



# Rumination Syndrome in Children and Adolescents

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*“Rumination syndrome is an under-recognized  
condition in pediatric and adolescent patients.”*

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## Introduction

The purpose of this article is to describe the characteristics and treatment of a pediatric functional gastrointestinal disorder that prompts parents to bring their child to the doctor for evaluation of regurgitation or vomiting up of food after eating. [A *functional disorder* refers to a disorder where the primary abnormality is an altered physiological function (the way the body works) rather than an abnormality that is characterized by tissue damage or inflammation.] In the context of this article, “functional” means that the symptoms occur within the expected range of the body’s behavior. (Examples: Shivering after a cold swim is a symptom, but not due to disease. Or, a runner’s leg cramp is very painful, but the muscle is healthy.)

## What is rumination syndrome?

The word “rumination” refers to a very specific form of regurgitation of food after meals, part of it being vomited and the rest swallowed. Rumination syndrome is characterized by the effortless regurgitation of recently ingested food into the mouth followed usually by expulsion, though in some patients, or under certain circumstances, it is followed by re-chewing and re-swallowing. The syndrome is diagnosed in the doctor’s office based upon symptoms and the absence of other medical problems that could explain them.

In order for rumination syndrome to be diagnosed, patients should have symptoms that persist over weeks or months, not acute vomiting that has lasted only a few days as occurs in gastroenteritis (gastrointestinal flu).

## Who develops rumination syndrome?

Although initially described in infants and the developmentally disabled, it is now widely recognized that rumination syndrome occurs in males and females of all ages and abilities. In children and adolescents without developmental disabilities, rumination syndrome is somewhat more common in females than males. In our

experience, children and adolescents with rumination syndrome are often good students who participate in athletics and other extra-curricular activities.

## What causes rumination syndrome?

The cause of rumination is unknown. Because it is a functional gastrointestinal disorder, rumination is not caused by an infection or by inflammation. In some patients, rumination occurs at times of significant stress, as a manifestation of rejection, or in patients who have previously suffered a more serious eating disorder such as bulimia nervosa. In some cases, stressful life events can be identified around the time of symptom onset, but the disturbance persists even after the precipitating event has been resolved. However, in most cases rumination occurs in the absence of such identifiable factors. Rarely, patients use rumination for “gain,” (e.g., to control body weight).

## How is rumination syndrome diagnosed?

The diagnosis of rumination syndrome is based upon the characteristic symptoms and the absence of signs of disease. Although diagnostic criteria (symptom-based, Rome II) for childhood functional gastrointestinal disorders have been developed, such criteria for children and adolescents with rumination syndrome have not been defined.

The lack of formal criteria for diagnosing rumination syndrome in children and adolescents likely contributes to the lack of awareness of the condition and to the difficulty in making the diagnosis. We anticipate that such criteria will be developed in the future.

## Is there a special test that can be done to diagnose rumination syndrome?

There are no diagnostic tests that can be performed to diagnose rumination syndrome. Although many patients undergo extensive and sometimes invasive testing prior to diagnosis, such tests can only rule out other causes of

regurgitation. Commonly performed clinical tests include upper abdominal barium studies (barium swallow), abdominal x-rays, upper endoscopies (EGD), assessment of stomach emptying, and other specialized testing. In patients with rumination syndrome, these studies are nearly always normal. A small number of patients will have mildly delayed emptying of the stomach due to the back and forth motion of food that occurs during rumination. This slows the transfer of stomach contents into the small bowel. Blood tests in patients with rumination are nearly always normal, with the exception of mild electrolyte (sodium, potassium) abnormalities with prolonged and severe rumination.

**Barium Swallow** – A barium swallow or “upper GI series” is an x-ray test used to examine the upper digestive tract (the esophagus, stomach, and small intestine). These internal organs are normally not visible on x-rays. Swallowing the liquid barium – which temporarily coats the inside lining of the esophagus, stomach, and intestine – allows the outline of these organs to be visible on the x-ray pictures.

**Upper Endoscopy** – Upper Endoscopy (EGD) is an inspection of the esophagus and stomach using a camera on a thin tube that is placed down the throat. It allows doctors to find structural abnormalities and infections in the upper digestive tract and is useful for explaining swallowing or other problems.

**Assessment of Stomach Emptying** – Also called a gastric emptying study, this test evaluates the emptying of food from the stomach. After food mixed with a small amount of radioactive material is consumed, a scanner monitors the amount of radioactivity in the stomach for several hours. In patients with abnormal emptying of the stomach, the food stays in the stomach longer than normal (usually hours) before emptying into the small intestine.

A more invasive test called gastroduodenal manometry has been performed in patients with rumination syndrome. This test involves using a thin tube (catheter) to monitor contractions of the stomach and small intestine. We believe this test should only be performed in cases of suspected intestinal pseudo-obstruction, a very rare condition associated with abnormal motility of the gastrointestinal tract.

## **Do children and adolescents with rumination syndrome have other symptoms, too?**

The primary symptom in rumination syndrome is the regurgitation of recently ingested food. However, many children and adolescents with rumination have additional symptoms. In our experience, other common symptoms include nausea, heartburn, abdominal discomfort, diarrhea, and/or constipation. Patients with additional symptoms may require further medical evaluation before rumination syndrome can be confidently diagnosed.

## **Are there potential complications associated with rumination syndrome?**

There are no significant medical complications resulting from rumination syndrome itself. However, complications may result from extensive and sometimes invasive testing or treatment before the diagnosis is made. Patients frequently miss school due to symptoms, and may even require hospitalization for evaluation and/or management of symptoms prior to diagnosis. The common complications of rumination syndrome are relatively mild and variable and include weight loss, vitamin and mineral deficiencies, and dental problems including cavities and erosion of enamel caused by stomach acid. Fortunately, with appropriate treatment, many of the complications associated with rumination syndrome are reversible.

## **What else can cause symptoms seen in rumination syndrome?**

There are many different causes of persistent regurgitation and vomiting including abnormal stomach emptying (gastroparesis), gastroesophageal reflux disease (GERD), blockage of the intestine (mechanical obstruction), abnormal motility of the intestine without blockage (intestinal pseudo-obstruction), eating disorders such as anorexia and bulimia nervosa, and medication side effects. However, the typical pattern and timing of symptoms allows the differentiation of rumination from other conditions.

## **How is rumination syndrome treated?**

Because rumination is a learned behavior, the treatment of this condition involves behavioral modification. The current behavioral treatment for rumination syndrome

consists of habit reversal using special breathing techniques (diaphragmatic breathing) to compete with the urge to regurgitate. Habit reversal techniques are used in such a way that the target behavior (rumination) is eliminated by the consistent use of an incompatible or competing behavior. The rumination behavior is eliminated because rumination and the competing response cannot be performed at the same time.

In our experience, medications are not helpful at improving symptoms. Operations such as fundoplication [a surgical procedure in which the upper part of the stomach is wrapped around the lower esophagus] to inhibit regurgitation of stomach contents have not proven to be effective in the setting of rumination, and adult patients who received the operation had considerable upper abdominal discomfort after meals, though the regurgitation was stopped.

In general, early intervention with behavioral treatment is recommended in order to reduce adverse consequences related to school absenteeism, weight loss, extensive diagnostic testing, and hospitalization in this patient population.

### **How successful is the treatment for rumination syndrome?**

The outcome for pediatric and adolescent patients with rumination syndrome who undergo behavioral treatment is very good. The vast majority of patients will have significant improvement of their symptoms, and many report complete resolution of symptoms following treatment. Patients with other medical or psychological conditions in addition to rumination syndrome may require additional therapeutic interventions.

### **What are the nutritional issues parents should be aware of?**

The severity of regurgitation in patients with rumination syndrome is quite variable. For some, regurgitation occurs at nearly every meal and the amount of weight loss can be significant. On the other hand, many children and adolescents with rumination syndrome are able to

maintain and even gain weight despite frequent regurgitation. In rare cases, patients with severe symptoms and associated weight loss require supplemental nutritional support through a tube placed in the stomach or by vein. However, after rumination syndrome is diagnosed and behavioral treatment is initiated, such measures are almost never required. In general, it is recommended that children and adolescents with rumination syndrome eat a balanced diet, and no dietary restrictions are required. After behavioral treatment is initiated, a dietary review under supervision by the behavioral therapist or a dietitian would be advantageous.

### **Conclusions**

Rumination syndrome is an under-recognized condition in pediatric and adolescent patients. Insufficient awareness of the clinical features of rumination syndrome contributes to the under-diagnosis of this important medical condition. The diagnosis of rumination syndrome is based upon clinical features, and extensive diagnostic testing is unnecessary. Early behavioral therapy is advocated, and patient outcomes are generally favorable.

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