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# Recurrent Abdominal Pain in Children

See also separate [Acute Abdominal Pain in Children](#) article.

## Introduction to recurrent abdominal pain

Recurrent abdominal pain (RAP) in children describes recurring abdominal pain without organic cause. It presents commonly in general practice and it causes a great deal of school absence and considerable anxiety. Most cases can be managed in primary care. Medication is not normally needed.

The initial approach adopted by primary care doctors is crucial to successful management. It involves thorough history and examination skills, understanding and awareness of red flags which suggest organic pathology, and the knowledge and consulting style that offer a clear and empowering approach to patients, whilst avoiding unnecessary investigation.

## Defining recurrent abdominal pain

RAP in children is defined as abdominal pain which occurs at least four times a month over a period of two months or more, which is severe enough to limit a child's activities and which, after appropriate evaluation, cannot be attributed to another medical condition.

RAP is believed to be a functional gut-brain interaction disorder (FGID) caused by altered feedback mechanisms between the gut and central pain pathways. There are several defined RAP patterns in children, of which paediatric irritable bowel syndrome (IBS) is the most common<sup>[1, 2]</sup>.

### Other definitions of RAP

- The original definition of RAP, published in 1958, included both organic and functional pain<sup>[3, 4]</sup>.
- The Rome Criteria (recently updated as Rome IV) narrowed the definition to functional pain, and defined several specific clinical patterns<sup>[5, 6, 7]</sup>.
- The term chronic abdominal pain (CAP) is sometimes used interchangeably with RAP, particularly in published research. The term is not always restricted to functional pain, so is potentially confusing. It will not be used further here.

The Rome Criteria provide a symptom-based framework for approaching diagnosis and management of RAP. This article follows these criteria and discusses RAP without organic cause. Organic causes of abdominal pain are discussed as differential diagnoses.

## Epidemiology<sup>[8]</sup>

- RAP affects 10-20% of school-aged children worldwide<sup>[9]</sup>.
- 3-8% of children with this pattern of pain have a causative organic pathology (and are excluded from the Rome definition of RAP). They usually have 'alarm' features.
- RAP occurs most commonly between ages 5 and 14 years. It is uncommon in children under 5 years of age.
- Girls are more commonly affected than boys (relative prevalence 1.5).
- There is an association between obesity and RAP<sup>[10]</sup>.
- There is an association between stress and RAP. Children with RAP are more likely to have experienced events such as deaths of family members, domestic violence, harsh punishment from parents, parental job loss and economic stress, hospitalisation and bullying.
- RAP appears unrelated to socio-economic group.
- There is evidence for a genetic component<sup>[2]</sup>.
- Children with a history of cow's milk protein hypersensitivity or abdominal surgery have an increased prevalence of FGIDs years later<sup>[2]</sup>.

## Pathophysiology

- The pathophysiology involves a dysregulation of visceral nerve pathways, leading to visceral hyperalgesia. Infective, inflammatory or psychological triggers may initiate this sensitisation<sup>[11, 12]</sup>.
- The onset of paediatric IBS frequently follows an episode of acute gastrointestinal inflammation (infectious or non-infectious)<sup>[2]</sup>.
- RAP is additionally affected by temperament and by family and school environments (the bio-psychosocial model). Less effective mechanisms of coping with stress may contribute to pain and to associated anxiety and depression<sup>[13]</sup>.
- There is some evidence of altered intestinal flora in paediatric IBS<sup>[14, 15]</sup>.
- Poor diet, poor fluid intake and lack of exercise can contribute to RAP.
- Increased prevalence in girls has led to suggestions that levels of sex hormones might play a role. Ovarian hormones can modulate both visceral pain perception and the susceptibility to stress. Adults with FGIDs report symptom exacerbation during menses<sup>[8]</sup>.

## Discounted causation theories

The following theories have been discounted:

- Food allergies: there is no convincing evidence for food allergy or intolerance as a cause of RAP. Nevertheless some patients report benefit from dietary restriction - eg, lactose-free or wheat-free diets. Dietary exclusion is frequently recommended by alternative healthcare practitioners<sup>[16]</sup>.
- There has been some, conflicting, evidence for increased prevalence of *Helicobacter pylori* in children with RAP. However, there is little evidence that *H. pylori* causes pain in the absence of peptic ulceration<sup>[17]</sup>.

## Associated symptoms

- Children with RAP are more likely to have headache, joint pain, anorexia, vomiting, nausea, excessive gas, and altered bowel symptoms, although these symptoms may also occur in the presence of organic pathology. There is considerable overlap between recurrent headache and recurrent abdominal pain<sup>[18]</sup>.
- Children with RAP are more often diagnosed with anxiety or depressive disorders compared to unaffected children. Abdominal pain can cause depression/anxiety and, once developed, abdominal pain and depression/anxiety worsen each other.
- RAP leads to increased functional impairment in everyday life and to school absence. 80% of affected children report school absence of at least one day in the previous term, compared to 45% in a control group<sup>[19]</sup>.

## Risk factors for recurrent abdominal pain

- Parental anxiety in the first year of life is associated with early RAP.
- Children with a parent with gastrointestinal problems are more likely to have RAP.
- There is an association with a history of illness in siblings<sup>[20]</sup>.
- Attention deficit hyperactivity disorder (ADHD) is associated with a two-fold increase in RAP<sup>[21]</sup>.
- Being bullied is associated with an increase in all health complaints in children, including RAP<sup>[21, 22]</sup>.
- Child abuse, including sexual abuse and neglect, may present with RAP. Unexplained abdominal symptoms are common in abused children<sup>[8, 23]</sup>.
- It may be relevant that research suggests a high prevalence of recalled history of paediatric sexual abuse in adults with functional gastrointestinal illness<sup>[23]</sup>.
- A diet high in fruit appears to be protective<sup>[10]</sup>.

## Presentations of recurrent abdominal pain in children<sup>[5, 6]</sup>

Several symptom groups are seen in childhood RAP, allowing classification into commonly occurring presentations. The Rome criteria define these as:

- Childhood IBS (this accounts for over 70% of all paediatric RAP).
- Functional dyspepsia:
  - Postprandial distress syndrome.
  - Epigastric pain syndrome.
- Abdominal migraine.
- Functional abdominal pain (FAP).
- FAP syndrome.

### Paediatric IBS

At least four times a month for at least two months:

- Abdominal pain which, at least 25% of the time is:
  - Improved with defecation; **and**
  - Onset is associated with change in stool frequency or form.
- After appropriate medical evaluation the symptoms cannot be attributed to another medical condition.

Child IBS patients are generally classified into three types: constipation-predominant, diarrhoea-predominant and mixed or alternating type, according to the predominant stool type associated with abdominal pain episodes. Children with IBS often experience a sense of incomplete evacuation after defecation and sit on the toilet for a long time.

### Functional dyspepsia

#### Postprandial pain syndrome

For at least two months:

- Troublesome postprandial fullness, occurring after ordinary-sized meals, several times per week; **and**
- Early satiation that prevents finishing a regular meal, several times per week.

Other symptoms may include:

- Upper abdominal bloating or postprandial nausea.
- Excessive belching.
- Epigastric pain syndrome which may co-exist.

### Epigastric pain syndrome

At least four times a month for at least two months:

- Intermittent pain or burning localised to the epigastrium, of at least moderate severity:
  - Pain is not generalised or localised to other areas.
  - Is not relieved by defecation or passage of flatus.
  - Does not fulfil criteria for biliary pain.

Other symptoms may include:

- Epigastric pain of a burning quality, without a retrosternal component.
- Pain induced or relieved by ingestion of a meal, also occurs while fasting.
- Postprandial distress syndrome which may co-exist.

### Abdominal migraine

At least twice in the preceding 12 months, all of the following:

- Paroxysmal episodes of intense, acute periumbilical pain lasting at least an hour.
- Intervening periods of normal health, lasting weeks to months.
- The pain interferes with normal activities.
- The pain is associated with two or more of: anorexia, nausea, vomiting, headache, photophobia, pallor.
- After appropriate medical evaluation the symptoms cannot be attributed to another medical condition.

### Functional abdominal pain (FAP)

At least four times a month for at least two months:

- Episodic or continuous abdominal pain.
- Insufficient criteria for other functional gastrointestinal disorders.
- After appropriate medical evaluation the symptoms cannot be attributed to another medical condition.

### FAP syndrome

At least four times a month for at least two months:

- Impairment of normal activities.
- FAP in at least 25% of episodes.
- Somatic symptoms such as headache, limb pain, or difficulty in sleeping.

## Presentations suggestive of organic disease

The presence of alarm symptoms or signs increases the likelihood of organic disease and should prompt further investigation. In the absence of alarm symptoms, diagnostic studies are unlikely to detect organic disease, although children should be reviewed. It is important, as always, to re-evaluate at review. Occasionally, alarm symptoms may not be present at the first presentation but appear later.

### Alarm features in RAP

Features suggestive of underlying organic pathology include:

- Involuntary weight loss.
- Falling off growth centiles.
- Gastrointestinal blood loss.
- Significant vomiting.
- Chronic severe diarrhoea.
- Unexplained fever.
- Persistent right upper or right lower quadrant pain.
- Family history of inflammatory bowel disease.
- Abnormal physical signs such as pallor, jaundice, guarding, rebound tenderness, altered bowel sounds, or a palpable mass.
- Joint inflammation.
- Oral and/or perianal lesions.
- Skin rashes.
- Delayed puberty.
- Remember also to be alert to any features suggestive of child abuse, including sexual abuse and neglect<sup>[23]</sup>.

| Typical clinical features of organic versus non-organic causes of RAP     |   |                                       |
|---|---|---------------------------------------|
| Clinical features   | Organic causes  | Non-organic causes                    |
| Site of pain:   | Anywhere - but particularly the flanks and suprapubic pain. Note especially persistent right upper or right lower quadrant pain.  | Usually central and often epigastric. |
| Family history (particularly of abdominal pain, headache and depression): | Less likely but take note of a family history of inflammatory bowel disease.  | More likely.                          |
| Psychological factors (particularly anxiety):                             | Less likely (but see text).   | Anxiety more likely.                  |
| Headache:   | Less likely.  | More likely.                          |
| Alarm symptoms (see above):   | Alarm symptoms more likely. <ul style="list-style-type: none"> <li>• Vomiting generally equally likely but beware persistent or significant vomiting.</li> <li>• Chronic severe diarrhoea.</li> <li>• Unexplained fever.</li> <li>• Gastrointestinal blood loss.</li> </ul> | Alarm symptoms less likely.           |
| Abnormal signs:   | Present.  | Absent.                               |
| Abnormal growth and/or involuntary weight loss:                           | Present.  | Absent.                               |
| Abnormal investigations (FBC, ESR, urinalysis, for example):              | Expected.   | Not found.                            |

## History<sup>[24]</sup>

The history should be aimed at assessing the problem and its impact on the child and their family, looking for the presence of alarm symptoms, and identifying factors which may be contributing to the pain. The history should focus on:

- Site of pain. The history in children can be difficult. There may be difficulties describing the pain and localising it once the pain has passed.
- Quality and nature of pain.
- Timing and duration of pain.
- Whether pain is relieved by defecation or not.
- Associated symptoms (eg, headache, tiredness, belching, altered bowel habit).
- Severity of the pain (pain scales can sometimes be helpful, although they can also be misleading).
- Effect of the pain on school attendance, physical activity, and daily living.
- Beliefs and concerns of the child and parent regarding the source and meaning of the pain, and their expectations of the physician.
- Diet, including any known or suspected allergies or intolerances.
- Family history of bowel disorders.
- Focus on:
  - Gastrointestinal symptoms, including bowel habit.
  - Genitourinary symptoms.
  - Past medical history. It is important to review any past illnesses, hospital admissions and relevant perinatal and neonatal history.

## Examination

Careful examination is helpful in excluding organic disease but also to show patients that their condition is being thoroughly evaluated.

- Plot height and weight on a growth chart (documented significant weight loss is a red flag sign).
- Check for signs of anaemia, jaundice, mouth ulcers, skin rash and arthritis.
- Ask the child to point with one finger to where the pain is worse and is most frequently felt. In IBS this is most often around the umbilicus.
- Inspect the abdomen for scars or distension and palpate for masses.
- Check perianal appearance: prominent perianal skin tags or fistulae suggest Crohn's disease.
- Palpate for organomegaly, tenderness and/or abdominal mass.

Typically, there is vague tenderness without guarding or rigidity, and bowel sounds will be normal. It can be helpful to discuss the reassurance of normal findings.

## Investigations<sup>[2, 24, 25]</sup>

The possibility of non-organic causes needs to be raised early in the consultation. Commencing investigations before discussing this makes subsequent acceptance of a non-organic diagnosis difficult, as the doctor may appear to have run out of ideas.

Some literature suggests that in the absence of red flag or alarm symptoms, no investigations are justified. Others point out that, given that both coeliac disease and giardiasis may cause unexplained abdominal symptoms without red flag symptoms, and both are relatively common in the UK, some investigations are needed.

A pragmatic approach to primary care investigation is to:

- Offer reassurance and explanation regarding the likely mechanism of pain.
- Explain that you would like to arrange a blood and stool test to rule out coeliac disease and any other signs of inflammation that might change this view.
- Check FBC, inflammatory markers and anti-endomysial antibodies.
- Stool sample for giardia. Depending on your global location you may wish to add examination for cysts, ova and parasites.
- Consider urine microscopy to rule out recurrent urinary infection.

Further blood and stool tests and further imaging are not indicated in the absence of red flag symptoms. If the child is afraid of blood tests and has no alarm symptoms, and coeliac disease is considered excluded by the history, it is worth remembering that blood tests have extremely low yield in terms of positive results.

FBC and ESR have very low positive yield in well children. If a coeliac screen is also needed, checking FBC and ESR on the same sample seems pragmatic when the child has bravely borne the test. Other blood tests, ultrasound, computerised tomography examination, and endoscopy provide no benefit in investigating RAP without alarm symptoms.

## Differential diagnosis

The list of diagnoses of abdominal pain in children and adolescents includes common, uncommon and rare conditions. There are also many conditions in which RAP might occur but it would not be the predominant symptom.

The most likely differential diagnoses in a child who is otherwise well, are:

- [Constipation](#) (which may also co-exist with IBS).
- [Coeliac disease](#).
- [Lactose intolerance](#) (including transient symptoms after gastroenteritis).
- [Giardiasis](#). Symptoms closely mimic IBS: UK prevalence 2-7%, where infections are usually acquired in the UK<sup>[26]</sup>.
- Mesenteric adenitis.
- [Urinary tract infections](#).
- Mittelschmerz.
- Period pain.

Other differential diagnoses which may need to be considered but which would typically raise red flags in the history and examination:

- [Intussusception](#) (uncommon over 18 months of age, but a medical emergency).
- [Gastro-oesophageal reflux disease](#).
- [Crohn's disease](#).
- [Ulcerative colitis](#).
- [Urolithiasis](#).
- [Pancreatitis](#).
- [Meckel's diverticulum](#).
- [Peptic ulcer disease](#).
- [Wilms' tumour](#) (peaks at 3-4 years of age; rare at age above 10 years).
- Helminth infestation (globally significant; rare as a UK cause).
- Childhood abdominal sarcomas.
- Pregnancy.
- Sexually transmitted infection.

There is a long list of conditions in which RAP might feature but not predominate or be the sole feature, including:

- [Sickle cell disease](#).
- [Familial Mediterranean fever](#).
- [Porphyria](#).
- [Lead poisoning](#).
- Chronic infection - eg, [tuberculosis](#).

## Management<sup>[1, 2, 24]</sup>

The most important therapeutic step is to explain the diagnosis, explain strategies to cope with stress and provide reassurance that there is no serious underlying disease.

Most children with RAP are successfully managed in primary care, although follow-up will be required and continuity of care is highly valued. Paediatric IBS accounts for the majority of cases of RAP. Some therapeutic interventions appear beneficial in cases where reassurance is not enough. The aim of therapeutic intervention is to improve the quality of life by ensuring the child's pain is minimised.

### Initial discussion

Establishing empathy is essential. GPs should adopt a positive approach. Once the diagnosis is made, it is important to explain that there is no serious underlying disease. Parents and children must not feel discredited or dismissed. Specific worries about potential causes must be addressed<sup>[27]</sup>.

### Explaining symptoms

An explanation of symptoms is essential. Many GPs find functional disorders difficult as they feel they are challenging patients' health beliefs. However, children and parents are generally receptive to clear, informed explanations. They will be relieved that nothing serious underlies the problems and relieved that you have met the problem before - particularly if you have positive suggestions and a plan for follow-up.

It can be helpful to equate the concept of functional pain with parents' personal experience, such as the understanding that people get headaches when worried, become nauseated when given bad news, or develop loose stools when anxious. This helps people accept that stress causes physical pain and is a normal response.

### Helping parents respond

Parents should be advised to reduce concerned responses to their child's pain, focusing on distraction instead<sup>[28]</sup>. Doctors, parents and teachers should identify (and remove) things that reinforce the symptoms (such as time off school with access to TV and treats, or being excused homework tasks).

### Managing school absence

The child should be strongly encouraged not to allow pain to lead to removal from normal activities. Children should attend school irrespective of pain. This can be difficult at first; however, progress is often rapid. The school may need reassurance with a letter from the doctor explaining the pain is non-organic but acknowledging its genuine nature. Pain during class is managed by continuation of the usual routine, not by removal to a sick room.

Gradual re-introduction of a child to school (for example, half-days) is not advised as it can paradoxically reinforce symptoms by focusing on sickness rather than wellness. The child's pain can be acknowledged but should not be focused upon.

### Avoid investigations

Excessive investigations, ambiguous or contradictory advice, lack of continuity, and failing to accept pain as genuine, can result in poor outcomes. Patients respond better to explanations for functional pain that make sense, remove blame from them and generate ideas about the management of symptoms. The critical factor associated with recovery is parental acceptance at the time of diagnosis of a bio-psychosocial model of illness<sup>[13, 27]</sup>.

### Therapeutic interventions

The following therapeutic interventions have been used in children with IBS where explanation and return to normal activities have not been successful or possible. However, with the possible exception of dietary advice and probiotics these are not interventions for the first appointment, but are reserved for difficult-to-manage cases with intrusive symptoms.

#### Dietary interventions<sup>[29]</sup>

- If the child's diet is poor or unusually restrictive then dietary advice may be helpful.
- There is little evidence that lactose-free diets are effective in the management of children with RAP.
- Probiotics have demonstrated a beneficial effect in all FGIDs, particularly IBS. This is thought to be due to enhancement of gut barrier function, inhibition of pathogen binding and modulating gut inflammatory response. They may also reduce visceral hypersensitivity, alter colonic fermentation and stabilise colonic microbiota.
- The benefit of fibre supplementation is unclear. If fibre is to be tried, soluble rather than insoluble fibre is recommended (the latter may produce bloating and discomfort).
- Fermentable oligosaccharides, disaccharides, monosaccharides and polyols (FODMAPs) have been suggested as triggers for symptoms in IBS patients; however, the evidence for trialling a low FODMAP diet is weak.

#### Drug treatment<sup>[30]</sup>

Medication should be limited to those children with symptoms impacting on quality of life, who have not responded to simple management. The following medications have been used:

- **Peppermint oil:** exerts an antispasmodic action via menthol and results in anti-flatulent action. Adverse events are generally mild and transient and include typical gastrointestinal effects like heartburn and anal/perianal burning or discomfort. 1-2 enteric coated capsules (180-200 mg) daily over 2-4 weeks can be helpful in IBS. They must be swallowed whole.

- **Tegaserod**: is a selective 5-HT<sub>4</sub> (serotonin) agonist which has shown benefit in children with IBS and chronic constipation. However, due to its significantly increased risk of cardiovascular ischaemic events, it is not recommended<sup>[31, 32]</sup>.
- **Antispasmodic agents**: mebeverine is licensed in the UK and is generally well tolerated, used prn before meals. However, its efficacy in global improvement of IBS has not been clearly demonstrated<sup>[33]</sup>.
- **Antidiarrhoeal agents**: are reserved for cases where diarrhoea and increased bowel frequency interfere with activities of life. Loperamide is most commonly used. It is effective in reducing diarrhoea but does not alleviate abdominal pain.
- **Pizotifen**: has been shown to be effective when used prophylactically in children with abdominal migraine, in a small trial. It has known side-effects of drowsiness, increased appetite, and gastrointestinal disturbances<sup>[34]</sup>.
- **H<sub>2</sub>-receptor antagonists**: famotidine is effective in children with severe dyspeptic symptoms. In the UK it is not licensed for use in children but ranitidine is licensed for children aged over 3 years<sup>[34]</sup>.
- **Amiripryline**: is effective in adults with IBS in producing global improvement, increasing feelings of well-being and reducing abdominal pain. It would not normally be recommended in children without specialist involvement<sup>[35]</sup>.
- **Tricyclic antidepressants (TCAs) and selective serotonin reuptake inhibitors (SSRIs)**: have been used for treatment of IBS in children. The risk profiles mean that their use is not recommended in primary care.

### Biopsychosocial therapies<sup>[36, 37]</sup>

- **Hypnotherapy**: has a beneficial effect in children with IBS, which persists for at least five years after cessation of therapy. It is thought to reduce visceral hyperalgesia and colonic contractions, and improve the patient's negative thoughts about their condition. A systemic review found statistically significant improvement in abdominal pain scores<sup>[38]</sup>.
- **Cognitive behavioural therapy**: may be effective for children with RAP, although the need for multiple sessions limits practicality<sup>[28]</sup>.
- **Yoga exercises**: have been found to be effective in children with RAP, resulting in significant reduction of pain intensity and frequency<sup>[39]</sup>.
- **Acupuncture**: may relieve pain by release of endogenous opiates. There is conflicting evidence for its effectiveness in RAP.

### Alternative healthcare

Alternative medicine flourishes around functional bowel disorders, as in many others where medicine does not offer simple answers. A range of alternative theories of pathophysiology exist on line, many allowing patients to purchase non-evidence-based allergy tests. These may lead to (sometimes restrictive) exclusion diets.

These tests and consultations may be expensive and whilst as GPs we encourage patients to be empowered, gather information from many sources and seek solutions that work for them, it is also important to advise them in areas where the quality of the evidence may be being misrepresented.

In the case of children there are two particular issues:

- Particular caution is needed regarding exclusion diets in children, as a balanced diet with adequate calorie intake is crucial for growth and development, bone and muscle health, energy and fitness, learning and general well-being.
- Focusing on simple 'causes' of RAP may feel easier and more understandable at first but this can be counter-productive. If/when the restrictive diet is not tolerable or does not prevent symptoms, the child's sense of being failed may make solving the problem more difficult.

The GP should find out whether patients with functional bowel disorders have explored options in alternative medicine, and offer appropriate and objective advice and support.

### Prognosis

- Some children with RAP will continue to have intermittent or constant IBS<sup>[40, 41]</sup>.
- IBS is more likely to persist where there is a family history of IBS<sup>[42]</sup>.
- Children are more likely to have recovered at follow-up if their parents accept a psychological cause for symptoms<sup>[8]</sup>.
- Possible risk factors for chronicity:
  - Presentation under the age of 6 years.
  - History of more than six months before presentation.
  - Parental functional problems, stressful life events and sexual abuse are all associated with persistence of FAP.
- Anxiety, depression and severity of pain are not related to persistence.

### Summary

Paediatric RAP is a significant and prevalent problem, which can have a massive impact on a child's well-being, hitting school attendance, mood and their perception of their own health and fitness. If an over-prolonged search for organic disease is pursued at the expense of thorough assessment, engagement, explanation and review, the problem can become increasingly difficult for parent, patient and doctor.

However, with careful history and examination, clear explanation and follow-up and a commitment from parent and child to stop the condition limiting normal activities, good results are obtained for children without referral, drugs or extensive testing.

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