecific symptoms generate a vast differential diagnosis, exhaustive (and exhausting) negative results of medical evaluations offer no guidance for targeted treatment, and persistent, unexplained debility prevents teens from living the lives they envisioned.

In such cases, physicians often feel that they have nothing left to offer patients except an unsatisfying psychological explanation. Indeed, each of these not-so-hypothetical patients heard from their doctors that the problems were all “in your head.” However, each of these adolescents qualifies for a diagnosis of a specific functional disorder, for which there are evidence-based treatments, expert-tested management strategies, and well-grounded hope for recovery. In fact, each of the real-life patients who inspired these vignettes recovered to live active, social lives and has every reason to expect a healthy future.

In this article, we outline an updated way to conceptualize or frame functional disorders and discuss effective

pediatrician-based management of adolescents with functional disorders.

BACKGROUND—WHAT IS A PERSON ANYWAY? FROM WHERE DO ILLNESSES ORIGINATE?

Throughout history, various views of the identity of a human being have predominated. Greek philosophers, such as Plato and Aristotle, conceived of humans as a combination of mind, body, and emotion. Christian traditions espoused a view of people as integrated body, mind, soul, and spirit. According to a Buddhist perspective, identity resides in the mind, and all problems, including sickness, originate in the mind. (1)

Naturally, one's understanding of what constitutes a human being can affect one's view of illness. Some maintain a dichotomized view of disease, believing illnesses to be either physical or mental. Others take this dichotomy further, asserting that only the material physical world is important and that if there is no identifiable structural problem, then there really is no problem at all. Within this framework, problems without an identifiable structural correlate must be imaginary.

Likewise, many people, both lay and professional, believe that conversion and functional disorders are not “real.” Even when a doctor believes in the reality of the patient's symptoms, patients often believe that the physician thinks that their symptoms are imaginary, purely psychological, or even willful. In our scientific world, people sometimes assume that if all the test results are normal, then the patient must be normal, regardless of the symptoms. These symptomatic patients are then shuttled off to mental health professionals to address the “true” nature of their symptoms, often feeling invalidated, defensive, and without a clear path forward.

In this article, we work from an assumption that people are more than just bodies, and we argue that functional disorders are best understood beyond the dichotomy of body and mind. We will see that illnesses and symptoms may be identifiably physical, identifiably mental, or identifiably the result of neurologic miscommunication (between the brain and nerves, between nerves, or between nerves and the muscles on which they act), with resulting dysregulation of physical function by the nervous system. We provide a framework from which to view various symptoms as related to neurologic dysfunction even when no structurally identifiable nerve abnormality is present. Implicit in this discussion is the recognition that even this broader conceptualization of functional symptoms likely represents an oversimplification of multiple processes at play in these patients. However, our hope is to encourage re-examination of outdated assumptions about functional disorders and the suboptimal clinical practices that stem from these premises.

A FRAMEWORK FOR UNDERSTANDING HEALTH PROBLEMS—STRUCTURAL, PSYCHIATRIC, AND FUNCTIONAL

It is perhaps helpful to use a framework encompassing 3 types of disease processes: structural, functional, and psychiatric. As seen in the Figure, these illness types can be overlapping and can exist concurrently.

Structural disorders are the classic domain of medical doctors. A bone is broken, an appendix is inflamed, or a tumor is growing. Cells fail to produce insulin, antibodies block the action of thyrotropin, excess metanephrines cause hypertension. These are structural disorders: a specific body part—an organ or tissue or chemical—is damaged or deficient or excessive in a way that causes tangible symptoms. Good clinicians, helped by laboratory tests or imaging or biopsies, can identify the abnormality and offer focused treatment. Much of traditional Western medicine deals with these structural anatomical disorders.

Psychiatrists, in contrast, deal not with defective structures but rather with disordered thought processes, affect, and behavior in the absence of a structural abnormality identifiable by existing medical technology. The signs of the disease are clear, but there is no measurable or correctable physical etiology. Careful diagnostic systems and classifications help organize and order these various psychopathologies into specific disorders, examples of which include bipolar disorder and obsessive-compulsive disorder. Treatment with evidence-based psychotherapies (eg, cognitive behavior therapy [CBT]) and/or pharmacotherapies (eg, serotonin reuptake inhibitors) is effective in altering automatic negative thoughts, regulating affect, promoting adaptive behavioral responses, and restoring chemical equilibria.

Apart from well-defined structural and psychiatric disorders, patients can have bothersome or even debilitating symptoms. With fully normal test results, these patients do not have an identifiable structural disorder. Having no identifiable pattern of altered thought processes or dysregulated affect, they do not qualify for a psychiatric diagnosis. On medical and psychiatric evaluation, their bodily structures and mental thought processes test out as within normal limits. The problem is that their bodies just don't work properly; that is, the problem is one of function. The thought is that when mind and body do not collaborate effectively to provide for proper bodily functioning, patients have functional disorders.

There are 3 main aspects of the nervous system: the motor nervous system, the sensory nervous system, and the autonomic, or involuntary, nervous system. Dysregulation of the motor nervous system may manifest, for example, as an apparent paralysis (with normal brain, nerve, and muscle

potential demonstrable on testing) or as a functional gait disorder. Dysregulation of the sensory nervous system may manifest as chronic pain (with no demonstrably abnormal input to the sensory nerves). Dysregulation of the autonomic nervous system may manifest as chronic nausea due to altered gastrointestinal motility or postural dizziness due to altered circulation with gravitational challenge (without identifiable structural organ abnormality).

Conceptualization of functional disorders can be challenging, especially for those of us entrained to a dichotomized (physical or psychiatric bases of disease) worldview, but analogies may help. Parents can often understand the difference between types of disorders by analogy to computers, realizing that no analogy is perfect. In the computer analogy, the problem might be related to the hardware (structural), to the central processing unit (psychiatric), or to the software (functional); this analogy does not imply that a body or a brain is represented by a specific part of a computer, but it does help differentiate various sorts of medical conditions. Today's adolescents might think of these distinctions as related to another analogy, the handheld device; the problem might be with the phone (structural), the operating system (psychiatric), or the application or "app" (functional). Each type of problem is real whether structural, psychiatric, or functional. Each type of problem can negatively affect activity. Each type of problem is treatable, provided the clinician and patient understand the reality and nature of the problem.

The overlapping circles in the schematic diagram (Figure) remind us of the interacting nature of these disorders. Just as patients with depression might also have cancer or chronic pain, so too may individuals with functional disorders concurrently experience generalized anxiety or hyperthyroidism. The exact boundaries between these overlapping conditions are not always clear.

Furthermore, as scientific knowledge progresses, some disorders presently classified as functional or psychiatric (without identifiable structural abnormality) may be found to have a structural basis. Such was the case with seemingly psychotic patients, as popularized in Susannah Cahalan's book *Brain on Fire*, in whom anti-*N*-methyl-D-aspartate (NMDA) receptor antibodies were discovered; immunomodulation for their autoimmune (structural) disorder was more effective as treatment than was psychotherapy or psychopharmacology. Anti-NMDA receptor-associated disease was found to be structural after all, and some day specific structural abnormalities may be identified as the underlying basis of other conditions currently considered psychiatric or functional in nature.

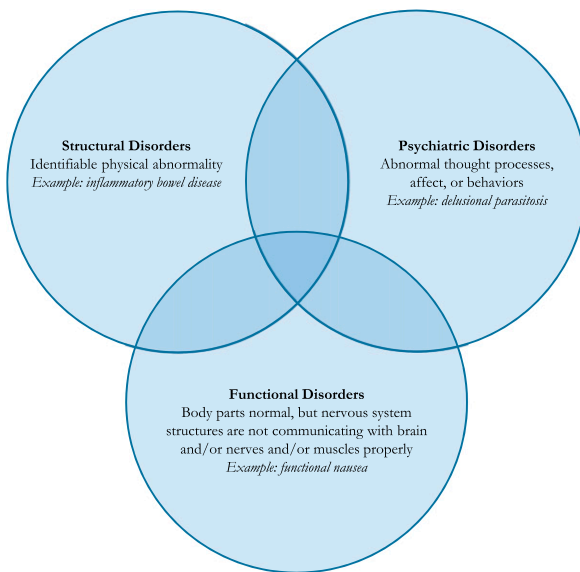


Figure. Relationships among structural, functional, and psychiatric disorders using examples of distinct conditions that are associated with abdominal discomfort.

FUNCTIONAL DISORDERS—CLINICAL DEFINITIONS, INCIDENCE, COMMON SYNDROMES

Definition

A functional disorder is a constellation of bothersome physical symptoms that compromise regular, daily function but for which there is no identifiable organic or psychiatric pathology. Importantly, “functional disorder” is not a diagnosis of exclusion. As experienced by the patients described in the Introduction section of this article, functional disorders are specific problems with common patterns of presentation for which specific, effective treatments are available.

Incidence

It is not unusual to feel unwell. Adolescents frequently have bothersome symptoms, even when no specific pathology can account for the symptoms. A school-based, nationally representative sampling of 6th- to 10th-grade girls in the United States revealed that at least once each week 29% experience headaches, 21% have abdominal pain, 24% have backaches, and 31% have morning fatigue. (2) Symptoms often co-occur; thus, 3.2 million American girls experience both abdominal pain and headache at least weekly, and 4.1 million with weekly (or more frequent) headaches also experience bothersome morning fatigue at least once each week. (2) Although not implying causality, these symptoms were more common in girls who used alcohol, caffeine, or cigarettes; having parental and teacher support seemed protective of symptoms. (2)

It is also not unusual for symptoms to prompt medical care even when no specific etiology for the symptoms can be identified. In a study of 890 adolescents and adults newly evaluated at 7 outpatient clinics in London, United Kingdom, 52% had medically unexplained symptoms. (3) The prevalence of medically unexplained symptoms varied from 37% in dental clinics to 66% in gynecology clinics; prevalence in medical specialty clinics ranged from 41% to 62%. The risk of finding no medical explanation for the symptoms was greatest in younger, female, employed patients. Specific psychiatric pathology was not linked to the presence of medically unexplained symptoms, and, interestingly, patients with medically unexplained symptoms were more likely than those with medical conditions to blame their symptoms on physical diseases rather than on lifestyle factors.

The actual incidence of functional disorders in a general pediatric practice is unknown, but it is estimated that 20% of patients in neurologic and psychiatric practices are affected by functional disorders. (4) Thus, these patients are seen every week, some identified as the “worried well,” others as having “medically unexplained symptoms,” and others as requiring other sorts of evaluation and care. A large number of patients in any pediatric practice likely experience symptoms for which there is no identifiable pathologic correlate. Without good treatment, there can be ongoing debilitation.

Common Syndromes

It is helpful to understand that there are several common categories of functional disorders (Table 1). Various functional disorders may have different causes and different pathophysiologies, but they share 2 basic unifying characteristics: association with symptoms that negatively affect normal life activities and lack of an identifiable structural or psychiatric basis. Those previously referred to as “conversion disorders” typically affect the nervous system and are now collectively labeled as “functional neurologic symptom disorders.” Functional gastrointestinal disorders include a variety of conditions characterized by nausea and abdominal discomfort. Chronic pain syndromes vary in type and include migraine headaches and fibromyalgia. Chronic fatigue occurs with or without specific autonomic nervous system findings such as postural tachycardia. Each of these syndromes shares a common functional basis with the others, but each is also subject to recent advances in understanding.

As we consider each of these syndromes in turn, it is helpful to remember that they are each problems of function in the context of anatomically and chemically normal body parts. It is also helpful to dismiss the now-archaic notion that if a disorder was functional, it was not real.

Table 1. Common Functional Disorders

CATEGORY	EXAMPLES
Functional neurologic symptom disorders	Nonepileptic seizures
	Episodic hyporesponsiveness (functional fainting)
	Functional gait disorder
Functional gastrointestinal disorders	Functional nausea and vomiting disorders
	Functional abdominal discomfort disorders
	Functional defecation disorders
Chronic pain syndromes	Headache (various types)
	Generalized systemic pain (fibromyalgia)
	Chronic regional pain syndrome
Chronic fatigue	Chronic fatigue syndrome
	Postural orthostatic tachycardia syndrome

Functional Neurologic Symptom Disorders. Functional neurologic symptom disorders can present dramatically. Patients can lose vision, exhibit seizurelike movements, become unresponsive, or lose mobility. These abnormalities may be brief, recurrently episodic, or chronic. In the setting of functional blindness, the results of eye examination and imaging of the occipital cortex are normal. With functional fainting, vital signs and electroencephalographic findings are normal, even during spells. In patients with functional seizurelike episodes, no epileptogenic correlate is present on electroencephalography. (5) With seeming paralysis or with a chaotically wobbling astasia-abasia gait (an inability to stand [astasia] and/or walk [abasia] normally), imaging and electromyography findings are normal, and the pattern of deficits does not fit with any recognized neuroanatomical pathway. The classic observation of a patient seeming unconcerned in the face of debilitating symptoms (“la belle indifference”) is not uniformly observed. (6)

Nomenclature for functional neurologic symptom disorders has evolved over time. The topic of these unexplained, seemingly neurologic symptoms proved vexing for stalwarts of medical history, including Hippocrates, William Harvey, Thomas Sydenham, and Sigmund Freud. (4) Past generations used the term *hysteria*, but this became pejorative and was dropped from the third edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM)* in 1968. (4) *Somatization disorder* and *hypochondriasis* were used for some years and then dropped. *Conversion disorder* has continued as a valid term, but the alternative term, *functional neurologic symptom disorder*, was added in the 2013 *DSM-5*. (4) Whatever the term used to describe the situation, the condition is characterized by the presence of

atypical neurologic symptoms that are inconsistent with any known pathologic neurologic disorder. (4)

The prevalence of functional neurologic symptom disorders in children and adolescents is unknown, but it is seen in 2 to 12 per 100,000 individuals in various clinical settings. (4)(6) Functional neurologic disorders are more commonly reported in females, (6) especially adult females, who have been abused (sexually or physically); other stressful triggers to the onset of symptoms have been identified. (4)(5)(6) Many others have a chronic neurologic (eg, pain, seizures) or psychiatric (eg, anxiety) condition that seems to predispose to development of a superimposed functional neurologic disorder. (5)(7) However, many patients are unable to identify a specific event triggering their condition. Indeed, the newest diagnostic criteria no longer require a triggering stressor as a prerequisite to the diagnosis. (4) Although it is often difficult to infer motivation from behaviors, implicit in the diagnosis of functional neurologic symptom disorder is that the symptoms are not intentionally produced. (8)

Functional Gastrointestinal Disorders. Functional gastrointestinal disorders are common in pediatric patients and are associated with significant impairment of quality of life for the patient and for the family, and with significant cost. (9) The initial 1990 Rome Criteria for the diagnosis of functional gastrointestinal disorders applied only to adults, but pediatric criteria have been included in subsequent iterations, including the 2016 revised Rome IV Criteria. (9)

For simplicity, experts divide functional gastrointestinal disorders into 3 types. First, functional nausea and vomiting disorders typically manifest in younger children as cyclic vomiting, rumination, or aerophagia and in adolescents as simple functional nausea and vomiting. Second, functional abdominal pain disorders include dyspepsia, irritable bowel syndrome, and abdominal migraine, as well as nonspecific chronic abdominal pain. Finally, functional defecation disorders include constipation and pelvic floor dysfunction. The Rome IV document provides a review of the epidemiology, pathophysiologic features, diagnostic criteria, and treatment for each type of functional gastrointestinal disorder. (10)

Depending on the population in question, the prevalence of functional gastrointestinal disorders varies from 10% to 87% in children and adolescents. (11) There are some international variations in the prevalence of functional gastrointestinal disorders, and the burden of the condition seems to be increasing over time. (11) The diagnosis of a functional gastrointestinal disorder may be made on the basis of typical symptoms rather than as a diagnosis of exclusion. (10)

Chronic Pain. Worldwide, 20% to 46% of children experience chronic pain. (12) Chronic functional pain syndromes may be intermittent or persistent. Functional

disorders of chronic pain may be localized or generalized. In the case of chronic regional pain syndrome, in which pain is localized to a specific body part, features of autonomic dysfunction often co-occur.

Fibromyalgia affects 2% to 6% of children, especially female adolescents. (12) Diagnostic criteria include widespread pain, specific tender trigger points identified during careful physical examination, and associated symptoms, commonly fatigue and disordered sleep. (12)

Headaches affect 10% to 20% of children and adolescents. (13) Distinctive types of headaches are characterized by specific features, including sensation, location, frequency, duration, and associated symptoms. However, adult classification systems are imperfectly applied to adolescents; for instance, migraines are usually shorter in adolescents than in adults, are more often frontal instead of unilateral, and are more often associated with autonomic symptoms. (14)

Chronic Fatigue. Chronic fatigue is characterized by overwhelming tiredness (not necessarily sleepiness) that interrupts normal daily function. A research definition of chronic fatigue syndrome, first developed in the 1990s, was updated in 2015 to “systemic exertion intolerance.” (15) This new definition is based on significant impairment of routine daily function, postexertional malaise, unrefreshing sleep, and either cognitive impairment or orthostatic intolerance. (15) Autonomic dysfunction is common with chronic fatigue, and many affected patients have associated orthostatic intolerance with excessive postural tachycardia, thus qualifying for a diagnosis of postural orthostatic tachycardia syndrome. (16)(17)(18)

Approximately 20% of adolescents experience chronic bothersome fatigue, and 1% to 2% are disabled by their fatigue. (17) Of course, fatigue can result from iron deficiency, hypothyroidism, poor sleep hygiene, and many other problems; however, most adolescents with chronic fatigue have no sign of a specific organic abnormality.

PUTATIVE PATHOPHYSIOLOGIC MECHANISMS OF FUNCTIONAL DISORDERS

By definition, functional disorders are not associated with any specific etiologic abnormality of bodily structures and chemicals. Nonetheless, there is growing evidence to suggest specific pathophysiologic mechanisms by which functional disorders occur.

Patients with functional nonepileptic seizures demonstrate evidence of altered activity in brain connections. Inhibitory pathways arising from areas of the brain associated with emotional responses are co-activated with the normal movement-stimulating areas of the brain. (8) Functional magnetic resonance imaging in the resting state shows increased connectivity between the insula (important for emotion), the inferior frontal gyrus and parietal cortex

(important for executive control), and the precentral sulcus (involved in movement). (9)

The brain-gut axis includes local gastrointestinal and distant neurohormonal circuitry to provide, ideally, fluid and comfortable movement of nourishment through the intestinal tract. New knowledge of the chemical actions taking place in the gastrointestinal tracts of individuals with functional gastrointestinal disorders provides a basis to understand functional gastrointestinal disorders. (19) The enteric nervous system responds to intestinal contents and regulates intestinal flow. Furthermore, the chemicals working in the enteric nervous system, such as serotonin, are the same chemicals that transmit central nervous system information or interact with the brain’s neurotransmitters. Alterations in serotonin activity in the gastrointestinal tract alter serotonin effects in the brain, and vice versa. Many of these alterations relate to the vagus nerve, providing a physiologic explanation for the common co-occurrence of functional problems with the circulatory system in patients with altered intestinal flow.

Microorganisms not only inhabit the intestinal tract, but also affect intestinal flow. Thus, alterations in the microbiome can disrupt the regular functioning of the intestines and have been linked to several functional gastrointestinal disorders. (9) International travelers who develop diarrhea are at risk for postinfectious irritable bowel syndrome, the pathophysiology of which is likely related to changes in the microbiome.

Distinct from the function of specific organs, chronic pain can result from variations in neurotransmitters. Disequilibrium of neurochemicals is associated with amplification of painful stimuli and with allodynia, the perception of sensations not normally thought to be painful as being very painful. (20) Alterations in normal neurologic function take place in both ascending and descending pathways. (20) Neurotransmitters involved in the sensation of pain, such as glutamate, are found at increased levels in the spinal fluid of patients with chronic widespread pain, and pain-inhibitory chemicals, such as dopamine, are decreased. (20) Because these neurotransmitters also function in the regulation of activation and sleep, it is not surprising that fatigue and nonrefreshing sleep are common in patients with chronic pain. The hypothalamic-pituitary axis and mast cell activation are also involved in pain sensation and contribute to both the increased perception and decreased inhibition of pain in the central nervous system. (21)

Altered pain perception is often best understood in the framework of central sensitization. (22) Various chemical gateways either facilitate or inhibit the delivery of sensory messages from various body parts to the brain. Between the body (sensory nerve endings) and the brain (site of pain perception), an altered neurochemical balance overly sensitizes the brain to incoming sensory stimulation by opening the pain pathways (sometimes

explained by analogy as opening gates or increasing flow through filters) more widely, allowing more of these pain messages to get through. Studies of sensory stimulation in healthy volunteers and observations in patients with chronic pain support this notion of central sensitization. (22)

THE DIAGNOSIS OF FUNCTIONAL DISORDERS IN ADOLESCENTS

The diagnosis of a functional disorder should be based on specific, recognizable features of a patient's clinical presentation. It is important to recognize other contributing structural or psychiatric problems, but the diagnosis of a functional disorder should not be seen as an afterthought or a diagnosis of exclusion. Early identification of a functional disorder avoids the cost and inconvenience of additional, unnecessary testing and consultation while quickly directing the patient to appropriate treatment.

Functional neurologic symptom disorders may be diagnosed using the criteria noted in the *DSM-5*. (8)(15) Functional gastrointestinal disorders can be diagnosed following the guidelines of Rome IV, as elaborated on by an expert consensus group. (9)(10) Chronic pain is a clinical diagnosis because the pain persists and debilitates even in the absence of tests showing an organic cause of the pain; features such as allodynia are strongly suggestive of a functional pain disorder. (12) The diagnosis of chronic fatigue should include an evaluation for excessive postural tachycardia. Although the treatments of chronic fatigue and postural orthostatic tachycardia syndrome are nearly identical, individuals with excessive postural tachycardia may also benefit from volume expansion (through the intake of generous quantities of oral fluid and salt) and medication (such as a β -blocker or midodrine). (17)(18)

TREATMENT OF FUNCTIONAL DISORDERS—APPROACH TO THE PATIENT AND FAMILY

A Clear and Empathic Presentation of the Diagnosis

Critical to a successful outcome for a patient with a functional disorder is the delivery of the diagnosis. (8) The diagnosis must be explained in such a way that the patient understands the reality and severity of the condition and is provided with optimism for recovery. Far too many patients get stuck in their disability after hearing doctors say, "You are fine, just go to school," when it might be more therapeutic to say, "Good news: Your test results are normal. You have a problem of how your body functions instead of a structural problem, and we can help you recover fully from that." Diagnostic discussion should also help clarify how treatment approaches for persistent functional symptoms (ie, behavioral activation

even as symptoms persist) are often dramatically different from treatment of acute conditions (ie, wait until symptoms abate to resume activity), and recognition of the challenges presented by this seemingly counterintuitive method (eg, "This is probably going to feel like the wrong thing to do, but we know that it is ultimately what will lead to recovery.").

A Specific Roadmap to Recovery

Typically, recovery from a functional disorder involves 3 concurrent treatment modalities. The patient should be directed to engage in 1) physical activity, 2) CBT, and 3) supportive medical oversight. The road to recovery might be long and the journey will likely be difficult for patients and for care providers alike, but clear directions can facilitate improved outcomes.

First, resumption of physical activity and a more typical schedule is critical for the patient who has become physically dysfunctional. Altered nerve pathways have made it impossible, or at least very difficult, to keep up with normal academic, athletic, and social activities, or even with basic activities of daily living. A stepwise, sustainable plan will facilitate a return to normal activity, and structured physical therapy emphasizing regularity and moderation in physical activity is often helpful. Specifically, the patient should start with daily aerobic exercise (clinically defined as activity that results in breathing faster than normal without panting) for a duration that does not leave postexertional fatigue lasting more than a couple of hours. Whether feeling well or not, the patient then engages in that exercise session every day, and the duration of exercise is increased by 1 to 2 minutes every 5 days until reaching (and then continuing) a daily session of 30 minutes. Other routine physical activities (housework, play with a pet, outdoor recreation) should be encouraged. For those absent from school, structured incremental increases in academic activity should target a stepwise return to a full schedule.

Second, restoration of the mind-body connection is facilitated by CBT; involvement of mental health professionals can be a key component of care. Due to central sensitization, an altered brain-gut axis, and neurotransmitter dysfunction, the brain of a patient with a functional disorder has lost some control of sensory, motor, and/or autonomic functions of the body. CBT is of proven effectiveness in overcoming functional disorders. (8)(12)(17) CBT focuses on broadening an individual's coping repertoire and mitigating the negative impact of stress while promoting functional restoration. Typical elements include physiologic self-regulation (eg, relaxation, meditation, biofeedback), cognitive restructuring, and various behavioral strategies (eg, exposure, habit reversal, sleep hygiene, addressing sources of unintentional reinforcement/secondary gain). Care should be comprehensive, and collaboration of multidisciplinary team members can help helpful.

Table 2. Effectively Discussing Functional Disorders with Patients and Parents

THEME	ACTION	EXAMPLES
Connection	Validate	Yes, your symptoms feel miserable.
	Affirm	The problem is real. It is not all “in your head.”
	Share	What are your goals? What would you like us to accomplish?
Collaboration	Focus	Let’s move together from diagnostic discovery to real recovery.
	Be there	You are not alone. We are in this together until you are well.
	Involve a team	You don’t have to do this alone. I’ll help. We’ll involve others, too.
Comprehension	Explain using	We’ve seen this before. It’s a neurotransmitter problem.
	science and	Your brain and your body aren’t communicating properly.
	stories	Your story reminds me of another teenager who...
Coordination	Plan	Let’s review the next steps in your recovery regimen.
	Permit	Some people actually get better quickly.
	Innovate	What motivation might help your body get better?
Communication	Believe	I know you can do this. I’ve seen similar patients recover.
	Be real	You’ve been through so much. I would feel terrible if I were you.
	Laugh	I don’t know how things could be any worse, unless it was me who was suffering so much.
	Model	I’ve been through this before. Here’s how we’ll do it together.
	Allow	Your body is now primed to recover, and we can expect a full recovery.

Finally, evidence supports the importance of continued oversight by the medical provider, even when the diagnostic odyssey is discontinued. In 2017, a landmark study of medication management for children and adolescents with migraine headaches found that more than half of patients improved with either amitriptyline or topiramate, but those receiving placebo did just as well with fewer adverse effects. (23) Regular follow-up with careful attention to the patients are likely what made the placebo comparably (~65%) effective. Patients with functional disorders may present with long-term disability, but regular follow-up can help promote good, lasting recovery. Functional gait disorders, for instance, sometimes resolve quickly once CBT and physical therapy are instituted; for other patients, recovery is gradual and ongoing. Many patients are helped from shifting the emphasis away from continued diagnostic testing and prescribing additional medications and, instead, toward supportive reassurance and oversight of ongoing functional restoration while providing close collaboration between health-care professionals and the patient and family.

Features of a Physician’s Communication Style Associated with Good Patient Outcomes

Successful outcomes for adolescents with functional disorders sometimes seem to depend more on the physician’s communication with the patient than on any other single factor. It is hard work for a patient to regain effective neurologic function between the mind and the body, and success

depends on helping the patient to believe in and act on the hope of recovery.

Herein we offer 5 features of a pediatric care provider’s successful approach to facilitating recovery from functional disorders: 1) connection, 2) collaboration, 3) comprehension, 4) coordination, and 5) communication (Table 2). These features are informed by decades of expert experience, (24) studies of what patients want, (25) and scientific literature. (8)

Connection. Adolescents with functional disorders fare much better when they connect to and relate well with the person explaining the diagnosis and coordinating their treatment. The physician (or advanced practice provider) must meet and personally connect with the patient’s experience and understanding of his or her disorder. The provider must validate the patient (“Yes, your symptoms feel miserable.”) without being dismissive. The provider must affirm the patient (“The problem is real. It is not in your head.”). And, the provider must share the process with the patient (“What are your goals and how can I help you reach them?”), building on the present situation and preparing to work toward mutually desirable outcomes.

Collaboration. All too often, adolescents with functional disorders feel discouraged as they watch their lives, their friends, and their futures moving on without them. Some patients have lost hope of getting better. Even more challenging for clinicians are adolescents whose identity has been built around an illness such that they no longer see themselves as capable of being well. It is important to develop a shared focus

on recovery, not diagnosis, as the true destination (“Shall we move from a diagnostic discovery to real recovery?”). Collaboration is also important with parents who have, perhaps, long been fixated on finding new specialists and new diseases to explain (but perhaps not help) the symptoms. Shared goals, not goals imposed by parents or pediatricians, are needed.

The treating professional should be there for the patient (“You are not alone. We are in this together and will be until you are well.”). The provider should involve a team (“You don’t have to do this alone. I am here to help. We’ll also involve your family, your school, and other experts [therapists] to help you become well again.”). It is vitally important that all medical and allied health members of the team coordinate their care seamlessly.

Comprehension. Of course, these techniques will be ineffective if the patient does not “get it” or if the patient thinks the provider does not get it. A mutual understanding of the diagnosis is key. It might take time—days, weeks, or even longer—for the patient and family to reframe the illness as a functional/“software”/“app” problem when they have been seeking new structural explanations for months or years. The physician should attempt to explain the disease model by describing brain pathways, central sensitization, and neurotransmitters using data with diagrams and by sharing cases that he or she has seen and treated before. When talking with the patient, the physician can provide medical facts and statistics combined with theory, stories, and analogies that best explain the nature of the disorder. This conversation should be on an intellectual level that the patient and family can understand. Often, tangible examples of similarly presenting yet subsequently recovered patients (such as the ones described at the beginning and end of this article) can be described to provide the patient with a mental model and hope for recovery.

Coordination. With a fresh diagnosis and with the willingness to try a fresh approach to treatment, patients and families should be ready to move forward, but they will need specific guidance to begin. Together, the treating team and patient and family should plan specific steps. There should be a clear review of all pending appointments (such as with therapists or school staff) to clarify the roles of all members of the coordinated care team. Goals and action items for the next few days should be affirmed. Follow-up visits should be scheduled. The patient should know that although many patients require prolonged professional help to recover, some improve dramatically and quickly. Then, one should permit the patient to do the same; patients can be told about the potential for a quick recovery and can be given “permission” to simply get better (and then still continue with rehabilitation to embed the improved neurologic function for the long-term). One immobile patient who was given permission to recover quickly went to a

mall in her wheelchair, saw some peers walking by in “skinny jeans,” and decided she wanted to walk in skinny jeans too. So, she did! The provider should be empowered to innovate to help patients discover the subtle desires and next steps that might allow their brains to quickly restore normal neurologic pathways (although not all patients recover so quickly).

Communication. Good communication is a skill to be developed with time and experience. Providers should believe in their patient and in the scientifically credible possibility of recovery. Optimism is key. One should maximize the power of the placebo, ie, share explanations and attitudes that foster a positive outlook and expectation of recovery. Physicians should be real (authentic, genuine, and able to relate) with their patients because adolescents can see through an inattentive or dismissive lack of concern. Providers should be seen as open and authentically genuine with patients. Providers are even encouraged to laugh; patients often report that humor goes a long way toward recovery, especially when the humor is founded on all of the preceding principles being discussed. (See Table 2 for an example of incorporating humor.) One can model recovery by mentioning how similar patients have overcome their condition and model confidence by pointing out good things the patient is already doing that facilitate recovery. The physician should model normal function and demonstrate positive behaviors during the patient interaction, not affirming pain behaviors but reinforcing any behavior that moves toward normal health and function with genuine enthusiasm. Along the way toward recovery, patients can be reassured that progress in normalizing function often precedes a subjective sense of “feeling better,” such that shifting from mentally monitoring symptoms to monitoring function becomes highly productive. The provider should be careful not to attach any stigma to the condition, and in fact should help the patient begin to normalize his or her experience of life (“You’ve been excluded from a lot of normal activities. Now you have the opportunity to get back to previously normal activities, to learn to cope and recover.”). Finally, the provider should allow the patient to recover. The physician can give permission for quick progress (find a patient-specific motivational factor, such as skinny jeans, that might be an individual patient’s prompt to recovery) as well as for courageous perseverance in the face of long recovery times.

TREATMENT OF FUNCTIONAL DISORDERS—APPROACH TO THE SPECIFIC FUNCTIONAL SYNDROME

Having established a foundation for the general principles for recovery of all patients with functional disorders, we now

consider some specific treatment modalities for specific functional syndromes.

Functional neurologic symptom disorders respond well to treatment, especially when the symptoms are short-lived before the clear diagnosis of a functional disorder. CBT has long been the mainstay of treatment, but increasing evidence also supports the importance of physical therapy, especially when motor symptoms predominate. (8) With involvement of rehabilitation services, multidisciplinary treatment programs are effective, and sustained recovery can be anticipated. (26) Even when functional gait disorders have been symptomatic for more than a year, adolescents and adults receiving intensive physical and occupational therapy based on a motor reprogramming concept can achieve sustained favorable outcomes. (27) Sometimes temporary separation from the home environment can be helpful as the patient gains new skills and solidifies new habits.

Similarly, for children and adolescents with functional gastrointestinal disorders, implementation of a biopsychosocial model of care (with empathic communication, CBT, and medications as deemed appropriate) was effective, with full recovery in 60% of patients within 1.5 years of follow-up. (28) Medications such as amitriptyline and buspirone and selective serotonin reuptake inhibitors can be an effective adjunct with multifaceted treatment in many patients with functional gastrointestinal disorders. (19)

Multidisciplinary care is also helpful for patients with chronic pain. (12) Medications such as duloxetine, amitriptyline, and gabapentin can help alleviate symptoms when the extent of pain limits the possibility of engaging in advised nonpharmacologic treatments, whereas physical activity and physical therapy, combined with CBT, lead to lasting improvement. (12)

Exercise and resumption of regular academic activities are essential to recovery from chronic fatigue, as is good CBT. For tired adolescents with postural orthostatic tachycardia syndrome, medications (eg, a β -blocker and/or midodrine) and volume repletion (with aggressive oral hydration and salt intake) add to the potential for full recovery. (17) A few patients improve quickly with nonpharmacologic treatments, but most patients with postural orthostatic tachycardia syndrome are treated with a medication such as a β -blocker. Patients with orthostatic intolerance without excessive postural tachycardia rarely need such medication. Notably, full recovery is the rule rather than the exception for patients with chronic fatigue. (29)

CONCLUSIONS

The 5 patients described at the beginning of this article represent specific patients seen in a general pediatric practice; each had a favorable outcome. Within 2 days of receiving

a diagnosis of a functional disorder, the 15-year-old with a functional gait disorder was running and jumping well; he sustained good recovery with ongoing therapy. The 13-year-old with functional gastrointestinal disorders gradually built up to full-time school over the course of the subsequent semester but still struggles with some nausea. The 17-year-old with nonepileptic spells embraced CBT, returned to dance and full-time school attendance within 2 months, and is now making college plans. The 16-year-old with headache stayed out of sports but is otherwise functioning well in all ways and still reaps benefit from physical therapy. The 14-year-old with chronic fatigue and postural orthostatic tachycardia syndrome recovered completely and is now thriving as a medical student.

Summary

- Based on some research evidence as well as consensus, it is clear that functional disorders are common (3) during the adolescent years.
- Based on case reports, expert opinion, reasoning from first principles, and limited studies, it seems evident that, with appropriate diagnostic help and good provider-patient communication, a specific evidence-guided treatment program may be established. (4)(5)(8)(17)(22)(26)
- Based on case series and expert opinion, full recovery from functional disorders is possible. (12)(23)(26)(27)(28)(29)

To view teaching slides that accompany this article, visit <http://pedsinreview.aappublications.org/content/41/12/630.supplemental>.

Understanding and Managing Adolescents with Conversion and Functional Disorders

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1. A 15-year-old girl with bipolar depression presents to your practice for a follow-up from a hospital admission for multiple episodes of seizurelike activity. She had an extensive evaluation in the hospital, and an electroencephalogram is negative. The family tells you that the hospital doctors told them that it was “all in her head.” The family is really confused and does not know what to do next. Which of the following is the first measure a health-care provider should take in helping this patient?
 - A. Collaboration.
 - B. Communication.
 - C. Comprehension.
 - D. Connection.
 - E. Coordination.
2. A 10-year-old girl with no remarkable medical history has been having trouble walking and has not attended school for the past 2 weeks. The patient has been seen at multiple hospitals and was recently admitted to the hospital where all tests were normal except for a neurologic evaluation. She was discharged with referral to psychiatry. Now she requires a wheelchair. In addition to cognitive behavior therapy (CBT), which of the following is the next best step in management of this patient?
 - A. Intense physical and occupational therapy for 1 year with motor reprogramming.
 - B. Living with a relative.
 - C. Occupational therapy.
 - D. Physical rehabilitation.
 - E. Psychopharmacotherapy.
3. A 13-year-old boy has been having periumbilical pain usually in the mornings for 2 months. Multiple evaluations by pediatricians and hospitals have revealed a negative evaluation. The family is very stressed because the child has missed a lot of school. He is referred to a gastroenterology specialist but the appointment is 3 months away. Which of the following is the best next step in management?
 - A. Implement the biopsychosocial model of care.
 - B. Refer the patient to psychiatry.
 - C. Send the patient to the emergency department to get him hospitalized so that gastroenterology can see him right away.
 - D. Start the patient on a high-fiber diet.
 - E. Start the patient on an antispasmodic medication for 1 month.
4. A 13-year-old girl has chronic bilateral leg pain and is not able to do activities of daily living. She is mostly homebound and is missing school. She has tried pain medications, which did not work. She was evaluated by orthopedics and sports medicine without much benefit. Which of the following is the best treatment regimen for this patient?
 - A. Gabapentin.
 - B. Duloxetine.
 - C. Amitriptyline.
 - D. Physical therapy and CBT.
 - E. Combination of physical therapy, CBT, and medications such as gabapentin, amitriptyline, or duloxetine.

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5. A 16-year-old boy is unable to attend school due to chronic fatigue and postural hypotension. He had infectious mononucleosis 3 months ago. He sleeps up to 16 hours a day and still feels fatigued. He has not been able to keep up with schoolwork, and his parents are thinking of homeschooling him. On assessing the patient, his pediatrician noted orthostatic intolerance without evidence of excessive postural tachycardia. Which of the following is the most appropriate treatment approach to recommend at this time for this patient?
- A. Encourage fluid and salt intake, exercise, and gradual increase in academic activities.
 - B. Encourage exercise and gradual increase in academic activities.
 - C. Encourage exercise, gradual increase in academic activities, and start CBT.
 - D. Reassure and schedule follow-up in 1 month.
 - E. Prescribe a β -blocker.

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