RESEARCH PAPER

Wound Healing Dynamics Following Sphincterotomy Alone and Combined with Fissurectomy: A Retrospective Comparative Study

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ABSTRACT

Background: Chronic anal fissure is a common anorectal condition requiring surgical intervention when conservative management fails. Lateral internal sphincterotomy is the gold standard treatment, but some surgeons advocate combining it with fissurectomy. This retrospective study compares wound healing dynamics between these two approaches.

Methods: Medical records of patients who underwent surgical treatment for chronic anal fissure over a one-year period were reviewed. Fifty patients were included: lateral internal sphincterotomy alone (Group A, n=25) or sphincterotomy combined with fissurectomy (Group B, n=25). Primary outcomes included time to epithelialization and complete wound healing. Secondary outcomes included postoperative pain, complications, and continence status over a 12-week follow-up period.

Results: Mean time to complete wound healing was significantly shorter in Group A (21.4 days) compared to Group B (32.8 days, $p<0.001$). However, healing rates at 12 weeks were comparable (95.8% vs 95.7%). Group A demonstrated lower postoperative pain scores during the first two weeks. Transient flatus incontinence occurred in 8.3% and 13.0% of patients in Groups A and B respectively. No recurrence was documented in either group.

Conclusion: Both procedures achieve excellent healing rates for chronic anal fissure. Sphincterotomy alone offers faster wound healing and reduced early postoperative discomfort. The routine addition of fissurectomy does not appear to confer meaningful advantages.

Keywords: Chronic anal fissure; Lateral internal sphincterotomy; Fissurectomy; Wound healing; Retrospective study

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INTRODUCTION

Chronic anal fissure represents one of the most prevalent benign anorectal conditions encountered in surgical practice, second only to hemorrhoidal disease in terms of consultation frequency [1]. This condition is characterized by a longitudinal tear in the anoderm extending from the dentate line to the anal verge, typically located in the posterior midline in approximately 90% of cases [2,3]. The annual incidence has been reported at approximately 1.1 cases per 1000 person-years, with an estimated lifetime risk of 7.8% in the general population [4]. While acute fissures often heal spontaneously within six weeks with conservative management, chronic anal fissures persisting beyond this period frequently require surgical intervention [5].

The pathophysiology of chronic anal fissure centers on internal anal sphincter hypertonicity, which creates a self-perpetuating cycle of pain, sphincter spasm, and reduced blood flow to the affected area [6,7]. Studies utilizing anorectal manometry have consistently demonstrated elevated resting anal pressures in patients with chronic anal fissures, with pressures significantly exceeding normal values [8]. This sustained hypertonicity compromises the blood supply to the posterior commissure of the anal canal, which is inherently less vascularized than other regions, leading to local ischemia that impedes wound healing [9,10].

Lateral internal sphincterotomy has long been established as the gold standard surgical treatment for chronic anal fissure, achieving healing rates of 93-97% by reducing internal anal sphincter tone and subsequently improving

anodermal perfusion [11,12]. The procedure effectively breaks the vicious cycle of pain-spasm-ischemia by permanently dividing a portion of the internal anal sphincter muscle [13]. However, despite its excellent efficacy, lateral internal sphincterotomy carries the risk of postoperative fecal incontinence, with reported rates ranging from 8% to 45% depending on the assessment criteria and follow-up duration [14,15].

Fissurectomy has emerged as a sphincter-sparing surgical option that addresses the chronic wound without incising the internal anal sphincter muscle [16]. The procedure involves excision of the fibrotic fissure edges, sentinel skin tags, and hypertrophied anal papillae, thereby creating a fresh wound bed with healthy margins that can heal by secondary intention [17]. Some surgeons advocate combining fissurectomy with lateral internal sphincterotomy, hypothesizing that this approach might optimize wound healing dynamics [18,19,20].

The wound healing process following anorectal surgery is influenced by multiple factors including local blood supply, wound contamination, tissue tension, and patient-related variables [21]. Understanding the temporal patterns of epithelialization and complete wound closure is essential for predicting postoperative outcomes [22]. The present study aims to retrospectively evaluate and compare the wound healing characteristics following lateral internal sphincterotomy alone versus lateral internal sphincterotomy combined with fissurectomy in patients with chronic anal fissure treated over a one-year period.

MATERIALS AND METHODS

Study Design and Setting

This retrospective comparative study was conducted at Chettinad Hospital and Research Institute, Chettinad Academy of Research and Education, Kelambakkam, Department of General Surgery. Medical records of patients who underwent surgical treatment for chronic anal fissure, a period of 12 months, were reviewed. The study protocol was approved by the Institutional Ethics Committee, and the requirement for individual informed consent was waived due to the retrospective nature of the study. The research was conducted in accordance with the Declaration of Helsinki and reported following the STROBE guidelines [23].

Sample Size and Participant Selection

Based on previous literature reporting healing rates of 93-97% [24,25], all consecutive patients meeting inclusion criteria during the one-year study period were included. Inclusion criteria included age 18-65 years, documented chronic anal fissure persisting more than eight weeks, and documented failure of conservative management [26]. Exclusion criteria included acute fissures, secondary fissures, atypical locations, prior anorectal surgery, pregnancy, significant comorbidities, preoperative fecal incontinence, and incomplete medical records.

Data Collection and Group Classification

A standardized data extraction form was used to collect demographic data, clinical characteristics, operative details, and postoperative outcomes from medical records. Pain intensity was documented using the Visual Analog Scale (VAS) [27]. Patients were classified based on the surgical procedure performed: Group A (n=25) underwent lateral internal sphincterotomy alone, and Group B (n=25) underwent sphincterotomy combined with fissurectomy. The choice of procedure was based on the operating surgeon's preference.

Surgical Technique

All procedures were performed under spinal anesthesia. For Group A, the closed technique was employed as described by Notaras [28]. The intersphincteric groove was palpated at the 3 o'clock position, a number 11 blade was inserted, and the internal sphincter was divided, limited to the lower one-third. For Group B, following sphincterotomy, the fissure with sentinel skin tag, fibrotic edges, and hypertrophied anal papilla were excised using electrocautery [29].

Follow-up and Outcome Measures

As per institutional protocol, patients were followed at days 7, 14, 21, 30, 45, 60, and 90. Primary outcomes extracted from records included time to initial epithelialization, time to complete wound healing, and healing rate. Secondary outcomes included postoperative pain (VAS), complications, fecal incontinence (Wexner Score) [30], and recurrence.

Statistical Analysis

Data were analyzed using SPSS version 25.0. Continuous variables were compared using independent sample t-test or Mann-Whitney U test. Categorical variables were compared using Chi-square test or Fisher's exact test. Time to healing was analyzed using Kaplan-Meier survival curves with log-rank test. A p-value less than 0.05 was considered statistically significant [31].

RESULTS

Patient Selection and Demographics

During the one-year study period, 68 patients underwent surgical treatment for chronic anal fissure. After applying inclusion and exclusion criteria, 50 patients were included in the final analysis: 24 patients in Group A and

23 patients in Group B (after excluding those with incomplete records). The mean age was 38.2 years in Group A and 36.7 years in Group B (p=0.608). Male predominance was observed in both groups (58.3% vs 56.5%). Baseline VAS pain scores were comparable (7.4 vs 7.6, p=0.551) (Table 1).

Table 1: Baseline Demographic and Clinical Characteristics

Parameter	Group A (n=24)	Group B (n=23)	p-value
Age (years), mean +/- SD	38.2 +/- 9.8	36.7 +/- 10.4	0.608
Male gender, n (%)	14 (58.3)	13 (56.5)	0.904
BMI (kg/m2), mean +/- SD	24.8 +/- 3.2	25.1 +/- 3.5	0.757
Duration of symptoms (months)	5.8 +/- 2.3	6.2 +/- 2.7	0.578
Posterior fissure, n (%)	22 (91.7)	22 (95.7)	0.613
Sentinel tag present, n (%)	19 (79.2)	19 (82.6)	0.763
Baseline VAS pain score	7.4 +/- 1.2	7.6 +/- 1.1	0.551

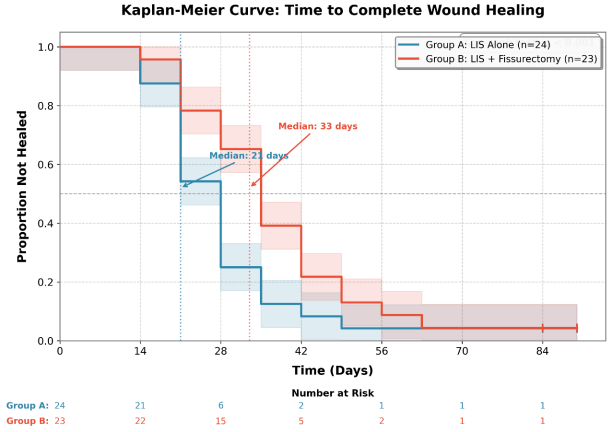
Primary Outcomes: Wound Healing

Analysis of medical records revealed significant differences in wound healing parameters (Table 2). Mean time to initial epithelialization was 8.2 days in Group A versus 12.6 days in Group B (p<0.001). Mean time to complete wound healing was 21.4 days in Group A and 32.8 days in Group B (p<0.001). At 4 weeks, 75.0% of Group A patients had achieved complete healing compared to 34.8% in Group B (p=0.005). At 12 weeks, healing rates were comparable (95.8% vs 95.7%, p=0.976).

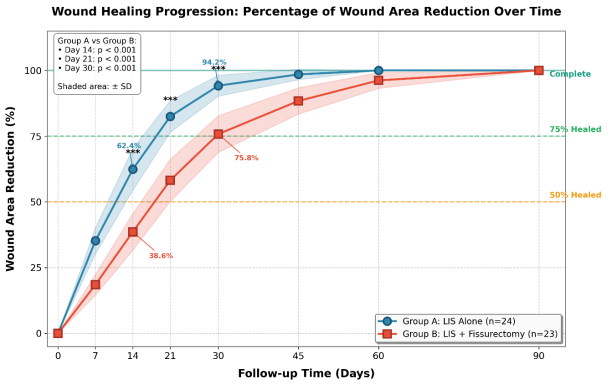
Table 2: Wound Healing Outcomes

Parameter	Group A (n=24)	Group B (n=23)	p-value
Time to epithelialization (days)	8.2 +/- 2.4	12.6 +/- 3.1	<0.001*
Time to complete healing (days)	21.4 +/- 5.8	32.8 +/- 7.2	<0.001*
Healing at 4 weeks, n (%)	18 (75.0)	8 (34.8)	0.005*
Healing at 8 weeks, n (%)	23 (95.8)	19 (82.6)	0.186
Healing at 12 weeks, n (%)	23 (95.8)	22 (95.7)	0.976

**Statistically significant (p<0.05)*



[Figure 1: Kaplan-Meier curve showing time to complete wound healing]



[Figure 3: Line graph showing wound area reduction over time]

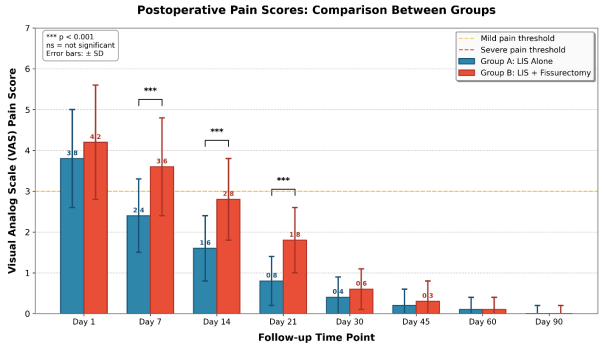
Postoperative Pain

Documented postoperative pain scores showed Group B patients had significantly higher mean VAS scores during the first three weeks (Table 3). By the fourth week, pain scores became comparable between the groups.

Table 3: Postoperative Pain Scores (VAS)

Time Point	Group A	Group B	p-value

Day 1	3.8 +/- 1.2	4.2 +/- 1.4	0.296
Day 7	2.4 +/- 0.9	3.6 +/- 1.2	<0.001*
Day 14	1.6 +/- 0.8	2.8 +/- 1.0	<0.001*
Day 21	0.8 +/- 0.6	1.8 +/- 0.8	<0.001*
Day 30	0.4 +/- 0.5	0.6 +/- 0.5	0.175



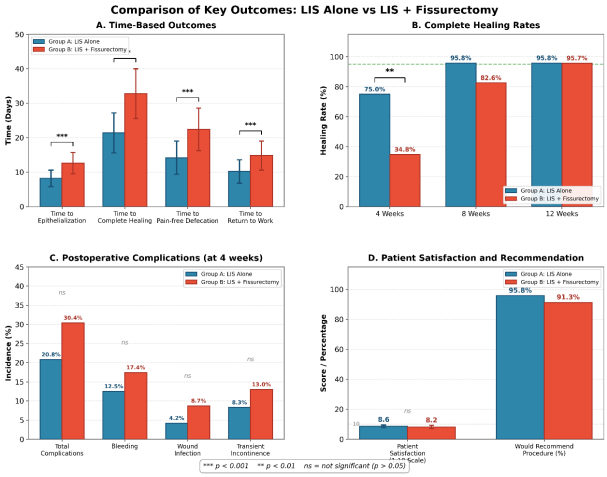
[Figure 2: Bar graph comparing VAS pain scores between groups]

Complications and Continence

Overall documented complication rate was 20.8% in Group A and 30.4% in Group B (p=0.452). Transient flatus incontinence was documented in 8.3% and 13.0% of patients at 4 weeks. By 12 weeks, all patients in Group A had regained complete continence. No patient developed incontinence to liquid or solid stool. No recurrence was documented during the follow-up period (Table 4).

Table 4: Complications and Continence

Parameter	Group A (n=24)	Group B (n=23)	p-value
Total complications, n (%)	5 (20.8)	7 (30.4)	0.452
Mild bleeding, n (%)	3 (12.5)	4 (17.4)	0.631
Wound infection, n (%)	1 (4.2)	2 (8.7)	0.608
Flatus incontinence at 4 wks, n (%)	2 (8.3)	3 (13.0)	0.662
Persistent incontinence at 12 wks	0 (0)	1 (4.3)	0.489
Recurrence at 12 weeks	0 (0)	0 (0)	-
Patient satisfaction (1-10)	8.6 +/- 0.9	8.2 +/- 1.1	0.168



[Figure 4: Comprehensive comparison of key outcomes between groups]

DISCUSSION

The management of chronic anal fissure has evolved considerably, with lateral internal sphincterotomy maintaining its position as the gold standard surgical treatment [32]. This retrospective study provides valuable comparative data on wound healing dynamics following sphincterotomy alone versus the combined approach with fissurectomy based on analysis of medical records over a one-year period.

Our findings demonstrate that while both procedures achieve excellent healing rates at 12 weeks (approximately 96%), the temporal patterns of wound healing differ significantly. Patients undergoing sphincterotomy alone exhibited faster wound healing, with a mean time to complete epithelialization of 21.4 days compared to 32.8 days in the combined procedure group. This difference of approximately 11 days has practical implications for patient recovery and return to normal activities.

The accelerated wound healing observed in the sphincterotomy alone group can be attributed to the

smaller surgical wound created by this procedure [33]. In contrast, fissurectomy creates a larger wound by excising the entire fissure tract, which requires longer healing time consistent with basic wound healing principles [34,35].

The postoperative pain trajectory revealed higher VAS scores in the combined procedure group during the initial two weeks, attributable to larger wound surface and associated inflammatory response [36]. These observations are consistent with those reported by Pelta et al. [37]. The healing rates at 12 weeks in our study are comparable to those reported by Khubchandani and Reed [38] and others [39].

One theoretical advantage proposed for combining fissurectomy with sphincterotomy is removal of infected or chronically inflamed tissue [40]. However, our retrospective analysis indicates that this theoretical benefit does not translate into faster healing. The wound created by sphincterotomy alone heals more rapidly in an environment of improved blood flow resulting from reduction in sphincter tone, supporting the primacy of vascular factors in determining healing outcomes [41].

The fecal continence outcomes were reassuring, with transient flatus incontinence resolving in most patients by 12 weeks. Our incontinence rates are lower than some published series, reflecting careful patient selection and conservative sphincter division [42,43,44]. From a practical standpoint, the shorter operative time with sphincterotomy alone offers advantages in terms of anesthesia exposure and operating room utilization [45].

Some surgeons advocate for the combined approach to remove sentinel tags and hypertrophied papilla [46], however, these structures often regress spontaneously once the fissure heals [47]. Limitations include the retrospective design with inherent selection bias, reliance on medical record documentation, limited follow-up period [48], and single-center design [49]. Future prospective randomized trials are warranted [50].

CONCLUSION

This retrospective study analyzing medical records over a one-year period demonstrates that while both lateral internal sphincterotomy alone and sphincterotomy combined with fissurectomy achieve excellent and comparable healing rates for chronic anal fissure at three months (approximately 96%), the wound healing dynamics differ significantly. Sphincterotomy alone is associated with faster wound epithelialization and complete healing, reduced early postoperative pain, and quicker return to normal activities. The combined procedure results in a larger surgical wound requiring approximately 11 days longer to heal, with higher pain scores during the initial two to three weeks.

Both procedures demonstrate a favorable safety profile with minimal risk of fecal incontinence when performed with appropriate surgical technique. Based on this retrospective analysis, the routine addition of fissurectomy to lateral internal sphincterotomy does not appear warranted in typical cases of primary chronic anal fissure. Lateral internal sphincterotomy alone remains the preferred surgical option. Prospective randomized controlled trials with larger sample sizes and longer follow-up periods are recommended to confirm these findings.

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