

# OBSTETRIC ANAL SPHINCTER INJURY (OASIS)

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## INTRODUCTION

Obstetric anal sphincter injuries (OASIS) are complications that occur during vaginal delivery. Also referred to as third- and fourth-degree perineal lacerations, these injuries involve the anal sphincter complex and, in more severe cases, anal mucosa. In addition to contributing to short-term morbidity, such as wound breakdown and perineal pain, OASIS is a leading risk factor for subsequent loss of bowel control in women.

## ANORECTAL ANATOMY AND LACERATION

Continence of feces and gas is maintained by the anorectal complex, which consists of the anal canal and rectum. The anal canal starts below the anorectal junction that is formed by the puborectalis muscle. The major muscular components of the anal canal are the internal and external anal sphincters.

- The internal anal sphincter is the terminal thickened portion of the smooth circular muscle of the gastrointestinal tract. The internal anal sphincter is under autonomic control and contributes up to 85 percent of resting pressure of the anal canal and is critical to maintaining continence. Internal anal sphincter damage is associated with passive soiling or flatal incontinence.
- The external anal sphincter is a striated muscle that provides most of the squeeze pressure important in maintaining anal continence. The external anal sphincter is innervated by the pudendal nerve. Damage to the external anal sphincter is associated with fecal incontinence.

## CLASSIFICATION OF OBSTETRIC LACERATIONS

First degree	Second degree	Third degree	Fourth degree
Injury to perineal skin only	Injury to perineum involving anal sphincter complex	<b>3a:</b> Less than 50% of external anal sphincter thickness torn	Injury to perineum involving anal sphincter complex (external anal sphincter and internal anal sphincter) and anal epithelium
		<b>3b:</b> More than 50% external anal sphincter thickness torn	
		<b>3c:</b> Both external anal sphincter and internal anal sphincter torn	

## EPIDEMIOLOGY AND RISK FACTORS

•**Incidence** – A meta-analysis of eight observational studies that included over 99,000 women reported the following. Overall OASIS risk: 6.3 %. Risk of OASIS in the first delivery: 5.7% and the Risk in parous women with no previous OASIS is 1.5%.

In a retrospective study of over 700 women with twin pregnancies, OASIS occurred in 2.8 percent of women undergoing vaginal delivery of both twins.

In evaluating the prevalence of OASIS, the delivery record appears to be a more accurate source of information than patient recollection because of recall bias. As an example, one study of over 1000 women reported that women with

pelvic floor symptoms were more likely to recall a history of OASIS regardless of whether such a laceration was documented.

•**Risk factors** – Risk factors for OASIS include vaginal delivery, obstetric factors, operative vaginal delivery, episiotomy, fetal macrosomia, prolonged second stage, fetal occiput posterior presentation, and increasing maternal age. Obesity does not appear to be a risk factor.

•**Obstetric factors** – Prolonged second stage of labor and episiotomy have been consistently associated with increased risk of OASIS. Additional risk factors likely include primiparity, large birth weight, and vaginal birth after cesarean delivery. A computer-generated model has been created to help predict the risk of OASIS for individuals considering a trial of labor after cesarean delivery.

**Supporting data include:-** In a retrospective cohort study of over 22,000 women undergoing term vaginal delivery in the Kaiser Permanente Northern California health system, second-stage of labor  $\geq 3$  hours, midline episiotomy, and vaginal birth after cesarean delivery were associated with an approximately threefold increased risk of OASIS. An approximate doubling of OASIS risk was reported for being primiparous or of Asian ancestry.

-A case-control study of over 28,000 births in India similarly reported an increased risk of OASIS with prolonged second stage of labor and episiotomy [16]. Additional OASIS risk factors in the adjusted analysis included primiparity, gestational age  $\geq 41$  weeks, epidural analgesia, shoulder dystocia, and birth weight  $\geq 4000$  g.

-A different population-based study of over 284,000 women reported a 1.5-fold increase in the odds of OASIS with each 500 g increase in fetal birth weight over 2000 g [17]. In addition, a retrospective analysis of over 67,000 birth reported an OASIS rate of 9 percent for women with shoulder dystocia [18].

•**Operative vaginal delivery** – The risk of OASIS, and subsequent fecal incontinence, is increased with operative vaginal delivery (both vacuum-assisted and forceps). In the above study from the Kaiser Permanente health system, OASIS occurred in 24 percent of vacuum-assisted deliveries compared with 4 percent of spontaneous deliveries. The body of evidence suggests that forceps delivery is associated with a greater risk of OASIS than vacuum delivery, but the data are conflicting. In a study of over 100,000 spontaneous vaginal deliveries, OASIS occurred in 8.6 percent of forceps assisted deliveries, 3.7 percent of vacuum assisted vaginal deliveries, and 1.3 percent of spontaneous vaginal deliveries. In addition, small cohort studies have reported the diagnosis of delayed OASIS in over 80 percent of women with forceps-assisted deliveries. Thus, operative vaginal delivery should only be used for obstetric indications given the increased risk of OASIS.

•**Episiotomy** – Routine use of episiotomy is no longer recommended because of insufficient objective, evidence-based data demonstrating benefit or defining the criterion for its use. One consequence of episiotomy is extension of the incision into or through the anal sphincter complex, particularly for median (midline) episiotomy. In the above Kaiser Permanente study, median episiotomy was associated with an approximate threefold increased risk of OASIS compared with an approximate doubling of risk for mediolateral episiotomy.

A meta-analysis of over 700,000 pregnant patients found that mediolateral episiotomy neither increased nor protected against perineal lacerations (relative risk 1.55, 95% CI 0.95-2.53). When episiotomy is deemed necessary, we recommend mediolateral episiotomy to reduce the risk of OASIS, although rarely mediolateral incisions may still extend into an anal sphincter laceration.

•**Prior OASIS** – Women with prior OASIS are at increased risk of repeat OASIS in a subsequent delivery. Repeat OASIS rates of 3 to 6 percent have been reported; variation comes in part from number of prior OASIS events.

## CLINICAL SIGNIFICANCE

Clinical issues related to OASIS include an increased risk for loss of bowel control, optimal mode of delivery for future pregnancy, and routine screening at the time of vaginal delivery.

**Loss of bowel control** — OASIS increases the risk of subsequent loss of bowel control. Studies have reported postpartum fecal incontinence (involuntary loss of stool) rates of 0 to 28 percent in women with OASIS, compared with rates of 1 to 10 percent for women delivered without OASIS. Rates vary by definitions used and duration of follow-up. At least one study has reported that fourth-degree lacerations are associated with higher long-term risk of bowel incontinence compared with third-degree lacerations.

Loss of bowel control can be further divided into flatal, fecal, and anal incontinence. Various terminologies exist for medical professionals; affected patients prefer the term "accidental bowel leakage". ●Flatal incontinence – The involuntary loss of flatus only ● fecal incontinence – The involuntary loss of solid or liquid feces ● anal incontinence – The involuntary loss of solid or liquid feces or flatus

**Approach to future delivery** — for women with a prior OASIS, there are insufficient high-quality data to make recommendations regarding delivery mode in a subsequent pregnancy. While we take the approach below, the ultimate decision regarding delivery route is made by the patient.

●For asymptomatic women with one prior OASIS, we believe vaginal delivery can be reasonably offered after careful counseling regarding the risks of a second OASIS (and subsequent fecal incontinence) compared with the risks of cesarean delivery. We would advise use of operative delivery and episiotomy only as obstetrically indicated. For women with primary OASIS, the risk of repeat OASIS is approximately 3 to 5 percent. It is estimated that 2.3 cesarean deliveries would be needed in women with prior OASIS to prevent one new case of anal incontinence. In addition, it is not clear that subsequent vaginal delivery negatively impacts measurable anal sphincter function.

●For asymptomatic women with two or more prior OASIS or symptomatic women with any prior OASIS, we offer a planned cesarean delivery in future pregnancies. Women with two prior OASIS have an approximately 10-fold increased risk for sphincter injury with the next delivery. Women with transient anal incontinence symptoms following an initial delivery have a one in six chance of developing permanent symptoms following a subsequent vaginal delivery. Of note, while it appears that vaginal delivery increases the short-term risk of persistent fecal incontinence in women with previous OASIS, an elevated risk of fecal incontinence is not noted when women are followed for five or more years. In counseling symptomatic women with a history of OASIS, it is important to explain the uncertainties regarding risk of recurrent or persistent anal incontinence as well as operative risks associated with cesarean delivery.

In a retrospective study of 153 women with a prior OASIS, approximately 30 percent elected to have a cesarean delivery at the time of subsequent pregnancy. Selection of cesarean delivery was associated with White ethnicity and severity of endoanal ultrasound results, although study numbers were small. In another retrospective study of 233 patients with prior OASIS, endoanal ultrasound and anorectal manometry were performed on all the patients and then test results were applied to different decision algorithms regarding route of delivery. When the strictest protocol was applied, which included cesarean delivery when only one investigation was abnormal or for all women with anal incontinence, more than 80 percent of women would be advised to have a cesarean delivery in subsequent pregnancy. When the algorithm was changed to require symptomatic women to have one abnormal investigation and asymptomatic women to have abnormalities of both tests, the advised cesarean delivery rate dropped to 40 percent.

**Screening at time of vaginal delivery** — There is no consensus as to whether or not postpartum women should be routinely screened for OASIS in the delivery room or postpartum period. Persistent pelvic floor issues in a postpartum patient, particularly fecal urgency or incontinence, should raise suspicion for possible pelvic floor injury, including OASIS.

## PREVENTION

While the risk of OASIS during vaginal delivery cannot be eliminated, some techniques appear to reduce the incidence of OASIS. However, a reduction in OASIS is not clearly associated with reduced long-term loss of bowel control.

●Cesarean delivery – While primary cesarean delivery does prevent OASIS, cesarean delivery has not been associated with decreased long-term rates of fecal incontinence and thus is not routinely advised for this indication. However, for women who have had a previous anal sphincter injury or have symptomatic fecal incontinence, planned cesarean delivery, after counseling regarding risks and benefits, is a reasonable approach to decrease the chances of permanent symptoms.

●Perineal massage – Perineal massage, either antepartum or during the second stage of labor, has shown to decrease muscular resistance and reduce the likelihood of laceration for patients. However, while perineal massage may reduce the incidence of perineal laceration, it does not appear to decrease postpartum fecal incontinence.

●Maternal birth position – Population studies have reported increased rates of anal sphincter injury for women who deliver in standing, squatting, or lithotomy positions compared with supine, semi recumbent, or lateral recumbent positions. It is not known if the standing, squatting, or lithotomy birth positions are associated with increased long-term rates of loss of bowel control or if the other positions reduce the long-term rates of involuntary loss of bowel control.

●Obstetric provider training – Training programs have been created to improve clinician understanding of perineal anatomy, improve recognition of obstetric lacerations, and reduce OASIS. While at least one study has reported decreased OASIS rates, the long-term impact of such programs on loss of bowel control is not known. That said, the risks associated with improved provider education are likely to be low.

## CLINICAL PRESENTATION

While there are no universal standards for defining OASIS subtypes by the time frame in which the patient presents, we find the following subgroups clinically useful as the management differs among them. These time frames are general parameters and not strict guidelines.

●Immediate – The majority of women with OASIS have an obvious perineal laceration following vaginal delivery. The diagnosis is confirmed by physical examination, including anorectal examination. ●Postpartum – Postpartum OASIS refers to anal sphincter injury that is identified during the postpartum period, typically within six to eight weeks after delivery, but not recognized at the time of delivery. These women may present with symptoms of perineal pain or discomfort, perineal bleeding or discharge, and/or loss of bowel control.

Women with postpartum OASIS can have either:

●A recognized laceration that was repaired at the time of delivery but presents with a complication, such as wound separation or infection, during the postpartum period. This group represents the most common cause of postpartum presentation.

●OASIS that may or may not have been recognized at the time of delivery but requires repair in the postpartum period. This group can include women who have unattended deliveries or who are unable to access obstetric services immediately after delivery.

●Delayed – Delayed OASIS, also known as occult OASIS, refers to an anal sphincter laceration that is diagnosed beyond the postpartum period, generally remote from delivery. These women typically present with symptoms of loss of bowel control and/or fecal urgency years following delivery.

## EVALUATION AND MANAGEMENT

### 1. Immediate OASIS

Immediate OASIS is one that is recognized and repaired at the time of delivery.

- Diagnostic evaluation — Patient history and physical examination are the main components of the diagnostic evaluation in women suspected to have OASIS immediately after vaginal delivery. Imaging is performed in some research settings
- History – The history includes information about the patient's delivery, medical and surgical problems, and assessment of behavioral changes. For women who are being evaluated immediately postpartum, the obstetric events that preceded the delivery are most relevant.
- Physical examination – The physical examination is adjusted based on the timing of the examination in relation to vaginal delivery and the presenting symptoms. Immediately following vaginal delivery, all women are presumed to be at risk for OASIS. The clinician should examine the perineum for evidence of disrupted anal sphincter complex. A digital anorectal examination is performed to assess for possible sphincter and/or anal mucosal injury. Examination of obstetric lacerations, the perineum, and rectum requires adequate tissue exposure and lighting. Analgesia or anesthesia to improve patient comfort can aid evaluation.

●Imaging – Endoanal ultrasound is not routinely performed prior to perineal repair due to limited availability of equipment and clinician training as well as sparse outcome data. In a trial that randomly assigned 752 primiparous women with a second-degree perineal laceration to either ultrasound or routine clinical examination of the anal



sphincter, women who received ultrasound evaluation were less likely to have severe fecal incontinence at 3 months (3.3 versus 8.7 percent) and 12 months (3.2 versus 6.7 percent) postpartum. The women in the ultrasound group were more likely to report severe perineal pain at three months compared with control women (5.2 versus 0.9 percent). Ultrasound would have to be performed in 29 women to prevent one case of severe fecal incontinence at one year following delivery.

**Treatment:- Surgical repair** — If OASIS is diagnosed following vaginal delivery, immediate surgical repair is the mainstay of treatment. The approach to surgical repair and discussion of overlapping versus end-to-end techniques are presented in detail separately.

When resources for immediate repair of known OASIS following vaginal delivery are not available, OASIS repair may be delayed for up to 12 hours without apparent detrimental effect. Factors that can preclude immediate repair include lack of anesthesia services, lack of operating room and/or staff, and inadequate training of the obstetric provider. In a trial that randomly assigned women with OASIS to immediate repair or repair after an 8 to 12 hour delay, there were no differences in anal incontinence or pelvic floor symptoms between the groups at one year of follow-up.

**Adjunct treatments** — In addition to surgical repair, we advise the following adjunct treatments for all women with OASIS to help reduce symptoms and improve function.

- Behavioral changes – Behavior changes to avoid constipation are generally advised for all patients with defecatory symptoms. A detailed discussion of these approaches is presented separately.

Such interventions can include:

- Education regarding fluid intake (at least 48 to 64 oz of fluid a day, mostly water; this volume is increased as needed for lactating women) and dietary adjustments (high-fiber diet with at least 30 grams of fiber per day).

- Increase in fiber intake with the goal of avoidance of loose stools.

- Establish predictable patterns of bowel evacuation (ie, bowel training).

- Use proper posture during defecation (examples of proper toilet positions can be found online).

- Medical therapy to prevent constipation – Stool-bulking agents, softeners, osmotic agents, and stimulant laxatives are prescribed, in that order, as needed to prevent constipation. For women with symptomatic fecal incontinence, loperamide can be used in conjunction with stool bulking agents, such as methylcellulose (commercial name Citrucel) or psyllium (commercial name Metamucil).

- Physical therapy and pelvic floor muscle training – Many clinicians advise women to begin pelvic floor physical therapy with pelvic floor muscle training after appropriate healing of their sphincter injury. Several trials have reported improvement in anal and fecal incontinence symptoms with such physical therapy. While pelvic floor physical therapy is typically begun six to eight weeks from repair, at least one study has reported improved outcomes with initiating therapy four weeks from repair. Pelvic floor physical therapy is performed by physical therapists with specialty training. For women with fecal incontinence, training in fecal urge suppression techniques can also be helpful.

- Biofeedback – Biofeedback is a physiotherapy technique that uses external equipment to provide visual or auditory biofeedback during muscle training. One trial reported similar short-term outcomes for women with OASIS assigned to either biofeedback or traditional pelvic floor training. However, in adults with fecal incontinence, biofeedback is often used as an adjunct to pelvic floor exercises, as combination treatment appears to be more effective than pelvic floor physical therapy alone. It is not yet known if adding biofeedback will improve long-term outcomes for women with OASIS.

Post-repair care — Care of OASIS injuries does not end in the delivery suite. Appropriate postpartum perineal care is important to decrease the risk of postpartum complications, including wound separation and infection.

## 2. Postpartum OASIS

**Presentation and history** — Women with postpartum OASIS typically present with symptoms of fecal urgency, fecal or anal incontinence, perineal pain or discomfort, perineal bleeding, and/or discharge. Symptoms can either persist or worsen following delivery. Key elements of the history include the details of the delivery and events that deviate from routine postpartum recovery. For example, some women with wound separation report feeling a "popping" sensation when their sutures separated. Additional risk factors include instrumented vaginal delivery, known higher-order perineal laceration, and episiotomy.

**Physical examination findings** — For women who present in the postpartum period, the examiner needs to consider the following possibilities when performing the physical examination:

- **Recent repair with possible complications** – These are women who underwent repair of the anorectal sphincter and perineal structures but present during the postpartum period with complications of the repair. The clinician evaluates for evidence of normal healing as well as disrupted sutures, wound separation, hematoma and/or seroma, and infection (with or without abscess). Rectovaginal examination is crucial to assess healing of perineal structures and anorectal complex. In a retrospective review of over 900 women with OASIS, 7 percent experienced wound complications, including infection, separation, packing, operative intervention, and secondary repair. Women suspected of having either problem are typically evaluated in the operating room, where adequate analgesia, visualization, and wound debridement can occur.

If wound separation is noted, the examiner next determines if superficial or deep structures are affected. If infection or abscess is suspected, the examiner may need to remove any remaining sutures to assess the extent of tissue involvement.

- **Disrupted perineum with OASIS** – OASIS is present but was not repaired in the immediate postpartum period. This perineum may appear as a cloaca or with partial integrity of the rectovaginal septum, perineal structures, or perineal skin.

- **Intact perineum with underlying OASIS** – Some women have what appears to be a visually intact perineum, yet a partial or full disruption of the anal sphincter complex is detected on digital anorectal examination or with imaging (eg, office endoanal ultrasound). Digital anorectal examination involves circumferential palpation of muscular and connective structures. When a defect is suspected, the asymmetry can often be felt by the palpating finger. Use of an additional examination finger inside the vagina or on the perineum can aid in detecting tissue asymmetry and making the diagnosis. Anorectal squeeze assessment during examination may also reveal asymmetry in the normally circumferential muscle contraction (ie, absence or decrease of contraction of the anterior portion of the anal sphincter), which further supports the diagnosis.

**Management:** - **Separation (breakdown)** — Wound separation of a previously repaired OASIS typically occurs within days or weeks of the initial repair. In our experience, these women generally present with perineal pain, bleeding, and/or foul-smelling discharge. Some women have diagnosed the perineal disruption on self-examination, yet some may be asymptomatic. On physical examination, the wound is noted to be disrupted, although suture material may still be present. Removal of suture material may be necessary to understand the extent of the separation. The depth of separation needs to be determined because subsequent management decisions will be based on the level of tissue integrity.

For women with isolated wound separation (ie, no infection), the repair technique is similar to primary repair. In our practice, we advise using interrupted sutures as much as possible throughout the repeat repair. The rationale is that if one suture breaks or erodes, the remaining sutures will remain in place. All necrotic tissue must be debrided prior to performing the repeat repair. The debridement technique depends on the amount and location of necrotic tissue as well as patient characteristics. The goal of debridement is to remove the fibrinous and necrotic tissue to expose healthy, pink, and vascular tissue. Superficial debridement can be performed in the office. However, if extensive debridement is needed, this is typically done with local anesthesia or sedation. Debridement can be done both sharply and bluntly. Sharp debridement uses scalpel or scissors in cases of extensive debridement or excessive necrotic tissue. Blunt debridement can be done using a sponge or plastic brush (we use prep brushes or Cytobrushes). There is currently no conclusive evidence whether repair should be delayed, although historical practice has been to delay the repair for up to three months. In our practice, the timing of repeat repair is individualized and based on patient tissue quality, extent of the breakdown, and the patient's symptoms and

preference. In a case series, 18 individuals with OASIS underwent repair a median of 19.5 days from diagnosis of wound separation, with no recurrences at three months postoperatively.

If the tissue integrity is found to be poor, closure of the wound should be delayed and possible infection should be suspected. Separate from symptoms and signs of systemic infection, signs of perineal wound infection can include presence of pus or heavy discharge with suture breakdown and tissue discoloration. In these cases, we use similar debridement technique as above: remove loose sutures and consider systemic antibiotic treatment (for women with confirmed or likely infection) while frequently monitoring the wound (at least weekly). Delayed repair is considered once infection is cleared and tissue quality is improved.

**Infection** — When infection is suspected, the clinician needs to determine if infection is superficial or deep and if an abscess is present. If deep infection surrounds intact suture material, the suture material should be removed. If wound infection is diagnosed, wound closure is delayed until the infection has cleared. These women require surgical debridement of the necrotic tissue, incision and drainage of any abscesses, and antibiotic therapy. After debridement, the wound is loosely packed with surgical gauze. The patient is then followed at least weekly and sharp debridement is repeated as necessary. Once the wound is no longer infected, plans can be made for a delayed closure three to six months from time of initial debridement. The evaluation and management of women with infected perineal wounds and delayed wound closure are reviewed in detail separately.

**Interval OASIS repair** — Women with OASIS who are diagnosed during the postpartum period, but not at the time of delivery, are managed similarly to women with a wound separation.

**OASIS repair with intact perineum** — The timing of OASIS repair in women with an intact perineum depends on many factors, including the patient's symptoms, desire for future child-bearing, and patient preferences. We only consider postpartum OASIS repair in the setting of an intact perineum in women with symptoms of fecal incontinence. Approach to repair of OASIS with intact perineum is similar to any anal sphincteroplasty. The patient's position depends on training and provider preference: Most gynecologic surgeons prefer the lithotomy position, whereas colorectal surgeons prefer jack-knife. The repair often includes an inverted-U incision of an intact perineum and dissection of the perineal structures and anal sphincters.

**3. Occult (delayed) OASIS** — Occult OASIS, also known as delayed OASIS, refers to an anal sphincter laceration that is diagnosed beyond the postpartum period, typically years later.

**Mechanism** — Anal sphincter injury may not be recognized on examination after vaginal delivery, and thus be unrepaired, or may be recognized and repaired, but with continued sphincter defect. Up to 35 percent of women with a recognized and repaired OASIS will have persistent sonographic defects of the anal sphincter complex 6 to 12 months postpartum. Women with fourth-degree lacerations appear to be at increased risk for residual sphincter defects compared with women with third-degree perineal lacerations.

**History, examination, and imaging** — Women with occult OASIS may present for evaluation of anal incontinence. History elements that are particularly important include risk factors for OASIS (eg, operative vaginal delivery or episiotomy) or a prior diagnosis of OASIS. Occult OASIS is suggested by the dovetail sign on physical examination and confirmed by imaging, typically endoanal ultrasound that demonstrates a torn anal sphincter complex. Endoanal ultrasound evaluates the entire anal sphincter complex, including both internal anal sphincter (IAS) and external anal sphincter (EAS). Ultrasound imaging can also identify the posterior portion of the puborectalis muscle. Disruptions can be identified at the level of the IAS and EAS.

Normal anatomic variations that are visualized with endoanal ultrasound include: Normally, at the level of puborectalis muscle, the EAS is not visualized anteriorly, as this is proximal to the normal EAS position. Normal IAS ends more proximally than EAS.

Other imaging modalities that can be helpful include perineal or introital ultrasound or magnetic resonance imaging (MRI). In situations where endoanal ultrasound is not available, MRI may be helpful in making the diagnosis, particularly if there is concern for fistula. There is no consensus as to which women benefit from additional imaging; imaging decisions are based on provider preference and equipment availability.

Women with suspected occult OASIS based on history and symptoms may undergo anorectal manometry, which is the gold standard for assessing anal sphincter function. Absent or impaired anal sphincter function can indicate prior OASIS, but such findings are not exclusive to OASIS.

**Treatment** — Decision to repair occult OASIS depends on patients' presenting symptoms and preferences. There are several techniques for surgical dissection and repair.

### PROGNOSIS

●Primary OASIS – For women with primary OASIS, the risk of repeat OASIS in a future vaginal delivery is approximately 3 to 5 percent. Women with one OASIS are at increased risk of anal incontinence and fecal urgency compared with women without OASIS (47 versus 13 percent). Of women with OASIS, those with internal anal sphincter involvement are at increased risk for wound infection and dehiscence, perineal pain, and rectovaginal fistula compared with women who have only external anal sphincter injury.

●Repeat OASIS – In a 2016 meta-analysis of eight studies including over 99,000 women, repeat OASIS occurred in 6.3 percent of women with a prior OASIS. However, women with two prior OASIS have been reported to have a 10-fold increased risk for sphincter injury in next pregnancy.

Beyond having had a primary OASIS, additional risk factors for recurrent anal sphincter injury include

- Operative vaginal delivery
- Median episiotomy
- Large for gestational age fetus
- Shoulder dystocia

Women who sustain a second OASIS appear to have an increased risk of long-term anal and fecal incontinence. In a secondary analysis of data from a questionnaire survey, women with a second OASIS had a nearly 70 percent increased risk of anal incontinence and nearly double the risk of fecal incontinence. The study adjusted for type of OASIS, maternal age, infant birth weights, years since delivery, and presence of anal incontinence before the second pregnancy, and the women were followed for five years or more.

**Long-term complications** – Long-term sequelae of OASIS (primary or repeat) include:-

- Fecal and anal incontinence
- Perineal pain
- Dyspareunia
- Defecatory dysfunction
- Urinary incontinence

### SUMMARY AND RECOMMENDATIONS

●Continence of feces and gas is maintained by the anorectal complex, which consists of the anal canal and rectum. The internal anal sphincter is the terminal thickened portion of the smooth circular muscle of the gastrointestinal tract that provides most of the resting anal pressure. The external anal sphincter is a striated muscle that provides most of the squeeze pressure important in maintaining anal continence.

●Clinical issues related to obstetric anal sphincter injuries (OASIS) include an increased risk of loss of bowel control, optimal mode of delivery for future pregnancy, and routine screening at the time of vaginal delivery.

●The overall risk of OASIS is approximately 6 percent. Risk factors include vaginal delivery, obstetric factors, operative vaginal delivery, episiotomy, fetal macrosomia, longer second stage, and increasing maternal age.

●While the risk of OASIS during vaginal delivery cannot be eliminated, factors that appear to reduce the incidence of OASIS include avoidance of episiotomy, perineal massage, maternal birth position, and training of obstetric providers. However, despite a reduction in OASIS, reduced long-term loss of bowel control is not certain.

●While there are no universal standards for defining OASIS subtypes by the time frame in which the patient presents, we find the subgroups of immediate, postpartum, and delayed clinically useful as the management differs among them. These time frames are general parameters and not strict guidelines.



- Immediate OASIS is one that is recognized and repaired at the time of delivery. For women diagnosed with OASIS at the time of vaginal delivery, immediate surgical repair is the mainstay of treatment.
  - Postpartum OASIS refers to lacerations that are diagnosed in the postpartum period (six to eight weeks postpartum) but not at the time of delivery. These women typically present with symptoms of fecal urgency, fecal or anal incontinence, perineal pain or discomfort, perineal bleeding, and/or discharge, yet they may also be asymptomatic. These women may have had an OASIS repair and subsequent complications, an OASIS that was not repaired, or an intact perineum with underlying OASIS.
- Occult OASIS, also known as delayed OASIS, refers to an anal sphincter laceration that is diagnosed beyond the postpartum period, typically years later. Women with occult OASIS may present for evaluation of anal incontinence. These women may undergo delayed surgical dissection and repair if symptoms warrant intervention.
- For women with primary OASIS, the risk of repeat OASIS in a future vaginal delivery is approximately 3 to 5 percent. Women who sustain a second OASIS appear to have an increased risk of long-term anal and fecal incontinence.

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