ABSTRACT

- **Objective:** To review functional gastrointestinal disorders (FGIDs) in children, with an emphasis on evidence-based diagnostic and treatment approaches.
- **Methods:** Review of the literature.
- **Results:** Chronic or recurrent abdominal pain is a common condition in children. No clinical practice guidelines currently exist for pediatric functional abdominal pain broadly or FGIDs more specifically. The Rome classification system includes several discrete diagnostic entities that are diagnosed based on symptom criteria in the absence of red flags. The prevailing biopsychosocial model of pediatric functional abdominal pain suggests that intervening to address biological factors, while providing coping skills and environmental supports to encourage functioning, offers the greatest likelihood of positive treatment outcomes and decreased disability.
- **Conclusion:** Simultaneously treating all contributors to pain maintenance in FGIDs offers the greatest promise in effectively breaking the pain cycle.

Chronic or recurrent abdominal pain is one of the most common chronic pain entities in children and adolescents, affecting an estimated 0.3% to 19% of children worldwide [1–3]. Compounding this, chronic or recurrent abdominal pain can have significant psychosocial and financial costs, which often persist into adulthood [4–7], making this a global health problem with impact well beyond the individual child and family.

Unfortunately, no clinical practice guidelines yet exist for assessment and/or treatment of this condition. This may be due, at least in part, to the historical term “recurrent abdominal pain” or “RAP” being too broad of a label to effectively guide clinical practice. Indeed, the American Academy of Pediatrics and the North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition called for the term “RAP” to be retired in 2005 in favor of a symptom-based classification system created and revised by a group of experts over the past 2 decades [8]. This classification system, commonly referred to as the Rome criteria and currently in its third version [9], includes several discrete diagnostic entities that are collected under the heading of functional gastrointestinal disorders (FGIDs). These diagnostic entities include functional dyspepsia, irritable bowel syndrome (IBS), functional abdominal pain syndrome, and abdominal migraine (see Table 1 for symptom-based criteria) and are diagnosed in the absence of clear structural or biochemical abnormalities that explain the symptoms.

In the absence of red flags (as discussed below), there is no specific testing required to rule out disease. Instead, the intent is to allow the clinician to make a positive diagnosis of an FGID based on symptom criteria alone. Evidence suggests that most children with chronic or recurrent abdominal pain meet criteria for at least one FGID, with IBS and functional dyspepsia being the 2 most common [10,11]. Although more work needs to be done to validate the Rome criteria, this remains the best classification system currently available and is the current standard for entry into most therapeutic trials.

This move to call chronic or recurrent abdominal pain “functional” in no way implies that the pain is not real, nor does it imply that this pain does not have a pathophysiological basis. In fact, FGIDs are best understood within a biopsychosocial framework, wherein pain results from and is maintained by a combination of biological (eg, inflammation, dysmotility, visceral hyperalgesia), psychological (eg, anxiety, depression, sleep), and social (eg, interactions with peers, teachers, parents) factors that may be interactive with each other. It is important to note that...
the biopsychosocial model for FGIDs is both complex and dynamic; children may achieve the same end result (ie, abdominal pain) through different pathways and, further, an individual child’s pain may be maintained by different factors at different points in time. As our sophistication in classification, medical technology, and statistical approaches improves, so does our understanding of the complex nature of abdominal pain in children.

This case-based review will illustrate our current understanding of FGIDs in children with an emphasis on evidence-based diagnostic and treatment approaches that may be applicable to the pediatric primary care, general practice, or subspecialist office.

**CASE STUDY**

**Initial Presentation**

An 11-year-old boy presents with a 4-month history of daily abdominal pain.

**History and Physical Examination**

Pain was occurring intermittently every day with episodes lasting 5 to 60 minutes each time. Pain often occurred after eating, but occurred unpredictably at other times of the day as well. The patient had associated complaints of nausea, bloating, and early satiety. Physical examination demonstrated only mild epigastric tenderness without rebound. He was diagnosed with functional dyspepsia based on his symptom profile.

- What is the initial approach to evaluating a child with chronic abdominal pain?

**Initial Evaluation Process**

The initial assessment of a child with a complaint of chronic or recurrent abdominal pain should first focus on excluding clear organic, and potentially serious, disease. Red flags may arise during the physical examination and/or medical history that warrant additional workup before a functional diagnosis can be considered (see Table 2 for a listing of red flags and recommended workup). Red flags such as anemia, hematochezia, and weight loss appear to be useful indicators of Crohn’s disease in children with chronic abdominal pain [12]. It should be noted, however, that there has been no evaluation of the ability of blood tests in isolation to predict diagnoses in these patients. In the absence of red flags, the focus of the evaluation should be on classifying the patient’s symptoms by FGID criteria and identifying as many of the patient’s current contributors (biological, psychological, and social) to pain main-
Maintenance as possible in order to guide development of a comprehensive treatment plan in the next step.

- **What potential biologic contributors should be assessed?**

Tests to identify potential biologic targets of therapy are limited, but potential biologic targets may be inferred given a patient’s predominant symptoms and current knowledge regarding the pathophysiology of specific FGIDs. While this starts with a standard physical examination and thorough medical history, it does not necessarily end there. The patient’s symptoms should be considered a guide for further evaluation via in-depth questioning, laboratory testing, and/or endoscopic evaluation, where indicated. A few of the more common biologic contributors to FGIDs are outlined below.

**Colonic Motility**

Colonic motility may represent an important therapeutic target for a subset of children with IBS. While there are no routinely available tests to evaluate colonic motility in a primary care setting, IBS is associated with either rapid colonic transit typical of diarrhea-predominant IBS or delayed colonic transit typical of constipation-predominant IBS, both of which can be ascertained via a careful review of symptoms. It should be noted, however, that transit is increased in only 48% of adults with diarrhea-predominant IBS and decreased in only 20% of those with constipation-predominant IBS [13]. Though there are many fewer pediatric studies, the findings in children are similar to those in adults.

**Electromechanical Issues**

Electromechanical issues, such as delayed gastric emptying, gastric electrical rhythm disturbances, impaired accommodation (relaxation) with meals, and disordinated gastroduodenal motility, have been associated with functional dyspepsia [14–18]. In children, specifically, delayed gastric emptying and gastric electrical rhythm disturbances have been each demonstrated in approximately 50% of children with functional dyspepsia [16]. Gastric emptying can be assessed utilizing a solid meal nuclear medicine gastric emptying study when this is a concern. Although tests for other mechanical dysfunctions are not readily available, there is evidence to suggest that early satiety may indicate impaired gastric accommodation [19].

**Visceral Hypersensitivity**

Visceral hypersensitivity is believed to be of central importance in the generation of pain in FGIDs in adults, with similar but somewhat conflicting studies in children [13]. Hypersensitivity to distension has been reported in 21% to 95% of adults with IBS and 34% to 65% of adults with functional dyspepsia [13,14]. Hypersensitivity to

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*Table 2. Alarm Signs and Symptoms for Chronic or Recurrent Abdominal Pain with Suggested Initial Workup*

<table>
<thead>
<tr>
<th>Alarm Signs/Symptoms</th>
<th>Recommended Initial Evaluation</th>
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<tbody>
<tr>
<td>Weight loss</td>
<td>Complete blood count, albumin, erythrocyte sedimentation rate, C-reactive protein, and celiac serology</td>
</tr>
<tr>
<td>Deceleration of linear growth</td>
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<tr>
<td>Delayed puberty</td>
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<tr>
<td>Significant vomiting</td>
<td>Liver function tests, amylase, lipase, urinalysis, and abdominal ultrasound</td>
</tr>
<tr>
<td>Right upper quadrant pain/tenderness</td>
<td></td>
</tr>
<tr>
<td>Hematemesis or hematochezia</td>
<td>Complete blood count, erythrocyte sedimentation rate, C-reactive protein, celiac serology, stool exam for pathogens, and endoscopy</td>
</tr>
<tr>
<td>Right lower quadrant pain/tenderness</td>
<td></td>
</tr>
<tr>
<td>Chronic severe diarrhea</td>
<td></td>
</tr>
<tr>
<td>Perianal disease or oral lesions</td>
<td></td>
</tr>
<tr>
<td>Systemic symptoms including unexplained fever, unexplained rash, or arthritis</td>
<td></td>
</tr>
<tr>
<td>Family history of IBD or celiac disease</td>
<td></td>
</tr>
<tr>
<td>Dysphagia</td>
<td>Barium swallow and endoscopy</td>
</tr>
</tbody>
</table>

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acid also has been reported in adults with functional dyspepsia [20]. Tests for hypersensitivity are also not readily available. While there are no specific symptoms indicative of hypersensitivity, given its frequency it is reasonable to view it as a potential therapeutic target in all patients with chronic abdominal pain.

Inflammation

Inflammation, in the form of increased mast cells and eosinophils, has been increasingly implicated as a contributory player for at least a subset of children with FGIDs [21]. While not indicative of disease per se, these inflammatory cell types can have broad-reaching implications for motility, electromechanical function, and sensitivity of the gastrointestinal tract. For example, IBS in adults is associated with increased mast cell density and activation and when near nerves, their density correlates with pain severity [22–24]. Mast cell density has been shown to be increased in the stomach of adults with functional dyspepsia and their activation is associated with gastric hypersensitivity [25,26]. In children, antral mast cells are associated with anxiety, motility disturbances, and meal-related symptoms. Duodenal eosinophils also have been highly implicated, with density significantly increased in adults with functional dyspepsia [27]. In children, duodenal eosinophils are associated with anxiety and meal-related symptoms, while having more indirect effects on motility. Thus, biopsies from upper and/or lower endoscopy may yield important clues about possible treatment targets even when read as grossly normal.

• What potential psychological and/or social contributors should be assessed?

Identification of potential psychological and social contributors requires collection of an array of information about the child, the family, and the larger social environment. This may occur through administration of validated screening measures and/or brief, targeted interview with the child and parent(s) as part of an expanded medical interview during the initial workup. It is important to remember that psychiatric diagnosis is not the goal; instead, the focus is on identification of all possible psychosocial treatment targets that currently serve to maintain pain in some fashion for that child. For many children, these may be subclinical; however, if more substantial concerns arise about some aspect of psychosocial functioning during this evaluation, that may trigger referral to, and collaboration with, another pediatric health provider (eg, psychologist, sleep specialist). A few of the more common psychological and social contributors to FGIDs are highlighted below.

Anxiety and Stress

Anxiety and stress are among the most highly implicated psychosocial contributors to FGID symptomatology and warrant special mention here given their physiologic effects, which include inflammation, dysmotility, and visceral hypersensitivity. Anxiety and stress appear to interact with the gastrointestinal tract primarily through the release of corticotrophin-releasing hormone (CRH) with secondary activation of mucosal mast cells [28], followed by cascading effects as previously described. Children with FGIDs as a group tend to have more concurrent symptoms of anxiety and depression than their peers [29], while examination of individual variation suggests approximately 35% to 45% of this group experience isolated elevations in anxiety when screened with validated clinical tools [30]. The directionality of the relationship between anxiety and pain is not entirely clear, as early temperament markers of anxiety predict a relative increased risk for the development of FGIDs in early school-age, but children with FGIDs also appear to be at increased risk for anxiety and depression in the future [29,31]. It may be that anxiety increases vulnerability in some children, while it is a reaction to the occurrence of pain and disability in others. Still another possibility is that both anxiety and pain arise from a similar genetic or other biologic condition, with emerging evidence related to the microbiota to support this third option [32]. Whatever the directionality for the individual child, however, the fact remains that anxiety and stress must be identified and addressed when present, even at a subclinical level, in order to maximize clinical outcomes. Broad-based screening questionnaires (eg, Behavior Assessment System for Children, 2nd ed) [33] or more narrow-band scales (eg, Self-Report for Childhood Anxiety Related Emotional Disorders) [34] may aid in the identification of these issues, whether subclinical or more clearly defined. Targeted discussion with the family also can shed considerable light on temperament and other more subtle indicators of stress reactivity that may be more difficult to capture in a standardized questionnaire format.
Sleep

Sleep also can be a critical issue for a subset of children with FGIDs, with one recent study documenting a clinical elevation in one or more sleep problem scales in 45% of this population [35]. Disrupted sleep can result in increased emotional/behavioral problems that, in turn, lower a child’s pain tolerance, interfere with effective use of coping skills, and increase functional disability [36]. This becomes a cyclic and escalating issue for children with FGIDs, with pain serving to increase stress and arousal, which interferes with sleep quality and quantity, which then predicts increased pain the following day [37]. Adequate sleep, in contrast, appears to have a restorative effect that can aid in both pain relief and recovery by promoting tissue healing, immune function, and the body’s natural analgesic efforts [37]. Several relatively brief questionnaires exist (eg, the Sleep Disturbances Scale for Children) [38] that may aid the practitioner in quickly screening for sleep issues as part of the initial workup.

Parents

Parents are especially powerful sources of learning and reinforcement for children. Increasing evidence suggests that parent behavior has a significant impact on the child’s pain experience and associated functioning [39–41]. Parent behavior may be beneficial and help children to increase their use of positive coping skills or, alternatively, may be detrimental and result in symptoms being maintained, or even increasing in intensity or frequency, over time. However well-intended, solicitous parenting behaviors have been found to predict prolonged illness, symptom reoccurrence, and increased disability in children with chronic medical conditions, including FGIDs [42,43]. Solicitous parenting behaviors may include such things as provision of social rewards (eg, more time with parents or special attention), material gain (eg, increased provision of treats or privileges), removal of a noxious stimulus (eg, protection from being bothered by siblings), escape from undesirable responsibilities (eg, school attendance or completion of chores), or other behaviors that serve to reinforce the sick role. Parental behavior in response to pain can be assessed through an expanded medical interview, including questions about the frequency of absenteeism from school and other activities, how the child spends his/her time when absences do occur, etc., through observation of parental response to pain experienced during the initial evaluation visit, and/or through administration of a brief questionnaire (eg, Adult Responses to Child Symptoms or Illness Behavior Encouragement Scale) [44].

Additional Clinical Evaluation

The patient completed a 4-week trial with a proton pump inhibitor (PPI) but did not experience significant symptom relief. At the next visit, an expanded medical history and clinical evaluation was performed. History was positive for asthma, seasonal allergies, ADHD, headaches, fatigue, and significant problems with sleep duration and quality. ADHD was reportedly well controlled on stimulant medication. The patient was being homeschooled and missed extracurricular/social activities several times per week due to pain. Screening measures indicated clinically significant problems with sleep initiation, resulting in approximately 5 hours of sleep per night, as well as at-risk concerns for anxiety and locus of control. Parents reported making sure that the patient completed homework and kept up on school assignments, but they allowed him to skip chores and decreased expectations with regard to other previously held responsibilities in response to pain episodes.

Due to a non-response to the trial of acid suppression, he was scheduled for upper endoscopy. The examination was grossly normal, as were mucosal biopsies, with the exception of duodenal mucosal eosinophilia.

What is the therapeutic approach to the child with functional abdominal pain?

In the absence of evidence-based guidelines, the biopsychosocial model of FGIDs suggests that simultaneously treating all contributors to pain maintenance would offer the greatest promise in effectively breaking the pain cycle. Clinical treatment therefore should focus on identifying as many potential contributors as possible and targeting them simultaneously in treatment, rather than on identifying and treating a single causal factor. Each of these factors, independently or in combination with other factors, can affect pain experience [45]. Outlined below are several therapeutic components that may be appropriate to consider based on a patient’s initial presentation, arranged by area.

Biological Treatment

Medication management varies by the specific pattern of FGID symptoms or by identified (or suspected) individ-
ual biological factors. However, evidence for most of the current medications in use has been obtained from studies in adults; only a small number of controlled studies in children currently exist. Visceral hypersensitivity and motility disturbances represent the most frequent targets for intervention in the existing adult literature.

In adults with IBS, tricyclic antidepressants (TCAs), selective serotonin reuptake inhibitors (SSRIs) and antispasmodics (including cimetropium/dicyclomine, peppermint oil, pinaverium, and trimebutine) targeting visceral hypersensitivity and/or dysmotility are effective [46,47]. There have been only two controlled pediatric trials assessing TCAs for FGIDs and no trials for SSRIs. Amitriptyline was ineffective in the larger trial which included functional dyspepsia, functional abdominal pain, and IBS patients [48]. In the other trial, which included only IBS patients, amitriptyline treatment was associated with decreased diarrhea and pain [49]. Other than a single trial of peppermint oil, there are no controlled trials of antispasmodics in pediatric IBS [50]. Antibiotics have been shown to be effective for non-constipated IBS in adults, but have not been evaluated in children [51]. Two controlled studies support the use of probiotics (Lactobacillus rhamnosus GG) in children with IBS [52,53]. Based solely on the available adult literature, reasonable initial options would include daily low-dose TCAs (eg, amitriptyline 0.3 mg/kg given at bedtime) with antispasmodics (eg, dicyclomine or peppermint oil) given on an as needed basis, antibiotics directed at small bowel bacterial overgrowth (eg, metronidazole or rifaximin), and probiotics for diarrhea-predominant IBS, or a laxative with an SSRI for constipation-predominant IBS. Given the side effect concerns regarding SSRI antispasmodics in children, the clinician must weigh the potential for efficacy against possible side effects and, when used, monitor carefully. In addition, it may be wise to specifically warn patients and parents about the risk of suicidal ideation and recommend strongly that they immediately discontinue the medication and call should a concern arise.

Seventy-two percent of pediatric gastroenterologists treat functional dyspepsia empirically (before endoscopy) with acid reduction therapy [54]. H2 antagonists, PPIs, and prokinetics have been found to be superior to placebo in the treatment of functional dyspepsia in adults [55]. Only one small trial of acid suppression has been published in pediatric functional dyspepsia, in which famotidine was shown to be superior to placebo in global pain resolution [56]. Prokinetics have not been evaluated for functional dyspepsia in children. Reasonable initial options based on the existing evidence would be an H2 antagonist or a PPI (especially if there are reflux symptoms) when pain is the predominant symptom or a prokinetic agent targeting dysmotility when pain is not the predominant symptom (eg, more problems with nausea or bloating).

Regardless of the specific FGID, inflammation with eosinophils and/or mast cells represents a potential therapeutic target. Inflammation may be documented (eg, duodenal eosinophilia in functional dyspepsia) or suspected based on clinical profile (eg, mast cells in an anxious diarrhea-predominant IBS patient). Montelukast has been shown to be effective in children with functional dyspepsia in association with duodenal eosinophilia [57]. Other options targeting eosinophils and mast cells include combination of H1 and H2 antagonists (eg, ranitidine and hydroxyzine) and oral cromolyn as a mast cell stabilizing agent [58,59]. Readers are referred to a recent review for a fuller discussion of eosinophils and mast cells as therapeutic targets [21].

**Psychological Treatment**

Similar to the approach outlined with regard to biological targets above, psychological treatments must be matched to the clinical presentation of the child. Psychological treatment can take many forms, from informal education that can easily be incorporated into a routine office visit to referral out for formal therapy services. In the case of FGIDs, educating the family on their biopsychosocial nature can help provide context for a multicomponent approach to treatment and may enhance adherence [60]. Including in this explanation the reassuring messages that the child’s pain is understood, that it is not dangerous, and that there is something that can be done about it can be very helpful in decreasing anxiety and further healthcare seeking in both the parent and child [8]. Evidence also suggests that children whose parents accept a biopsychosocial conceptualization of abdominal pain and its treatment appear more likely to experience symptom improvement [61]. For parents who reject the idea of psychological and social contributors to their child’s pain, the clinician should explain that this is likely to negatively impact their child’s response to treatment, including limiting the effectiveness of medications used.

More formal psychological treatments with empirical support for use in pediatric FGID populations include...
cognitive-behavioral therapy, hypnotherapy, and biofeedback-assisted relaxation training [62]. All 3 modalities, as applied to FGIDs, focus on changing thoughts and/or behaviors in the interest of alleviating physical symptoms. When referring out for these modalities, it may be helpful to communicate expectations directly to the collaborating provider; many children with FGIDs do not have a diagnosable mental health disorder, leaving community providers uncertain of their role in the treatment plan. When more substantial mental health issues are apparent, referral for individual therapy, psychiatry, and/or family therapy certainly may be helpful. Even if these issues have arisen secondary to the onset of pain, mental health issues can be a significant source of emotional and social stress that may play a further contributory role in maintenance of pain and disability. Similarly, referral for psychoeducational evaluation of learning issues also may be helpful when a history of academic performance concerns and/or school avoidance is reported.

**Social Environment**

The social environment also must be considered and addressed as part of the clinical presentation. Behavioral coaching of parents can be a critical component of in-office care for children with FGIDs. Parents can be coached to maintain behavioral expectations for their child's participation in school and other activities, encourage and model good coping with pain symptoms, avoid asking about pain, and provide differential attention for preferred versus non-preferred behaviors [61,63]. For example, parents can be asked to provide praise, a preferred activity, or other rewards when they see their child using good coping skills and/or engaging in well behaviors (eg, using relaxation, attending a portion of the school day) and ignore or minimize attention paid when their child complains about pain, displays non-verbal pain behavior (eg, wincing, guarding, curling up), or refuses to engage in expected daily activities (eg, school attendance, chore completion, family events).

School is another social environment that can be critical to address for children with FGIDs. When children with FGIDs have been out of school for a prolonged period of time, a gradual and structured return to the classroom may be an important part of the treatment plan. This involves initially choosing a block of time the patient is able to attend every day without increased symptoms, the patient attending school for the agreed upon amount of time regardless of pain, and regularly evaluating progress to determine when and how much additional class time to add. This approach to school return can reduce fear and avoidance, reintegrate patients into age-appropriate academic/social activities, and redirect attention away from symptoms and toward functioning [64,65]. Even when children are attending school regularly, they may get behind in daily school work, have difficulty focusing in class, or need to make more frequent trips to the restroom than typically allowed. Accommodations can be requested to reduce stress associated with school that may be counter-productive to recovery and/or to remove barriers to consistent attendance, such as: allowing easy access to the bathroom, encouraging brief breaks for use of stress and pain management skills, allowing participation in clubs and sports while working on getting back to school, and carefully considering makeup work and the timeline for its completion. The clinician may need to play a more direct role in intervening with the school, including providing a letter of support or even talking to school personnel by phone, as needed, to support execution of the plan.

**Treatment**

The patient’s treatment took place over a period of approximately 3 months. He was treated initially with montelukast and ranitidine to address the endoscopically identified inflammatory component of his abdominal pain. After 2 weeks on this regimen, he had achieved moderate improvement and hydroxyzine was added. In tandem with medication, he was referred to a certified biofeedback practitioner near his home. He attended biofeedback-assisted relaxation training sessions once per week initially and practiced the skills several times per day at home, with visit frequency tapered over a 6-week period. Parent coaching was provided related to maintaining normal daily expectations, using positive reinforcement to encourage patient adherence to treatment plan components, and modeling/prompting of positive coping with pain and stress, in addition to basic education about the biopsychosocial nature of functional gastrointestinal disorders. Basic sleep hygiene recommendations also were provided to promote improved sleep quality and duration as part of the comprehensive treatment plan.

Finally, under the medical team’s guidance, the patient’s family utilized a structured plan for graduated school re-entry. First, in preparation for anticipated re-entry, a formal accommodation plan (ie, a 504 plan for health issues)
was developed by the school, in collaboration with the family and medical team. This plan addressed anticipated barriers to school return and ensured that appropriate school supports (eg, taking breaks for biofeedback practice, being allowed to use the restroom as needed) were in place to support school attendance and success once the re-entry process began. Given that this patient was being homeschooled completely at the time of initial evaluation, he started by attending one consistent class period daily and gradually added time to his in-school schedule as his stamina increased. During the process of reentry, he also received instruction from a homebound teacher in the classes he was not yet attending. As specific classes gradually were added to his in-school schedule, support for these classes was dropped from homebound and the amount of homebound instruction time was reduced.

- What is the long-term prognosis for children with FGID?

Abdominal pain can persist for years with many children continuing to have problems with both abdominal pain and associated symptoms into adulthood [6,7,66,67]. On long-term (5–15 years) follow-up, children with dyspepsia demonstrate persistence of dyspeptic symptoms, as well as lower quality of life and higher functional disability, despite medical therapy [7]. With implementation of treatment utilizing a biopsychosocial model, we have found substantial improvement in pain and functional disability in approximately 80% of patients at 4 to 6 weeks follow-up [60]. Further studies are necessary to understand the full impact of the biopsychosocial model on long-term prognosis.

Response to Treatment

At 6 weeks, the patient reported that his pain was minimal and no longer directly interfering with his functioning. He was having abdominal pain only about once per week. His appetite, energy, and headaches were improved. He also noted that he was finding it easier to fall asleep at bedtime. At 8 weeks, he had achieved complete resolution of pain and return to full daily functioning, including full-time school attendance.

Of note, he experienced one symptom flare as medications were weaned. Restarting treatment with the same medications, encouraging increased biofeedback practice in the short-term, and encouraging parents to maintain expectations while supporting his use of positive coping skills to manage pain and symptoms throughout was effective in quickly resolving this flare. After an additional 3 months of treatment, he was able to be weaned off medications successfully with no further symptoms noted. Maintenance treatment with medication for asthma, seasonal allergies, and ADHD continues at this time. In addition, he continues to practice biofeedback regularly, with increased practice in advance of anticipated stressful events (eg, return to school each fall, sports tournaments, school exams) to reduce vulnerability during these specific periods.

Conclusion

This case highlights the benefits of assessing and treating childhood chronic abdominal pain from a biopsychosocial perspective. Intervening to address biological factors while providing coping skills and environmental supports to encourage functioning offers the greatest likelihood of positive treatment outcomes and decreased disability.

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