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## Obstetric anal sphincter injuries

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### ABSTRACT

Obstetric anal sphincter injuries can be associated with significant short and long term consequences causing devastating impacts on the quality of lives of young, otherwise healthy women. The major consequence is anal incontinence which may be short or long term and vary in severity. The other consequences include pain, infection, dyspareunia and sexual dysfunction. This may in turn result in considerable economic burden to health care providers and patients. It also has an implication on future deliveries. Although it can never be eliminated, it can be reduced by improving practice, training and provision of high quality multidisciplinary care in order to reduce long-term morbidity. Obstetric anal sphincter injuries are also a source of litigation which can be distressing to both patients and clinicians. The aim of this review article is to explore the available evidence on epidemiology, strategies for preventions, prognosis and also how to deal with governance issues.

## 1. Introduction

Vaginal delivery is the major cause of anal dysfunction in women. Between 0.6% and 9.0% of women, who deliver vaginally, where mediolateral episiotomy is performed, sustain obstetric anal sphincter injuries (OASIS)<sup>[1]</sup>.

A recent study in the UK found four fold increases in the rate of reported third- or fourth-degree perineal tears in England, with the rate rising from 1.8% in 2000 to 5.9% in 2011<sup>[2]</sup>. An increased risk of OASIS was associated with a maternal age above 25 years, forceps and ventouse delivery, especially without episiotomy, Asian ethnicity, a more affluent socio-economic status, higher birth weight, and shoulder dystocia. One possible reason for this trend is the rise in maternal age at first birth and maternal weight, which are linked to a higher birth weight and risk of perineal tears. Other reasons include increased awareness and training, which is likely to result in a better case detection and recording of obstetric injuries, and changes in the management of the second stage of labour.

OASIS have short and long-term implication on womens' health. Recent studies have shown that between 20% and 40% of women who sustain OASIS has anal dysfunction<sup>[3–7]</sup>.

Workshop courses and supervised training over the last 10 years has led to an improvement in recognising and managing these tears. Ultrasound scanning detects residual defects in the anal sphincter complex in about 19%–36% of asymptomatic women following repair of OASIS. However, the clinical relevance of these asymptomatic defects currently remains unclear<sup>[4,8,9]</sup>.

Several factors have been implicated in OASIS either alone or in combination. One of the major risk factor is instrumental delivery. Hence, it is important that supervised training is provided during instrumental deliveries to minimise the incidence of these tears. Standardising the technique of episiotomy would also help to reduce risk of OASIS. Since it is difficult to eliminate OASIS it is important to provide multidisciplinary care and training to reduce the short and long-term morbidity from this condition. OASIS is also a source of litigation. Establishment of credible strategy in dealing with this clinical risk helps to improve patients' care and reduce litigation. In this review we aim to discuss the epidemiology, strategies for preventions, prognosis and also how to deal with governance issues.

## 2. Classification of perineal trauma

Prior to 1999, classifications of perineal trauma were inconsistent with lack of clarity of involvement of the specific components of the anal sphincter complex. Sultan revised this classification system, which has now been incorporated into the Royal College of Obstetricians and Gynaecology guidelines as well as the International Consultation on Incontinence (Table 1)<sup>[10]</sup>.

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Third and fourth degree tears that involve the obstetric anal sphincter complex are also known as ‘OASI’. A third degree perineal tear is defined as a partial or complete disruption of the anal sphincter muscles involving either or both external and internal anal sphincter muscles. Depending on the extent of involvement of the muscles the third degree tear is further sub classified into 3A, 3B and 3C.

A fourth degree tear is defined as a third degree tear that extended to involve anal mucosa. An isolated anal or rectal injury is rare and should be documented as separate entity. The main risk with such injury is the potential of ano or rectovaginal fistulae if not recognised and repaired at the time.

### 3. Epidemiology

Various risk factors are associated with OASIS. More often, these risk factors coexist and result in a compounding effect significantly increasing the risk of OASI. Some of these are modifiable and have a role in prevention of OASI. The main risk factor is forceps delivery with a risk of 7% followed by primiparity, shoulder dystocia and prolonged second stage (all 4%)<sup>[11]</sup>. The other risk factors include large birth weight, persistent occipito posterior position, induction of labour, epidural analgesia, episiotomy.

#### 3.1. Birth weight

A larger birth weight greater than 4 kg is a significant risk factor for OASI (2%)<sup>[12,13]</sup>. A recent metanalysis by Vasileios comparing the birth weights in second and first degree tears to OASI found that birth weight was consistently higher by 192.88 g (95% CI 139.80 g-245.96 g) in the OASI group<sup>[14]</sup>.

Larger birth weight results in a larger head circumference, prolonged labour, a higher risk of instrumental delivery and shoulder dystocia<sup>[15,16]</sup>. Also it is postulated to disrupt the supports of the pelvic floor as well as increase the risk for pudendal neuropathy which may cause functional bowel problems<sup>[17]</sup>.

#### 3.2. Episiotomy

Episiotomy is found to be a significant risk factor for causing severe perineal trauma. Though episiotomy is traditionally given to prevent perineal trauma in the second stage, the evidence for this is

still controversial. Systematic review by Eason *et al.* found that by avoiding episiotomy the incidence of perineal trauma decreased with an absolute risk difference of  $-0.23$  (95% CI  $-0.35, -0.11$ )<sup>[18]</sup>. However, the incidence varies with the type of episiotomy. Median episiotomy, which is more commonly performed in USA, has a much higher incidence of OASI compared to a mediolateral episiotomy that is favoured in European subcontinent.

There is some evidence that a mediolateral episiotomy may be beneficial in preventing OASIS, but its value is still debatable<sup>[19-23]</sup>. This could be due to the variations in practice of episiotomy itself. A wider angle may prevent an anal sphincter injury where as a narrow angle would predispose OASI<sup>[21,24]</sup>. Andrews *et al.* showed variations in performance of mediolateral episiotomies between doctors and midwives with none in the midwifery group performing the episiotomy in the desired angle between of  $60^\circ$ <sup>[25]</sup>. Jango *et al.*<sup>[26]</sup> found a protective effect from mediolateral episiotomies in primiparous women who are having a vacuum delivery. Latest systematic review by Vasileios has shown that median episiotomy was more associated with significant perineal trauma whereas this was not significant for mediolateral episiotomy<sup>[14]</sup>.

#### 3.3. Instrumental delivery

Instrumental delivery is associated with a higher incidence of OASI compared to normal delivery.

Vasileios *et al.*<sup>[14]</sup> found that the incidence is high regardless whether it was a forceps or a vacuum delivery. An earlier systematic review by Eason also found that the risk was increased with both instruments, but to a lesser extent by vacuum<sup>[18]</sup>. However, a population based study by Handa *et al.* found that ventouse delivery was associated with higher perineal trauma than forceps (OR 2.30; 95% CI 2.21, 2.40)<sup>[27]</sup>. There are several other studies quoting a higher incidence with forceps but the variations could be due to the larger practice of forceps deliveries in the studies compared to vacuum deliveries.

#### 3.4. Parity

The risk of sustaining an OASI is highest in the first delivery (4%)<sup>[15,23]</sup>. The odds ratio was found to be 3.24 (95% CI 2.2–4.76) in primigravida<sup>[14]</sup>.

#### 3.5. Asian ethnicity

Handa *et al.*<sup>[27]</sup> found that women of Indian and Filipino origin had a higher risk of sustaining severe perineal trauma. Groutz *et al.*<sup>[28]</sup> have also found the incidence in Asian women to be 20% compared to 3.2% in Caucasian women. Dua *et al.*<sup>[29]</sup> have demonstrated equal perineal length in Caucasian and Asian women in the first stage of labour; however they found shorter perineum as an independent risk factor. Perineal length was also not found to be a predictor for instrumental deliveries in this study. Hence it's possible that in this group it was the perineal length which was the independent factor rather than ethnicity, which increased the incidence of OASI.

#### 3.6. Other causes

Induced and augmented labour was found to be independent risk factors in causing OASIS. Though epidural analgesia

**Table 1**

Classification of perineal injury.

Type of tear	Definition
First degree tear	Injury to perineal skin
Second degree tear	Injury to perineum involving perineal muscles but not involving the anal sphincter
Third degree tear	Injury to the perineum involving the anal sphincter complex
3A	Less than 50% of EAS thickness torn
3B	More than 50% of EAS thickness torn
3C	Both EAS and IAS torn
Fourth degree tear	Injury to perineum involving the anal sphincter complex (both EAS & IAS) and anal epithelium
Buttonhole tear	External anal sphincter intact but anal or rectal mucosa with or without internal anal sphincter tear

appears to be a risk factor, on multivariate analysis after adjusting for the instrumental delivery, episiotomy and primi-gravidity, this appears to be a protective<sup>[19]</sup>. Longer duration of second stage of labour and occipito posterior position also significantly increase the risk of OASIS<sup>[28]</sup>. There is also a higher risk of instrumental deliveries and need for episiotomy in occipito posterior positions.

Maternal age, body mass index, position of birth, pool birth, vaginal birth after caesarean section were not found to be independent risk factors in causing OASI<sup>[14]</sup>.

#### 4. Prevention of 3rd and 4th degree perineal tears

Awareness of risk factors for OASI, particularly modifiable ones, is essential in order to avoid the primary event.

Forceps delivery is the main risk factor for the causation of 3rd and 4th degree perineal tear with risk of up to 7%<sup>[30–38]</sup>.

##### 4.1. Interventions that could reduce the incidence of tears and pelvic floor damage in forceps delivery

Several techniques have been described in an attempt to minimise the risk of major perineal trauma resulting from instrumental delivery.

###### 4.1.1. Episiotomy

Though episiotomy itself is a risk factor, there is evidence that selective episiotomy with instrumental deliveries reduces the risk of 3rd and 4th degree tears. A large observational study from the Netherlands of 28732 operative vaginal deliveries concluded that mediolateral episiotomy is protective against obstetric anal sphincter injury in both vacuum and forceps<sup>[19]</sup>. However, a smaller angle of episiotomy is more likely to lead to an anal sphincter tear. Eogan *et al.*<sup>[39]</sup> in a case control study found that an episiotomy cut at a smaller angle from the midline was more likely to be associated with a 3rd degree perineal tear than an episiotomy cut at a larger angle. This study found that for every degree the mediolateral episiotomy that was made smaller, there was an average relative increase of 10.4% in the risk of a 3rd degree tear. They concluded that if a right mediolateral episiotomy is indicated, then the angle of this should be as large as possible in order to reduce the incidence and thereby the potential sequelae of OASIS.

Midline episiotomy is the strongest risk factor for subsequent 3rd and 4th degree perineal tears. Labrecque *et al.*<sup>[40]</sup> found a 15.4% incidence of OASI with midline episiotomies in a retrospective cohort study of 6522 primiparous women who delivered between 1985 and 1993. The frequency of 3rd and 4th degree tears were 60.6% with an episiotomy and 4.5% without an episiotomy (relative risk = 4.6). They concluded that a strong association exists between median episiotomy and 3rd and 4th degree tears in primiparous women.

Large retrospective cohort study<sup>[41]</sup> from Miami from 1989 to 1995 that included more than 50000 deliveries concluded that midline episiotomy, fetal size, operative vaginal delivery and older maternal age were independent risk factors for OASIS. They also concluded that older nulliparous women are at a higher risk of OASIS and midline episiotomy should be avoided in older nulliparous women who require operative vaginal delivery.

##### 4.1.2. Traction force in forceps delivery

In order to minimise risk of tears from instrumental deliveries, it is recommended that the traction is performed to maintain the flexion of fetal head in the direction of the pelvic floor<sup>[42]</sup>. This will reduce the diameter which distends the pelvic floor and the perineum. Traction that does not maintain flexion and is not in the direction of the pelvic floor, leads to deflexion and an increase in the diameter of the fetal head, which distends the perineum. This leads to an increase in the risk of perineal tears, failure of instrumental delivery, difficult delivery and fetal injuries.

However, the direction of traction in the occipito anterior is different from the occipito posterior position. In the occipito anterior position Pajot's manoeuvre is recommended to achieve this. While in the direct occipito posterior position, the traction should be in a horizontal forward direction when the delivery is intended to be face to pubis. Delivery of fetal head in occipito posterior position is always a dilemma. When the head is in the direct occipito posterior position, decision has to be made whether to rotate the head to direct occipito anterior using manual rotation, rotation with vacuum extractor, Kielland's forceps, deliver as face to pubis or by caesarean section. This depends on the clinical circumstances and skills of the operator.

A survey showed that most obstetricians in North America have abandoned rotational instrumental delivery in favour of caesarean section due to increase of OASIS<sup>[43]</sup>. In Australia, obstetricians prefer using a vacuum extractor for rotational instrumental delivery<sup>[44]</sup>. This has reinforced the opinion of some obstetricians that rotational deliveries of more than 45° are likely to be abandoned<sup>[45]</sup>.

##### 4.1.3. Traction force in vacuum delivery

In the UK there has been increasing use of a vacuum extractor rather than forceps<sup>[46,47]</sup>. The experience and skills of obstetricians will vary depending on the setting in which they have been trained. A high rate of inappropriate placement and inappropriate choice of cup type and size leading to a high failure rate of vacuum has been cited as a reason for readdressing training needs<sup>[48]</sup>. The application of vacuum requires the understanding of the anatomy of the fetal head and the position of the flexion point<sup>[42]</sup>. The flexion point is an imaginary spot over the sagittal suture of the fetal skull, located approximately 6 cm posterior to the centre of the anterior fontanelle or 1–2 cm anterior to the posterior fontanelle. When the cup is properly placed with its centre over the flexion point, the edge of a standard 60 mm cup lies approximately 3 cm or 2 finger breadths behind the centre of the anterior fontanelle in the midline over the sagittal suture. The cup has to be applied as much as possible near to the posterior fontanelle, with the edge of the cup 2 finger breadths from the anterior fontanelle.

The direction of pull on the traction handles changes as the fetal head transverses the pelvic curve. This will allow traction that maintains flexion and in the direction of the pelvic floor. In occipito posterior, the use of the posterior metal cup is preferable to the plastic cup, as the rate of detachment is less than with the plastic cup.

#### 4.2. Routine versus selective episiotomy

In 1993, the Argentine Collaborative Trial, the largest of the randomised trials, conducted in eight hospitals in Argentina, compared selective versus routine use of mediolateral

episiotomies<sup>[49]</sup>. They concluded that anterior tears were more common among the selective use group while posterior perineal trauma, healing, complications, and dehiscence were more common among the routine use group. Easton *et al.*<sup>[18]</sup> reviewed randomised control studies and cohort studies and found that avoiding routine episiotomies decreased the risk of perineal lacerations that required suturing by 23%. Liberal use of midline or medio-lateral episiotomies did not prevent anal sphincter tears.

#### 4.3. Perineal protection during delivery

RCTs have not shown a beneficial effect on OASIS by hands-on perineal protection<sup>[50]</sup>. However, a population-based cohort study by Laine *et al.*<sup>[51]</sup> has shown that the incidence of OASIS was reduced from 4% (between 2003 and 2005) to 1.9% (between 2008 and 2010) as a result of the implementation of training programme for perineal support in labour. This reduction could not be explained by changes in population characteristics or OASIS risk factors during the study years. The reduction of incidence of OASIS between the two study periods was consistent across subgroups of women; regardless of parity, delivery method and infant birth weight. However, the training programme included training in correct performing of episiotomy when indicated. This might have also played part in the reduction.

#### 4.4. Perineal massage

A single-blind, randomised, prospective, controlled trial<sup>[52]</sup> that involved 1034 nulliparous and 493 multiparous women who delivered at five teaching hospitals in the province of Quebec compared the outcome of perineal massage to the control arm without massage. The proportion of nulliparous women who delivered vaginally with intact perineum was 61% higher in the message group (24.3%) than in the no-massage group (15.1%), an absolute difference of 9.2% (95% CI 3.8%–14.6%;  $P=0.001$ ). However, there was no difference between the two groups with respect to dyspareunia, sexual satisfaction or perineal pain. There was no statistical difference in the number of intact perineum among the multiparous women. There was also no statistical difference in the message groups versus the no-massage groups in the risk of third and four degree perineal tears.

In 2001, Stamp *et al.*<sup>[53]</sup> from Australia studied the effects of perineal massage in second stage of labour on the perineal outcome and found no statistical differences between the massage and the no-massage groups. However, recent Cochrane review in 2011<sup>[54]</sup> found that the risk of third- and fourth-degree tears was significantly lower in the massage group versus the hand off group in second stage of labour.

#### 4.5. Warm perineal compresses

Recent Cochrane review in 2011<sup>[54]</sup> found significant effect of warm compresses on reduction of third- and fourth-degree tears [risk ratio (RR) 0.48, 95% CI 0.28 to 0.84 (two studies, 1525 women)].

#### 4.6. Maternal position

Recent study from Stockholm, Sweden<sup>[55]</sup>, found that women who used a lithotomy or squatting position in the second stage of

labour had a higher risk of OASIS compared with women using other positions. Supine, semirecumbent, lateral recumbent and all four positions showed a tendency to decreased risk for OASIS, although not statistically significant.

However, the study had its limitations as there were no record on how long the women adopted the position noted in the files and aspects of perineal management, such as guarding (protection of perineum, hands on), were not recorded.

Recent Cochrane review 2012<sup>[56]</sup> showed that there was no difference in the number of 3rd and 4th degree in different positions. However, there was significant increase in the number of second degree perineal tears and decrease in the number of episiotomies in the upright position which could be due to difficulty performing episiotomy in that position or due to hand-off practice.

Though upright position in labour might have no effect on the perineal outcome it does help to speed head descend, engagement and reduction of instrumental delivery in our view. This can be supported on scientific understanding of the mechanism of labour. Women who have wide angle of inclination of their pelvis have their pelvis tilted anteriorly. This is usually associated with exaggerated lordosis, pendulous abdomen and high head as the head is not in the direction of pelvic floor. Squatting during labour would help to reduce the angle of inclination and help the head to be directed in the direction of the pelvis and hence help engagement and speed delivery. Similarly, women who have their uterus tilted to the right or left may have a slow descend of the head during labour. Altering the position would usually help to speed engagement and cervical dilation.

#### 4.7. Role of pre-existing risk factors

A history of anal sphincter laceration is associated with 3–4 fold increased risk of a severe obstetrical laceration at second stage compared with no history of sphincter laceration whether they had episiotomy or not in the second delivery<sup>[57,58]</sup>. Hence it is important that these women are counselled about their risk. Instrumental delivery should be avoided, episiotomy should be performed only when indicated and management of their delivery should be performed by senior trained obstetrician.

### 5. When OASIS should be repaired, immediate or delayed?

A recent study from Sweden<sup>[59]</sup> of 165 women with OASIS concluded that delayed repair provided the same functional outcome at 1-year follow up. Delaying the repair should thus not be recommended routinely, but can be an alternative under special circumstances when appropriate surgical expertise is not readily available.

### 6. Litigations from OASIS

Missing an OASI is considered to be negligent as the women might be subject to a lifetime problems including fecal and flatus incontinence, dyspareunia and perineal pain. In the last decade, National Health Service Litigation Authority (NHSLA) spent £18.8 million pounds in total value including both damages and legal costs with respect to OASI<sup>[60]</sup>.

Negligence is based on failure to carry out steps that would be reasonably expected to be followed, regardless of

consequences. The time window to make a claim is defined by law, rather than any organisation whether in the National Health Service or not.

Training remains a crucial issue in diagnosing and repairing the tears. It is essential to perform a rectal examination before all cases of perineal repair in order to avoid missing an OASIS. It is important to establish multidisciplinary team to care for these women.

## 7. Measures that can be helpful in reduction of litigations

To reduce litigation, trainees should be supervised until they become competent in performing instrumental delivery and repair of perineal tears. There is evidence that practical training in instrumental deliveries using simulators and mannequins can be useful to enhance training and enables trainees to learn how to achieve the appropriate force with the help of computer-assisted visual feedback<sup>[61]</sup>. Attending National Perineal Trauma Courses are now mandatory for all obstetrics and gynaecology trainees in the United Kingdom. Documentation can also be improved with establishment of proforma for repair of perineal tears.

Patients who sustained OASIS should be debriefed of labour circumstances and any morbidity and its implication on the short and long term. Postnatal follow-up should also be organised and preferably at perineal trauma clinics. Staff awareness can be improved with regular review of cases of major degree perineal tears and associated medico-legal cases.

The following are some key points which are useful to implement when morbidity arises from 3rd and 4th degree perineal tears. (Adapted from Keriakos *et al.*<sup>[42]</sup>:

1. Ensure that 3rd and 4th degree perineal tears are reported.
2. Ensure that there are guidelines established in the unit for management of these cases.
3. Every unit should also have guidelines for bladder management in labour and following delivery.
4. Establishment of documentation proforma.
5. Ensure that patients are given follow up appointments in postnatal clinics or dedicated perineal trauma clinics.
6. Trigger the investigation procedure when morbidity arises. Notify senior members of staff who have been trained to carry out investigations.
7. Establish the circumstances as they initially appear and chronology of events, and identify any obvious care management problems.
8. Identify both specific and, where appropriate, general contributory factors.
9. Compile a report of events, listing causes of care management problems and recommendations to prevent recurrence.
10. Debrief juniors or ask them to present case-base discussion to identify their training needs.
11. Anonymously present cases in informal meetings to learn from mistakes.
12. Implement actions arising from the report and monitor progress.
13. Regularly auditing the practice.

## 8. Prognosis

Women with OASIS are significantly more likely to report faecal incontinence (0–28%), faecal urgency, and incontinence

to flatus (15%–59%) compared to women without OASIS<sup>[12,62]</sup>. The second group has much lower incidence for both faecal incontinence (1%–10%) and flatus incontinence (1%–11%)<sup>[63]</sup>. If the internal sphincter is involved there is a higher risk of faecal incontinence compared to external sphincter injury alone<sup>[64,65]</sup>. These women are also at risk of other complications including wound infection and dehiscence (7.3%)<sup>[65]</sup>, perineal pain and even rectovaginal fistula.

Several randomised trials have shown that the prognosis is good, whether the tear has been sutured by the end to end method or the overlap method, with 60%–80% of patients remaining asymptomatic at 12 months<sup>[3,9,66]</sup>. Recent Cochrane review in 2013<sup>[67]</sup> found a statistically significant lower incidence of faecal urgency and lower anal incontinence scores and statistically significant lower risk of deterioration of anal incontinence symptoms at 12 months in the overlap group. At the end of 36 months there appear to be no significant differences in flatus or faecal incontinence between the two groups.

The incidence of residual defects on endo anal ultrasound remains between 19% and 36%, though the significance of these defects remains unknown. These are found to be greater in women with 4th degree tear compared to 3rd degree tears (OR 15.4, 95% CI 4.8–50.0)<sup>[68]</sup>.

In occult OASIS that has been unrecognised at the time, majority of women remain asymptomatic with only 23% complaining of faecal incontinence in the initial post-partum period<sup>[69]</sup>. Frudinger *et al.* in a prospective evaluation of asymptomatic primiparous women with occult OASIS, found that if women were asymptomatic in the initial post-partum period, they continued to remain asymptomatic at 10 years<sup>[70]</sup>.

Impact of subsequent vaginal delivery – The risk of a subsequent laceration is between two to seven fold after a vaginal delivery with most studies citing a risk of recurrent laceration of 3.6%–7.2%<sup>[71–74]</sup>. Even though there is an increased overall risk of a recurrent laceration, the absolute risk remains low. Hence in asymptomatic women with good sphincter function, vaginal delivery should be offered as there is a 95% chance of not sustaining a further OASIS or developing de novo anal incontinence after delivery. Operative delivery has the highest risk (OR 6.5, 95% CI 1.5–9.4), with significantly increased risk when a median episiotomy is performed (OR 17.4, 95% CI 7.5–51.0)<sup>[73]</sup>.

The mode of delivery should be decided after full counselling explaining the recurrent risk of a further OASIS, risk of faecal incontinence as well as the risk of caesarean section. This should be documented in patients' notes. Women who sustained an OASIS may have had a traumatic experience previously and struggle to cope with a further vaginal delivery. If the risk factors are present, the threshold for considering a caesarean section may be lowered. Women require sympathy, psychological support and consideration to their request for caesarean section<sup>[75]</sup>. Routine episiotomies are not preventative and it should be reserved to those women with thick inelastic and scarred perineum.

In women who are symptomatic, anal incontinence could be permanent in one in six cases following a subsequent vaginal delivery<sup>[76]</sup>. Hence if symptoms are present, caesarean section would be the preferred mode of delivery. A potential estimate of 2–23 caesareans would be required to be performed to prevent a recurrent anal sphincter laceration.

Impact of recurrent perineal trauma – There is very little guidance on the management of women who have had recurrent OASIS. Most studies have small numbers of such cases and

show good recovery with no symptoms after the second repair. However, the long term impact is unknown and they may have a higher risk of developing de novo fecal incontinence later in life. Anorectal studies can be utilised in the counselling process when deciding the mode of delivery of women who had recurrent OASIS. Caesarean section might be the preferred mode of delivery due to the unknown impact on long term sphincter function with recurrent OASIS.

## 9. Conclusions

Perineal trauma is unfortunate outcome of vaginal delivery. OASIS have short and long term implications. These are perineal pain, dyspareunia, sexual, urinary and anal dysfunction which can lead to psychological, social and marital problems and implication regarding future delivery. Although it can never be eliminated it can be reduced by improving practice and training. Improving care for those who are affected reduces the long-term morbidity.

## Conflict of interest statement

The authors report no conflict of interest.

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