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Sphincteroplasty for Fecal Incontinence Due to Old OASIS

Tariq Akhtar Khan[1*], Ayesha Rahman[1], S.M. Syeed-Ul-Alam[2], Mohammad Wazibullaha[3], Md. Abdul Mukit[1], Md. Noor Alamin[1], Md. Kamrul Ahsan[1], Md. Nashir Uddin[1], Athkia Maisha[1]

Abstract

Background: Obstetric anal sphincter injuries (OASIS) are an important cause of anal incontinence and may result in persistent fecal incontinence with substantial physical and psychological consequences. Current knowledge suggests that sphincteroplasty is feasible for sphincter gap of less than 120°. Sacral nerve stimulation or an artificial sphincter may be required for gaps greater than 120°. These procedures are more costly, complex, and less widely available than sphincteroplasty. As most OASIS-related sphincter gaps are greater than 120°, this study was conducted to evaluate the outcomes of sphincteroplasty in patients with fecal incontinence due to old OASIS.

Methods: This prospective observational study was conducted at the Department of Colorectal Surgery, Mugda Medical College Hospital, Dhaka, Bangladesh, and several private hospitals in Dhaka city from July 2023 to June 2026. A total of 30 patients with fecal incontinence due to old OASIS were included. Clinical and sphincter defect assessments were performed, followed by double-breasting anterior sphincteroplasty in selected patients. The Cleveland Clinic Fecal Incontinence Score (CCFIS) was assessed before surgery and at 1 and 3 months postoperatively, and the data were analyzed descriptively.

Results: Among 30 patients, the mean age was 37.2 ± 8.2 years, with 56.7% having an OASIS duration of >10 years. Grade 4 OASIS was the most common injury grade (50.0%), and 36.7% had a history of previous repair. Sphincteroplasty was performed in 86.7% of patients, with all operated patients undergoing double-breasting anterior sphincteroplasty. Sphincter gaps of >120°–180° were found in 60.0% of patients, including all patients with Grade 4 OASIS and 3 patients (10.0%) with a history of previous repair. Digital palpation, endoanal ultrasonography (EAUS), and MRI were used in 100.0%, 80.0%, and 60.0% of patients, respectively. Colonoscopy was performed in 63.3% of patients, with colitis/proctitis and polyps detected in 31.6% and 26.3%, respectively. The mean CCFIS decreased from 12.6 preoperatively to 3.0 at 1 month, followed by an increase to 5.6 at 3 months after sphincteroplasty.

Conclusion: Sphincteroplasty is an effective surgical option for improving fecal continence in patients with chronic OASIS-related fecal incontinence.

Keywords: Sphincteroplasty; Fecal Incontinence; Obstetric Anal Sphincter Injuries; OASIS

Introduction

Obstetric anal sphincter injuries (OASIS) are an important maternal health concern, and their reported incidence differs considerably across regions,

Affiliation:

[1]Department of Colorectal Surgery, Mugda Medical College, Dhaka, Bangladesh

[2]Department of Surgery, Bangladesh Medical University, Dhaka, Bangladesh

[3]Department of Colorectal Surgery, Sir Salimullah Medical College Hospital, Dhaka, Bangladesh

***Corresponding author:**

Tariq Akhtar Khan, Department of Colorectal Surgery, Mugda Medical College, Dhaka, Bangladesh

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partly because of variations in obstetric practices, healthcare resources, and awareness. The reported incidence varies from approximately 1% in Nordic countries to as high as 30% in some African regions, with an estimated worldwide average of 11% [1,2]. OASIs occur in approximately 0.5–11% of vaginal deliveries, depending on obstetric practices, and are recognized as a leading cause of fecal incontinence (FI). Several factors have been associated with the occurrence of OASIS, including instrumental delivery, prolonged labor, primiparity, and high birth weight [3-5]. In females, obstetric anal sphincter injuries are the most common cause of anal incontinence, although clinically apparent OASIS occurs in less than 3 percent of vaginal deliveries in developed countries [6]. OASIS may result in considerable maternal morbidity, including perineal pain, dyspareunia, and anal incontinence.

The consequences of OASIS may extend beyond the immediate postpartum period and include substantial physical and psychological effects. Fecal incontinence may develop following these injuries and has been reported in up to 61% of women after repair, with the risk influenced by factors such as injury severity, maternal age, and mode of delivery [7]. Persistent FI symptoms may occur in 20–40% of women despite primary repair, while complications including infection, wound dehiscence, and impaired sphincter function have also been reported [8,9]. In some women, fecal incontinence becomes apparent only several years after the initial obstetric injury, making it difficult to determine whether a primary repair was performed or whether the original injury was occult or remained undiagnosed. When anterior repair of the anal sphincter is undertaken for fecal incontinence months or years after the initial injury, it is considered a secondary sphincter repair, irrespective of whether a direct primary repair was performed during the postpartum period [10]. From a colorectal perspective, secondary overlapping sphincteroplasty is used to address severe sphincter disruptions associated with OASIs; however, suboptimal sphincter function after repair, recurrence of symptoms, and long-term colorectal complications such as rectal prolapse and chronic constipation remain important concerns [11].

Overlapping sphincteroplasty has been established as a major surgical technique for OASIS repair since its introduction by Parks and McPartlin in 1971 [12]. For persistent FI associated with OASIS, secondary overlapping sphincteroplasty is considered a preferred surgical intervention because of its reported functional outcomes compared with end-to-end repair [13,14]. Repair of a damaged external anal sphincter (EAS) can be performed using either end-to-end (approximation) repair or overlap repair [15]. Although sphincteroplasty can provide improvement in continence, reported outcomes vary, with restoration of continence ranging from 50–85% during follow-up periods of 1–10 years, while recurrence of symptoms has been reported in approximately 30–50% of cases [16,17].

Current knowledge suggests that sphincteroplasty is feasible for sphincter gaps of less than 120°. Sacral nerve stimulation or an artificial sphincter may be required for gaps greater than 120°, particularly when there is extensive sphincter disruption or inadequate residual muscle for direct repair. However, defects greater than 120° have commonly been excluded from sphincteroplasty series, and the management of such patients may therefore require alternative treatment strategies [18].

Other treatment approaches, including sacral nerve stimulation and biofeedback, have demonstrated potential benefits, although limitations associated with these therapies indicate the need for further evaluation [19]. Secondary sphincteroplasty is performed in a considerable proportion of women with unresolved FI, emphasizing the importance of evaluating its efficacy and safety and considering long-term outcomes [20]. Despite its use, there remains no consensus regarding the most effective surgical technique for secondary repair of OASIS [21]. Furthermore, the long-term outcomes of surgical interventions, including sphincteroplasty, perineorrhaphy, and transposition of muscle flaps, have been reported as unsatisfactory. Therefore, this study was conducted to evaluate the outcomes of sphincteroplasty in patients with fecal incontinence due to old OASIS.

Objective

- To evaluate the outcomes of sphincteroplasty in patients with fecal incontinence due to old OASIS.

Methodology and Materials

This prospective observational study was conducted at the Department of Colorectal Surgery, Mugda Medical College Hospital, Dhaka, Bangladesh, and selected private hospitals in Dhaka city from July 2023 to June 2026. A total of 30 patients with fecal incontinence due to old obstetric anal sphincter injuries (OASIS) were included based on specific inclusion criteria. The study evaluated the clinical characteristics, extent of sphincter defects, diagnostic assessment, surgical management, and postoperative continence outcomes following sphincteroplasty.

Inclusion Criteria

- Patients with fecal incontinence secondary to old OASIS.
- Patients with documented Sultan grade 3a, 3b, 3c, or grade 4 OASIS.
- Patients with a demonstrable anal sphincter defect on clinical or imaging assessment.
- Patients with persistent fecal incontinence despite previous repair, where applicable.
- Patients with adequate clinical and diagnostic records for evaluation.

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Exclusion Criteria

- Patients with fecal incontinence due to causes other than OASIS.
- Patients with acute or recently sustained OASIS.
- Patients with anorectal malignancy or major structural anorectal disease unrelated to OASIS.
- Patients with neurological disorders causing fecal incontinence.
- Patients with inadequate clinical or diagnostic records.

Clinical Assessment

A detailed clinical history was obtained, including demographic characteristics, duration of OASIS, previous repair history, and severity of fecal incontinence. The Sultan classification was used to grade the obstetric anal sphincter injury. The Cleveland Clinic Fecal Incontinence Score (CCFIS) was recorded before surgery and at one and three months postoperatively.

Assessment of Sphincter Defect

The extent of anal sphincter disruption was assessed by digital rectal examination. Endoanal ultrasonography (EAUS) and magnetic resonance imaging (MRI) were performed where indicated, particularly in patients with a history of perineal tear repair who continued to experience fecal incontinence, to delineate the sphincter defect and assist in surgical planning. The circumferential extent of the sphincter gap was recorded in degrees.

Colonoscopic Assessment

Colonoscopy was performed in selected patients presenting with altered bowel habits to identify associated colorectal pathology, particularly inflammatory or mucosal abnormalities. Patients diagnosed with proctitis or colitis received oral ciprofloxacin, metronidazole, and 5-aminosalicylic acid (5-ASA). Polypectomy or biopsy of polyps was also performed during the same sitting when indicated.

Surgical Procedure

Patients selected for surgical treatment underwent double-breasting anterior sphincteroplasty. The disrupted sphincter ends were identified and mobilized while keeping the fibrous tissue covering the sphincter intact, followed by approximation and overlapping of the sphincter muscle to restore anal sphincter continuity.

Postoperative Follow-up

Patients who underwent sphincteroplasty were followed postoperatively. CCFIS was assessed at 1 month and 3 months after surgery and compared with the preoperative score to evaluate improvement in fecal continence.

Data Collection and Statistical Analysis

Demographic, clinical, diagnostic, surgical, and follow-up data were recorded using a structured data collection format. Continuous variables were expressed as mean ± standard deviation, while categorical variables were presented as frequency and percentage.

Results

Table 1: Demographic and Injury Duration Characteristics of the Study Participants (n = 30).

Category	Characteristic	Frequency (n)	Percentage (%)
Age	20–29 years	5	16.7
	30–39 years	14	46.7
	40–49 years	9	30
	≥50 years	2	6.7
	Mean ± SD (years)	37.2 ± 8.2	
Duration of OASIS	1–5 years	3	10
	6–10 years	10	33.3
	11–15 years	11	36.7
	16–20 years	6	20

The majority of patients were aged 30–39 years (14 patients, 46.7%), followed by those aged 40–49 years (9 patients, 30.0%), 20–29 years (5 patients, 16.7%), and ≥50 years (2 patients, 6.7%), with a mean age of 37.2 ± 8.2 years. Regarding duration of OASIS, 11 patients (36.7%) had an injury duration of 11–15 years, followed by 10 patients (33.3%) with a duration of 6–10 years, 6 patients (20.0%) with a duration of 16–20 years, and 3 patients (10.0%) with a duration of 1–5 years.

Table 2: Distribution of Study Participants According to Sultan's Grade and Previous Repair History (n = 30).

Category	Characteristic	Frequency (n)	Percentage (%)
Sultan's Grade	Grade 3a	3	10
	Grade 3b	5	16.7
	Grade 3c	7	23.3
	Grade 4	15	50
Previous Repair History	Previous repair performed	11	36.7
	No previous repair	19	63.3

Grade 4 OASIS was the most common injury grade, observed in 15 patients (50.0%), followed by grade 3c in 7 patients (23.3%), grade 3b in 5 patients (16.7%), and grade 3a in 3 patients (10.0%). Previous repair had been performed in

11 patients (36.7%), while 19 patients (63.3%) had no history of previous repair. Fecal incontinence persisted among all patients with a history of previous repair.

Table 3: Sphincter Gap Characteristics and Diagnostic Assessment of the Study Participants (n = 30).

Category	Characteristic	Frequency (n)	Percentage (%)
Sphincter Gap	60°–120°	12	40
	>120°–180°	18	60
Diagnostic Assessment	Digital palpation	30	100
	Endoanal ultrasonography	24	80
	MRI	18	60

The sphincter gap ranged from 60° to 180°, with 18 patients (60.0%) having a gap of >120°–180° and 12 patients (40.0%) having a gap of 60°–120°. All patients with Grade 4 OASIS had sphincter gaps of >120°, while 3 patients (10.0%) with a history of previous repair also had gaps >120°. Digital palpation was performed in all patients (30, 100.0%), while endoanal ultrasonography was used in 24 patients (80.0%) and MRI in 18 patients (60.0%).

Table 4: Surgical Management and Colonoscopic Findings Among the Study Participants (n = 30).

Category	Characteristic	Frequency (n)	Percentage (%)
Surgical Management	Underwent sphincteroplasty	26	86.7
	Did not undergo sphincteroplasty	4	13.3
Procedure Among Operated Patients	Double-breasting anterior sphincteroplasty	26	100
Colonoscopic Assessment	Colonoscopy performed	19	63.3
	No colonoscopy	11	36.7
Colonoscopic Findings	Colitis/proctitis present	6	31.6
	Polyp	5	26.3
	No significant abnormality	8	42.1

Sphincteroplasty was performed in 26 patients (86.7%), while 4 patients (13.3%) did not undergo surgery. All operated patients underwent double-breasting anterior sphincteroplasty (26 patients, 100.0%). Colonoscopy was performed in 19 patients (63.3%), among whom 6 patients (31.6%) had colitis/proctitis and 5 patients (26.3%) had polyps, while no significant abnormality was detected in 8 patients (42.1%). Patients with colitis/proctitis were treated with oral ciprofloxacin, metronidazole, and 5-ASA, and polypectomy or biopsy was performed during the same sitting when indicated.

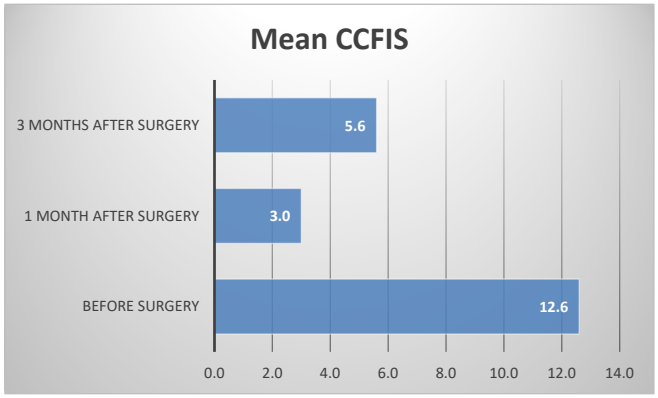


Figure 1: Comparison of Mean CCFIS Before and After Sphincteroplasty (n = 26)

The mean Cleveland Clinic Fecal Incontinence Score (CCFIS) was 12.6 before surgery, which decreased to 3.0 at 1 month after sphincteroplasty and increased to 5.6 at 3 months after surgery.

Discussion

In this prospective observational study patients with fecal incontinence due to old OASIS predominantly had long-standing and higher-grade sphincter injuries, with grade 4 OASIS being the most common. Most patients underwent double-breasting anterior sphincteroplasty, which was associated with substantial improvement in fecal continence as reflected by a marked reduction in mean CCFIS during postoperative follow-up.

The demographic profile of the present study showed a mean age of 37.2 ± 8.2 years, with the largest proportion of patients belonging to the 30–39-year age group (14, 46.7%). This finding was comparable with Haug et al.[22], who reported a median age of approximately 36 years among women undergoing secondary sphincteroplasty for obstetric anal sphincter injury. Haug et al.[22] also reported a symptom duration extending up to 20 years, consistent with the prolonged duration of OASIS observed in the present study, where 17 patients (56.7%) had an injury duration of more than 10 years. Similarly, Johnson et al.[23] reported a mean/median age in the mid-30s among women undergoing secondary sphincteroplasty and found that longer symptom duration was associated with poorer postoperative outcomes. These findings suggest that fecal incontinence following OASIS may persist for many years before definitive surgical management.

The present study demonstrated that grade 4 OASIS was

the most frequent injury, accounting for 15 patients (50.0%), followed by grade 3c in 7 patients (23.3%), grade 3b in 5 patients (16.7%), and grade 3a in 3 patients (10.0%). This distribution differed from that reported by Ramage et al.[24], who included 29 patients with grade 3a, 55 with grade 3b, 77 with grade 3c, and 16 with grade 4 OASIS, with grade 3c being the most common category in their cohort. However, the predominance of higher-grade injuries in the present study was consistent with the findings of Okeahialam et al.[25], whose network meta-analysis of 2,467 women demonstrated that the incidence of anal incontinence increased with increasing injury severity, from 22.4% in grade 3a to 24.9% in grade 3b, 26.8% in grade 3c, and approximately 28.6–32.4% in fourth-degree injuries. They further reported significantly higher odds of anal incontinence among women with grade 3c and fourth-degree injuries compared with grade 3a injuries. The high proportion of grade 4 injuries in the present cohort is therefore consistent with the association between more severe OASIS and subsequent anal incontinence. Previous repair had been performed in 11 patients (36.7%), while 19 patients (63.3%) had no history of previous repair, indicating that a considerable proportion of patients presented for definitive management without previous sphincter repair.

In the present study, the sphincter gap ranged from 60° to 180°, with 18 patients (60.0%) having a defect of >120°–180° and 12 patients (40.0%) having a defect of 60°–120°. This finding was comparable with Topal et al.[26], who reported a median sphincter muscle defect of 91° with a range of 60°–180° among 23 women with obstetric sphincter injury undergoing overlapping sphincteroplasty. Topal et al.[26] also emphasized that a large sphincter defect, particularly >90°, is an important parameter in selecting patients for sphincteroplasty. In the present study, digital palpation was performed in all patients (30, 100.0%), while endoanal ultrasonography (EAUS) was performed in 24 patients (80.0%) and MRI in 18 patients (60.0%), reflecting the use of clinical and imaging modalities for assessment of sphincter disruption. These findings were consistent with Martínez Hernández Magro et al.[27], who evaluated 22 women with fecal incontinence secondary to obstetric trauma and demonstrated structural sphincter defects by EAUS in all patients, with isolated anterior EAS defects in 16 patients (72.7%) and combined anterior EAS and IAS defects in 6 patients (27.3%). Thus, the findings of the present study similarly emphasize the importance of assessing the extent of sphincter disruption using clinical examination and imaging before definitive sphincteroplasty.

In the present study, sphincteroplasty was performed in 26 patients (86.7%), and all operated patients underwent double-breasting anterior sphincteroplasty. Colonoscopy was performed in 19 patients (63.3%), among whom 6 (31.6%) had colitis/proctitis and 5 (26.3%) had polyps, while no significant abnormality was detected in 8 patients (42.1%). This approach was consistent with the observations of Ong et al.[28], who noted that colonoscopy is not routinely required as part of the anatomical assessment of OASIS because the principal investigations are digital examination, endoanal ultrasonography, and/or MRI. However, endoscopic assessment may be appropriate in selected patients with fecal incontinence to identify alternative or coexisting causes, including inflammatory mucosal disease, proctitis/colitis, polyps, or malignancy. The detection of colitis/proctitis and polyps in the present study supports the potential value of endoscopic evaluation in selected patients, particularly when additional inflammatory or mucosal abnormalities may contribute to bowel symptoms. Patients with colitis/proctitis were treated with oral ciprofloxacin, metronidazole, and 5-ASA, while polypectomy or biopsy was performed during the same sitting when indicated.

The present study demonstrated a marked improvement in fecal incontinence following sphincteroplasty, with the mean Cleveland Clinic Fecal Incontinence Score (CCFIS) decreasing from 12.6 before surgery to 3.0 at 1 month and subsequently increasing to 5.6 at 3 months. This pattern was consistent with the findings of Pla-Martí et al.[29], who reported a substantial reduction in CCFIS from 15.5 ± 3.1 preoperatively to 5.8 ± 4.9 at approximately 30 months after sphincteroplasty among 35 patients completing follow-up. However, their long-term assessment showed a subsequent increase in CCFIS to 8.4 ± 4.9, indicating partial deterioration of continence over time. Similarly, the present study showed marked early postoperative improvement followed by a rise in CCFIS at 3 months, suggesting that although sphincteroplasty provides considerable short-term improvement in continence, some deterioration may occur during follow-up.

Video of sphincteroplasty procedure:

https://youtu.be/_4b3Bf2Sv5I?si=dEUZSWbOwpZcO7yq

Limitations of the study

The study had a few limitations:

- Short postoperative follow-up period, limiting assessment of the long-term effectiveness and durability of sphincteroplasty outcomes.
- Relatively small sample size, which may limit the statistical power and representativeness of the study.

Conclusion

Chronic OASIS can result in persistent fecal incontinence. Sphincteroplasty was associated with substantial improvement in fecal continence among patients with fecal incontinence due to old OASIS, with marked improvement during short-term postoperative follow-up. Double-breasting

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anterior sphincteroplasty may therefore be a useful surgical option for the management of chronic OASIS-related fecal incontinence.

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