Obstetric anal sphincter injury: How to avoid, how to repair: A literature review

Practice recommendations

- Avoiding obstetrical injury to the anal sphincter is the single biggest factor in preventing anal incontinence among women (A). Any form of instrument delivery has consistently been noted to increase the risk of obstetric anal sphincter injury and altered fecal continence by between 2- and 7-fold (A).
- Routine episiotomy is not recommended (A). Episiotomy use should be restricted to situations where it directly facilitates an urgent delivery (A). A mediolateral incision, instead of a midline, should be considered for persons at otherwise high risk of obstetric anal sphincter injury (A).
- The internal anal sphincter needs to be separately repaired if torn (A).
- Women with injuries to the internal anal sphincter or rectal mucosa have a worse prognosis for future continence problems (A). All women, particularly those with risk factors for injury, should be surveyed for symptoms of anal incontinence at postpartum follow-up (C).

Do you routinely check with new first-time mothers at a postpartum visit about changes in anal continence? They are at particular risk for obstetric anal sphincter injury and could be too embarrassed to raise the issue.

Sphincter injury following labor is the most common cause of anal incontinence (including flatus) in women, which can severely diminish quality of life and lead to considerable personal and financial costs. Endoanal ultrasound can detect these injuries, even in the absence of clinically obvious damage to the anal sphincter (occult obstetric anal sphincter injury).

In this article, we review measures to reduce the occurrence of obstetric anal sphincter injury, proper primary repair when it does occur, and appropriate long-term follow-up. Women with known obstetric anal sphincter injury must also be counseled about the risk of further damage during a future vaginal delivery.

**Injury more common than symptoms would suggest**

The conventional definitions of the 4 grades of perineal laceration in the US have been supplemented by more recent modifications included in a recent British Royal College of Obstetricians and Gynaecologists (RCOG) guideline (TABLE 1). The definition of third-degree laceration now reflects the various degrees of anal sphincter injury that may occur: partial (3a), full-thickness (3b), external anal sphincter injury, with or without injury to the internal anal sphincter (3c).

The incidence of clinical third- and...
Instrument delivery increased risk of anal injury 2- to 7-fold; vacuum-assisted delivery should be used when circumstances allow.

Fourth-degree lacerations varies widely; it is reported at between 0.5% and 3.0% in Europe and between 5.85% and 8.9% in the US. A landmark British paper from 1993 revealed that though only 3% had a clinical third- or fourth-degree perineal laceration, 35% of primiparous women (none of whom had any defect before delivery) had ultrasound evidence of varying degrees of anal sphincter defect at 6 weeks postpartum that persisted at 6 months. However, only about a third of these women had symptoms of bowel disturbance during the time of study.

These findings are supported by a meta-analysis in which 70% of women with a documented obstetric anal sphincter injury were asymptomatic. This meta-analysis concluded that clinical or occult obstetric anal sphincter injury occurs in 27% of primigravid women, and in 8.5% of multiparous women.

The long-term significance of occult obstetric anal sphincter injury and any relationship with geriatric fecal incontinence is unknown, although 71% of a sample of women with late-onset fecal incontinence were found to have ultrasound evidence of an anal sphincter defect thought to have occurred at a previous vaginal delivery. A recent English study reveals that when women were carefully re-examined after delivery by a skilled obstetrician looking specifically at the anal sphincter, the prevalence of clinically diagnosed third-degree lacerations rose sharply from the 11% initially diagnosed by the delivering physician or midwife to 24.5%. A subsequent endoanal ultrasound detected only an additional 1.2% (3 injuries, 2 of which were in the internal anal sphincter and therefore clinically undetectable). This strongly suggests that the vast majority of obstetric anal sphincter injuries can be detected clinically by a careful exam and that, when this is done, true occult injuries will be a rare finding.

Mechanisms of injury

Maintenance of fecal continence involves the coordinated action of several anatomical and physiological elements. An intact, innervated anal sphincter complex (both external and internal) is necessary. The sphincter complex can be damaged during childbirth in 3 ways.

Direct mechanical injury. Direct external or internal anal sphincter muscle disruption can occur, as with a clinically obvious third- or fourth-degree perineal laceration or an occult injury subsequently noted on ultrasound.

Neurologic injury. Neuropathy of the pudendal nerve may result from forceps delivery or persistent nerve compression from the fetal head. Traction neuropathy may also occur with fetal macrosomia and with prolonged pushing during Stage 2 in successive pregnancies, or with prolonged stretching of the nerve due to persistent poor postpartum pelvic floor tone. Injured nerves often undergo demyelination but usually recover with time.

Combined mechanical and neurologic trauma. Isolated neurologic injury, as described above, is believed to be rare. Neuropathy more commonly accompanies mechanical damage.

Who is at risk?

Several risk factors are unavoidable. One of these is primiparity, a consistently
reported independent variable also associated with other risk factors for obstetric anal sphincter injury, such as instrument delivery (TABLE 2).

### Preventing obstetric anal sphincter injury
Sphincter injury can occur even when obstetrical management is optimal. Although evidence from RCT data is often lacking, sufficient observational and retrospective data support the following recommendations to reduce the likelihood of injury.

#### Choose vacuum delivery before forceps
Any form of instrument delivery increases the risk of obstetric anal sphincter injury and altered fecal continence by between 2- and 7-fold. An RCT found clinical third-degree tears in 16% of women with forceps-assisted deliveries, compared with 7% of vacuum-assisted deliveries; the authors concluded that, when circumstances allow, vacuum delivery should be attempted first (acknowledging however that 23% of vacuum deliveries failed and proceeded to a forceps extraction, a sequence associated with increased injury). A meta-analysis confirmed that vacuum extraction is preferred when instrumental delivery is necessary (SOR: A). When midline episiotomy was performed during instrument delivery, the risk of obstetric anal sphincter injury approximately doubled again, such that, in one study, forceps delivery with episiotomy caused a 25-fold increase in obstetric anal sphincter injury.

Any steps that may safely reduce the need for instrument delivery should be supported. Toward this end, the Canadian Clinical Practices Obstetrics committee has recommended evidence-based labor interventions such as one-to-one support in labor, the increased use of a partogram in labor and appropriate oxytocin use, all in an effort to reduce needs for operative interventions.

#### TABLE 2

<table>
<thead>
<tr>
<th>RISK FACTOR</th>
<th>ODDS RATIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nulliparity (primigravidity)</td>
<td>3–4</td>
</tr>
<tr>
<td>Inherent predisposition:</td>
<td></td>
</tr>
<tr>
<td>Short perineal body</td>
<td>8</td>
</tr>
<tr>
<td>Instrumental delivery, overall</td>
<td>3</td>
</tr>
<tr>
<td>Forceps-assisted delivery</td>
<td>3–7</td>
</tr>
<tr>
<td>Vacuum-assisted delivery</td>
<td>3</td>
</tr>
<tr>
<td>Forceps vs vacuum</td>
<td>2.88*</td>
</tr>
<tr>
<td>Forceps with midline episiotomy</td>
<td>25</td>
</tr>
<tr>
<td>Prolonged second stage of labor (&gt;1 hour)</td>
<td>1.5–4</td>
</tr>
<tr>
<td>Epidural analgesia</td>
<td>1.5–3</td>
</tr>
<tr>
<td>Intrapartum infant factors:</td>
<td></td>
</tr>
<tr>
<td>Birthweight over 4 kg</td>
<td>2</td>
</tr>
<tr>
<td>Persistent occipitoposterior position</td>
<td>2–3</td>
</tr>
<tr>
<td>Episiotomy, mediolateral</td>
<td>1.4</td>
</tr>
<tr>
<td>Episiotomy, midline</td>
<td>3–5</td>
</tr>
<tr>
<td>Previous anal sphincter tear</td>
<td>4</td>
</tr>
</tbody>
</table>

All variables are statistically significant at P<.05.

*Relative risk of altered fecal symptoms based on RCT findings, vacuum vs forceps. Data from randomized controlled trials are lacking for most labor variables. Due to differing methods of analysis (univariate vs regression) and outcome measures, risk ratios reported in the literature vary considerably. This table presents the approximate odds ratios for risk factors that have been reported most consistently from 1 prospective cohort study, 1 randomized controlled trial, and, otherwise higher-quality retrospective analyses.

### If episiotomy necessary, mediolateral less risky than midline
Episiotomy was long promoted as a means of preserving the integrity of the perineal musculature and of avoiding damage to the anal sphincter, and it has been practiced routinely by some. Strong evidence now indicates that routine episiotomy (midline or mediolateral) is unhelpful and should be abandoned.

Observational evidence overwhelmingly shows that midline episiotomy is strongly associated with obstetric anal sphincter injury. One of the few RCTs comparing midline with mediolateral episiotomy, although flawed in its design, noted that a clinical third-degree laceration...
occurred as an extension of episiotomy in 11.6% of midline incisions compared with just 2% of mediolateral cuts.³²

Another RCT, designed to examine routine versus restrictive episiotomy, noted that all but 1 (98%) of the 47 third- or fourth-degree lacerations in a group of 700 women followed midline episiotomy.²⁹ A retrospective database analysis noted a 6-fold higher risk of third-degree perineal lacerations for women undergoing midline episiotomy compared with mediolateral incision.²³ Elsewhere, midline episiotomy was associated with a 5-fold increase in symptoms of fecal incontinence at 3 months postpartum when compared with women with an intact perineum.³⁴

Even when midline episiotomies do not extend into clinical third-degree lacerations, the incidence of resultant postpartum fecal incontinence triples when compared with spontaneous second-degree perineal lacerations.³⁰ The authors postulate that a perineum cut by midline episiotomy allows for more direct contact to occur between the fetal hard parts and the anal sphincter complex during delivery, thereby increasing occult obstetric anal sphincter injury.

Observational data conflict as to
whether mediolateral episiotomy contributes to, or protects against, obstetric anal sphincter injury—although the burden of evidence favors it as a risk factor that should be avoided when possible.\textsuperscript{16,23,33} An angle of mediolateral incision cut closer to 45 degrees from the midline has been associated with less obstetric anal sphincter injury than incisions cut at closer angles to the midline.\textsuperscript{34}

- Repairing sphincter injury

**Detecting injury in labor**
With any severe perineal laceration, closely inspect the external and, if exposed, internal anal sphincter and perform a rectal exam, particularly for women with numerous risk factors (although no good evidence supports the role of the rectal exam in diagnosing obstetric anal sphincter injury). Colorectal surgeons have advocated the use of a muscle stimulator to assist in identifying the ends of the external sphincter, but this has not become common practice.\textsuperscript{35}

**Immediate vs delayed repair**
It is standard practice to repair a damaged anal sphincter immediately or soon after delivery. However, given that a repair should be well done, and since a short delay does not appear to adversely affect healing, be prepared to wait for assistance for up to 24 hours rather than risk a suboptimal repair.\textsuperscript{16}

**Better training is needed**
Even among trained obstetricians and ob-gyn residents, 64% have reported no training or unsatisfactory training in management of obstetric anal sphincter injury; 94% of physicians felt inadequately prepared at the time of their first independent repair of the anal sphincter.\textsuperscript{17,24} To improve your repair skills in a workshop setting, consult the following sources—www.aafp.org/also.xml in the US, or www.perineum.net in UK.

**Analgesia and setting**
Adequate analgesia is an essential element in a good repair. Complete relaxation of the anesthetized anal sphincter complex facilitates bringing torn ends of the sphincter together without tension.\textsuperscript{39} Though theoretically this can be attained with local anesthetic infiltration, RCOG recommends that regional or general anesthesia be considered to provide complete analgesia.\textsuperscript{37} It is further recommended that repair of the anal sphincter occur in an operating room, given the degree of contamination present in the labor room after delivery and the devastating effects of an infected repair (SOR: C).\textsuperscript{40}

**Repair technique**
There are 2 commonly used methods of external anal sphincter repair: one, the traditionally taught end-to-end approximation of the cut ends, and the other, overlapping the cut ends of the external sphincter and suturing through the overlapped portions (FIGURE 2).\textsuperscript{16} Though an RCT from 2000 noted no significant difference in outcomes between these methods,\textsuperscript{41} other authors have suggested that an overlapping tech-
Immediately after repair, consider giving patients laxatives and broad-spectrum antibiotics, and possibly refer for physical therapy.

**FAST TRACK**

**Immediate post-repair management**

**Use a stool softener**

It had long been thought that constipation following obstetric anal sphincter injury allowed the sphincter to heal more effectively. However, new evidence from RCTs shows that using a laxative instead of a constipating regimen is more helpful in the immediate postpartum phase. Toward this end, use a stool softener, such as lactulose, for 3 to 10 days postpartum for women with obstetric anal sphincter injury.

**Should you prescribe an antibiotic?**

Given the devastating effects of post-repair infection, most authorities consider it prudent to prescribe a course of broad-spectrum antibiotics, possibly including metronidazole (SOR: C). A Cochrane review is registered to further examine this issue.

**Refer for physical therapy**

Some authorities consider an early referral to physical therapy for pelvic floor exercises helpful in the immediate postpartum for all patients with obstetric anal sphincter injury (SOR: C).

**Long-term management**

**Ask patients about incontinence**

Given that some women are too embarrassed to seek assistance, ask those with obstetric anal sphincter injury specific questions about any symptoms of anal incontinence at a follow-up visit, such as the 6-week postpartum visit (SOR: C). In some practices, all women who have sustained a third- or fourth-degree laceration are routinely scheduled for a 3-month follow-up visit to a dedicated clinic, irrespective of symptoms. Given the prevalence of occult obstetric anal sphincter injury for primigravid women, you may find it best to survey all women postnatally concerning any changes in anal continence.

**TABLE 3**

Demonstrates a validated, modified patient survey of anal incontinence. A score of 6 has been suggested as a cut-off to determine need for evaluation. Source: Mahoney et al, 2001; modified from Jorge and Wexner, 1993.
undergo anal manometry (during resting and forced squeezing) or endo-anal ultrasonography. Some patients respond well to physical therapy, though a few patients ultimately require reconstructive colorectal surgery and temporary colostomy.

Management in a subsequent pregnancy

Women who have had an obstetric anal sphincter injury are at increased risk for repeat injury in a future pregnancy.48 At some units, all such women are routinely offered a prenatal visit at the end of the second trimester to review their symptoms and to evaluate the anal sphincter with manometry or ultrasound. A large prospective study, however, found that recurrence of obstetric anal sphincter injury could not be predicted and that 95% of women with prior injury did not sustain further overt sphincter damage during a subsequent vaginal delivery.49

However, for some women, a repeat anal sphincter laceration could prove devastating. For these women—e.g., those with previous severe symptoms that required secondary surgical repair—initiate an in-depth discussion concerning the risks and benefits of elective cesarean delivery versus vaginal delivery.37,40

CONFLICT OF INTEREST

The authors have no conflict of interest to declare.

REFERENCES


