

Defecation patterns in infants: a prospective cohort study

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ABSTRACT

Introduction Data regarding prevalence and natural history of infant dyschezia, defined by the Rome III criteria as straining and crying for at least 10 min before successful passage of soft stools, are lacking.

Objective We aimed to investigate prevalence and natural history of infant dyschezia.

Study design In 2003, 124 youth healthcare doctors participated in a national study on defecation patterns of infants. Using standardised questionnaires and bowel diaries, these were recorded of infants aged 1, 3 and 9 months old.

Results Out of 1292 infants, 46.4% had no gastrointestinal complaints. At 1 and 3 months old, 3.9% and 0.9% infants, respectively, fulfilled the Rome III criteria for infant dyschezia. However, at the same time points, parents of 17.3% and 6.5% of infants, respectively, reported symptoms preceding defecation while not strictly fulfilling the Rome III criteria ('modified Rome III criteria'). Dyschezia-like symptoms (Rome III criteria) were also reported in 0.9% of 9-month-old infants, with 5.7% having symptoms (modified Rome III criteria). Only 3/61 (4.9%) Rome III dyschezia infants and 1/306 (0.3%) infants with modified Rome III criteria at 1 or 3 months had symptoms fitting the diagnosis of infant functional constipation at 9 months old.

Conclusions The present definition of infant dyschezia seems too strict. We propose to widen the definition in terms of symptoms as well as age in order to better fit the appreciation of the parents. The prevalence of infant dyschezia declines with age. There seems to be no relation to the development of functional constipation.

INTRODUCTION

Infant functional gastrointestinal disorders, including colic, regurgitation, functional constipation and dyschezia, represent a variable combination of age-dependent symptoms without biochemical or structural abnormalities.¹ In contrast to the other three conditions, data regarding prevalence and natural history of infant dyschezia are lacking.²⁻⁴ The current Rome III definition for infant dyschezia is straining and crying for at least 10 min before successful passage of soft stools in an infant younger than 6 months of age without any other health problem.¹ Usually they pass soft stools several times daily, which contrasts with infants suffering from functional constipation. The parents often mention that the infants turn red or purple in the face during defecation.

The common explanation for infant dyschezia is lack of coordination between increased intra-abdominal pressure preceding defecation and

What is already known on this topic

- ▶ Infant dyschezia belongs to the infant functional gastrointestinal diseases.
- ▶ Rome III criteria are set to give the diagnosis.
- ▶ Infant dyschezia and functional constipation of childhood are considered two separate entities.

What this study adds

- ▶ Infant dyschezia is a self-limiting condition.
- ▶ This is the first study to support the Rome III criteria for infant dyschezia.
- ▶ A broader definition of infant dyschezia does not alter natural history but gives healthcare professionals a better tool to satisfy the needs of parents.

relaxation of the pelvic floor. The symptoms tend to start in the first months of life and resolve spontaneously after a few weeks.¹⁻⁴ Parents are to be reassured that it is a benign condition and that the prescription of laxatives or using rectal stimulation should be avoided as these could produce artificial sensory experiences that may either be noxious or lead to conditioning with the infant waiting for the stimulus to start defecation.¹

Previously, we reported on the defecation pattern of infants without gastrointestinal problems.⁵ The primary aim of the present study was to investigate prevalence and natural history of infant dyschezia as defined by the Rome III criteria. The secondary aims were to investigate the relation of infant dyschezia with subsequent constipation and whether the Rome III criteria were adequately identifying children with apparent defecation problems without constipation.

PATIENTS AND METHODS

Between September and November 2003, 124 Dutch youth healthcare doctors working in well-baby clinics participated in a nationwide study on defecation patterns of infants, for which we coined the acronym LOOZ (*Landelijk Onderzoek naar Ontlasting bij Zuigelingen*).⁵ Infants were included when fulfilling the following criteria: (1) duration of pregnancy ≥ 37 weeks; (2) weight at birth ≥ 2500 g; (3) postnatal hospitalisation ≤ 2 days and (4) no congenital defect, metabolic disturbance,



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disorder of the gastrointestinal tract or indication of allergy to cow's milk. After parental approval, a standardised questionnaire concerning feeding and defecation was completed at any visit after the infant had reached the ages of 1, 3 and 9 months. Questions about defecation included straining and crying before defecation, redness of the face during defecation and straining without subsequent defecation. In addition, parents were asked to keep a bowel diary at the ages of 1 and 3 months, in which they recorded frequency, consistency, quantity and colour of the stools over three consecutive days, using a reference chart.⁶

Items recorded for this analysis were straining, crying and redness of the face in relation to successful or unsuccessful defecation. Infant dyschezia was defined according to the Rome III criteria: at least 10 min of straining and crying before successful passage of soft stools without other health problems in an infant younger than 6 months of age. Infants with only one of the abovementioned criteria or redness of the face during defecation and straining without consequent defecation were considered partly fulfilling the Rome III criteria (in the following dubbed 'modified Rome III criteria'). In order to assess the presence of similar symptoms at the age of 9 months, we specifically addressed these symptoms in the 9-month questionnaire, while distinguishing children fulfilling the classical Rome III criteria from those fulfilling the modified criteria.

Statistical analysis

Results were analysed using SPSS (V19). Baseline details of infants fulfilling the definition of infant dyschezia and their mothers were compared with those of healthy infants with a complete normal defecation pattern as described in our earlier study.⁵ Differences for binary variables (sex, breast feeding vs non-breast feeding at the ages of 1 and 3 months) were analysed with Fisher's exact test; differences for quantitative variables (mother's age, birth weight) were analysed with the independent samples t test.

Daily stool frequency was calculated by dividing the total number of stools in the 3-day diary by 3. A table of frequency and consistency of stools was designed per age for the ages of 1 and 3 months based on the number of diapers.⁵ For the age of 9 months, defecation frequency and consistency were asked via a questionnaire and divided into categories. Statistical significance was defined as $p < 0.05$.

RESULTS

Study population

In total, 1598 infants were eligible for the study. Parents of 205 infants (13%) refused participation, with the most common reason being lack of time ($n=91$). Parent-related issues (too busy, forgotten) led to the exclusion of another 68 infants, while in the course of the study 33 children had to be excluded because they were diagnosed with cow's milk allergy. The results of 1292 infants could be used for analysis. In total, 600 children had no gastrointestinal issues throughout the study period;⁵ they served as a control group. Infants using laxatives or fitting the diagnosis of infant functional constipation were not included in the analysis for the age concerned.

Prevalence of dyschezia as defined by the Rome III criteria

The number of infants fulfilling the Rome III criteria for dyschezia varied with age. At the age of 1 and 3 months, dyschezia was present in 51 (3.9%) and 11 (0.9%) infants, respectively. At the age of 9 months, the symptoms of another 11 infants (0.9%) were consistent with a diagnosis of dyschezia, apart from them being older than 6 months. Table 1 shows the demographic

details of the mothers and infants compared with the control group.⁵

Of the 51 infants with dyschezia at 1 month of age, only one continued to have the same symptoms at 3 months of age, but not anymore at 9 months; two other infants fulfilled the criteria only at 9 months of age, but not at 3 months of age. None of the infants fulfilling the Rome III criteria for infant dyschezia at 3 months of age had similar complaints at the age of 9 months.

Prevalence of dyschezia as defined by the modified Rome III criteria

Using the modified Rome III criteria at 1, 3 and 9 months old, dyschezia was present in, 223 (17.3%), 84 (6.5%) and 74 (5.7%) infants, respectively. Although the number of infants with dyschezia increased significantly with the revised criteria, the age distribution showed the same pattern as with 'classical' Rome III criteria. Only one infant having dyschezia (modified Rome III criteria) at 1 month had dyschezia at the age of 3 and 9 months; 13 other infants with dyschezia at 1 month also had dyschezia-like symptoms at 9 months but not at 3 months of age. Six of the infants having dyschezia at 3 months had these symptoms also at 9 months.

Table 1 depicts the demographic characteristics of mothers and infants, comparing those with the classical and the revised criteria to the control group.

Relation with constipation

In the group of 1292 infants, functional constipation according to the Rome III criteria was not seen at the ages of 1 and 3 months, while at the age of 9 months, 10 children (0.8%) fulfilled these criteria (ie, 1–3 times per week or less defecation combined with hard stools). However, at the ages of 1, 3 and 9 months, 10 (0.8%), 20 (1.5%) and 30 infants (2.3%), respectively, were receiving laxatives for suspected constipation.

Of the 51 infants with infant dyschezia (Rome III criteria) at the age of 1 month, 1 (2%) was using lactulose at the age of 3 months and 3 (6%) presented with infant functional constipation according to the Rome III criteria at 9 months. In contrast, none of the 11 infants fulfilling Rome III criteria for dyschezia at the age of 3 months presented with infant functional constipation at 9 months of age. Using the revised criteria, none of the infants in the 1-month-old group had constipation at 9 months and only one infant at the age of 3 months had constipation at 9 months.

Stool characteristics

Stool characteristics of children with infant dyschezia according to the Rome III criteria at the ages of 1, 3 and 9 months are presented in table 2. Of the 11 nine-month-old infants, 7 (64%) had hard stools. In the modified Rome III group, 19 infants had hard stools (27%) at 9 months. None of these fulfilled the Rome III criteria for functional constipation. Six infants were classified by the youth healthcare doctor as having constipation, although not fulfilling the Rome III criteria.

Also, 43 of the 51 (84%) infants with Rome III dyschezia at 1 month of age passed the first meconium within 24 h after birth compared with over 94% in the control group ($p < 0.01$).⁵ All 51 dyschezia infants passed meconium within 48 h. In the modified Rome III group, 195 infants passed meconium within 24 h (87.4%) and 6 infants passed meconium after 48 h ($p = ns$ vs control group).

Table 1 Demographic characteristics of mothers and infants with (modified) Rome III dyschezia and controls⁵

Diagnosis	1 month		3 months		9 months		Control ⁵
	Rome	m-Rome	Rome	m-Rome	'Rome'	m-Rome	
Mother's age (years, mean)	30.0	30.6	32.6	31.2	29.1	31.2	32.0
n	51	222	11	84	11	73	600
p Value*	0.03	ns	ns	ns	ns	ns	
Sex							
Male (%)	45	54	55	57	40	49	51.2
Female (%)	55	46	45	43	60	51	48.8
n	44	199	11	76	10	70	552
p Value	ns	ns	ns	ns	ns	ns	
Birth weight (g, mean)							
Male	3676	3582	3446	3510	3257	3449	3694
Female	3610	3466	3713	3428	3541	3568	3531
n	50	199	10	74	11	69	552
p Value	ns/ns	0.03/ns	ns/ns	0.02/ns	ns/ns	0.005/ns	
Exclusively breast fed							
1 month (%)	43	41	36	43	36	62	65.1
n	51	90	11	36	11	45	
p Value	0.002	<0.001	0.05	<0.001	0.05	ns	
3 months (%)	26	27	18	24	30	34	44.4
n	47	54	11	20	10	24	
p Value	0.008	<0.001	ns	<0.001	ns	ns	

Rome, diagnosis according to the Rome III criteria; 'Rome', same criteria, apart from age; m-Rome, diagnosis according to the suggested modified Rome III criteria.
*p Value is tested against the control group.

Relation with feeding

Both the infants in the Rome III and modified Rome III groups at 1 and 3 months old differ significantly from the controls in receiving exclusively breast feeding (table 1).⁵ At 9 months of age, the difference disappears.

DISCUSSION

This is the first population-based study that prospectively investigates the prevalence of infant dyschezia in healthy children attending well-baby clinics.

The Rome III criteria for infant dyschezia require at least 10 min of straining and crying before the successful passage of soft stools without any other health problem in an infant younger than 6 months of age. We found, however, that parents reported other defecation-related symptoms, especially extreme reddening of the face and straining without subsequent defecation, far more often than the symptoms required for diagnosis of infant dyschezia. Inclusion of all infants with one or more of these symptoms quadruples the number of infants with dyschezia at 1 month of age and results in still higher prevalences in

older children. As an instrument useful in preventive medicine, a broader definition of infant dyschezia probably matches the needs of parents better than do the present Rome III criteria.

We found a prevalence of infant dyschezia (Rome III criteria) at the age of 1 month of 3.9%, declining to 0.9% at the age of 3 months. At 9 months, the prevalence of dyschezia-like symptoms was 0.9%, although according to the Rome III criteria, the diagnosis of infant dyschezia can only be made in infants younger than 6 months old. We found that dyschezia is especially prevalent at the age of 1 month and that, contrary to expectation, infants exhibiting dyschezia at the age of 1 month represent a different population from the infants with dyschezia at 3 (and 9) months.

For the modified Rome III groups, prevalence of dyschezia was 17.3%, 6.5% and 5.7% at 1, 3 and 9 months, respectively. Likewise, there was a decline between 1 and 3 months and a different population at 3 months compared with 1 month. Irrespective of strictness of inclusion criteria, infant dyschezia shows a natural decline during the first year of life. Extending the definition did not lead to significant changes in defecation

Table 2 Stool characteristics at 1 and 3 months (m1 and m3) old of infants with infant dyschezia according to the (modified) Rome III criteria

Diagnosis	Rome 1 month (n=51)		m-Rome 1 month (n=223)		Rome 3 months (n=11)		m-Rome 3 months (n=84)		'Rome' 9 months (n=11)		m-Rome 9 months (n=74)	
	m1	m3	m1	m3	m1	m3	m1	m3	m1	m3	m1	m3
Defecation frequency per day Mean	1.95	1.36	2.06	1.21	1.03	0.88	1.96	1.06	1.91	1.24	2.66	1.46
SD	1.52	0.91	1.89	0.95	0.85	0.75	1.76	0.95	1.78	0.92	2.11	1.12
Consistency* Mean	3.41	3.39	3.43	3.31	3.00	3.00	3.46	3.14	3.50	3.53	3.36	3.49
SD	0.75	0.74	0.77	0.75	0.74	0.89	0.78	0.78	0.50	0.51	0.89	0.69

Rome, diagnosis according to the Rome III criteria; 'Rome', same criteria, apart from age; m-Rome, diagnosis according to the suggested modified Rome III criteria.

*Consistency is rated from 1 (hard) to 4 (watery).⁶

frequency, type of feeding, feeding frequency, consistency and demographic details, with the exception of the 1-month consistency and frequency of children with 'modified' infant dyschezia at 3 months, but it is unlikely that this difference is relevant.

The literature on infant dyschezia is extremely limited. The only other prospective study performed in primary care clinics identified two infants with dyschezia in a group of 9660 children 0–12 years of age, of whom 196 had a Rome II diagnosis.⁷ Out of 4157 successive infants <24 months of age visiting a general paediatric clinic, Loening-Baucke identified 10 infants with dyschezia compared with 185 with constipation.⁴ Hyman *et al*⁸ reviewed charts of 57 infants <1 year of age referred to a tertiary care clinic, 20 of whom met the Rome III criteria for dyschezia and 37 those for functional constipation. The only factors that differed between the two groups were age at referral (mean age 103 days for dyschezia and 213 days for constipation) and stool characteristics (being soft in 80% of infants with dyschezia and hard in 92% of those with constipation). Importantly, all 20 children with dyschezia were referred with a chief complaint of constipation, underscoring the lack of familiarity with the condition.⁸

We have shown that infant dyschezia is a self-limiting condition that fits into the hypothesis that it has a developmental background, although our results also suggest that the type of feeding might play a role. In this respect, it joins with the other functional disorders typical for young infancy, that is, infant regurgitation and infant colic. We have confirmed, therefore, that the mainstay of dyschezia therapy is reassurance of parents and that there is no role for laxatives or other measures in treating those infants.

Another purpose of our study was to investigate the relationship between infant dyschezia and infant functional constipation. We found a prevalence of 4.9% of constipation among infants previously diagnosed with dyschezia (3 out of 61) and an even lower prevalence of 0.2% in the modified criteria group. In the whole group of 1292 infants, the prevalence of constipation was 1%. Loening-Baucke reported a prevalence rate of 2.9% for infant constipation in the first year of life.⁴ As a consequence, having dyschezia at 1 or 3 months of age has no predictive value for the development of constipation later in infancy. This underscores the Rome III notion that dyschezia should not be considered related to constipation and does not require laxative treatment.

The strength of our study lies in the fact that it is a population-based survey in a large group of infants followed prospectively. As its main weakness may be considered the fact that follow-up is confined to three time points in the first year of life, which could mean that we missed some cases of infant dyschezia between 3 and 6 months of age. However, as we have shown that the condition is mainly present before 3 months of age, it is unlikely that more frequent contacts would have resulted in a significant different outcome.

CONCLUSION

Infant dyschezia according to the Rome III criteria has a low prevalence and declines between 1 and 3 months of age, although similar symptoms are also found in infants 9 months of age. Symptoms are short-lived and disappear without relevant intervention. There seems to be no causative relationship between infant dyschezia and infant functional constipation, underscoring the notion that they should be considered separate conditions.

With a broader definition of infant dyschezia, the prevalence rises to 21.2%, 7.4% and 6.6% at 1, 3 and 9 months of age, respectively, but with an identical natural history. Only four infants with dyschezia show signs of infant functional constipation. We suggest that these modified criteria match the needs of parents better than the current Rome III criteria.

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