

Decreasing the Incidence of Anal Sphincter Tears During Delivery

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OBJECTIVE: To estimate if an interventional program causes a decrease in the frequency of anal sphincter ruptures.

METHODS: A total of 12,369 vaginal deliveries between 2002 and March 2007 were enrolled in the interventional cohort study. Slowing the delivery of the infant's head and instructing the mother not to push while the head is delivered was the intervention. Data were analyzed in relation to occurrence of anal sphincter tears.

RESULTS: The proportion of parturients with anal sphincter tears decreased significantly during the study period from 4.03% (285 of 7,069) to 1.17% (42 of 3,577) ($P<.001$). A similar decrease was observed for instrumental deliveries (from 16.26% to 4.90%; $P<.001$) and noninstrumental deliveries (from 2.70% to 0.72%; $P<.001$). Although the number of patients with fourth-degree anal sphincter ruptures from 2002 through 2004 was 10, 13, and 11 per year, respectively, there was just one fourth-degree anal sphincter rupture during the whole study period of 18 months ($P<.001$). The number of episiotomies increased from 13.9% (980 of 7,069) in the years 2002–2004, to 23.1% during the first 9 months of the intervention (416 of 1,776; $P<.001$), but decreased to 21.1% (381 of 1,801) during the last 9 months of the intervention.

CONCLUSION: As a result of this intervention the number of anal sphincter ruptures was reduced from 4.03% to 1.17%. (*Obstet Gynecol* 2008;111:1053–7)

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See related article on page 1058.

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The most important risk factor for fecal incontinence in women is traumatic vaginal delivery causing third- or fourth-degree anal sphincter rupture. Despite apparently adequate primary repair, approximately 30–50% of these women will suffer from chronic anal incontinence, dyspareunia, fecal urgency, or perineal pain when the anal sphincter (third degree) and/or the anal mucosa (fourth degree) are damaged.¹ The repair performed by appropriately trained staff using the correct technique might decrease the morbidity.² The utmost attention should be focused on improving obstetric practice to minimize the number of severe anal sphincter lacerations.

In Norway we have experienced a gradual increase in the incidence of anal sphincter rupture from less than 1% in the late 1960s to 4.3% today (Official Statistics of Norway, Medical Birth Registry, Bergen, Norway). A similar increase has been reported from other European countries, including the Nordic countries with the exception of Finland, where the frequency of anal sphincter ruptures has remained stable at 0.3–0.6% over the past 15 years (Official Statistics of Finland, Hospital Discharge Registry, STAKES, Helsinki, Finland).

There are several potential reasons for the increment of anal sphincter rupture. Our earlier retrospective study published in 1998³ found a marked difference in the frequency of anal sphincter rupture between Finland and Sweden. Our study showed it was obvious the traditional methods for helping the newborn through the last stage of delivery, which are still taught and practiced in Finland, seem to protect the pregnant woman against severe perineal damage.

In Norway, the national Health Control Agency (Helsetilsynet) reviewed all the Norwegian delivery ward data in 2004. As previously stated, where the frequency of anal sphincter tears was 1% in 1969, it was found to have steadily risen to 4.3% by 2004. The agency felt this level of increment was unacceptable, and after consultation with the Department of Health and Social Affairs, a National Advisory Committee



for Childbirth (Nasjonalt råd for fødselsomsorg) was set up to develop a national plan to reduce the number of anal sphincter ruptures. The aim of the study was to find out if an intensive interventional program causes a decrease in the frequency of anal sphincter ruptures, which has been on the increase for several decades.

MATERIALS AND METHODS

As a first step in this program, a clinical intervention with active training of personnel on the labor ward was started. The aim was to instruct the midwives and doctors in the traditional way of assisting the delivery of the infant during the final part (crowning) of the second stage of delivery, a procedure which was commonly used in Norway before the 1980s.

Slowing the delivery of the infant's head to protect the mother from perineal lacerations is a classic recommendation in many textbooks. One way to achieve this is keeping a hand on the neonate's head when it is crowning. Another is to instruct the mother not to push while the head delivers to slow down the process. By combining these two procedures one can achieve good control in delivering the newborn's head. In the classical method described by Pirhonen et al² (Fig. 1) these methods are used in addition to a technique for guiding the head through the introitus by gripping the baby's chin with a flexed middle finger of the other hand. This procedure allows optimal control and slow delivery of the fetal head. In addition, the delivery room personnel were told to encourage the women to move freely during delivery and push in the position they felt most comfortable. Further, they should help the women to choose a position during the last minutes of pushing



Fig. 1. The hands-on technique to control delivery of the head used in the study.

Laine. *Anal Sphincter Rupture*. *Obstet Gynecol* 2008.

whereby the classical maneuver could be performed and the perineum observed.

Further, we focused on the use of episiotomy. A routine episiotomy was not recommended, but only where clinically indicated on individual basis. If an episiotomy was done, should the cut be as far away from the anal opening (so called lateral or mediolateral episiotomy) as possible to avoid anal sphincter rupture.

The project was started at the Oestfold Trust Hospital in Eastern Norway. During the first 9 months, the obstetric staff held small group "focus" meetings to discuss how to change the rise in anal sphincter rupture.

The clinical intervention program commenced at Oestfold Trust Hospital in September 2005. During the first two days, tutorials were organized. The program included basics of anal sphincter rupture, and a presentation of the ongoing project. The entire labor ward staff took part. The physicians were also instructed in the use of similar manual protective techniques for use with vacuum extractors or forceps.

Practical supervision started at the beginning of October 2005. All members of staff took part in the program. Each member of staff was instructed and supervised in three stages: first with a pelvic model on how to perform the classical method. After the practice sessions were successfully passed, the midwife/doctor was supervised on the technique during real deliveries. Initially the instructing midwife had her hands over the accoucheur's to teach the correct technique. Finally, the midwives/doctors were allowed to deliver under supervision.

Possibly the most important goal of this project was to establish a local core team of experts who would take continued training after the midwife instructor had fulfilled the active training period. These midwives/doctors were exposed to more deliveries than the rest of the staff, until they were of high competence.

Data on all deliveries registered in the Oestfold Trust Hospital obstetric database between January 2002 and March 2007 were collected. To minimize the bias using administrative data, we manually checked and validated the data at the time of database enrolment.

For statistical analysis, the proportion of parturients with anal sphincter rupture during delivery (International Classification of Diseases, 10th Revision code O70) was calculated per 100 parturients. Their share was compared by type of delivery (instrumental and noninstrumental) and by timing (before the intervention) from January 2002 to September 2005 and with the intervention period from October 2005 to March 2007 by using the test for relative proportions. Similar statistical methods were used for analyzing for



possible confounding factors. The classification of anal sphincter tears is presented in the Box.

Classification of Anal Sphincter Tears

Third-degree perineal tear, including:

- Less than 50% of external anal sphincter thickness torn
- More than 50% of external anal sphincter thickness torn
- Internal anal sphincter torn

Fourth-degree perineal tear, including:

- Injury of the anal sphincter complex and anorectal epithelium

The present study is part of national program aiming to reduce the number of anal sphincter ruptures in Norway. Further, the hospital in Fredrikstad was the first of five hospitals to take part in the program. Therefore, both the National Advisory Committee for Childbirth and the Directorate for Health and Social Affairs approved the study.

RESULTS

The proportion of parturients with anal sphincter tears decreased significantly during the study period from 4.03% (285 of 7,069) in years 2002–2004 to 1.17% (42 of 3,577), ($P<.001$) (Fig. 2). A similar decrease was observed for instrumental deliveries (from 16.26% to 4.90%, $P<.001$) and noninstrumental deliveries (from 2.70% to 0.72%, $P<.001$) (Table 1).

The most dramatic decrease occurred in the patients with the most severe (grade four) perineal tears. Although the number of patients with grade four anal sphincter tears from 2002 through 2004 was 10, 13, and 11 per year, respectively, there was just one grade four anal sphincter tear during the whole study period of 18 months ($P<.001$).

The number of instrumental deliveries increased slightly from 9.8% of vaginal deliveries (695 of 7,069) in years 2002–2004 to 11.7% (207 of 1,776; $P=.011$) during the first 9 months and to 12.2% (220 of 1,801; $P<.001$) during the last 9 months of the intervention period (Table 2). The number of forceps varied between 0.4% and 0.7% of vaginal deliveries from 2002 to 2007 ($P=.432$, $P=.190$, and $P=.318$, respectively, not significantly different). No rotational forceps were done.

The number of episiotomies was 13.9% (980 of 7,069) during the years 2002 to 2004, and showed no change during the first 9 months of 2005, just before the intervention started (225 of 1,723, not significantly different). During the first 9 months of the intervention period, the number of episiotomies increased to 23.1% (416 of 1,776; $P<.001$), but then started to decline and was 21.1% (381 of 1,801; $P<.001$ when compared with the period 2002–2004) during the last 9 months of the intervention period (not significantly different when compared with the first 9 months).

In the period from 2002 to spring 2007, no statistically significant changes occurred with regards to high birth weight, nulliparity, epidural anesthesia, shoulder dystocia, or fetal presentation. The cesarean section frequency in Fredrikstad increased during the

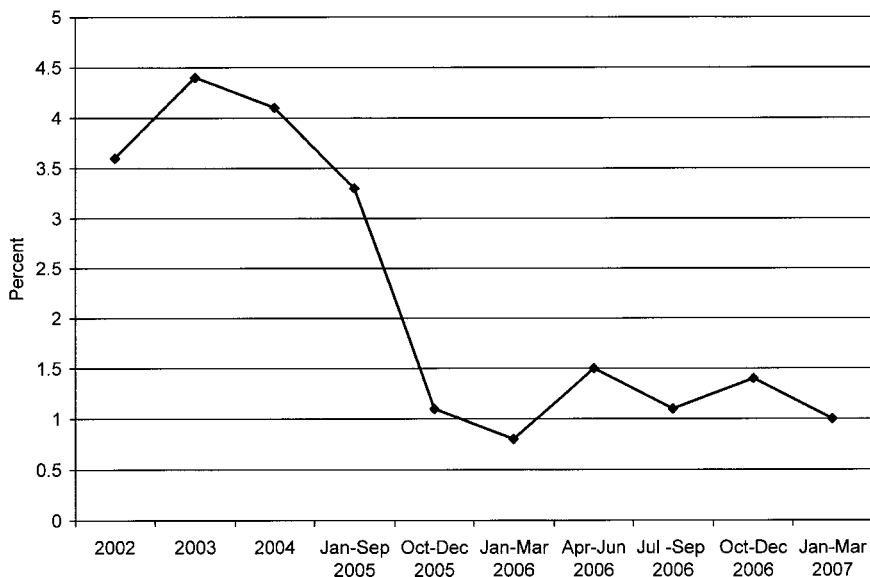


Fig. 2. Frequency of anal sphincter ruptures in Fredrikstad from January 2002 to March 2007. The years 2002–2004 were before intervention, January to September 2005 was local effort, and October 2005 to March 2007 was the period for active intervention.

Laine. Anal Sphincter Rupture. *Obstet Gynecol* 2008.



Table 1. The Frequency of Anal Sphincter Ruptures in Fredrikstad, Norway

	2002–2004*	January to September 2005†	Study Period‡
Noninstrumental deliveries	2.70 (172/6,374)	2.12 (33/1,559)	0.72 (23/3,189)
Instrumental deliveries	16.26 (113/695)	14.63 (24/164)	4.90 (19/388)
Total	4.03 (285/7,069)	3.31 (57/1,723)	1.17 (42/3,577)

Data are % (n/N).

* The period from 2002 to 2004 was without any intervention.

† The period from January to September 2005 was focusing of the high incidence of anal sphincter rupture.

‡ The study period was from October 2005 to March 2007.

autumn of 2004, and was highest (20.8%) during the “focusing” period during the first nine months 2005, but decreased during the intervention to 19.3% of all deliveries ($P=.21$ when compared with the focusing period, not significantly different) (Table 2).

DISCUSSION

The great majority of articles dealing with the incidence of anal sphincter rupture focus on the risk factors for anal sphincter rupture such as increased fetal weight, primiparity, and instrumental deliveries.

There are very few studies on manual protection of the perineum. Parnell et al⁴ showed that easing of the perineum will decrease the number of anal sphincter ruptures in noninstrumental deliveries. Further, it has been shown that inexperienced birth attendants will increase the perineal damage rate.⁵

Mayerhofer et al⁶ considered perineal ischemia caused by manual intervention an important risk factor for severe perineal trauma. Our results show that perineal support decreases the number of anal sphincter ruptures. Data from Sweden⁷ suggested that the visualization and manual protection of perineum are important in preventing sphincter injury, which is in accordance with our own results.

After analyzing possible risk factors published in our previous retrospective study, it remained obvious that the use of traditional birth assistance instead of newer techniques including so called “hands off”

techniques would decrease the number of anal sphincter ruptures. The method is described in many educational books from the 1960s, 1970s, and before. However, after the 1970s, manual assistance was thought to be less important, and so has been increasingly forgotten. In contrast, however, Finland has continued to teach these traditional methods and they still form the main approach.

The use of episiotomy has been considered as a risk factor, but results from published studies are contradictory.^{8,9} In the present study, the number of episiotomies increased as the anal sphincter rupture decreased dramatically; an episiotomy was performed in one of five vaginal deliveries. The use of midline episiotomy has been reported to cause a marked increase in the incidence of anal sphincter rupture, and is rarely used in Europe.^{5,10} Two reports were published in 2006 focusing on the technique of episiotomy.^{11,12} The most common type of episiotomy used, called mediolateral episiotomy, was not correctly described or used by accoucheurs in many cases, and was more or less similar to a midline episiotomy. Eogan et al¹² calculated a 50% relative reduction in risk of anal sphincter rupture for every 6.3° increment in the angle of episiotomy away from anal opening. Tincello et al¹³ reported that episiotomies drawn by doctors were significantly longer and more angled from anus than those drawn by midwives. In educational programs similar to ours, it is

Table 2. The Characteristics of the Study Population in Different Time Periods

	2002–2004	Focusing Period		Interventional Period	
		January to September 2005	First 9 Months	Last 9 Months	
Total number of deliveries	8,353	2,176	2,235	2,232	
Number of cesarean deliveries	1,284 (15.4)	453 (20.8)	459 (20.5)	431 (19.3)	
Vaginal deliveries	7,069	1,723	1,776	1,801	
Instrumental deliveries	695 (9.8)	164 (9.5)	207 (11.7)	220 (12.2)	
Episiotomy	980 (13.9)	225 (13.1)	416 (23.1)	381 (21.1)	
Epidural analgesia	1,987 (28.0)	507 (28.1)	514 (28.9)	520 (28.9)	
Nulliparity	3,463 (41.4)	879 (40.4)	931 (41.6)	941 (42.2)	
Macrosomia (>4,500 g)	348 (4.2)	89 (3.7)	91 (4.1)	92 (4.1)	

Data are n or n (%).



important to learn the correct use of episiotomy to minimize the risk of anal sphincter tears.

The use of an upright delivery position makes it more difficult to use the traditional method in helping the neonate out. Several authors have concluded that the use of, for example, squatting will increase or is associated with an increase in anal sphincter rupture.¹⁴

Our results clearly show that it is possible to reverse the rising trend of anal sphincter rupture. The total number of anal sphincter ruptures decreased even when the number of instrumental vaginal deliveries increased. The change in practice and attitude did not come easily. However, as soon as staff realized how their own management had such profound effects on the incidence of anal sphincter rupture, the vast majority of healthcare workers were positively inclined toward the practice. A critical point for the change was the period after completion of the intensive training period; when local staff, led by the local experts, took full responsibility for the continued practical performance of this project. As a result of our project, the number of anal sphincter ruptures in Fredrikstad is now close to the levels seen in Norway during the late 1960s.

It is difficult to determine the exact significance of different parts of the educational program in decreasing the number of anal sphincter ruptures. We are confident that manual support of perineum was the most important part in this program. However, other factors having an effect on the outcome were close contact between patient and accoucheur, correct indication and technique when performing episiotomy, and the delivery position.

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