ORIGINAL ARTICLE

FUNCTIONAL AND SURGICAL OUTCOMES OF DELAYED EARLY VERSUS LATE REPAIR OF OBSTETRIC ANAL SPHINCTER INJURIES A RETROSPECTIVE COHORT STUDY

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ABSTRACT

Background: Obstetric anal sphincter injuries (OASIS) remain a significant cause of postpartum anal incontinence and impaired quality of life among women. Standard management involves immediate primary repair; however, missed or inadequately repaired injuries often necessitate secondary reconstruction. Current practice varies between **delayed-early repair** (within 2–21 days after delivery) and **late repair** (≥3 months postpartum), yet evidence on comparative outcomes remains limited.

Objective: This study aims to compare functional outcomes (continence, quality of life) and surgical outcomes (wound complications, dehiscence, rupture, and fistula formation) between delayed-early and late anal sphincter repair in women with obstetric anal sphincter injuries.

Methods: This single-centre retrospective cohort study at Sahiwal Teaching Hospital (2014–2024) reviewed women undergoing delayed early and late anal sphincter repair by the same surgeon for ten-year time period. All patients received standardized postoperative care.

RESULTS: Sixty women were analyzed (29 delayed early repair; 31 late repair). Mean blood loss, Wexner scores, postoperative pain, and quality-of-life measures (daily life interference, pad use, constipation medication, and urgency) were comparable between groups, with no statistically significant differences ($p > 0.05$). Both approaches achieved similar short-term clinical and functional outcomes**.**

Conclusion: our study suggests that both delayed early and late repairs can be effective and safe when performed by experienced surgeons with standardized postoperative protocols. Delayed early repair may offer the advantage of faster recovery and reduced risk of dyspareunia or fistula, though these trends require validation in larger studies.

Key Words: Perineal Injuries, Anal Sphincter/injuries, Sphincteroplasty, Delayed Treatment, Time Factors, Postoperative Complications, Quality of Life, Fecal Incontinence.

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INTRODUCTION

Obstetric anal sphincter injuries (OASIS), frequently occurring during the process of parturition and not always immediately discernible, constitute a notable contributor to postpartum anal incontinence and a diminished quality of life in the female population.[1,2] The presence of gas and stool incontinence represents a significant disability, severely compromising the individual's quality of life across personal, professional, and social dimensions, with estimations indicating that continence disorders may affect as much as 15% of the adult demographic; however, the prevalence continues to appear epidemiologically

underestimated. Among females, obstetric trauma serves as the predominant cause of incontinence, often described as "the silent affliction" since affected individuals tend to refrain from discussing it, and healthcare providers do not routinely inquire about incontinence subsequent to childbirth.[3] The standard protocol entails immediate primary repair; nevertheless, instances of overlooked or inadequately repaired injuries frequently necessitate subsequent reconstructive procedures. Current methodologies exhibit variability, oscillating between delayed-early repair (conducted within 2–21 days post-delivery) [4,7] and late repair (≥3 months postpartum) [3, 8] albeit empirical evidence concerning comparative outcomes remains insufficient. Although delayed early repair may enhance sphincter functionality and continence, it is associated with a heightened risk of wound complications.[4,7] Late repair benefits from fully healed tissues but may result in slower functional recovery.

Late or secondary repair, performed ≥3 months postpartum after tissue healing, remains the traditional treatment for persistent postpartum incontinence or pelvic floor defects.[10,12] While often effective when the external sphincter is well reconstructed, outcomes depend on muscle strength and residual defects, emphasizing careful preoperative assessment and patient selection.[11,13] High complication rates highlight the need for skilled surgeons and detailed imaging and functional evaluation before surgery.[3]

Quality of life is significantly affected by persistent faecal incontinence due to its physical, psychological, and social impact.[13,14] While conservative measures like pelvic floor training offer limited benefit, surgical repair remains the mainstay for patients with structural sphincter defects.[15,16] The optimal timing of repair, early versus delayed, remains controversial.[17]

The optimal timing of secondary anal sphincter repair remains uncertain due to heterogeneous, largely observational evidence. Whether delayed-early repair improves functional outcomes or increases wound-related complications is unclear, creating a gap in balancing continence and quality-of-life benefits against surgical risk. This study, the first to directly compare delayed-early and late secondary sphincter repair in our setting and internationally, aimed to compare functional outcomes (continence and quality of life) and surgical outcomes (wound complications, dehiscence, infection, and fistula formation) in women with obstetric anal sphincter injuries

METHODS

This is a single centre **retrospective cohort study** conducted at Sahiwal teaching Hospital Sahiwal, affiliated with Sahiwal Medical College Sahiwal. Medical records of women undergoing obstetric anal sphincter injuries (OASIS) were reviewed over a ten-year period from April 2014 to April 2024.

Ethical approval was obtained from the Institutional Review Board of Sahiwal Medical College (IRB# 202/IRB/SLMC/SWL) dated 13 /03 /2025. Given the retrospective nature of the study and use of anonymized medical records, the Institutional Review Board granted a waiver of informed consent.

Hospital records were reviewed to identify eligible patients and extract operative and perioperative details. Women, aged 18–40 years with obstetric anal sphincter injuries (3rd or 4th degree perineal tears) diagnosed postpartum and underwent surgical repair were eligible. A total of 115 patient records with a diagnosis of obstetric anal sphincter injury were screened. After exclusion of patients with primary repair at delivery (n=25), non-obstetric anal sphincter injuries (n=2), incomplete records (n=11), and inadequate follow-up (n=17). 60 women were included in the final analysis ,29 delayed-early repair; 31 late repair based on timing of repair: delayed-early repair (performed after 24 hours and up to 3 weeks postpartum) and late repair (performed after 3 months postpartum with availability of complete follow-up data for at least 6 months post-repair. fig 1

Patients with primary repair at the time of delivery, with prior anorectal surgery unrelated to OASIS, non-obstetric anal sphincter injuries (e.g., trauma, iatrogenic, Crohn's disease) and incomplete medical records or loss to follow-up were excluded. Patients requiring diverting colostomy were excluded; no eligible patient required colostomy during the study period.

Eligible cases were identified through paper-based operation theatre registers, inpatient admission files, outpatient follow-up records, and consultant operative logs, particularly for the earlier years when electronic records were unavailable. Data were extracted using a predefined structured proforma capturing demographic characteristics, obstetric details, operative findings, postoperative complications, and follow-up outcomes.

Operation notes revealed all eligible records of delayed-early and late secondary repairs were performed under spinal anaesthesia by a consultant gynaecologist with expertise in urogynecology, using a standardized sphincter-vagino-perineoplasty technique. In delayed-early repairs, existing sutures were removed, wounds irrigated with povidone-iodine saline, and necrotic tissue debrided. The internal anal sphincter was repaired end-to-end, while the external sphincter was repaired using overlapping or end-to-end technique depending on tissue availability. Perineal reconstruction was completed in three layers.

All patients received standardized postoperative care, including intravenous antibiotics for three days followed by oral antibiotics for five days, nil by mouth for three days, gradual dietary advancement, twice-daily sitz baths with antiseptic wound care, and one-week inpatient observation.

Postoperative follow-up in the gynaecology outpatient clinic at 3 weeks, 6 weeks, 12 weeks, and 24 weeks after surgery

was mentioned. Continence status, dyspareunia, wound complications, fistula formation, and quality-of-life measures were assessed using a structured questionnaire. Only patients with complete follow-up data up to 24 weeks were included in the final analysis.

Descriptive statistics summarize baseline characteristics of both groups. Continuous variables e.g. Age, number of children, weight of mother and baby in Kg expressed as **mean ± standard deviation**, categorical variables like socioeconomic status, mode of delivery, episiotomy were expressed as frequencies and percentages. Categorical outcomes (e.g., wound complications, dyspareunia, fistula formation, continence) analysed using **Chi-square test.** Relative risk (RR) and attributable risk were calculated for categorical outcomes. Statistical significance set at **$p < 0.05$**. Data analysis conducted using **SPSS version 26**.

RESULTS

A total of 60 women were included in the analysis, with 29 undergoing delayed early repair and 31 undergoing late repair. The mean age of the study population was **28.9 ± 4.9 years** (range 18–40). The mean number of children was **2.15 ± 1.18** (range 1–5). The average maternal weight was **60.5 ± 6.8 kg** (range 50–75 kg), while the mean birth weight of babies was **3.36 ± 0.35 kg** (range 2.8–4.0 kg). Mean intraoperative blood loss was comparable between the two groups (220.7 ± 64.8 ml vs. 216.1 ± 58.3 ml; $p = 0.775$).

With respect to socioeconomic background, **37 (61.7%)** women were classified as poor, **20 (33.3%)** as middle income, and **3 (5.0%)** as high income. Episiotomy was performed in **32 (53.3%)** women, while **28 (46.7%)** delivered without episiotomy. Diabetes was present in **6 (10.0%)** participants. Normal vaginal delivery occurred in **51 (85.0%)** cases, while **7 (11.7%)** were assisted with forceps and **2 (3.3%)** with vacuum extraction.

Figure 1. Comparative Outcomes Bar Chart

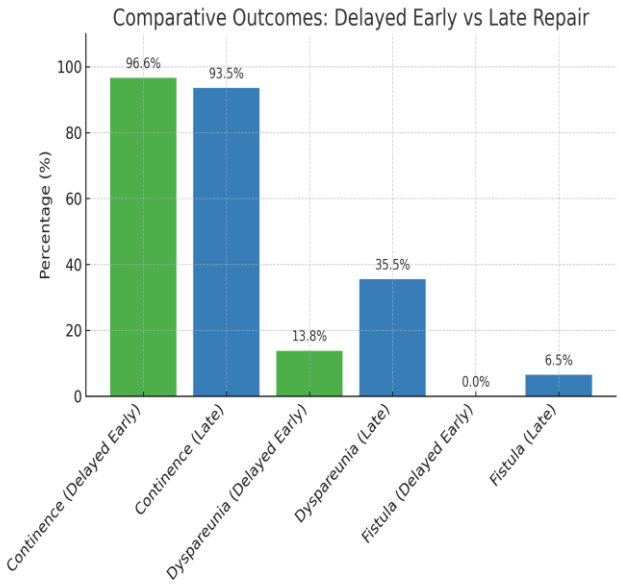

Table: 1 Comparison of Outcomes between Delayed Early and Late Repair of Anal Sphincter Injury (n=60)

Outcome	Delayed Early (n=29)	Late Repair (n=31)	Relative Risk (RR) (95% CI)	Attributable Risk (AR)	P-value	Interpretation
Continence at 24 weeks	28/29 (96.6%)	29/31 (93.6%)	1.03 (0.92–1.16)	+3.0%	0.62	High continence rates in both groups; no significant difference
Rectovaginal fistula	0/29 (0.0%)	2/31 (6.5%)	~4.7*	+6.5%	0.16	Trend toward higher risk in late group; not statistically significant (very few events)
Dyspareunia	4/29 (13.8%)	11/31 (35.5%)	0.39 (0.14–1.09)	–21.7%	0.06	Lower dyspareunia risk in delayed early group; borderline significance
Wound infection	1/29 (3.4%)	2/31 (6.5%)	1.87 (0.18–19.55)	+3.0%	0.60	No statistically significant difference between groups
Wound disruption	0/29 (0.0%)	3/31 (10.7%)	6.56 (0.35–121.8)	+10.7%	0.24	Higher in late group, but not statistically significant (wide CI due to small sample size)

*Approximate value based on small event frequency.

Table 2: Comparison of Functional Outcomes between Delayed Early and Late Repair Groups (n = 60)

Outcome	Delayed Early (n = 29) Mean ± SD	Late (n = 31) Mean ± SD	p-value
Incontinence	4.52 ± 1.24	4.61 ± 1.12	0.755
Interference with daily life	0.31 ± 0.85	0.29 ± 0.90	0.930
Need to wear pads	0.21 ± 0.82	0.26 ± 0.89	0.818
Use of constipation medications	0.21 ± 0.82	0.23 ± 0.88	0.932
Urgency	0.21 ± 0.82	0.26 ± 0.89	0.818
Wexner score	0.10 ± 0.31	0.13 ± 0.34	0.763

Table 3. Multivariate Logistic Regression Analysis for Predictors of Anal Incontinence at 24 Weeks

Variable	B	aOR (Exp(B))	95% CI for aOR	p-value
Timing of repair	0.531	1.70	0.13 – 22.6	0.687
Mode of delivery	0.680	1.97	0.21 – 18.8	0.547
Episiotomy	-0.622	0.54	0.04 – 7.56	0.649
Presence of diabetes	-18.131	0.00	–	0.999
Maternal age (per year)	-0.170	0.84	0.59 – 1.19	0.326
Number of children	0.558	1.75	0.35 – 8.77	0.500
Constant	0.425	1.53	–	0.918

Comparison of functional outcomes between the delayed early repair group (n = 29) and the late repair group (n = 31) showed no statistically significant differences.

Given the small number of incontinence events, multivariable modelling was not pursued beyond exploratory analysis to avoid overfitting. Therefore, adjusted analyses were limited, and findings are presented primarily using relative and attributable risks

DISCUSSION

This study compared the outcomes of delayed early versus late anal sphincter repair in women with obstetric anal sphincter injuries (OASIs). The principal finding of this study is that at 24 weeks, continence was achieved in nearly all women, with no meaningful difference between groups (RR = 1.03, AR = 3%). However, women undergoing delayed early repair experienced earlier recovery, with some regaining continence within 2–6 weeks, a trend not observed in the late repair group. Functional outcomes—including Wexner scores, wound disruption, bleeding, and postoperative pain—were similar across both groups. This suggests that earlier intervention, even after the "immediate" postpartum period, may facilitate more rapid functional recovery.

This is spotted by Sorensen in 2008 where delayed early anal sphincter reconstruction during the puerperium was associated with favourable long-term outcomes in a study from1991–2005. It was found higher continence rates than controls but no significant impact on quality of life, indicating the procedure is safe and effective without requiring a covering stoma.[9]

The overall continence preservation rate in our cohort is favorable, with only 6.7% reporting some degree of incontinence in the late group. These figures align with previous reports, where long-term continence after late sphincter repair ranged from 80% to 90 %.[18,19, 5]

Our findings that delayed-early repair is associated with earlier return of continence echoes recent studies but we have lower rate of wound complications. Barbosa et al reported that early secondary repair (within ~21 days) yields long-term functional outcomes comparable to those of late repair, though with an increased risk of complications (e.g fistula formation) in some patients.[6] Early continence recovery in the delayed-early group supports the idea that limited fibrosis and identifiable tissue planes soon after delivery facilitate better anatomical repair as by Sultan & Thakar in 2021.[5] In contrast, later repairs face denser scarring and potentially worse outcomes.

Women undergoing late repairs may have sustained compounded injuries resulting from initial under-classification or misdiagnosis, leading to progressive worsening of symptoms over time.[20] This explains why some studies show late overlapping sphincter repair yields satisfactory short-term results; however, long-term continence declines, with only about 39% maintaining good outcomes after several years.[21,4] There is no difference in the success rates in different techniques. A randomized controlled trial from a university hospital reported no significant difference in fecal incontinence rates at 12 months between the overlapping and end-to-end repair.[22] One study in Turkey showed high success rate of 88.2% after overlapping repair.[23]

Some observations merit particular attention. In this study, wound-related complications were infrequent overall, with no statistically significant differences between early and late secondary repair. The risk of wound infection was slightly higher in the late group, but the attributable difference was small (3%) and the wide confidence interval indicates considerable uncertainty. Wound disruption occurred in only 5% of cases, while confined to the late group (10.7%), also failed to reach statistical significance after correction for small sample size. These findings are broadly consistent with previous reports, which suggest that wound infection and dehiscence are relatively uncommon following late sphincter repair, but may occur more frequently when surgery is delayed. [1,3,18] Rectovaginal fistula occurred only in the late repair group (6.5%), corresponding to an attributable risk of 6.5% and a corrected relative risk of ~4.7, raising the possibility that earlier intervention may reduce the risk of fistula formation, though based on very few events. Dyspareunia was less frequent after delayed early repair (13.8% vs 35.5%), with RR = 0.39 and AR = –21.7%, suggesting a potential reduction in sexual dysfunction, corresponding to a relative risk reduction of more than half, although statistical significance was not firmly established. This suggests that earlier repair might help preserve sexual function, could be because of less fibrosis.[5]

The prevalence of wound infection and dehiscence even after primary obstetric anal sphincter injury (OASI) repair is noteworthy, a contemporary meta-analysis has indicated

pooled incidence rates of approximately 4.4% (95% CI, 0.4–8.4) for infection and approximately 6.9% (95% CI, 1.6–12.2) for dehiscence.[5]

These statistics highlight wound complication represent inherent risks associated with sphincter repair, even prior to the consideration of the delayed versus early secondary intervention debate. Wound complications are more likely in contaminated fields, under tension, or with poor vascularity, conditions often present during early reclosure of a dehisced sphincter repair. Although early repair may shorten symptom duration and hasten recovery, current evidence remains insufficient to support its routine use.[4,7] For instance, a review concerning the management of perineal breakdown indicates that early repair attempts have been made as early as 7–10 days, yet robust comparative data remain conspicuously absent.[4]

Evidence on delayed-early repairs remains scarce. Reported complication rates include 10.3% skin dehiscence and 5.2% infection as by Okeahialam et al., 2021.[5] Onsberg Hansen et al**.** similarly found that early secondary repair is feasible, with most patients achieving high rates of continence, but noted notable morbidity, including infection and rectovaginal fistulas in a small series noted 9 out of 17 patients experienced postoperative infections, and 2 developed wound dehiscence or fistula during the follow-up period, with significant incidences of anal incontinence, diminished quality of life, and sexual dysfunction noted at the five-year period.[7] Our study's low wound disruption rate (5%) and high continence at 24 weeks suggest that robust surgical technique and structured perioperative care contributed to favourable outcomes and low morbidity.

Our results reinforce the evidence that both delayed early and late repairs can achieve satisfactory continence, but the earlier timeline may provide patients with quicker return to function, a factor that has important psychosocial and quality-of-life implications, while late repair remains appropriate if earlier intervention is not possible.

In our cohort of 60 women, demographic characteristics (mean age 28.9 years, parity 2.15) were consistent with prior series, where obstetric anal sphincter injuries (OASIs) affect relatively young, multiparous women.[23, 24] The predominance of participants from lower socioeconomic backgrounds highlights disparities in obstetric care access and may partly explain delayed recognition and referral patterns.

This study's strengths include a clearly defined cohort, standardized continence assessment, and the first direct comparison of delayed-early vs. late anal sphincter repair within the same centre under uniform surgical and perioperative conditions. Both groups achieved comparable continence and low complication rates, likely aided by meticulous sphinctrovaginoperineoplasty technique, consistent surgeon experience, and rigorous postoperative care e.g., prolonged NPO, sits baths, antiseptic wound care, and one-week hospital stay. The predominance of spontaneous vaginal deliveries (85%) may also have contributed to favourable outcomes, as instrumental deliveries are linked to poorer results.

This study has some limitations. Although it spans a 10-year period, the sample size was limited because secondary anal sphincter repair following obstetric anal sphincter injury is an infrequent and highly selected procedure. Most women with OASIS undergo primary repair at delivery or are managed conservatively, and only a small proportion require delayed-early or late secondary reconstruction. Furthermore, strict inclusion criteria requiring complete operative records and follow-up reduced the number of eligible cases. The small number of outcome events also limited the ability to perform extensive multivariable modelling. There is lack of objective assessments (manometry, endoanal ultrasound). Possible self-report bias, the retrospective design and short-term follow-up may restrict generalizability of the findings Despite these constraints, the findings have important clinical implications, suggesting that performing repair within weeks, when feasible, may promote faster continence recovery and reduced patient distress compared with waiting several months

CONCLUSION

The findings indicate that delayed-early anal sphincter repair is a practical and effective option when primary repair is not feasible or has failed. Performing repair within weeks, rather than delaying for months, may improve accessibility and outcomes in low-resource settings. Both delayed-early and late repairs achieved similar continence and complication rates, suggesting that timing can be individualized based on patient factors, surgical expertise, and available resources. Future studies should include larger multicentre cohorts, longer follow-up, and objective outcome measures such as manometry, endoanal ultrasound, and quality-of-life assessments. While randomized trials may not be practical, prospective studies could better define the optimal timing for repair.

ETHICAL APPROVAL

Ethical approval of article was granted by the Institutional Review Board of Sahiwal Medical College vide reference No. 202IRB/SLMC/SWL dated 13 March, 2025.

AUTHOR'S CONTRIBUTIONS

SB: Conceived idea, review of manuscript, supervision
FA: Data collection, lab work
AR: Manuscript writing, data analysis
All Authors: Approval of the final version of the manuscript to be published

CONFLICT OF INTEREST

Authors declare no conflict of interest.

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