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# Anterior non-episiotomy or natural forceps delivery: refining the technique and improving communication as a way of reducing obstetric anal sphincter injuries in instrumental deliveries

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**Abstract**
Despite the liberal use of episiotomy, instrumental delivery is associated with an increased risk of obstetric anal sphincter injuries (OASIS). Traditionally, lists of the risk factors linked to OASIS have ignored the human factor. The anterior non-episiotomy forceps (ANEF) or natural forceps delivery significantly reduces the rate of OASIS, and indeed, perineal trauma, by refining the human factor and improving the operator's practice. Furthermore, it is associated with improved maternal recovery because it minimizes the need for episiotomy, and therefore, peripartum blood loss. After implementing ANEF in a series of 360 consecutive Neville–Barnes forceps deliveries in primiparae, the rate of OASIS was 1.9%, compared to the reported prevalence of 8.9% in traditional forceps deliveries with routine episiotomy. Enhanced recovery pathways (ERPs) are increasingly being implemented across surgical specialties to reduce the impact of operative procedures and improve patient experience. Part of the authors' ongoing work to reduce the rate of perineal injury and OASIS, this article describes the ANEF delivery, which should become part of the ERPs in obstetrics.

*Keywords:* anterior non-episiotomy forceps, instrumental deliveries, natural forceps, OASIS, obstetric anal sphincter injuries.

## Introduction

The rate of obstetric anal sphincter injuries (OASIS) following a vaginal delivery in the UK is unacceptably high. The clinical incidence of OASIS has been reported to be as much as 5.9–6.1% (Edozien *et al.* 2014; Thiagamoorthy *et al.* 2014), while worryingly, sonographic evidence is seen in as many as 17.6–35% of women (Ozyurt *et al.* 2015; Kamizan Atan *et al.* 2016). The problem is further compounded by the fact that, despite adequate repair, such injuries may cause both short- and long-term morbidity in 20–50% of patients, which has associated physical, psychological, financial and societal costs (Øian & Acharya 2015; Fowler 2017), underlining the necessity of primary prevention.

It is widely accepted that instrumental delivery is linked to an additional increase in the risk of third- and fourth-degree perineal tears (RCOG 2011, 2015). Although episiotomy is widely employed as a form of prevention during instrumental deliveries, it is far from clear whether this procedure reduces the risk of OASIS, has no impact, or indeed, is a causative factor (Macleod *et al.* 2008; Stedenfeldt *et al.* 2012; Vathanan *et al.* 2014). Routine and restrictive episiotomies are associated with OASIS rates of 8.9% and 10.9%, respectively (Murphy *et al.* 2008). This ambiguity is also reflected in the Royal College of Obstetricians and Gynaecologists (RCOG) guidelines, which state that: "Clinicians should

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explain to women that the evidence for the protective effect of episiotomy is conflicting"; and "Mediolateral episiotomy should be considered in instrumental deliveries" (grade of recommendation: C and D, respectively) (RCOG 2015, p. 2).

Apart from highlighting instrumental and forceps deliveries without episiotomy as posing a specific risk of OASIS, the RCOG also lists several maternal, foetal and labour variables as factors that potentially contribute to this form of injury. These include Asian ethnicity, nulliparity, a birthweight of > 4 kg, shoulder dystocia, occipitoposterior position of the emerging head and a prolonged second stage of labour (RCOG 2015). However, despite being extensive, this list is by no means exhaustive, which could explain why attempts to develop a risk-factor model to predict OASIS have so far failed (Williams *et al.* 2005).

Traditionally, such approaches to attributing an underlying contributory component to OASIS have failed to consider what is possibly the most important of all parameters: the human factor. There have been no attempts to explore and attempt to improve the possible impact of the accoucheur, his or her practice, maternal effort, and any surrounding or environmental factors. These are all dynamic variables that could have a direct impact on the extent of any trauma, and indeed, the outcome of such deliveries.

Interestingly, in an attempt to reduce rates of perineal injury by improving technique, the RCOG, the Royal College of Midwives (RCM), and the London School of Hygiene and Tropical Medicine, with funding provided by The Health Foundation, recently introduced the OASI Care Bundle Project, which was piloted at 16 sites across the UK (RCOG 2017). Among other steps, the care bundle promotes the use of the hands-on technique by the accoucheur to control the emerging foetal head. Such interventions were influenced by successful Scandinavian programmes, and a Norwegian cohort study reported a 50% reduction in the risk of OASIS (Laine *et al.* 2012).

As part of the present authors' ongoing work to improve clinical practice and instrumental delivery technique in order to reduce the rate of OASIS and perineal trauma, this article describes the ANEF (*ἄνευ*, Greek for "without") or natural forceps delivery (Myriknas 2015, 2016; Myriknas *et al.* 2017). The ANEF delivery technique focuses on refining the most significant modifiable variable, i.e. the human factor, which includes the operator, technique, communication and participants. By improving the human factor, the accoucheur aims to enhance maternal experience, while minimizing the possibility of OASIS and, indeed, perineal injury.

## Anterior non-episiotomy forceps delivery

During an ANEF birth, while constantly communicating with and giving feedback to the mother, the operator closely mirrors the course that the foetal head follows naturally with the forceps. If the technique is performed correctly, this allows the perineum to stretch slowly and accommodate the emerging head, without the need for an episiotomy (https://www.youtube.com/results?search_query=myriknas). The key steps of the ANEF delivery, involve improving two things: communication and technique.

### *Communication*

The accoucheur should effortlessly assume charge in a friendly, relaxed and confident manner. He or she must reassure the woman, and outline what will follow, empowering her and instilling confidence in all participants.

The operator constantly updates the mother about the progress of the foetal head delivery, giving her vital inspiration to continue pushing during the early contractions, and clear guidance to stop pushing and pant instead as the head crowns.

At the same time, the operator prepares the midwife or anaesthetist to expect instructions about when they will need to drop the delivery bed/operating table to its lowest position.

### *Technique*

The initial maternal posture is important. The patient should be in the lithotomy position, with her upper body at ≤ 45° and her buttocks 2 cm off the edge of bed/table. The aim is to straighten the lumbosacral angle, and rotate the mother's pelvis towards her head. This will increase the relative anteroposterior pelvic diameter, which is not dissimilar to what the McRoberts manoeuvre is intended to achieve in cases of shoulder dystocia (RCOG 2012).

Dropping the bed/table to its lowest position as the baby's head crowns is also of paramount significance for: (1) the correct positioning of the operator, which will allow him or her to closely approximate the operating field; and (2) a subsequent, critical manoeuvre in ANEF delivery that involves acutely raising the handles at 90°.

Once the posterior fontanelle has negotiated the symphysis pubis, and as the head is crowning,

the handles of the forceps are elevated anteriorly at 90°, above the maternal pubic rami, sustaining acute extension of the foetal head.

A subsequent pull involves a very slow (over 1–2 min) controlled delivery of the head, during which the mother is encouraged to stop pushing, and breath and blow gently instead.

This slow, acutely anterior delivery of the head is the most crucial parameter in ANEF delivery. It enables the anterior vagina to take most of the strain of the emerging head, and gives the perineum adequate time to stretch and accommodate the birth. Therefore, there should be minimal trauma, and no need for an episiotomy.

Performed correctly, an ANEF delivery means that an episiotomy can be avoided. There is also no need for perineal support because the accoucheur controls the pace of the head delivery, applying countertraction with the forceps as necessary. This is especially important in women without adequate analgesia, who may feel an overwhelming urge to push.

## Anterior non-episiotomy forceps data

The present authors' cumulative data on ANEF deliveries is more than encouraging (Myriknas 2015, 2016; Myriknas *et al.* 2017). In 360 consecutive Neville–Barnes ANEF deliveries performed over the past 4.5 years on primiparae who were representative of the UK population, the rate of OASIS was 1.9% ($n = 7$). Among the remaining women, 28% had an intact perineum, 29% had a first-degree tear, and the remaining 41% generally experienced a second-degree tear that was smaller than an episiotomy or a labial tear (Fig. 1). Only 17 of those patients had a postpartum haemorrhage of $> 1000$ mL. There were no adverse foetal outcomes.

Interestingly, the human factor could account for each of the seven cases of OASIS that occurred; for example, poor technique (i.e. forceps at less than 90° or faster-than-indicated head delivery), incorrect operator or maternal position, and inadvertent forceful expulsive maternal effort when the patient was asked to pant.

## Discussion

The ANEF delivery introduces a holistic, multidisciplinary approach into assisted vaginal birth. The operator effortlessly takes control, calmly communicating with and instructing the mother, helping to deliver the baby slowly along the natural curve of the pelvic floor, and consequently, diminishing any perineal trauma. The

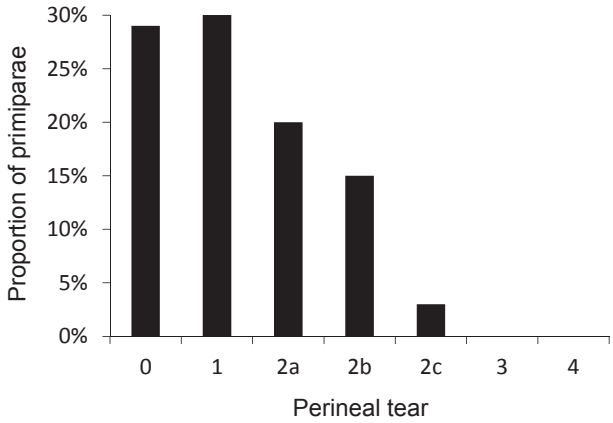


**Figure 1.** Breakdown of perineal tears in 360 consecutive Neville–Barnes anterior non-episiotomy forceps deliveries in primiparae: (0) intact; (1) first-degree; (2a) second-degree (small); (2b) second-degree (average); (2c) second-degree (extensive or additional vaginal wall tears); (3) third-degree; and (4) fourth-degree.

ANEF approach concentrates on refining the human factor (i.e. the operator, technique, communication and participants) as a way of bettering the maternal experience, and minimizing physical and psychological morbidity.

In Norway and Finland, where the rates of OASIS are the lowest in the world (0.5–1.0%), a package of intervention in spontaneous vaginal deliveries is used that is not dissimilar to the ANEF approach (Laine *et al.* 2012; Øian & Acharya 2015). The focus of this system is fourfold and involves: (1) good communication, with the woman being asked to do fast upper-costal breathing without pushing just before head delivery; (2) adequate perineal support; (3) a delivery position that allows visualization of perineum; and (4) episiotomy only on indication and with protective characteristics. Similar parameters have recently been adopted by the RCOG and the RCM as part of the OASI Care Bundle Project in an attempt to reduce anal sphincter trauma (RCOG 2017).

Nevertheless, vaginal childbirth is an established risk factor for perineal trauma and pelvic floor injury. The incidence of identified OASIS has been reported to be 5.9–6.1%, and 17.6–35.0% of such tears have been sonographically diagnosed, although the clinical significance of this remains unknown (Edozien *et al.* 2014; Thiagamoorthy *et al.* 2014; Ozyurt *et al.* 2015; Kamizan Atan *et al.* 2016). In addition, since the levator ani substantially stretches in the second stage of labour, this can cause irreversible overdistention, or even avulsion. This is a significant risk if the puborectalis muscle is detached from its insertion on the inferior ramus of the os pubis bone, a problem that has been reported in

10–35% of women after their first vaginal birth (Ozyurt *et al.* 2015; Kamizan Atan *et al.* 2016).

With such high rates of physical morbidity, it is not surprising that large epidemiological reviews have associated natural childbirth with a significant negative impact on maternal quality of life (QoL). Vaginal birth has been extensively linked to pelvic floor dysfunction, pelvic organ prolapse (POP), dyspareunia, urinary incontinence (UI), defective defecation and chronic pelvic pain (Bollard *et al.* 2003; Pollack *et al.* 2004; Srivastava *et al.* 2008; Shek & Dietz 2010; Handa *et al.* 2012; Rostaminia *et al.* 2013; Fowler 2017).

However, apart from the physical impact described above, it is also well documented that women can develop psychological morbidity and tocophobia following an assisted vaginal delivery. Fifty per cent of the participants in a study by Rather *et al.* (2016) did not plan on having any further pregnancies 3 years after undergoing instrumental deliveries, and fear of childbirth was the commonest reason for this.

Unfortunately, despite the physical and psychological sequelae of vaginal birth on a woman's QoL often being substantial, there is an obvious lack of preventative strategies. The protective role of prophylactic episiotomy is yet to be established. In systemic analyses, no differences were found in symptoms of POP, UI or faecal incontinence between spontaneous laceration and episiotomy groups (Hartmann *et al.* 2005; Uma *et al.* 2005). Paradoxically, episiotomy has been identified as an additional risk for OASIS in another study (Stedenfeldt *et al.* 2012). Therefore, routine episiotomy is generally discouraged, and Cochrane Reviews have reached a consensus that restrictive episiotomy should be practised (Carroli & Belizan 1999; Carroli & Mignini 2009).

The ANEF technique takes into consideration the possible short- and long-term physical and psychological outcomes of instrumental assisted births. Overall, an ANEF delivery does not seem to increase the risk of perineal and pelvic floor injuries more than a natural delivery or a traditional operative birth. Furthermore, the approach probably has a protective effect in terms of maternal morbidity, as discussed above and reported previously (Myriknas 2015, 2016; Myriknas *et al.* 2017). Since the risks and severity of both short- and long-term complications can be directly proportional to the extent of the trauma, an ANEF delivery appears to minimize such sequelae by diminishing the extent of any obvious injury. Complete protection from avulsion of the fascia might be impossible to achieve, although it is reasonable to assume that the controlled, slow delivery as the foetal head is crowning would also reduce the impact on the pelvic floor.

The force–velocity relationship is demonstrated in the centripetal force formula. Force ($F$) is not just proportional to velocity ($v$), but to velocity squared. Therefore, slowing down the delivery could be the most important parameter in reducing the force applied to and the impact of the foetal head ($m$ = mass, $r$ = radius) on the vaginal and perineal tissues, and indeed, the pelvic floor:

$$F = \frac{mv^2}{r}$$

Nevertheless, the present authors recognize the need for unbiased evidence to confirm that the ANEF approach is superior to the traditional method of forceps extraction. The preliminary results of a retrospective QoL study indicate that, apart from an apparent reduction in clinically diagnosed trauma, the feedback from patients, community midwives and pelvic physiotherapists caring for these women postnatally is very encouraging with regard to patient satisfaction and recovery.

Apart from QoL studies, ultrasound scans could further assist in establishing the validity of the ANEF technique in assisted deliveries. Although clinical detection of anal sphincter tears by senior obstetricians is to be expected, such diagnoses can be missed, especially in cases of occult trauma. At the same time, levator ani injury is an occult muscular trauma in itself. Hence, impartial and comprehensive detection of maternal birth trauma requires imaging. A prospective randomized controlled trial in which participants would be assessed with a four-dimensional transvaginal and/or endoanal ultrasound scan in the late third trimester and at 3–6 months postpartum, as well as clinically immediately following delivery, is necessary to compare the impact of ANEF, traditional forceps with episiotomy and spontaneous vaginal deliveries on the rates of perineal injury, OASIS, occult anal sphincter trauma and levator avulsion.

Enhanced recovery pathways (ERPs), which are increasingly being implemented in surgical specialties, reduce the impact of operative procedures and improve patient experience (RCOG 2013). By refining the human factor and technique in assisted vaginal deliveries, the ANEF approach is associated with reduced maternal morbidity, the avoidance of episiotomy, and minimization of blood loss and perineal trauma, all without foetal compromise. A 1.9% rate of

OASIS in a series of 360 consecutive deliveries in primiparae is exciting, especially since the corresponding rates in traditional forceps deliveries with routine and restrictive episiotomy have been reported to be 8.9% and 10.9%, respectively (Murphy *et al.* 2008). The ANEF approach can play a pivotal role in modern practice by becoming part of the ERP in obstetrics.

## Disclosure of interest

There were no conflicts of interest. The authors did not receive any funding.

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