

# ENCOPRESIS IN CHILDREN: AN OVERVIEW OF RECENT FINDINGS

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## ENKOPREZA KOD DECE: NAJNOVIJA SAZNANJA

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### ABSTRACT

The term 'encopresis,' derived from ancient Greek ἐγκόπρησις / egkóprēsis, which means stool, was first introduced in 1926 by Weissenberg to describe the loss of stool in underwear as the faecal equivalent of enuresis. The soiling of underwear is defined as the accidental passage of very small amounts of faeces into underpants. Quantitatively, the content of stool between encopresis and soiling is difficult to determine, and it is especially difficult for parents assess it. Therefore, a new term was adopted – faecal incontinence – that encompasses both encopresis and soiling.

Faecal incontinence is defined as the discharge of faeces in socially awkward situations at least once per month in children  $\geq 4$  years old. In approximately 95% of cases, faecal incontinence in children is not organic in origin, but instead appears as a functional gastrointestinal disorder. In 80% of children with functional faecal incontinence, the symptoms are associated with functional constipation. The remaining 20% of the cases involve no signs of faecal retention and are defined as non-retentive functional faecal incontinence.

This paper aims to present the latest findings within this area of paediatric gastroenterology.

**Keywords:** encopresis, children, incontinence

### SAŽETAK

Termin Encopresis je prvi uveo 1926 god. Weissenberg (Staro grčki naziv ἐγκόπρησις / egkóprēsis, stolica) da okarakterise pojavu stolice u donjem vešu kao ekvivalent noćnog mokrenja. Prljanje je definisano posebno, kao nenamerna pasaža vrlo malih količina stolice u ličnom rublju. Kvantitativno, sadržaj stolice između enkopreze i prljanja je teško odrediti, pogotovu roditelji teško mogu učiniti tu procenu, zato je usvojen nov naziv fekalna inkontinencija koji podrazumeva enkoprezu i prljanje zajedno.

Fekalna inkontinencija se definiše kao ispuštanje stolice u socijalno neadekvatnim uslovima najmanje jednom u toku meseca u razvojnog periodu deteta  $\geq 4$  godine. U oko 95% slučajeva, fekalna inkontinencija kod dece nije organskog porekla već se ispoljava kao funkcionalni poremećaj gastrointestinalnog trakta. U 80% dece sa funkcionalnom fekalnom inkontinencijom simptomi asociraju sa funkcionalnom konstipacijom. U preostalih 20% slučajeva ona je bez znakova fekalne retencije, definisana kao ne-retentivna funkcionalna fekalna inkontinencija.

Ovaj rad ima za cilj da prikaže najsavremenija saznanja iz ove oblasti dečje gastroenterologije.

**Ključne reči:** enkopreza, deca, inkontinencija



### INTRODUCTION

The ability to retain faeces has been associated with the study of privacy and order in our culture for approximately 200 years. The ancient Romans spent time together each morning and defecated around each other. This was recorded by the Minister of Finance at the time – Hadrian – who also introduced a tax on “villains” and defended his position with strong arguments. It was only with the invention of the

water closet (WC) that privacy-related defecation was developed and occurred with the sense of shame. The link between urges, privacy, order, cleanliness and bowel emptiness has been used for more than 150 years in pedagogy; in other words, even sitting on the toilet is considered part of one's upbringing; and, finally, to exist on one's own has become an integral part of an intelligible picture of a man (1).



**Table 1.** Rome III criteria for functional defecation disorders in children with a developmental age of at least 4 years

Suggested terminology	Definition
<i>Faecal incontinence</i>	<i>Passage of stools in an inappropriate place</i>
<i>Organic faecal incontinence</i>	<i>Faecal incontinence resulting from organic disease (e.g., neurological damage or sphincter abnormalities)</i>
<i>Functional faecal incontinence</i>	<i>Non-organic disease that can be subdivided into:</i>
– <i>Constipation-associated faecal incontinence (80%)</i>	
– <i>Non-retentive (non-constipation associated) faecal incontinence (20%)</i>	

## Definition

The term ‘encopresis,’ derived from ancient Greek ἐγκόπρησις / egkóprēsis, which means stool, was first introduced in 1926 by Weissenberg as the faecal equivalent of enuresis to describe the loss of stool in underwear (2, 3). Later, Bellman defined encopresis as the repeated voluntary or involuntary passage of normal stools into inappropriate places, such as into clothes or onto the floor after the age of 4 years without any organic cause (4). Soiling is specifically defined as an unintentional passage of very small amounts of stool into underwear. Quantitatively, the content of stool between encopresis and soiling is not easy to determine, and it can be especially difficult for parents to assess it. Therefore, a new term was adopted – faecal incontinence – that encompasses both encopresis and soiling (5, 6). Both conditions are commonly associated with functional constipation. At first, it was thought that all children with faecal incontinence had constipation, but subsequent findings revealed that faecal incontinence can occur without signs of constipation, which created confusion in the interpretation of the problem (7). In some parts of the world, doctors consider encopresis to be a mental disorder, and others use the term ‘encopresis’

in relation to soiling or faecal incontinence. Whatever it is called, the situation is very unpleasant for the child, and it is difficult for parents to accept the same. Due to the absence of a consensus on the interpretations of encopresis and other functional disorders of the gastrointestinal tract, a group of experts in paediatric gastroenterology established the criteria for childhood functional gastrointestinal disorders, known as Roma II, in the year 2000. Disorders of defecation included: functional constipation, functional faecal retention and functional non-retentive faecal soiling. Later, numerous studies evaluated the acceptability of these types of classifications in clinical practice, and it became clear that the first paediatric Roma criteria were too restrictive and were insufficient for many patients with specific functional gastrointestinal diseases such as constipation and abdominal pain (8). Therefore, the terms were redefined in 2006 as part of a set of criteria known as Roma III; the term ‘faecal incontinence’ was adopted as a substitute for encopresis and soiling to indicate organic faecal incontinence or functional faecal incontinence (9-11). Table 1.

The Roma III criteria are currently used to define functional faecal incontinence. Table 2.

## Epidemiology

The prevalence of functional faecal incontinence has been found to vary between 1 and 4% in children > 4 years old and between 1 and 2% in 7-year-old children. The rate in children aged 10 and 11 years was found to be 1.6%. This condition was observed three to six times more often in boys than in girls (3:1 to 6:1) (12-14).

Children with functional non-retentive faecal incontinence (FNRFI) experience faecal incontinence as their only symptom. In contrast to children with functional constipation, they have normal stool consistencies. Symptoms such as abdominal pain, rectal bleeding, difficulty defecating, poor appetite, palpable abdominal masses and palpable rectal masses are significantly less common in these children compared to those with constipation (15). Nocturnal faecal incontinence is less common in children with FNRFI (12%) compared to children with constipation (30%) (9), while the frequency of diurnal and nocturnal enuresis in them is higher

**Table 2.** Rome III criteria for functional faecal incontinence in children with a developmental age of at least 4 years

Suggested terminology	Definition
Functional constipation	<p>Most fulfil <math>\geq 2</math> criteria at least once per week for <math>\geq 2</math> months prior to diagnosis, with insufficient criteria for the diagnosis of irritable bowel syndrome:</p> <ol style="list-style-type: none"> <li>1. <math>\leq 3</math> defecations in the toilet per week</li> <li>2. <math>\geq 1</math> episode of faecal incontinence per week</li> <li>3. History of retentive posturing or excessive volitional stool retention</li> <li>4. History of painful or hard bowel movements</li> <li>5. Presence of a large faecal mass in the rectum</li> <li>6. History of large-diameter stools, which may obstruct the toilet</li> </ol>
Functional non-retentive faecal incontinence (FNRFI)	<p>Must fulfil all of the following for <math>\geq 2</math> months prior to diagnosis:</p> <ol style="list-style-type: none"> <li>1. Defecation into places inappropriate to the social context at least once per month</li> <li>2. No evidence of an inflammatory, anatomic, metabolic, or neoplastic process that explains the subject's symptoms</li> <li>3. No evidence of faecal retention</li> </ol>



(40-45%) than in children with constipation (25-29%), which suggests that children with FNRFI lack the normal physiological stimuli needed to go to the toilet (16-18). These children attended paediatric clinics for the first time at an older age than those who had constipation (on average 9.2:6.5 years). It is surprising that only 29% of these children had ever visited a doctor to address the problem (19, 20). Very often, FNRFI is not recognized as a distinct clinical entity by general practitioners and paediatricians, which frequently results in inadequate treatment with a negative response in the follow-up and deepens the problem. Approximately 30 - 40% of children with FNRFI have never been toilet trained successfully, while the majority have been completely toilet trained before and regressed to incontinence. Children may blame the occurrence of faecal incontinence on “not having time to go to the toilet”, or they may state that “I could not leave my computer game” or “I felt the urge to go, but I was too late”.

### Pathophysiology

The exact mechanism of FNRFI is generally unknown. In the literature, there are controversial ideas regarding its aetiology that focus on anorectal motility and sensation, genetics, and mental and psychiatric disorders. In any case, it is complex and multifactorial. Defecation is a complex action that takes place between the pelvic floor muscles, autonomic and somatic nervous systems and anal sphincter muscles. It consists of involuntary and voluntary actions that are both reflexive in nature. In infants and young children, myelination of the corticospinal tract is not yet complete, so they lack the ability to volitionally defecate. In most cases, this myelination is complete at the age of approximately 18 months, although the exact age can vary. At the age of 3 years, 98% of children are ‘clean’. Girls tend to gain control sooner due to their accelerated maturation, which is also reflected in their earlier bladder control. The process of control over defecation and urination is an issue of development and cannot be accelerated by intensive toilet training. A child’s initiative is the only proven indicator that they have developed the pathways needed to desire to be “clean” and “dry”. Abnormal dynamics of defecation are one of the factors involved in the pathophysiology of faecal incontinence. The use of so-called radiopaque markers (*colonic transit time*) and anorectal manometry enable the evaluation of sphincter function, while a *rectal barostat* is a tool used to investigate rectal compliance and sensation. Pathological findings on *colonic transit time* (CTT) were found in approximately 50% of constipated children, while findings within the normal range were found in all of the children with FNRFI. This points to the presence of normal intestinal motility in these children (21, 22). In assessing anorectal function, anorectal manometry has indicated that there is no significant damage to anorectal sensorimotor function in these children compared to healthy volunteers (23, 24). The *rectal barostat* method has indicated that an increase in rectal compliance, rather than a reduction in rectal sensitivity, is the pathophysiological mechanism in functional constipation in children. In children with high rectal compliance, a large-

volume stool is necessary to “trigger” an immediate sensation. It is not known whether genetic predisposition plays a crucial role in this, but in approximately 20% of children with FNRFI, a positive family history was reported. It is questionable whether it is a matter of genetic tendency or if it is the result of psychosocial and/or environmental effects, as psychiatrists have considered incontinence to be a result of emotional instability (conduct disorders, reduced alertness, lack of will, hyperactivity, poor social adaptability, learning difficulties), which is reflected in impulsive and unconscious defecation. Paediatricians believe that psychological problems are secondary and are a result of social incapacitation in children with faecal incontinence. Frustration and shame due to the inability to control defecation and occasional incontinence lead to comorbid psychological disorders in these children, which can be improved after successful treatment (25).

### Evaluation

Normal CTT (90%) results with anamnesis and a normal stool appearance without “faecal masses” in the physical findings are sufficient for a differential diagnosis. Other tests such as anorectal manometry, *rectal barostat* testing and MRI of the spinal cord are rarely needed (26).

The medical history involves questions about the frequency and size of the child’s stool, rectal bleeding, abdominal pain, painful defecation, etc. It is important to ask for the timing of defecation problems – daytime or nocturnal – and consider the situations associated with stool retention (playing outside, TV or computer use). FNRFI in most children usually occurs after school and before bedtime, while nocturnal faecal incontinence is associated with severe constipation. The child’s nutritional history is also important, as is information concerning their bowel habits. Urinary tract abnormalities (*enuresis*), growth, drugs, neuromuscular development, any family history of defecation disorders, and information about psychological problems in the child and their family (birth of twins, parental divorce, illness in the family) must be considered. (27, 28)

Each child with a defecation disorder must undergo thorough physical and neurological examinations. A perianal inspection provides important information on the position of the anus, rectal faeces, redness, dermatitis, eczema, fissures, haemorrhoids, scars, etc. Digital anorectal examination is an invaluable tool in the assessment of perianal sensation, anal tone, rectal size, faecal volume and consistency, and voluntarily activated anal sphincter contraction and relaxation (29). No anorectal physiologic abnormalities were present in children with FNRFI (30).

Warning signs that should result in increased attention are the absence of meconium passage, early occurrences of constipation, an empty rectal ampulla, refractory constipation, etc. Disturbing neurological signs include motor and sensory dysfunction in the lower extremities, abnormal reflex activity and anorectal sensation. An MRI of the spinal cord is justified in these cases (31).



## Treatment

In contrast with children with faecal incontinence caused by functional constipation, patients with FNRFI should not be treated with laxatives (32, 33). Education, toilet training, and positive motivation are the cornerstones of treatment for these patients (34). Children and their parents should be prepared for a long-term process with many ups and downs. The aim is to prevent accidents and achieve regular bowel emptying, emphasizing the importance of immediately going to the toilet (35, 36). In addition, the education of both children and their parents in colorectal physiology, defecation and faecal incontinence can help significantly. Finally, parents should know that children are not always aware of their faecal accidents; they should mitigate their child's guilt and explain the prevalence of the disorder and how cooperation is needed to treat it. Meticulously kept records and strict toilet training performed 3 times each day within 5 minutes after meals are the most effective methods (37-39). Small gifts can further increase motivation (40-42). No signs of improvement were noticed in these patients after the administration of laxatives, while the long-term administration of laxatives is required in children with constipation (43). The effects of loperamide, which increases the pressure in the internal anal sphincter and/or reduces rectal contraction, should be examined in paediatric patients (44). *Biofeedback training* has no additional effect in these groups of children (45). Successful treatment of children with FNRFI leads to improvements in most patients, which suggests that these children should be treated primarily in paediatric rather than psychiatric clinics and consulting rooms (46). The course of treatment is lengthy, symptoms often persist for a long time and relapses are possible.

## CONCLUSION

Faecal incontinence rarely results from FNRFI, but it is crucial to make a differential diagnosis between FNRFI and functional constipation because each requires different approaches and treatments. A proper diagnosis is made through a case history and physical examination and is confirmed by the *colonic transit time*. Changes in behaviour designed to educate both children and their parents along with toilet training are the most effective therapies for FNRFI, while cases of functional constipation require long-term treatment with laxatives in addition to toilet training and diet modification.

The high percentage of relapses observed indicates the importance of intensive monitoring and follow-up for these patients.

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