

# Anal Incontinence After Vaginal Delivery: A Five-Year Prospective Cohort Study

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**OBJECTIVE:** The long-term prevalence of anal incontinence after vaginal delivery is unknown. The aim of the present study was to evaluate the prevalence of anal incontinence in primiparous women 5 years after their first delivery and to evaluate the influence of subsequent childbirth.

**METHODS:** A total of 349 nulliparous women were prospectively followed up with questionnaires before pregnancy, at 5 and 9 months, and 5 years after delivery. A total of 242 women completed all questionnaires. Women with sphincter tear at their first delivery were compared with women without such injury. Risk factors for development of anal incontinence were also analyzed.

**RESULTS:** Anal incontinence increased significantly during the study period. Among women with sphincter tears, 44% reported anal incontinence at 9 months and 53% at 5 years ( $P = .002$ ). Twenty-five percent of women without a sphincter tear reported anal incontinence at 9 months and 32% had symptoms at 5 years ( $P < .001$ ). Risk factors for anal incontinence at 5 years were age (odds ratio [OR] 1.1; 95% confidence interval [CI] 1.0–1.2), sphincter tear (OR 2.3; 95% CI 1.1–5.0), and subsequent childbirth (OR 2.4; 95% CI 1.1–5.6). As a predictor of anal incontinence at 5 years after the first delivery, anal incontinence at both 5 months (OR 3.8; 95% CI 2.0–7.3) and 9 months (OR 4.3; 95% CI 2.2–8.2) was identified. Among women with symptoms, the majority had infrequent incontinence to flatus, whereas fecal incontinence was rare.

**CONCLUSION:** Anal incontinence among primiparous women increases over time and is affected by further childbirth. Anal incontinence at 9 months postpartum is an important predictor of persisting symptoms. (Obstet Gynecol 2004;104:1397–1402. © 2004 by The American College of Obstetricians and Gynecologists.)

Rupture of the anal sphincters at vaginal delivery is a serious complication. Despite immediate surgical repair, several of these women will suffer from anal incontinence (incontinence for gas and/or feces) at follow-up.<sup>1–4</sup> The overall incidence of sphincter tears at vaginal deliv-

ery is usually reported as less than 3% of births,<sup>3</sup> but primiparous women are at a significantly increased risk.<sup>5</sup>

Immediate primary repair is the standard procedure for obstetric sphincter tears. The functional outcome after primary repair is frequently disappointing, with anal incontinence developing in about 40% of women despite surgical intervention.<sup>1,2,6,7</sup> The long-term outcome after primary repair of sphincter injuries is largely unknown.

The aims of the present study were to determine the prevalence of anal incontinence in primiparous women 5 years after their first delivery, to evaluate the influence of subsequent childbirth on this symptom, and to identify risk factors for the development of anal incontinence.

## MATERIALS AND METHODS

During a 10-week study period (April 1 through June 9, 1995), 440 nulliparous women delivered at the Danderyd Hospital maternity ward. Women with duplex pregnancies ( $n = 8$ ), non-Swedish-speaking patients ( $n = 18$ ), and women delivered by cesarean ( $n = 65$ ) were excluded from the study. The remaining 349 women were asked to participate in a prospective questionnaire study regarding symptoms of anal incontinence. Questionnaires were distributed in the puerperal period and at 5 months, 9 months, and 5 years postpartum. Questionnaires at 5 months, 9 months, and 5 years postpartum were sent by mail. Second and third attempts to obtain answers from nonresponders were made by sending a second and a third questionnaire by mail. Subjects not answering the questionnaire after the third reminding letter were considered nonresponders.

The first questionnaire, concerning symptoms before the pregnancy, was completed within the first days postpartum and included medical history, bowel habits, and symptoms of anal incontinence. The questions about symptoms and bowel habits have previously been used in the assessment of patients treated for anal incontinence and were found to be reliable, valid, and sensitive to change.<sup>8,9</sup> Anal incontinence was defined as inconti-

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**Table 1.** Obstetric Characteristics

	Participants (n = 242)	Nonparticipants (n = 107)
Age (y)	30 ± 4	30 ± 5
Gestational age (d)	281 ± 10	283 ± 8
First stage of labor (h)	7.4 ± 5	7.2 ± 4
Second stage of labor (h)	1.4 ± 1	1.3 ± 1
Epidural	30	40
Upright delivery position	53	50
External fundal pressure	31	27
Episiotomy	5	2
Vacuum extraction	12	7
Birth weight (g)	3,505 ± 463	3,563 ± 430
Obstetric tears		
No tear	11	8
First degree	28	34
Second degree	46	50
Third degree	14	7
Fourth degree	1	1

Data are presented as mean ± standard deviation or percentage.

nence to solid stool, loose stool, or involuntary flatus. The symptoms were graded as no incontinence, incontinence less than once a week, incontinence more than once a week, or daily incontinence. The 5-year follow-up questionnaire also included obstetric data so that we could track and analyze delivery records produced since the index delivery.

Of the 349 women who were eligible for the study, 309 agreed to participate, 278 filled out the first 3 questionnaires, and 242 completed all questionnaires for the 5-year study. A total of 36 of 38 (95%) women with sphincter tears and 206 of 240 (85%) women without sphincter tears responded. Obstetric data are presented in Table 1.

One hundred seventy-eight women had one or more subsequent vaginal or cesarean childbirths during the period between the 9-month and 5-year follow-up (Table 2). One woman with a previous sphincter injury and 2 women without previous sphincter tears experienced a new sphincter laceration during the follow-up period at their second vaginal delivery.

**Table 2.** Childbirth During the Study Period

	No sphincter tear (n = 206)	Sphincter tear (n = 36)
No subsequent childbirth	44	9
One subsequent vaginal delivery	134	20
Two subsequent vaginal deliveries	20	3
Three subsequent vaginal deliveries	1	0
One subsequent cesarean delivery	8*	1
Two subsequent cesareans deliveries	0	3

\* One woman had both a cesarean and a vaginal delivery.

According to Swedish routines, trained midwives managed all uncomplicated deliveries. An obstetrician was called upon as needed for obstetric decisions and when a sphincter tear was suspected. The attending obstetrician mended sphincter tears in the immediate puerperal period by using an end-to-end repair technique with sutures of absorbable material. Stool softeners were administered during the first 2 postoperative weeks.

The  $\chi^2$  test was used to analyze the change in anal incontinence over time. When analyzing risk factors for development of anal incontinence, the study population was limited to women without any symptoms before the first pregnancy (n = 223). The association between anal incontinence at 5 years and maternal, fetal, or obstetric factors was analyzed using multivariable logistic regression in a forward stepwise procedure.<sup>10</sup> Duration of labor was dichotomized at 12 hours and second stage of labor at 1 hour.

The study was approved by the local ethics committee at Karolinska Hospital, Karolinska Institutet, Stockholm.

## RESULTS

Two hundred forty-two of the 349 primiparous women (69%) participated in the study and completed all 4 questionnaires. Thirty-six of these women (15%) had a sphincter tear at their index delivery; 19 of 242 women (8%) reported some degree of anal incontinence symptoms before their first vaginal delivery. After 9 months, 68 of 242 women (28%) reported anal incontinence symptoms; after 5 years, 85 of 242 women (35%) reported symptoms of anal incontinence ( $P = .001$ ; 95% confidence interval [CI] 0.0012–0.0014).

Sixteen of 36 women (44%) who sustained a sphincter tear at their first vaginal delivery reported some degree of anal incontinence at 9 months of follow-up (Table 3). At the 5-year follow-up, 19 of 36 women (53%) were incontinent ( $P = .002$ ; 95% CI 0.013, 0.018) (Fig. 1). Forty-two percent of the women were incontinent to flatus only and 11% were incontinent to feces (Table 3).

Among the 206 women without detected sphincter tears at their first vaginal delivery, 52 (25%) reported some degree of anal incontinence at 9 months. At the 5-year follow-up, 66 women (32%) reported symptoms of anal incontinence ( $P < .001$ ) (Figure 1). Twenty-seven percent of the women were incontinent to flatus only whereas 5% also experienced fecal incontinence (Table 3).

Nine of the 36 women with a sphincter tear at the first delivery (25%) had no additional childbirths during the study period. Of these 9 women, 4 (44%) reported anal incontinence symptoms at 9 months postpartum, and



**Table 3.** Degree of Fecal Incontinence and Involuntary Flatus

Symptoms	Sphincter tear		No sphincter tear	
	9 mo after delivery (n = 36)	5 y after delivery (n = 36)	9 mo after delivery (n = 206)	5 y after delivery (n = 206)
No incontinence	56	47	75	68
Fecal incontinence				
< Once per week	0	11*	1 <sup>†</sup>	4 <sup>‡</sup>
> Once per week	0	0	0	0.5 <sup>§</sup>
Daily	0	0	0	0
Involuntary flatus				
< Once per week	33	25	16	22
> Once per week	11	22	7	7
Daily	0	6	1	2

Data are presented as percentages.

\* All women were also incontinent to flatus.

<sup>†</sup> One woman also had incontinence to flatus.

<sup>‡</sup> All but 1 woman were also incontinent to flatus.

<sup>§</sup> This woman was also incontinent to flatus.

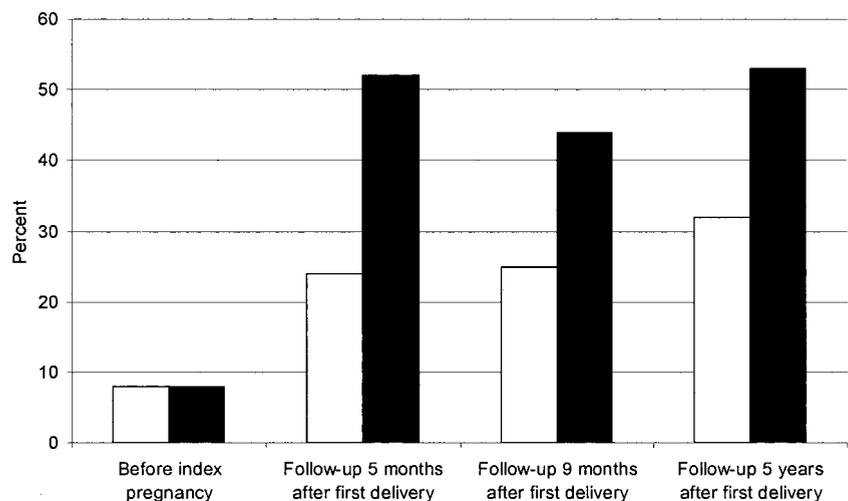
this prevalence was identical (44%) at the 5-year follow-up ( $P = .09$ ) (Fig. 2). Twenty-seven of the 36 women (75%) with a sphincter tear at the first delivery had 1 or more subsequent childbirths. Of these 27 women, 12 (44%) reported anal incontinence symptoms at the 9-month follow-up and 15 (56%) at the 5-year follow-up ( $P = .009$ ).

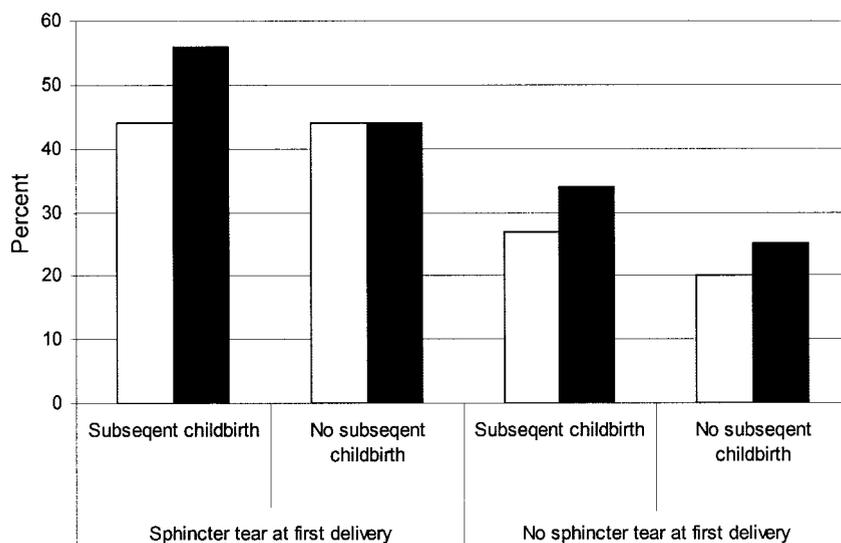
Forty-four of the 206 women without a sphincter tear at the first delivery (21%) had no additional childbirths during the study period. Of these 44 women, 9 (20%) reported symptoms of anal incontinence at the 9-month follow-up and 11 (25%) at the 5-year follow-up ( $P < .001$ ). One hundred sixty-two of the 206 women without a sphincter tear at their first delivery (79%) had 1 or more subsequent childbirths during the study period. Of these 162 women, 44 (27%) reported anal incontinence symptoms at 9 months postpartum and 70 (34%) at the 5-year follow-up ( $P < .001$ ).

Multivariable logistic regression analysis was used to analyze obstetric risk factors potentially involved in the development of anal incontinence 5 years postpartum. Age, sphincter tear at the first delivery, and subsequent childbirth were independent risk factors. Analyzed variables and odds ratios (ORs) are shown in Table 4. The presence of anal incontinence after the first delivery was the strongest risk factor according to multivariable regression, and this factor could be used as a predictor of persistent anal incontinence at 5-year follow-up. For women without symptoms of anal incontinence before their first pregnancy, anal incontinence at both 5 months (OR 3.8; 95% CI 2.0–7.3) and 9 months (OR 4.3; 95% CI 2.2–8.2) postpartum was a significant risk factor for persistent symptoms at 5-year follow-up. When analyzing women with sphincter tears separately, corresponding ORs were 5.3 (95% CI 1.2–23.3) at 5 months and 7.8 (95% CI 1.6–38.8) at 9 months.

**Fig. 1.** Prevalence of anal incontinence. Clear bars, no sphincter tear (n = 206); black bars, sphincter tear (n = 36).

Pollack. *Anal Incontinence After Vaginal Delivery*. *Obstet Gynecol* 2004.





**Fig. 2.** Anal incontinence in relation to subsequent childbirth. Subsequent childbirth ( $P = .009$ ); no subsequent childbirth ( $P$  not significant); subsequent childbirth ( $P = .004$ ); no subsequent childbirth ( $P = .001$ ). Clear bars, 9-month follow-up; black bars, 5-year follow-up.

Pollack. *Anal Incontinence After Vaginal Delivery*. *Obstet Gynecol* 2004.

## DISCUSSION

We chose to study primiparous women in this follow-up study so that we could assess the long-term impact of vaginal childbirth on anal incontinence. Primiparous women have a low frequency of anal incontinence symptoms, but they have an increased risk of anal sphincter tears compared with multiparous women.<sup>11</sup>

In the present study, 15% of the primiparous women experienced a sphincter tear at their first delivery. Forty-four percent of the women with sphincter tears had symptoms of anal incontinence at 9-month follow-up, and the frequency of symptoms remained high at the 5-year follow-up (53%). Our results are comparable with previous studies,<sup>1,2,6</sup> where a prevalence of up to 50% has been reported. Reasons for these poor results may include inadequate surgical technique or insufficient healing of the primary repair. In a study by Sultan et al,<sup>1</sup> a morphologic sphincter defect persisted in up to 85% of primary repaired sphincter injuries when assessed with endoanal ultrasonography at follow-up.

**Table 4.** Factors Associated With Anal Incontinence Five Years After First Vaginal Delivery

	Multivariable analysis odds ratio (95% confidence interval)
Age (y)	1.1 (1.0–1.2)
Sphincter tear	2.3 (1.1–5.0)
Subsequent childbirth	2.4 (1.1–5.6)

Variables that were analyzed but not significant were gestational age, duration of second-stage longer than 1 hour, duration of labor longer than 12 hours, use of oxytocin, epidural anesthesia, paracervical block, pudendal block, external fundal pressure, instrumental delivery vacuum extraction/forceps), episiotomy, upright birth-position, birth-weight, and head circumference.

Anal incontinence in women without clinically diagnosed sphincter tear may be due to neurologic impairment or occult sphincter injuries. Sultan et al<sup>12</sup> reported a strong association between occult injuries and anal incontinence, and these findings are supported by Zetterstrom et al.<sup>13</sup>

Among women without a clinically diagnosed sphincter tear, 25% reported anal incontinence at 9 months postpartum. Most of these symptoms were mild, and the majority had only infrequent symptoms of flatus (Table 4). After 5 years the reported prevalence was 32%, which is a significant increase ( $P < .001$ ). Studies with long-term follow-up data of anal incontinence after uncomplicated deliveries are few, but Ryhammer et al<sup>14</sup> found a 5% incontinence rate among women who delivered 2 to 13 years earlier. Many of these women also had subsequent deliveries. The higher prevalence of anal incontinence in our study might be explained by our decision to define involuntary gas leakage less than once a week as incontinence. Although this symptom could be considered mild and of no importance, to some women it can mean a great deal of embarrassment and psychological suffering. However, the present study was not designed to study quality-of-life aspects in relation to the frequency or severity of anal incontinence.

The impact of subsequent deliveries on anal incontinence is controversial. Fynes et al<sup>15</sup> found that primiparous women with persistent anal incontinence deteriorated after a second vaginal delivery. In a Danish study, Ryhammer et al<sup>14</sup> reported a significant increase in incontinence symptoms after the third delivery in women without clinical sphincter injury, whereas Hojberg et al<sup>16</sup> could not find this association. The present study



showed a significant increase in anal incontinence among women with additional deliveries. Most published data support our finding that additional deliveries may increase the risk for anal incontinence.

Our study demonstrated a long-term increase in incontinence symptoms after additional childbirths in women with previous sphincter tears. This finding is supported by several previous studies. In the study by Fynes et al,<sup>15</sup> primiparous women with transient symptoms or occult sphincter injury were at increased risk for developing anal incontinence after a second delivery. In a more recent study, Faltin et al<sup>17</sup> found an increased prevalence of anal incontinence after previous sphincter tear and subsequent delivery, and Payne et al<sup>18</sup> reported an increased risk for a recurrent sphincter injury at subsequent vaginal deliveries.

In the present study, the incontinence rate in the group without additional deliveries and no sphincter injuries was 25% after 5 years, compared with 34% in the group with 1 or more subsequent deliveries. In the study by Faltin et al,<sup>17</sup> incontinence symptoms increased from 3% to 10% after a second delivery among women who had intact sphincters (according to endoanal ultrasonography) after their first delivery. In our study, even mild and sporadic (< 1 per week) symptoms of gas incontinence were reported, which may explain the higher prevalence.

The present study indicates that increasing maternal age is a risk factor for developing anal incontinence. Our results indicate that a 30-year-old woman has twice as high a risk of developing anal incontinence compared with a 20-year-old woman. This finding is consistent with previously reported findings,<sup>5</sup> and is of importance because maternal age at the time of first childbirth continues to increase.<sup>19</sup>

Postpartum anal incontinence was an important predictor of persistent symptoms, particularly among women with a previous sphincter tear. These women had an almost 8 times increased risk for symptoms at 5 years if they reported symptoms at 9 months postpartum. Adding this finding to the increased risk of incontinence after subsequent delivery, we can make a firm argument against exposing the anal sphincter mechanism to the risk of functional impairment by a further vaginal delivery.

Our results suggest that patients with anal incontinence symptoms 9 months postpartum usually do not improve with time. In fact, the majority of these patients deteriorated with time, particularly if they underwent additional deliveries. Several previous reports have concluded that sphincter tear at delivery is the major cause of anal incontinence and that not all of these injuries are recognized at the time of delivery.<sup>12,20</sup> Far from all women with anal incontinence at 9 months in the present

study had a clinically detected sphincter injury, and it is plausible that some of these symptoms were the consequence of an occult injury. Although the present study did not collect information regarding occult injuries, a higher awareness of such injuries, resulting in meliorating clinical examinations of women after delivery, could have affected the outcome. Adding an endoanal ultrasound examination to the clinical examination immediately after parturition may also be of value. However, further studies on this matter are needed.

Unfortunately, the results of sphincter repair after delivery can be unsatisfying,<sup>1,2,21</sup> and studies evaluating new treatment strategies are needed. At our institution, we have developed collaboration between the gynecologic and surgical departments to optimize surgical treatment of primary obstetric sphincter injuries. We are currently studying whether delayed primary suture of sphincter tears or other treatment factors can improve continence after sphincter repair.

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