

# Obstetric Rectal Buttonhole Tear: Case Series, Literature Review, and Management Recommendations

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**Purpose:** Obstetric rectal buttonhole tear (ORBT) is a rare but serious complication of vaginal delivery, associated with rectovaginal fistula and fecal incontinence. Standardized management protocols are lacking.

**Patients and Methods:** We conducted a retrospective study of 3 institutional ORBT cases (2018–2024) managed with primary transvaginal layered repair and synthesized data from 40 published cases (1993–2024).

**Results:** Among 43 patients, 77.8% were primiparous; the median neonatal weight was 3570 g. ORBT occurred after spontaneous vaginal delivery (58.1%), operative vaginal delivery (34.9%), breech extraction (4.7%), or cesarean section (2.3%). Lateral episiotomy was present in 46.5% of cases, midline in 7.0%. Diagnosis was immediate postpartum (58.1%), during the second stage (34.9%), or delayed (7.0%). Primary transvaginal layered repair was performed in 81.4% of cases with favorable outcomes; colostomy was required in 2.3% after delayed diagnosis. Postoperative antibiotics and laxatives were administered in 86.0% and 72.1%, respectively. Complications occurred in 4.7% (wound dehiscence and rectovaginal fistula).

**Conclusion:** ORBT can occur irrespective of delivery mode, birth weight, or episiotomy but is more frequent in primiparas. Avoidance of rapid descent of the fetal head through the birth canal is recommended. Early diagnosis and primary layered repair by experienced surgeons under anesthesia (with transfer or short delay  $\leq 12$  h if necessary) optimize outcomes and minimize the need for colostomy. Perioperative antibiotics, structured bowel care, and adequate analgesia are recommended.

**Keywords:** isolated rectal tear, birth injuries, rectal lacerations, rectovaginal fistula, vaginal delivery

## Introduction

Obstetric rectal buttonhole tear (ORBT) is an uncommon but clinically significant complication of vaginal delivery, characterized by a full-thickness tear of the rectal mucosa and vaginal epithelium while typically sparing the anal sphincter complex.<sup>1</sup> First described in 1952,<sup>2</sup> ORBT has an estimated prevalence of 0.014% to 0.06%.<sup>3–5</sup> It may coexist with obstetric anal sphincter injuries (OASIS) when intervening anorectal mucosa remains intact, necessitating distinct recognition and management.<sup>1,6</sup>

Diagnosis is often delayed due to ORBT's concealed nature beneath an intact perineum or within minor perineal trauma.<sup>7</sup> This challenge is compounded by its exclusion from standard perineal tear classifications<sup>6</sup> and limited clinical training.<sup>8</sup>

Surgical repair presents unique difficulties, including bowel unpreparedness and mechanical stress from stool passage during early recovery.<sup>4</sup> These factors elevate risks of infection, wound dehiscence, and rectovaginal fistula (RVF) with profound physical, psychological, and social consequences.<sup>7,9</sup>

Despite these risks, repair protocols and postoperative care remain highly heterogeneous and inconsistently applied worldwide,<sup>4,5,7,9–37</sup> a reality stemming from the absence of formal guidelines, the diagnostic challenges, and the limited evidence base which is comprised predominantly of small, isolated case reports. This lack of standardization underscores the urgent need for a comprehensive synthesis of existing evidence to inform standardized, evidence-based management strategies.

## Materials and Methods

We performed a dual investigation of ORBT through institutional case review and literature synthesis.

### Institutional Cases

Beijing Daxing Maternal and Child Care Hospital records from December 2018 to December 2024 were systematically reviewed to identify vaginal delivery-associated ORBT cases.

### Literature Review

Electronic databases (PubMed, Web of Science, ScienceDirect, Google Scholar, CNKI) were comprehensively searched for studies published between January 1993 and December 2024. Medical subject headings and keywords included: “obstetric”, “vaginal delivery”, “rectal laceration”, “rectal buttonhole tear”, “rectovaginal tear”, and “isolated rectal tear”. Title/abstract screening identified relevant publications; only case reports and case series were included.

The literature search yielded 31 articles (1993–2024) describing 40 ORBT cases. Combined with three institutional cases, the final study sample comprised 43 ORBTs.

### Data Extraction

Standardized collection encompassed clinical characteristics, surgical details, postoperative management, outcomes and follow-up information.

## Results

### Case Series from Beijing Daxing Maternal and Child Care Hospital

Between December 2018 and December 2024, three ORBT cases (Table 1) were identified among 5087 vaginal deliveries at Beijing Daxing Maternal and Child Care Hospital (incidence 0.06%), all following forceps-assisted delivery.

**Table 1** Clinical Characteristics of Three Cases of Obstetric Rectal Buttonhole Tears

Characteristics	Case 1	Case 2	Case 3
Age (years)	29	27	31
Gestational age (weeks)	40+2	40	39
GxPy	G1P1	G1P1	G2P2
Pregnancy complications	GDM*	GDM*	No
Induction	Dinoprostone	Misoprostol	No
Episiotomy	Lateral	No	Midline
Mode of delivery	Forceps	Forceps	Forceps
Forceps indication	Fetal distress	Maternal exhaustion	Fetal distress
Fetal position	OP <sup>†</sup>	OP <sup>†</sup>	LOA <sup>‡</sup>
Duration of second stage (min)	20	170	10
Neonatal weight (g)	3120	3440	3625
Fundal pressure	Yes	Yes	No
Speed of fetal head passage	Rapid	Initially slow, then rapid	Rapid
Anal sphincter	Intact	OASIS 3a <sup>§</sup>	Intact
Tear length (cm)	2	4	1
Surgical approach	Four-layer	Four-layer	Three-layer
Anesthesia	CSE**	CSE**	Local
Surgical setting	Theater	Theater	Delivery room
Antibiotics	Etimicin	Mezlocillin + ornidazole	Mezlocillin + ornidazole
Diet	NPO <sup>††</sup>	NPO <sup>††</sup>	Low-residue/High-fluid
Motility inhibitor	Loperamider	Loperamider	No
Complications	No	No	No

**Abbreviations:** GxPy, gravidity (number of pregnancies) and parity (number of deliveries at  $\geq 20$  weeks, including current pregnancy); \*GDM, Gestational Diabetes Mellitus; <sup>†</sup>OP, Occiput Posterior; <sup>‡</sup>LOA, Left Occiput Anterior; <sup>§</sup>OASIS, Obstetric Anal Sphincter Injuries; \*\*CSE, Combined spinal-epidural anesthesia; <sup>††</sup>NPO, Nil Per OS (nothing by mouth).

## Clinical Presentation

Case 1: Examination revealed a 4-cm laceration in the right vaginal sulcus at the 7 o'clock position. At its apex, a 2-cm longitudinal rectovaginal defect (buttonhole tear) was identified, located 3 cm proximal to the anal sphincter complex. The patient had undergone a mediolateral episiotomy, but the anal sphincter complex remained completely intact. Case 2: Examination revealed a 4-cm midline rectovaginal defect extending from the posterior vaginal wall to the anterior rectal wall, located 2 cm proximal to the anal sphincter. A partial external anal sphincter injury (OASIS grade 3a)<sup>6</sup> was also identified, with an intact tissue bridge separating the rectal buttonhole from the sphincter tear. The patient had not undergone an episiotomy. Case 3: Examination revealed a 1-cm rectovaginal defect at the apex of a midline episiotomy, located 4 cm proximal to the anal sphincter. The sphincter complex remained completely intact.

The rectal lacerations in all three cases demonstrated well-defined margins, minimal bleeding, and no evidence of fecal contamination.

## Surgical Technique

All cases underwent immediate transvaginal layered repair performed by a senior obstetrician, with variation in anesthetic approach and setting based on case complexity. Cases 1 and 2 were repaired under combined spinal-epidural anesthesia in the operating room, while Case 3 was repaired under local anesthesia in the delivery room. The surgical preparation technique was standardized across all cases: after wound disinfection with povidone-iodine solution, the apex of the defect was packed with povidone-iodine-soaked gauze to enhance visualization and protect the posterior rectal wall. Digital rectal guidance was employed to facilitate precise identification of the defect apex.

The repair approach varied according to case complexity, with four-layer transvaginal repair performed in Cases 1 and 2, while Case 3 underwent a three-layer repair. The rectal mucosal closure technique was modified based on tissue conditions in each case. In Case 1, after an unsuccessful attempt at subcuticular running suture due to attenuated and friable rectal mucosa, the rectal mucosa was approximated with interrupted full-thickness 3–0 polyglactin 910 sutures (Vicryl, Ethicon, Somerville, NJ, USA) with knots tied on the vaginal side. Case 2 received continuous full-thickness 3–0 polyglactin 910 sutures for rectal mucosal approximation, while Case 3 was repaired using interrupted full-thickness 3–0 polyglactin 910 sutures.

In all cases, the rectal muscularis layer was approximated using continuous 3–0 polyglactin 910 sutures without mucosal penetration. Additional repair steps varied according to the presence of associated injuries and tissue integrity. Case 2 required end-to-end repair of the disrupted external anal sphincter with interrupted 1–0 polyglactin 910 sutures. Subsequent layers were repaired as follows: in Cases 1 and 2, both the rectovaginal fascia and vaginal epithelium were each closed separately with continuous 2–0 polyglactin 910 sutures; in Case 3, direct closure of the vaginal epithelium was performed with continuous 2–0 polyglactin 910 sutures as no distinct rectovaginal fascia was identified. Intraoperative digital rectal examination confirmed mucosal integrity in all cases.

## Postoperative Management

All patients received intravenous antibiotics initiated intraoperatively and continued for 5 days postoperatively. Case 1 was administered etimicin sulfate due to documented penicillin allergy, while Cases 2 and 3 received combination therapy with mezlocillin sodium plus ornidazole. Dietary management was individualized based on clinical assessment. Cases 1 and 2 were maintained on nil per os (NPO) status for 7 and 5 days respectively, with concurrent loperamide administration to minimize bowel motility. Following this period, a gradual reintroduction of low-residue, high-fluid diet was implemented. In contrast, Case 3 immediately commenced a low-residue, high-fluid diet for the first postoperative week. Standardized care for all patients included lactulose administration to prevent fecal impaction and promote stool softening, meticulous perineal hygiene with chlorhexidine-based cleansers, and structured psychological support throughout the recovery period.

## Outcomes and Follow-Up

All patients demonstrated uncomplicated postoperative recovery and were discharged on postoperative days 5 to 8. Discharge criteria included restoration of normal bowel movements, absence of fever, and normalization of inflammatory markers. Standardized weekly telephone consultations were conducted to assess dietary adherence, bowel elimination

patterns, lactulose administration compliance, perineal hygiene maintenance, and to reinforce pelvic rest recommendations including sexual abstinence for a minimum of two months postoperatively. Clinical evaluations performed at 6 and 12 weeks postoperatively confirmed complete wound epithelialization without evidence of dehiscence or fistula formation. All patients maintained normal bowel function with no reports of fecal urgency, incontinence, or constipation throughout the follow-up period.

## Overview of ORBT Cases (N=43)

### Clinical Presentation

This analysis encompassed 40 cases from published literature (Table S1) and 3 institutional cases (Table 1). The clinical characteristics of these cases are detailed in Tables 2 and 3. All lesions were localized along the posterior vaginal wall, predominantly appearing as longitudinal tears with regular margins. Analysis of cases with documented anatomical

**Table 2** Characteristics of Obstetric Rectal Buttonhole Tears (N=43)

Statistics	Age (Years)	Gestational Age (Weeks)	Birth Weight (g)	Laceration Size (cm)
n	36	27	36	39
Median	28	39	3570	3
Range	22–44	36–41	2500–4250	1–6

**Notes:** Data are presented as median (range). Sample sizes (n) differ among variables due to missing data. Total study population: N=43.

**Table 3** Characteristics of Obstetric Rectal Buttonhole Tears and Their Management (N=43)

Characteristics	n	Percentage (%)
<b>Parity (n=36)</b>		
1	28	77.8
2	8	22.2
<b>Episiotomy</b>		
Lateral	20	46.5
Midline	3	7.0
None	20	46.5
<b>Timing of Laceration Detection</b>		
Immediately postpartum	25	58.1
Second stage of labor	15	34.9
Delayed diagnosis	3	7.0
<b>Mode of Delivery</b>		
Spontaneous vaginal delivery	25	58.1
Vacuum extraction	8	18.6
Forceps <sup>a</sup>	7	16.3
Breech extraction	2	4.7
Cesarean section <sup>b</sup>	1	2.3
<b>Repair Method</b>		
Three-layer	15	34.9
Two-layer	8	18.6
Multi-layer <sup>c</sup>	7	16.3
Four-layer	6	14.0
Intentional surgical extension <sup>d</sup>	5	11.6
Diverting colostomy	1	2.3
Partial closure with drainage <sup>e</sup>	1	2.3

(Continued)

**Table 3** (Continued).

Characteristics	n	Percentage (%)
<b>Surgical Setting</b> (n=30)		
Theater	20	66.7
Delivery room	10	33.3
<b>Primary Operator</b> (n=31)		
Obstetrician/Gynecologist	22	71.0
Colorectal surgeon	9	29.0
<b>Anesthesia</b> (n=34)		
General	15	44.1
Local	10	29.4
Regional	9	26.5
<b>Outcome</b>		
Complete healing	40	93.0
Wound dehiscence	2	4.7
Rectal hemorrhage	1	2.3

**Notes:** Sample sizes differ among variables due to missing data. <sup>a</sup>This category includes one case involving combined forceps and vacuum use for twin delivery, classified under the forceps group. <sup>b</sup>Cesarean section was performed at full cervical dilation after an obstetric rectal buttonhole tear (ORBT) was detected during the second stage of labor. Despite delivery by cesarean, this case was classified as vaginal delivery-associated ORBT because the tear occurred during the second stage of labor, and the cesarean was performed to prevent exacerbation of the existing laceration. <sup>c</sup>Multi-layer repair refers to a layered closure technique in which the number of layers was not specified in the original reports. <sup>d</sup>Intentional surgical extension for improved exposure, including both extensions to rectal mucosa with intact sphincter (n=2) and complete fourth-degree extensions (n=3). <sup>e</sup>Partial wound closure was performed with strategic openings to facilitate drainage.

location (n=30) revealed that injuries most commonly involved the lower third of the vagina (70.0%, 21/30), followed by the middle third (26.7%, 8/30) and upper third (3.3%, 1/30). Concomitant anal sphincter injury occurred in 11.6% (5/43) of cases.

### Surgical Technique

Primary layered repair was performed in 81.4% (35/43) of cases, including one patient who underwent repair following resuscitation from shock and amniotic fluid embolism. Delayed secondary layered repair was performed in 2.3% (1/43) of cases three months after initial late diagnosis.<sup>35</sup> In another case (2.3%), a missed isolated rectal mucosa tear identified on postpartum day 6 necessitated management with diverting colostomy and subsequent layered repair.<sup>23</sup> One patient who underwent intentional partial closure with partial wound opening for drainage developed wound dehiscence on postoperative day 4.<sup>24</sup>

Analysis of rectal mucosa closure techniques (n=27) demonstrated that surgeons employed interrupted sutures in 55.6% (15/27) of cases and continuous sutures in 37.0% (10/27) of cases (including one case of continuous inverting sutures). Subcuticular sutures were used in 7.4% (2/27) of cases. Preferred suture materials included polyglactin 910 in sizes 1–0, 2–0, or 3–0 (55.2%, 16/29), with alternatives including poliglecaprone 25 (Monocryl, Ethicon), polyglycolic acid (Dexon, Covidien, Mansfield, MA, USA), polydioxanone (PDS, Ethicon), and glycomer 631 (Biosyn, Covidien).

Vaginal epithelium closure utilized continuous sutures in 76.2% (16/21) and interrupted sutures in 23.8% (5/21) of cases, with polyglactin 910 as the predominant material (56.0%, 14/25). For rectovaginal fascia repair (n=17), surgeons employed interrupted absorbable sutures in 52.9% (9/17), continuous sutures in 41.2% (7/17), and vertical mattress sutures in 5.9% (1/17) of cases. Suture materials included polyglactin 910 (44.4%, 8/18), polydioxanone (16.7%, 3/18), and other materials.

## Postoperative Management

Documentation of dietary management was available for 26 cases. Low-residue and/or high-fluid diets were prescribed in 57.7% (15/26) of patients for durations ranging from 2 days to 1 month. Complete bowel rest (NPO) was maintained in 30.8% (8/26) of cases, typically for 2–7 days or until restoration of bowel function. Regular diet (7.7%, 2/26) and semi-fluid diet (3.8%, 1/26) were less frequently prescribed.

Laxative therapy was administered in 72.1% (31/43) of cases. Among the 22 cases with documented laxative agents, lactulose was most frequently prescribed (50.0%, 11/22), followed by mineral oil (22.7%, 5/22), magnesium hydroxide (9.1%, 2/22), combination laxative regimens (9.1%, 2/22), castor oil (4.5%, 1/22), and senna glycosides (4.5%, 1/22).

Prophylactic antibiotics were administered in 86.0% (37/43) of cases. Among the 19 cases with documented antibiotic regimens, cephalosporin plus metronidazole was most frequently prescribed (42.1%, 8/19), followed by amoxicillin/clavulanic acid, gentamicin plus clindamycin, and mezlocillin plus ornidazole (10.5%, 2/19 each, respectively). Metronidazole was included in 52.6% (10/19) of prophylactic regimens. Antibiotic prophylaxis duration ranged from a single-perioperative dose to 14 days, with a median of 5 days.

Postoperative analgesics were documented in only 11.6% (5/43) of patients, with paracetamol administered either as monotherapy or in combination with ibuprofen. Among 22 patients with documented postoperative discharge dates, the median postoperative hospital stay was 5 days (range: 2–14 days). The majority of patients (72.7%, 16/22) were discharged following restoration of normal bowel function, while documentation of defecation status was incomplete in 22.7% (5/22) of cases, and discharge prior to defecation occurred in 4.5% (1/22) of cases. This latter patient subsequently developed rectal hemorrhage following the first postoperative defecation.<sup>19</sup>

## Outcomes and Follow-Up

Follow-up intervals ranged from 1 week to 1 year. Digital rectal examination served as the primary assessment modality, while proctoscopy and endoanal ultrasonography were infrequently utilized. Wound complications developed in 4.7% (2/43) of patients, comprising one case of wound dehiscence on postoperative day 4 and one case of RVF on postoperative day 27.<sup>4,24</sup> Additionally, one patient experienced rectal hemorrhage following the first postoperative defecation after discharge, which resolved with conservative management without progression to fistula formation.<sup>19</sup>

## Discussion

ORBT, defined as isolated full-thickness lacerations of the rectal mucosa and vaginal epithelium with preservation of the anal sphincter complex, represents a rare but serious complication of vaginal delivery.<sup>1</sup> The true incidence is likely underestimated due to challenges in diagnosis, misclassification, and inconsistent reporting systems, as most available epidemiological data are derived from retrospective case series rather than population-based studies.<sup>7</sup> Delayed recognition or suboptimal repair can lead to devastating complications including RVF formation and fecal incontinence, conditions associated with substantial physical morbidity and adverse psychological outcomes.<sup>38</sup> These potential sequelae emphasize the critical importance of prompt identification, implementation of evidence-based surgical techniques, and comprehensive postoperative management protocols.<sup>1</sup> Considering the complex nature of ORBT and the significant risk of adverse outcomes, we propose a structured management protocol (Table 4) designed to optimize patient care, establish consistent treatment approaches, facilitate effective interdisciplinary communication, and minimize complication rates.

## Clinical Features and Pathophysiological Mechanisms

In our pooled analysis of 43 cases, ORBTs predominantly involved the mid-to-distal vaginal segment (96.7% of cases). The characteristic injury pattern consisted of well-demarcated, longitudinal lacerations of the anterior rectal wall with full-thickness involvement of the rectal mucosa, muscularis, and vaginal epithelium. These lacerations were relatively small (median length: 3 cm; range: 1–6 cm) and associated with minimal intraoperative hemorrhage. The consistent anatomical location and these distinct morphological features facilitate transvaginal layered repair, making this approach the optimal reconstructive technique for primary repair of these injuries.<sup>1,3</sup>

**Table 4** Structured Management Protocol for Obstetric Rectal Buttonhole Tears

Management Phase	Key Recommendations
Diagnosis	Mandatory postpartum rectal exam. Consult senior surgeon if suspected.
Pre-op Assessment	Examination under anesthesia. Stabilize hemodynamics. Exclude sphincter injury.
Pre-op Preparation	Informed consent. Povidone-iodine irrigation. Foley catheter. Abx: Ceph + Metro. Delay repair if hemodynamically unstable; otherwise, delay for 8–12 h for senior surgeon. OR under GA/regional anesthesia.
Surgical Repair	Identify tear margins. Transvaginal layered closure: Rectal mucosa: 3–0 Vicryl*/Monocryl†, interrupted/continuous; Rectal muscularis: 3–0 Vicryl*, interrupted/continuous; Rectovaginal fascia: 2–0/3-0 Vicryl*/PDS‡, interrupted/continuous; Vaginal epithelium: 2–0/3-0 Vicryl*, continuous. Post-repair rectal exam.
Post-op Care	Bowel regimen: low-residue/high-fluid diet, and laxatives for 7–10 d. Abx: Ceph + Metro for 5 d. Analgesia: NSAIDs or acetaminophen. Monitor for infection, dehiscence, and fistula.
Discharge & Education	After normal bowel function. Fiber, hydration, and laxatives. No intercourse for 2–3 mo. Seek care for pain, incontinence, or dyspareunia.
Follow-up	Visits: 2wk, 6wk, and 3mo. Weekly phone check. Gentle rectal exam at visits.

**Notes:** Suture Types: \*Polyglactin 910; †Poliglecaprone 25; ‡Polydioxanone.

**Abbreviations:** Pre-op, preoperative; Abx, antibiotics; Ceph, cephalosporin; Metro, metronidazole; GA, general anesthesia; Post-op, postoperative; d, days; NSAIDs, nonsteroidal anti-inflammatory drugs; mo, months; wk, weeks.

In contrast to OASIS, ORBTs typically present as anatomically distinct entities. Whereas OASIS involves direct compromise of the anal sphincter complex, ORBTs predominantly manifest as isolated rectal injuries: our analysis revealed concomitant sphincter involvement in only 11.6% of ORBT cases. The majority of ORBTs occurred as localized lacerations in the lower vaginal region adjacent to an intact anal sphincter complex, with either completely preserved or minimally disrupted perineal tissue.<sup>7</sup> Temporally, these injuries also demonstrated distinct patterns; OASIS typically arises during the expulsive phase as the fetal head distends the perineum, whereas 34.9% of ORBTs occurred during the active second stage of labor prior to fetal crowning. This observed anatomical and temporal divergence suggests fundamentally different pathophysiological mechanisms underlying these two obstetric traumas.

The etiology of ORBTs likely involves excessive mechanical distension of the rectovaginal septum beyond its elastic threshold, resulting in isolated full-thickness rectal wall disruption without concomitant perineal or sphincter compromise.<sup>13,16,39</sup> This proposed mechanism aligns with both the published literature and our institutional experience of three cases in which rapid fetal descent occurred in the context of obstetrical interventions (forceps-assisted delivery, manual fundal pressure) or precipitous labor. Conversely, OASIS typically develops through progressive tears that extend upward from the perineal body toward the rectovaginal septum.<sup>21</sup> Understanding these mechanistic differences facilitates more precise identification of at-risk populations and enables the development of targeted preventive strategies specific to each type of obstetric injury.

## Risk Factors and Preventive Measures

Primiparity represented the predominant demographic factor (77.8%) among ORBT patients in this aggregate case series. Lateral episiotomy was present in 46.5% of cases and midline episiotomy in 7.0%. ORBT occurred following spontaneous vaginal delivery (58.1%), operative vaginal delivery (34.9%), with median neonatal weight of 3570 g (range: 2500–4250 g). These findings suggest ORBT can occur irrespective of delivery mode, fetal weight, or episiotomy status, while the limited sample size precludes definitive statistical analysis.

The pathophysiological mechanisms suggest mechanical stress to the rectovaginal septum during rapid fetal descent as the primary etiological factor.<sup>13</sup> Conditions precipitating accelerated fetal descent—operative vaginal delivery (particularly forceps),<sup>4,7,13,15,18,27</sup> fundal pressure application,<sup>11</sup> and precipitous labor<sup>3,13,18,21</sup>—create shearing forces that exceed the biomechanical tolerance of vaginal and rectal tissues, leading to subsequent full-thickness tears. This mechanism was observed in all three institutional cases. Fetal malposition, particularly persistent occiput posterior position<sup>4,15</sup> and compound presentations,<sup>2,13,14,17</sup> further increases mechanical stress by enlarging the presenting diameter traversing the birth canal.

Maternal tissue vulnerability contributes significantly to ORBT risk. The predominance of primiparity likely reflects reduced elasticity and compliance of primigravid tissues during their first exposure to significant mechanical distension.

Previous vaginal surgery or trauma<sup>15</sup> increases susceptibility through fibrotic tissue remodeling, diminishing the normal viscoelastic properties of the posterior vaginal wall. Endometriosis involving the deep posterior vaginal wall represents another risk factor through chronic inflammation, fibrosis, and aberrant neovascularization, compromising tissue integrity and elastic properties.<sup>21</sup>

Prevention strategies should focus primarily on controlled fetal descent.<sup>13</sup> Clinicians should avoid fundal pressure<sup>11,32</sup> and limit instrumental deliveries to cases with clear indications, optimal fetal position, and sufficient operator expertise. When operative delivery is necessary, controlled traction and careful technique are essential to avoid trapping vaginal tissue under instruments.<sup>27</sup> Comprehensive post-delivery examination of the vaginal canal is critical, as undetected ORBT significantly increases the risk of fistula formation and fecal incontinence.<sup>22,23,35</sup>

## Repair Strategies

### Preoperative Assessment

Complete ORBT assessment necessitates examination under anesthesia by an experienced surgeon.<sup>40</sup> In cases of diagnostic uncertainty, consultation with a second experienced examiner is warranted.<sup>41,42</sup> Systematic preoperative evaluation significantly reduces perioperative morbidity, particularly in emergency settings. We propose a structured three-phase assessment protocol:

- (1) Initial Stabilization Assessment: Rapid evaluation of hemodynamic parameters and quantification of hemorrhage to determine surgical urgency and guide resuscitation strategies;<sup>19,43</sup>
- (2) Physiologic Optimization: Correction of fluid, electrolyte, hypoglycemia, hypothermia and hematologic derangements to mitigate perioperative complications;<sup>22,44</sup> and (3) Comprehensive Injury Characterization: Methodical documentation of predisposing factors, concomitant injuries, time interval from injury to diagnosis, objective sphincter integrity, visualization of wound, and evaluation of tissue viability.<sup>43,45</sup>

Surgical intervention should be postponed in hemodynamically unstable patients; prerequisites include adequate volume resuscitation and physiologic stabilization.<sup>19</sup> Re-evaluation by an experienced surgeon and confirmation of tissue viability are essential determinants for optimal timing of definitive repair.<sup>16,44,46</sup> Exclusion of OASIS during comprehensive assessment is critical, as 71.5% of undiagnosed cases progress to moderate fecal incontinence.<sup>38,47</sup> Meticulous preoperative evaluation represents a fundamental component in optimizing long-term functional outcomes.<sup>48</sup>

### Preoperative Preparation

Informed consent must be obtained prior to the procedure. The discussion should include the proposed surgical technique, potential alternatives (including colostomy), expected outcomes, and possible complications.

As ORBT typically occurs without prior bowel preparation, the rectal and vaginal laceration sites should be irrigated with povidone-iodine solution (or chlorhexidine for patients with iodine hypersensitivity) to reduce infection risk.<sup>41</sup> A Foley catheter is inserted preoperatively for bladder drainage and maintained for 12–24 hours postoperatively. Prior to catheter removal, bladder function must be assessed through a voiding trial,<sup>45</sup> as micturition may be compromised by postoperative anesthesia, pain, and perineal edema.<sup>40</sup>

Prophylactic antibiotics are administered at the time of laceration repair.<sup>45</sup> The regimen typically consists of a single dose of a first- or second-generation cephalosporin (eg, cefotetan or cefoxitin) combined with metronidazole to provide coverage against vaginal and enteric flora.<sup>49</sup> For patients with severe penicillin allergy, gentamicin and clindamycin are recommended.<sup>41</sup> Intraoperative redosing of cephalosporins is indicated for procedures exceeding 3 hours or involving substantial blood loss. Metronidazole should be redosed after 8 hours if required.<sup>48</sup>

Povidone-iodine-saturated gauze is inserted at the tear apex within both the rectal and vaginal lumens to minimize uterine bleeding into the surgical field, enhance visualization, and prevent inadvertent incorporation of the posterior rectal wall during suturing.<sup>11</sup>

## Surgical Setting and Anesthesia

This aggregate case series analysis demonstrated that two-thirds of ORBT repairs were performed in operating rooms. This practice aligns with current recommendations for OASIS, which advocate for repairs in operating rooms to ensure optimal anesthesia and surgical resources necessary for comprehensive repair.<sup>42,45</sup> Adequate visualization is essential for detailed assessment and effective sphincter reconstruction, which is achieved through dorsal lithotomy positioning following anesthesia administration.<sup>6,40,50</sup> Proper illumination and positioning are required to identify the full extent of the injury. However, several guidelines acknowledge that under specific circumstances—including adequate sterile conditions, sufficient lighting, and expert consultation—repairs may be conducted in the delivery suite, particularly when operating room transfer is not feasible.<sup>40,50</sup> This clinical practice variation is reflected in the study population, with one-third of patients undergoing repair in the delivery suite.

General and regional anesthesia were the preferred methods for ORBT repair.<sup>6,40</sup> These anesthetic techniques provide multiple advantages: they ensure adequate analgesia, facilitate optimal patient positioning in dorsal lithotomy, promote sphincter relaxation necessary for thorough examination, and enable precise tissue reconstruction. In contrast, local anesthesia alone is generally considered insufficient for comprehensive repair and is therefore restricted to carefully selected cases with limited tissue disruption.<sup>41,42</sup>

## Surgeon Competence

ORBT repairs should be performed by the most experienced available surgeon, who must possess expertise in pelvic anatomy and reconstruction techniques, irrespective of specialty background.<sup>6,41,42</sup> However, proficiency in perineal trauma management remains suboptimal across specialties. Studies demonstrate that a substantial proportion of obstetric consultants and trainees misclassify OASIS severity, increasing the risk of inadequate management.<sup>51</sup> Similarly, most colorectal surgeons are seldom involved in acute OASIS repairs, with few possessing direct experience in such cases.<sup>50</sup> Furthermore, some persist in advocating defunctioning stomas in acute settings despite contrary evidence.<sup>52</sup>

Insufficient surgeon experience, inappropriate suture choice, and suboptimal repair technique are recognized risk factors for wound complications following OASIS repair.<sup>41</sup> Therefore, for hemodynamically stable patients, delaying repair for 8–12 hours to facilitate specialist involvement is deemed safe and does not increase complication risks.<sup>1,40,42,51</sup> When local expertise is unavailable, prompt referral to a specialized center should be prioritized.<sup>5,13</sup> Prophylactic antibiotic administration, such as cephalosporins with metronidazole, during the waiting period can help reduce infection risk.<sup>53</sup> Strategic deferment of repair to enable management by experienced surgeons has been associated with superior outcomes compared with immediate intervention by less experienced clinicians.<sup>54</sup>

Structured educational interventions have demonstrably reduced complication rates associated with severe perineal laceration repair procedures. Notably, simulation-based training encompassing perineal trauma classification, pelvic anatomical structures, and reconstructive techniques has demonstrated superior efficacy in improving clinical outcomes.<sup>55</sup>

## General Principles for Repair

Management of ORBT adheres to several fundamental principles: meticulous exposure of the injury site, precise anatomical reconstruction, timely intervention, and multidisciplinary collaboration for complex presentations.<sup>45</sup>

Achieving adequate visualization of both proximal and distal tissue margins is imperative and typically necessitates meticulous dissection to ensure complete exposure.<sup>6,50</sup> Multilayered anatomical reconstruction is the gold standard for restoring function and structure, ensuring precise approximation of all planes (rectal mucosa, muscular layer, rectovaginal fascia, and vaginal epithelium).<sup>39</sup> Inadequate approximation significantly increases rectovaginal fistula risk, as demonstrated in clinical series.<sup>24,56</sup> This layered approach optimally distributes tension and isolates tissue planes to prevent postoperative fistulization. In the presence of concomitant OASIS, the sphincter complex should be repaired as a separate layer.<sup>6</sup> Post-repair rectal examination is recommended to exclude missed mucosal defects.

Timely primary repair typically reduces the risk of long-term complications and psychological distress.<sup>8,10,16,23</sup> In contrast, secondary repairs are associated with poorer outcomes, primarily due to scarring and sphincter dysfunction, which frequently impede restoration of continence.<sup>57</sup>

For cases with delayed diagnosis or wound dehiscence, tissue viability should be prioritized over rigid adherence to treatment timelines.<sup>58</sup> Possible management strategies include primary repair, early secondary repair, delayed reconstruction, or fecal diversion, with the optimal approach ideally determined through multidisciplinary consultation.<sup>3,16,22,23,59</sup>

### Repair Approach

All cases in this combined analysis underwent repair via the transvaginal approach, consistent with contemporary literature establishing this as the preferred surgical technique for ORBT.<sup>1</sup> This approach confers superior anatomical access to the injury site compared with alternative surgical routes. The transvaginal route facilitates optimal visualization of the wound apex and precise identification of tissue planes, thereby enabling meticulous multilayered anatomical reconstruction. When clinically warranted, concurrent perineal body reconstruction and sphincteroplasty can be performed during the same operative intervention.<sup>60</sup> Among practitioners in obstetrics and gynecology, this approach effectively leverages domain-specific expertise and demonstrates association with favorable long-term functional outcomes.<sup>61</sup>

The transabdominal approach is indicated for extensive injuries, compromised visualization, or suspected intraperitoneal involvement. A colostomy is very rarely indicated but warrants consideration in scenarios involving gross contamination, peritonitis, high buttonhole tears (>7 cm from the anal verge), extended fourth-degree tears, or concomitant intra-abdominal injuries, as this intervention mitigates the risk of wound dehiscence.<sup>1,6,9</sup> Multidisciplinary collaboration enhances the management of complex cases, thereby optimizing clinical outcomes and reducing complication rates.

### Primary Layered Closure

This comprehensive review of 43 cases demonstrated that primary layered repair was the predominant technique for ORBT (81.4%). Regardless of the number of closure layers, when precise anatomical tissue approximation was achieved, cases typically resulted in favorable outcomes. Only one case (2.9%, 1/35) developed postoperative wound dehiscence and RVF complication.

Various layered closure techniques are employed in ORBT repair. The two-layer technique involves separate closure of the anterior rectal and posterior vaginal walls, typically utilized when the rectovaginal fascia cannot be identified.<sup>3,5,10</sup> The three-layer technique incorporates additional closure of the rectovaginal fascia,<sup>1,9</sup> while the four-layer approach further distinguishes and includes the rectal muscularis as a separate layer.<sup>22</sup>

The rectovaginal fascia offers significant structural reinforcement, potentially reducing the risk of wound dehiscence.<sup>11</sup> Evidence derived from RVF repair indicates that separate approximation of this fascial layer may improve healing outcomes.<sup>56</sup> However, when the fascia cannot be clearly delineated, a two-layer closure technique represents an acceptable alternative approach.<sup>4,10</sup>

The American College of Obstetricians and Gynecologists recommends meticulous approximation of the rectal muscular layer with 3–0 polyglactin sutures in either continuous or interrupted technique for repair of obstetric anal sphincter injuries.<sup>62</sup> Anatomically, the internal anal sphincter (IAS) - formed by thickened distal circular smooth muscle - contributes substantially to resting anal pressure.<sup>45,63</sup> When identifiable, the IAS should be repaired either as a reinforced distal layer or as a distinct layer,<sup>45</sup> as separate IAS repair demonstrably reduces complications following OASIS.<sup>6</sup> Our clinical outcomes align with existing evidence supporting the utility of separate rectal muscular layer repair in ORBT management.

Although optimal closure techniques for ORBT remain incompletely characterized, an individualized, anatomically-based layered closure approach tailored to intraoperative findings consistently correlates with favorable outcomes.

### Comparative Analysis of Surgical Techniques

Given the scarcity of ORBT, there is currently no standardized management protocol, and surgical techniques vary considerably. A thorough evaluation of the advantages and limitations of each technique is essential for informed clinical decision-making. As the largest case series on this topic to date, this study provides valuable insights to guide surgical management, despite its retrospective design.

Among the 43 cases (Table 3), surgical techniques included layered closure (35 primary, 1 secondary), intentional surgical extension (n=5), diverting colostomy (n=1), and partial closure with drainage (n=1). Postoperative wound dehiscence and RVF occurred in two cases (4.7%): one after primary layered closure and one following partial closure with drainage.

Given the limited sample size, heterogeneity in techniques, and non-randomized study design, formal comparative statistical analysis (eg, hypothesis testing or multivariable regression) was not performed. Descriptive comparisons indicated a wound dehiscence and RVF rate of 2.9% (1/35) for primary layered closure, while the single case managed with partial closure and drainage developed this complication. No instances were reported following intentional extension or colostomy; however, the very small number of cases in these groups precludes any definitive conclusions.

These apparent differences must be interpreted with extreme caution due to substantial confounding by indication, selection bias, and the lack of adjustment for critical variables such as tear severity, timing of repair (from injury to surgical intervention), and surgical expertise. Furthermore, the absence of standardized data on key obstetric rectal injury outcomes—including operative duration, functional outcomes (eg, anal continence), and patient-reported measures (eg, pain, quality of life, and sexual function)—precludes robust comparative inference. Importantly, the generalizability of these findings is limited by the small sample size (n=43) and potential publication bias inherent in case series-derived data.

Within these limitations, the outcomes observed here suggest that primary layered repair may be associated with a low rate of major complications.<sup>4</sup> This technique is supported by several recent studies, including Tunney (2023) and Ngene (2023), which reported satisfactory outcomes following meticulous primary layered closure with adequate tissue interposition.<sup>5,7</sup> The approach aims to restore anatomical continuity and reinforce tissue planes to withstand mechanical stress during defecation, while minimizing iatrogenic injury.<sup>7,39</sup> However, the procedure is technically demanding and requires expertise in identifying and approximating tissue planes within often compromised anatomy. Schmidt (2024) recently emphasized that inadequate surgical experience is a significant risk factor for postoperative failure.<sup>41</sup>

Intentional extension of the tear—whether by extending an episiotomy or a second-degree tear—has been used in selected cases to improve exposure and facilitate repair under direct vision.<sup>13,14</sup> While improved visualization is a perceived advantage, a major drawback is the conversion of a sphincter-sparing injury into a full-thickness defect, which carries a substantial risk of anal incontinence.<sup>1,57</sup> Therefore, this approach should be reserved for highly selected cases where exposure is severely limited and a layered repair is otherwise not feasible.<sup>4,9</sup>

Diverting colostomy is generally reserved for salvage situations, such as severe contamination, delayed diagnosis, or extensive tissue loss. In the present series, one case with a missed tear eventually required fecal diversion.<sup>23</sup> The principal advantage of this approach is the complete diversion of the fecal stream, thereby mitigating mechanical stress on the repair site.<sup>4,6</sup> However, stoma-related morbidity, the need for subsequent reversal surgery, and impacts on quality of life represent significant disadvantages. The decision to proceed with diversion should be made in consultation with both the patient and a colorectal surgery specialist.

Partial closure with drainage was attempted in one case but resulted in wound breakdown,<sup>24</sup> underscoring its limited utility in the context of acute obstetric tear. Derived from management algorithms for high-energy rectal destructive trauma, this technique essentially creates a controlled fistula and is not recommended for fresh, well-vascularized ORBTs.<sup>3,7,43,46</sup>

In summary, while primary layered closure is associated with favorable outcomes in most cases, no single technique is universally applicable. Surgical management should be individualized based on injury characteristics, tissue conditions, surgical expertise, and patient preferences.

## Technical Steps for Layered Repair

### Initial Assessment and Exposure

Precise identification of both proximal and distal tear margins constitutes a critical prerequisite to suture placement.<sup>6</sup> In cases where direct visualization of the apical defect proves challenging, methodical dissection to mobilize the rectum from adjacent anatomical structures facilitates optimal exposure.<sup>22</sup>

### Systematic Closure Sequence

Repair necessitates a sequential, layer-by-layer reconstruction proceeding from deep to superficial planes.<sup>41</sup> The repair sequence commences with approximation of the rectal mucosa and muscularis layers, followed by restoration of rectovaginal fascial integrity, and culminates with closure of the vaginal epithelium.<sup>20–22</sup>

### Post-Repair Assessment

Following completion of the layered closure, a thorough digital rectal examination is mandatory. This critical verification step serves multiple purposes: confirmation of repair integrity, detection of potential defects or inadvertently missed sutures, and assessment of appropriate anatomical restoration.

### Suture Selection Considerations

Selection of appropriate suture materials necessitates balancing minimal tissue reactivity with sufficient tensile strength throughout the healing process.<sup>41</sup> Contemporary evidence strongly supports the utilization of synthetic absorbable sutures across all tissue planes,<sup>39</sup> with polyglactin 910 emerging as the predominant choice for ORBT repair.<sup>1,4,40</sup> The findings from this aggregate case series analysis corroborate these evidence-based recommendations.

### Rectal Mucosa Repair

For rectal mucosal approximation, synthetic absorbable sutures, specifically 3–0 polyglactin 910 or poliglecaprone 25, constitute the preferred materials in contemporary practice.<sup>40</sup> Both interrupted and continuous non-locking techniques are acceptable.<sup>41,50</sup> However, extended-absorption monofilament sutures such as polydioxanone warrant avoidance due to their association with persistent local discomfort during the prolonged degradation period.<sup>42</sup> Regarding knot placement, either intraluminal or extraluminal positioning remains acceptable according to surgeon preference and anatomical considerations.<sup>1</sup>

Mucosal layer closure necessitates initiation at a minimum distance of 1 cm proximal to the tear apex, as inadequate approximation at this critical juncture significantly increases the risk of postoperative RVF development.<sup>40</sup> This technical principle represents a crucial determinant of successful repair outcomes.

ORBT predominantly manifests in the distal vaginal segment in proximity to the anal sphincter complex. Extension of the injury into the subsphincteric plane, if inadequately addressed during primary repair, potentially results in anovaginal fistula formation. Therefore, methodical dissection and comprehensive exposure of the sphincteric region constitute essential procedural elements to facilitate complete identification and meticulous reconstruction of all compromised tissue planes.

While a subcuticular repair for rectal mucosal approximation via the transvaginal approach have been described,<sup>62</sup> significant technical limitations have been identified. This technical vulnerability was objectively demonstrated in our institutional experience, wherein running subcuticular closure exhibited intraoperative failure secondary to inherent attenuated rectal mucosal tissue support.

Our clinical observations in OASIS management align with Sultan's seminal findings regarding anorectal mucosa repair principles.<sup>6</sup> Sultan demonstrated that subcuticular approximation provides inadequate structural integrity to withstand the mechanical forces exerted during fecal passage, particularly during defecatory distension. This structural insufficiency is attributable to the minimal thickness of the epithelium (< 1 mm) and its direct adherence to the IAS, creating an anatomical challenge for non-penetrating anorectal mucosa repair techniques.

Consequently, full-thickness interrupted or running non-locking mucosal approximation represents the recommended technical standard to achieve optimal repair integrity and durability.<sup>40,41,50,62</sup> This approach facilitates comprehensive tissue incorporation, enhancing mechanical stability of the repair and minimizing dehiscence risk in the anatomically challenging anorectal junction.

### Rectovaginal Fascial Repair

This combined analysis revealed interrupted (52.9%) and continuous (41.2%) suturing techniques for rectovaginal fascia repair, using polyglactin 910 or polydioxanone to reduce RVF risk. These findings align with evidence-based

recommendations for fascial layer reconstruction.<sup>6</sup> Current literature supports using 2–0 or 3–0 polyglactin 910,<sup>41</sup> with polydioxanone as a suitable alternative.<sup>4,6,7</sup>

### Vaginal Epithelium Repair

Continuous non-locking suture technique with 2–0 or 3–0 polyglactin 910 was predominantly used for vaginal epithelium repair (76.2%), consistent with current OASIS management guidelines.<sup>50</sup> This technique offers significant advantages including reduced postoperative pain, decreased analgesic requirements, and elimination of suture removal needs compared to interrupted methods.<sup>39,40</sup>

## Postoperative Management

### Pain Management

Current guidelines strongly recommend scheduled administration of NSAIDs and acetaminophen as first-line therapy for postoperative pain following perineal repair.<sup>50,64</sup> This regimen provides effective analgesia without impairing bowel motility, thereby supporting patient comfort, early mobilization, and promoting primary wound healing. Adjuncts including local cool packs and topical anesthetics further enhance pain relief.<sup>41,45</sup> Scheduled dosing for the first 24–48 hours is recommended. Inadequate pain control is not merely a comfort issue; it increases the risk of defecatory avoidance, constipation, elevated sphincteric pressure during straining, and impaired tissue healing—all of which may jeopardize repair integrity and contribute to complications such as wound dehiscence or fistula formation.<sup>1</sup> Notably, rectal suppositories are contraindicated due to the risk of mechanical disruption of the repair, and opioids are discouraged owing to their constipating effects and potential to increase anastomotic tension.<sup>40</sup>

Despite these clear recommendations, our pooled analysis of 43 cases revealed that only 11.6% of patients were documented to have received any form of analgesic regimen. This striking gap underscores a critical and alarming disparity between evidence-based guidelines and real-world clinical practice. The profound undertreatment of pain in ORBT patients highlights systemic deficiencies in perioperative awareness, protocol implementation, and individualized patient care planning.

To address these deficiencies, we emphatically recommend the following: (1) The development and adoption of standardized, procedure-specific analgesic protocols within obstetric units, which mandate scheduled around-the-clock non-opioid analgesia for at least the first 48 hours post-repair; (2) Structured education and training programs for maternity care providers to reinforce the importance of proactive pain management, not only for patient comfort but also as a critical determinant of surgical success; (3) Regular audit and feedback on pain management outcomes as part of quality improvement initiatives in perinatal care.

Bridging this practice gap is essential to improving both short-term recovery and long-term functional outcomes for women sustaining these severe childbirth injuries.

### Antibiotic Prophylaxis

Prophylactic antibiotics significantly reduce perineal wound infection rates in childbirth-related perineal trauma.<sup>65</sup> Given infection risks in ORBT comparable to colorectal surgery and OASIS, broad-spectrum antibiotics—typically cephalosporin with metronidazole—are recommended to prevent infection and RVF formation.<sup>48,50</sup> Per OASIS guidelines, intraoperative prophylaxis suffices for most cases, while extended regimens (up to 5 days) are reserved for high-risk cases such as those with rectal mucosal involvement requiring emergency repair.<sup>50</sup> Our aggregate case series observed a median antibiotic duration of 5 days. Given the elevated infection risk in ORBT patients, particularly with complex lacerations, adherence to extended OASIS protocols covering both aerobic and anaerobic pathogens is advised.

### Dietary Management

This aggregate analysis of case series reveals significant heterogeneity in postoperative dietary management following ORBT repair, underscoring a notable lack of standardized protocols. Among the cases reviewed, 57.7% (15/26) of patients were prescribed a low-residue and/or high-fluid diet, while 30.8% (8/26) were maintained on complete bowel rest (NPO)—often supplemented with bowel-suppressing agents. This variability highlights substantial deficiencies in current clinical guidance and reflects an alarming absence of evidence-based consensus.

Although current OASIS guidelines provide no specific dietary recommendations,<sup>1,50,53,62</sup> the Royal Women's Hospital, for instance, recommends a 7- to 10-day low-residue diet to reduce mechanical stress on the repaired site.<sup>64</sup> Nonetheless, the prevalent adoption of highly restrictive measures, including prolonged nil-by-mouth regimens, appears to stem more from empirical caution regarding early defecation and potential repair compromise than from robust clinical evidence.<sup>66,67</sup> Such practices may unnecessarily prolong recovery, increase the risk of malnutrition, and contribute to patient discomfort, all without proven benefits for wound integrity.

In contrast, Enhanced Recovery After Surgery (ERAS) protocols and several randomized trials support the safety and benefit of early enteral nutrition, showing no increase in complications while significantly improving recovery outcomes.<sup>67,68</sup>

A pragmatic approach—adopting a low-residue and high-fluid diet for 7–10 days—strikes a reasonable balance between safeguarding the repair and supporting metabolic and nutritional needs.<sup>40,64</sup> Nevertheless, the persistence of non-evidence-based practices underscores an urgent need for more explicit, consensus-driven dietary guidelines tailored to ORBT recovery.

### Laxative Use

In this comprehensive review of 43 cases, laxative therapy was administered in 72.1% of ORBT cases, with lactulose most frequently prescribed, followed by mineral oil and magnesium hydroxide. Given the presence of rectal mucosal lacerations, postoperative laxative use is critical for wound healing by preventing fecal impaction and reducing strain from constipation on the repair site. Despite guideline support for routine laxatives to prevent constipation and reduce wound dehiscence,<sup>1</sup> consensus on agent selection, dosing, and duration remains lacking.<sup>50,69</sup> Recent studies and ERAS protocols support early prophylactic laxative use, which can expedite recovery without increasing complications.<sup>67,70</sup>

Based on current evidence, we recommend first-line osmotic laxatives, such as lactulose or polyethylene glycol, for 7–10 days postoperatively.<sup>50,64,67</sup> Bulk-forming and stimulant laxatives should generally be avoided, and lubricants reserved as adjuncts in select cases, to minimize mechanical stress on the repair site.<sup>41,50,53,71</sup> This structured, prophylactic approach aims to optimize bowel function and protect wound healing during the critical postoperative period.

### Discharge Planning

In this aggregated case series, discharge timing after ORBT repair varied widely. The median postoperative hospitalization was 5 days (range: 2–14 days), with 72.7% of patients discharged following restoration of normal bowel function. Inpatient observation until bowel function returns correlates with fewer complications<sup>19</sup> and enables early detection of adverse events with individualized management.

Crucially, discharge education should address: (1) high-fiber diet and adequate hydration for constipation prevention; (2) continued laxative use titrated to achieve toothpaste-consistency stools; (3) abstaining from intercourse for 2–3 months post-repair, with subsequent guidance on gradual resumption and appropriate lubricant use;<sup>16,22,56</sup> and (4) recognition of warning signs requiring prompt medical attention (persistent pain, fecal or flatal incontinence, dyspareunia). These structured patient instructions are essential to optimize recovery outcomes and minimize post-discharge complications.

### Follow-Up Recommendations

In this comprehensive review of 43 cases, follow-up intervals showed substantial variation, ranging from 1 week to 1 year. Since complications such as wound dehiscence or RVF predominantly manifest during the early postpartum period, structured surveillance is critical for timely intervention.<sup>4,24,62</sup> Irregular monitoring risks delayed complication identification and poorer outcomes.

We recommend scheduled assessments at 2 weeks, 6 weeks, and 3 months postoperatively, supplemented by weekly telephone assessments. Gentle digital rectal examination provides a safe, evidence-based evaluation method.<sup>40,41,72</sup> Referral to multidisciplinary pelvic floor clinics is particularly valuable for high-risk patients, ensuring comprehensive specialized care.<sup>72</sup>

Standardized protocols enhance patient safety, satisfaction, data quality, and future pregnancy counseling while facilitating coordinated care across institutions.

## Management and Counseling for Subsequent Pregnancies

The management of pregnancy following ORBT repair remains challenging due to a significant lack of direct evidence. While no specific studies address the optimal mode of delivery after ORBT repair, insights may be cautiously extrapolated from the literature on other obstetric perineal and anorectal injuries, such as OASIS and RVF. It is important to emphasize that ORBT typically involves an isolated rectal mucosal laceration without significant sphincteric involvement or extensive fibrotic scarring—features that distinguish it from both OASIS and RVF.<sup>56</sup> Therefore, clinical recommendations must be individualized, and extrapolations from other conditions should be made with caution.

Current evidence supports the practice of elective cesarean delivery in women with a history of RVF or OASIS—particularly those with persistent symptoms, abnormal endoanal ultrasonography findings, or manometric abnormalities.<sup>50,73,74</sup> Although vaginal delivery may be considered after thorough assessment in carefully selected cases, this approach carries a recognized risk of recurrence or wound dehiscence.<sup>75</sup> Given the distinct anatomical and functional context of ORBT, a tailored approach to delivery planning is essential.

We propose the following management strategy: (1) preconception counseling involving a multidisciplinary team (including obstetricians, colorectal surgeons, and specialized midwives) to discuss potential risks such as recurrence, dehiscence, or fistula formation;<sup>75</sup> (2) antepartum assessment incorporating evaluation of bowel function, symptomatic sequelae, estimated fetal weight, and endoanal ultrasonography;<sup>73</sup> (3) elective cesarean delivery as the preferred mode of delivery, especially in women with persistent fecal incontinence, abnormal endoanal imaging, reduced anorectal pressures on manometry, or suspected fetal macrosomia;<sup>50,53,74</sup> (4) vaginal delivery may be considered only in highly selected cases—where patients have been thoroughly counseled and understand the potential risks—and should be conducted under strict intrapartum monitoring with avoidance of rapid fetal descent, although its safety in this context remains unproven.<sup>53,76</sup>

In summary, until prospective studies provide more robust evidence, a cautious and individualized approach is recommended to minimize maternal and neonatal morbidity in this high-risk population.

## Limitations and Research Implications

This study presents one of the largest reported case series on ORBT, and our literature review offers a comprehensive overview of clinical features, potential pathophysiological mechanisms, risk factors, preventive measures, surgical management, and perioperative care. Nevertheless, several limitations should be acknowledged. The small sample size reflects the rarity of ORBT and restricts the generalizability of our findings. The retrospective, single-center design introduces potential selection and information biases and may not fully represent broader clinical practice. In addition, existing literature is highly heterogeneous, with variable case reporting, management strategies, and follow-up protocols, and is predominantly limited to case reports. Publication bias cannot be excluded, as positive outcomes may be overrepresented.

Future research should prioritize the development of standardized reporting protocols, further investigation of pathophysiological mechanisms, and evaluation of subsequent delivery mode recommendations for patients with previous ORBT. Collaboration through multicenter studies and patient registries is needed to obtain larger and more diverse datasets, enabling prospective analyses. Comparative studies evaluating different management strategies are also warranted. These efforts will support the establishment of evidence-based guidelines and contribute to improved outcomes for this rare obstetric complication.

## Conclusion

This study represents the most comprehensive case review of ORBTs to date, combining a single-center case series with a systematic literature review. Our results demonstrate that ORBT can occur irrespective of delivery mode, fetal weight, or whether an episiotomy was performed, though it is more prevalent among primiparous women. The underlying mechanism likely involves rapid fetal descent and excessive mechanical distension of the rectovaginal septum beyond its elastic limit.

A key finding is the significant heterogeneity in both surgical repair techniques and postoperative management, underscoring the absence of standardized clinical guidelines. The frequently occult presentation of ORBT often results in delayed diagnosis, compounding therapeutic challenges. In response, we have developed an evidence-based management framework to support clinical decision-making.

Successful outcomes depend on timely diagnosis and immediate intervention. We propose a structured protocol that includes: comprehensive preoperative evaluation; meticulous layered repair performed by an experienced surgeon; perioperative antibiotic prophylaxis; standardized postoperative bowel management; and adequate analgesia. Early structured follow-up, preferably in a specialized clinic, is essential to monitor recovery.

This study provides a practical framework to reduce variability in clinical practice and improve patient care. However, the rarity of ORBT highlights the need for prospective, multi-institutional studies to validate these recommendations and optimize long-term outcomes.

## Data Sharing Statement

All available information is included in the manuscript.

## Ethics Statement

Written informed consent was obtained from the patients for publication. The case series have been reviewed and approved by the Ethics Committee of Beijing Daxing Maternal and Child Care Hospital for publication.

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