

## Preventing Anal Sphincter Tears during Delivery. A Review.

**Jouko Pirhonen\***

*The Norwegian Continence and Pelvic Floor Centre, University Hospital of North Norway, Tromsø, Norway*

**\*Corresponding Author:** Jouko Pirhonen, The Norwegian Continence and Pelvic Floor Centre, University Hospital of North Norway, Tromsø, Norway.

**Received:** October 26, 2015; **Published:** October 28, 2015

### Abstract

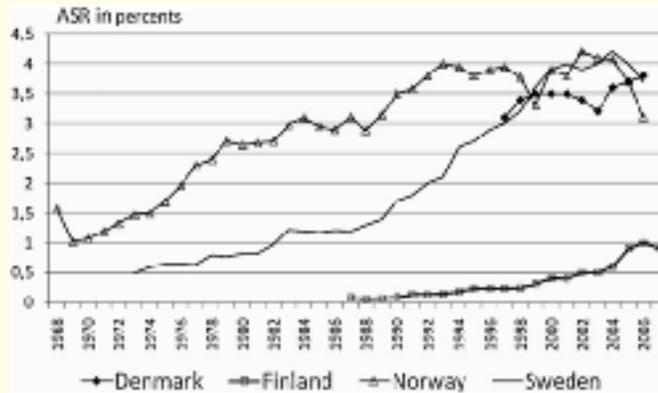
An anal sphincter injury is one of most serious complications during a delivery. Despite sufficient primary repair, studies show that 30-50% of all women suffering from such an injury experience anal incontinence. Obstetric anal sphincter injuries have gained more and more international interest during the last decades. While a concept requiring less activity from the midwife's side in association with the delivering woman being free to do as they wanted to gained popularity, the number of serious tears started to increase, especially in the western countries. Some sporadic reports have been published in this field but the greatest interest has been directed towards the interventional projects from Norway. After the interventional projects started, a dramatic improvement in the obstetric anal sphincter injury statistics was seen. One of the main challenges today is using a correct episiotomy as well as to know the optimal episiotomy level.

**Keywords:** *Obstetric anal sphincter injuries; Vaginal delivery*

### Introduction

An anal sphincter injury (OASIS) is one of most serious complications during a delivery. The overall rate varies in different reports (0.6–10.2%) [1-4]. OASIS following labor is even the most common cause of anal incontinence for women, and can severely diminish quality of life. Despite sufficient primary repair, studies show that 30-50% of all women suffering such injury experience anal incontinence. They represent serious complications of vaginal delivery for example because it can lead to pelvic floor disorders [5], dyspareunia [6,7] chronic pain [8,9,10], and ultimately to severe psychological and social problems [11]. To prevent an OASIS it is important to accumulate knowledge with regard to risk factors, in particular those modifiable to obstetric interventions. Factors such as nulliparity, vacuum, forceps and birthweight have been consistently associated with OASIS [3,4] [7-11]. There are conflicting results regarding the use of epidural analgesia, oxytocin induction or augmentation, fetal presentation, episiotomy (4,7,12-16), length of pregnancy [4,17], and birthing position [18,19,20].

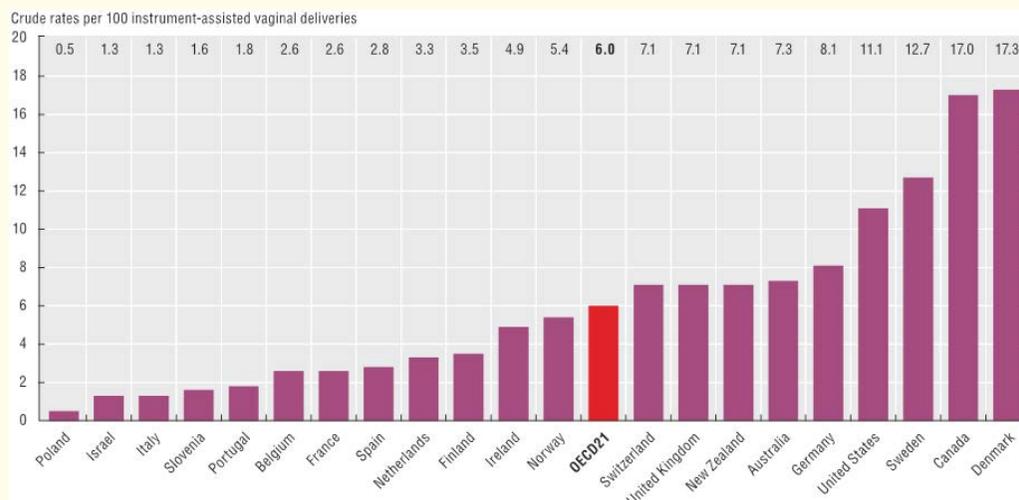
Obstetric anal sphincter injuries have gained more and more international interest during the last decades. At 1970s there was very scarce, if any, interest in this field. At that time the OASIS rate was low throughout the whole world. However, while a concept with less activity from the midwife's side in association with the delivering woman being free to do as they wanted to gained popularity, the number of OASIS started to increase. The situation in Europe was not consistent. In particular in the Eastern Europe the midwives and doctors kept the old tradition alive, which includes perineal support and episiotomy practice. However, in the western part of Europe, the new concept gained more and more popularity. For example, in the Nordic countries the situation changed completely, except in Finland. In Figure 1 the progress in the Nordic countries through decades is shown [21].



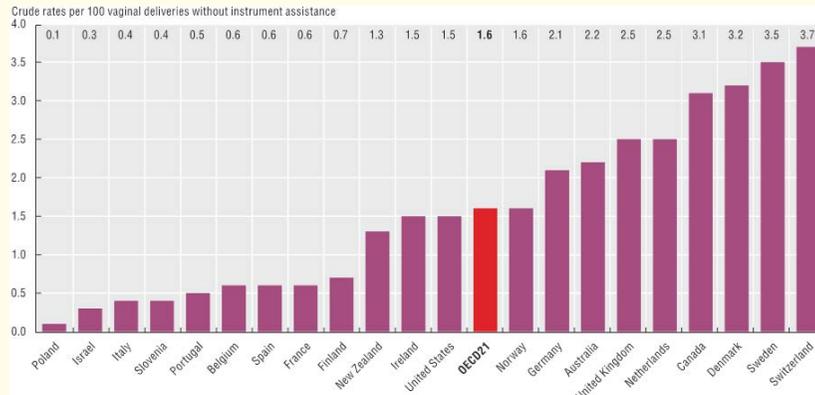
**Figure 1:** Incidence of anal sphincter tear is presented as percentages of all vaginal deliveries, including spontaneous and instrumental deliveries (from Laine K., et al. *European Journal of Obstetrics & Gynecology and Reproductive Biology* 2009).

The new approach in the delivery ward was accepted with a great enthusiasm. Interestingly, the dramatic change in Western Europe took place without any acceptance from local ethical committees. Simultaneously, the increase in the OASIS rate in many countries, especially in the Nordic countries, Great Britain and Switzerland, was huge. For example in Växjö in the southern part of Sweden, the OASIS rate was four times higher in first year after the introduction of the new regimen (official statistics from Växjö Hospital, Sweden).

The OECD follow the progress in numerous health indicators, and they publish a clinical summary every second year. The results from the latest report from 2013 are presented in Figure 2a (OASIS with an instrument) and 2b (OASIS without an instrument) presenting the latest data of OASIS [22].



**Figure 2a:** Obstetric trauma, vaginal delivery with instruments 2011 (or nearest year) (from *Health at a Glance* 2013).



**Figure 2b:** Obstetric trauma, vaginal delivery without instruments 2011 (or nearest year) (from Health at a Glance 2013).

The aim of this review is to give the reader a conclusion of the prevention of anal sphincter injuries including some future aspects.

### Early attempts

In the early 1990s it was claimed that an experienced colleague helps to decrease the number of OASIS. Surely true, but if one thinks that the older colleague has learned an incorrect technique, this helps very little. Gåreberg found, already in 1993 [23], that abnormal delivery positions were associated with increased risk for OASIS. For example, a delivery in an upright position included seven times higher risk for a sphincter tear. Later, the Swedish scientist has not found the same difference. This is not very surprising because the perineal support and the use of correct episiotomy technique has been totally forgotten. Therefore, when not using a perineal support technique neither in a treatment nor in a control group, the result in the OASIS rate will be the same in both groups. However, we have to keep in mind that the purpose of these early attempts was just to describe the different risk factors, and the existing situation in different delivery units, and not to decrease the OASIS rate.

Swedish midwife Ellen Samuelsson published some interesting articles in the end of the 1990s and in the beginning of the 2000s [14]. At this time it was still possible to find differences in the OASIS frequency in a prospective research article. Her most important findings were that if there was a lack of manual protection or suboptimal visualization of the perineum and perineal edema they were also significantly associated with the occurrence of anal sphincter tears in both the univariate and multiple logistic regression analysis.

Our study from 1990s [24] compared two birth units in Turku, Finland and Malmö, Sweden, where the rates of OASIS were 0.4% and 2.7%, respectively. Whilst the difference in anal sphincter ruptures in this review may be partly explained by varying diagnostic criteria for partial anal sphincter rupture in these two university hospitals, the diagnosis of total anal sphincter rupture is unambiguous. The reported prevalence of cases with a total tear (1 vs 32) is likely to represent a real difference.

We found that the prevalence of OASIS for low-risk women was 13 times higher in Malmö than in Turku suggesting that in units with high incidence of OASIS low-risk births might be predominantly affected. There was a difference in manual support given to the perineum and to the baby's head when crowning through the vaginal introitus between Malmö and Turku.

### Later attempts

Parnell, *et al.* published their material in 2001 [19]. The study included 1072 primiparous women at term. In non-instrumental vaginal deliveries easing of the perineum over the caput as it advanced helped prevent a rupture of the anal sphincter. Vacuum extraction performed with the woman in a semi-recumbent position was associated with an increased risk of rupture of the anal sphincter, whereas attention to the perineum during extraction decreased the risk. They concluded that fewer vacuum extractions and improved delivery technique will cause a decrease in the OASIS rate. This interesting finding was, however, forgotten, and the rise of the tears continued.

Schaub studied if an obstetric gel shortens the delivery [25]. An obstetric gel use significantly shortened the second stage of labor by 26 min (30%) ( $P = 0.026$ ), and significantly reduced perineal tears ( $P = 0.024$ ). No one has been able to reproduce the findings from this little study (183 deliveries included) so far.

In order to find out if warm compresses affects perineal tears, a randomized controlled trial was undertaken [26]. In the late second stage of labor, nulliparous women ( $n = 717$ ) giving birth were randomly allocated to have warm packs ( $n = 360$ ) applied to their perineum or to receive standard care ( $n = 357$ ). Women in the warm pack group had significantly fewer third- and fourth-degree tears (4.2% vs. 8.7%). The number of OASIS was extremely high, especially in the control group. Further, the vacuum delivery rate was higher in the control group (10.9% vs. 8.9%) as well the number of cesarean deliveries in the case group (3.3% vs. 2.2%). Based on the results of this tiny study, the recommendation to use warm compresses straight before the delivery is recommended by some authors [27]. However, the results of this study has not been reproduced so far.

### Interventional projects

Since 1998, when our study comparing OASIS statistic between Finland and Sweden came out, there was a silent period. Suddenly in 2004 something started to happen in Norway. The national Health Control Agency (Helsetilsynet) reviewed all the Norwegian delivery ward data in 2004. The agency felt the level of tears 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. At first, a national meeting was arranged in Bergen, Norway in January 2005 where I was invited to speak. After the meeting the officials together with us decided to start a nationwide project in aim to reduce these tears. National Advisory Committee for Childbirth prepared national guidelines which were published in January 2006. The hospital in Fredrikstad was the first one to take part in this intervention which had its start in September 2005.

Before the start of the intervention we had a long discussion on how the practical things should be arranged. A randomized study, which had been planned before, seemed to be very difficult to arrange. Several changes in our study in the clinical practice are complex procedures that are poorly amenable to the methodology of large multicenter randomized trials. Furthermore, similar techniques have been associated with an obstetric anal sphincter injury frequency under 1% in Finland through many decades. Therefore, a randomization, based on our experience, would have raised an ethical dilemma for us. It was natural to choose an interventional model with a rigorous prospective design and data collection to minimize biases.

A total of 12,369 vaginal deliveries between 2002 and March 2007 were enrolled in the interventional cohort study in the study from Fredrikstad [28], and 40,152 vaginal deliveries between 2003 and 2009 were enrolled in study from Tromsø, Lillehammer, Ålesund and Stavanger [15]. This means that the total amount of deliveries included was 52,521. 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.

Methods are presented in details in Pirhonen T., *et al.* [29]. Practical supervision started in Fredrikstad at the beginning of October 2005. All members of the staff took part in the program. Each member of the 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 undertake further 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

The total proportion of parturients with obstetric anal sphincter injuries decreased from 4.16–5.25% before intervention to 1.73% during the last year of intervention in the four hospitals [15]. Similarly, reintroducing the method led to a decrease in overall obstetric

anal sphincter injury frequency from 4.0% to 1.2% in Fredrikstad [28]. The overall obstetric anal sphincter injury rate differed significantly from pre interventional rates already 1 year after the start ( $P < 0.001$ ). A dramatic decrease of obstetric anal sphincter injury was observed for both non instrumental and instrumental deliveries after the intervention started, and the overall drop was statistically significant for both groups already after the first year of intervention. Furthermore, the most serious damage (grade 4) decreased more than grade 3 obstetric anal sphincter injury in all five hospitals.

Our study protocol has been copied later, and our results have been confirmed in projects in Norway [30,31].

### Future aspects

It has been almost two decades since the first warning signals of increasing number of perineal tears were published [24]. Since then, an intervention was started in Norway with a dramatic improvement in the OASIS statistic [15,28]. Later, even in Denmark, a similar intervention caused a significant decrease in these serious tears [32]. A similar effect using a better technique has been described also in Sweden (article in progress).

Recently, a focus has been partly directed to find an optimal level of episiotomy cuts. First of all, the most important fact here is to cut correctly. Improper episiotomy, often too short cut or an episiotomy directed towards anal opening, clearly increases the rate of OASIS. Therefore, the episiotomy technique used should be described carefully in future reports. Our group has recently studied the association between the episiotomy technique and the OASIS rate [16].

Schmitz, *et al.* [33] reported their experiences from France in 2014. Restrictive use of mediolateral episiotomy protects against severe perineal laceration especially in the case of instrumental delivery. Similar reports are published all the time. Escuriet, *et al.* [34] reported in 2015 that episiotomy procedures during normal singleton vaginal term deliveries without instruments in Catalonia has decreased steadily since 2007 to rates between 23.6 % and 30.0 % 2012, respectively. Their study results show a stable incidence trend below 1% for severe perineal trauma over the study period. Even in Israel with very low frequency of OASIS, some colleagues are worried about the correct episiotomy technique [35]. One could ask, why?

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**Volume 2 Issue 2 October 2015**

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