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LESSONS FROM 471 FISTULA-IN-ANO SURGERIES: A SEVEN-YEAR SINGLE-SURGEON CLINICAL AUDIT FROM SOUTH INDIA

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Abstract

Background:

Fistula-in-Ano remains a formidable surgical challenge owing to its tendency for recurrence, complex anatomy, fear of post operative incontinence and delayed wound healing. Regular clinical audits are vital to evaluate treatment outcomes and to refine surgical strategies.

Aim:

To analyze surgical outcomes of fistula-in-Ano managed by a single surgeon over seven years, with emphasis on recurrence, wound healing time and incontinence.

Methods:

This retrospective audit included a total of 471 patients operated between March 2021 and October 2025. Among them, 14 patients were lost to follow-up, and 42 patients were found to be tuberculosis (TB) positive during evaluation or follow-up.

For analytical purposes, two cohorts were compared based on the time of practice implementation:

- **Pre-Implementation Cohort**: 57 patients (March 2021–March 2022), with 4 recurrences (19%).
- **Post-Implementation Cohort**: 400 patients (April 2022–October 2025), with 17 recurrences (4.4%).

Treatment strategies included fistulogram, biopsy, curettage, TROPIS, fistulectomy, abscess drainage, and sphincter repair, tailored to fistula type and complexity. Outcomes were assessed for recurrence, wound healing time, and complications.

Results:

A total of 457 patients with fistula-in-ano were operated between March 2021 and August 2025, comprising 338 males and 119 females. The majority of cases (90%) were classified as complex fistulas. The overall recurrence rate for the entire cohort was 5.2% (21 patients). When analyzed by study period, **Pre-Implementation Cohort** (March 2021 – March 2022) showed a higher recurrence rate of 19%, whereas **Post-Implementation Cohort** (April 2022 – October 2025) demonstrated a marked reduction to 4.4%, reflecting refinement of surgical technique and improved case selection over time.

In this a total of 83 patients (18.1%) underwent redo surgery. Among these, 21 cases (4.6%) represented recurrences from the surgeon's own earlier operations, while 62 cases (13.5%) were referred from outside hospitals following failed primary procedures. Of the referred group, a few patients did not attend follow-up or declined redo surgery; the remaining underwent individualized

management using techniques such as TROPIS, fistulotomy, tunnel fistulectomy, seton placement, and primary sphincter repair, achieving complete wound healing in all operated cases.
Among the 457 patients included in the analysis, 42 patients (9.2%) were tuberculosis (TB) positive. One patient developed a complex ano-ureteral fistula secondary to HIV disease, and another patient had biopsy-proven malignancy due to Non-Hodgkin lymphoma. Posterior fistulas were the most common type (50%), followed by transsphincteric (24%) and supralevator (21%) variants. Postoperative wound healing occurred as follows: 60% of patients healed within 2 months, 20% within 4 months, and 20% within 6 months, with minimal morbidity. Importantly, anal continence was preserved in all patients in our study period.
Over seven years, progressive refinement of sphincter-sparing reduced recurrence from 19% to 4.4%, with complete continence preservation. Systematic evaluation, early imaging, and individualized surgical planning remain key to optimizing outcomes in fistula-in-ano.

Keywords: Fistula-in-Ano, Clinical audit, Recurrence, Complex fistula, Wound healing, TROPIS, Single-surgeon experience.

1. INTRODUCTION:

Anal fistula is not the most common anorectal disorder; however, it is undoubtedly among the most dreaded[1], as the two major problems associated with its management are recurrence and the risk of incontinence. Consequently, the anal fistula continues to remain an enigma for surgeons. Fistulotomy has long been regarded as the gold-standard procedure, given its high success rate. Nevertheless, it cannot be applied to high fistulae because of the increased risk of incontinence [2]
Fistula-in-ano is defined as a chronic pathological tract connecting the anal canal with the perianal skin, most often arising from cryptoglandular infection. Abscess drainage without definitive treatment frequently results in fistula formation, which seldom heals spontaneously.
Several other sphincter-saving procedures were developed in the last two decades, including video-assisted anal fistula treatment (VAAFT)[3]
[4]In 1976, Dr. Parks published a landmark classification system for anal fistulas, which remains widely used today. The system describes four types:

- **Intersphincteric (45%)** – The tract penetrates the internal sphincter while sparing the external sphincter.
- **Transsphincteric (30%)** – The tract passes through both the internal and external sphincters.
- **Suprasphincteric (20%)** – The tract penetrates the internal sphincter, then extends superiorly in the intersphincteric plane to pass above the external sphincter before reaching the perineum. This group includes horseshoe abscesses.
- **Extrasphincteric (5%)** – A rare type, where the tract forms a connection from the rectum to the perineum, extending laterally to both sphincters. These are often the most difficult to treat due to the need to preserve the sphincter complex.

Although numerous surgical innovations have emerged over the decades, recurrence and postoperative incontinence remain the two principal challenges. Recent advances, including TROPIS (Transanal Opening of Intersphincteric Space), and sphincter repair, have broadened the therapeutic spectrum. Yet, achieving a durable cure while safeguarding continence continues to be elusive.
This clinical audit presents a seven-year single-surgeon experience, characterised by continuous refinement of techniques and the integration of multimodal approaches, with the overarching aim of minimising recurrence and optimising outcomes in the management of fistula-in-ano.

Table 1 – Patient Demographics and Recurrent Cases

Parameter	Number of Patients	Percentage
Total patients	457	
Male	338	74%
Female	119	26%
Malignancy	1	0.2%

Complex Fistula	412	90.2%
Simple Fistula	45	9.8%
TB Positive	3	0.7%
HIV Positive	1	0.2%

Parameter	**Number**	**Percentage**
Total patients	457	
Redo of own cases	21	4.6%
Redo referred from outside	62	13.5%
Healed	83	100%

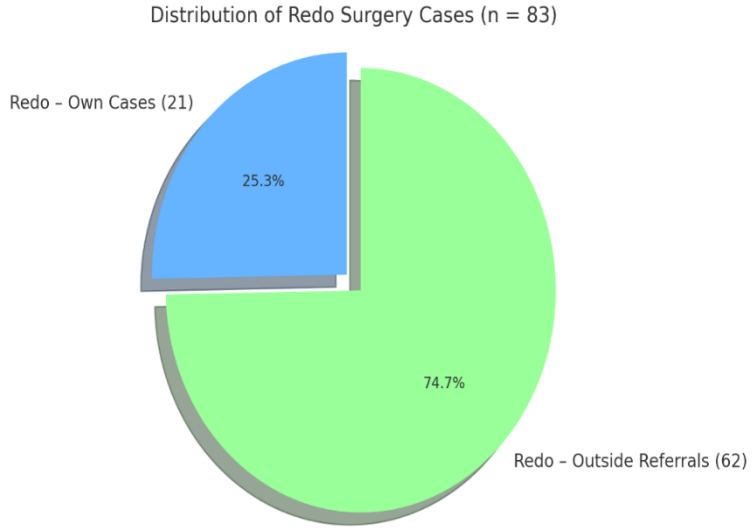

Fig 1. Distribution chart of fistula-in-ano Redo Surgery Cases.

Fistula Audit- Patient Demographics and Recurrent Cases

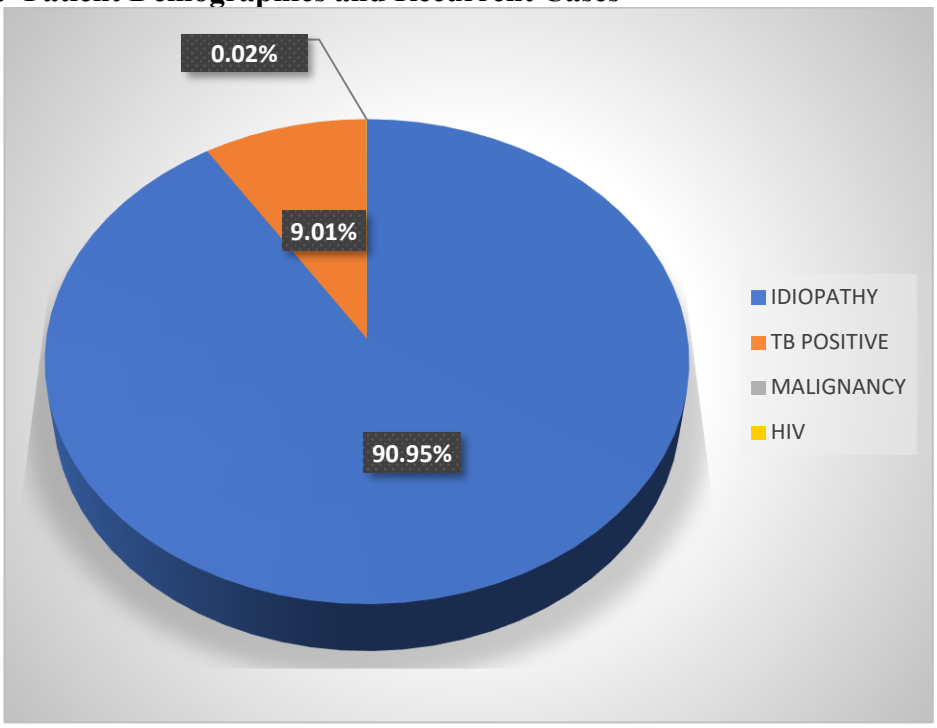

Fig 2. Etiological distribution of fistula-in-ano patients.

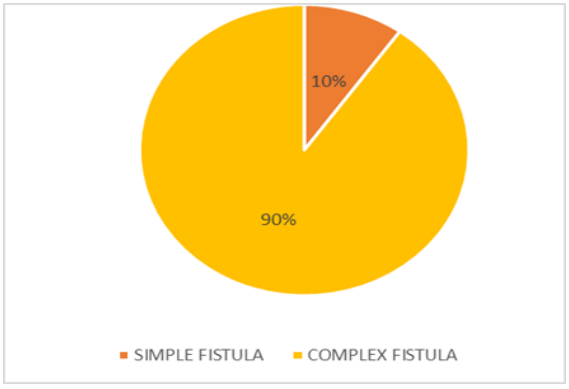

Fig 3. Distribution chart for Simple Fistula and Complex Fistula in fistula-in-ano cases.

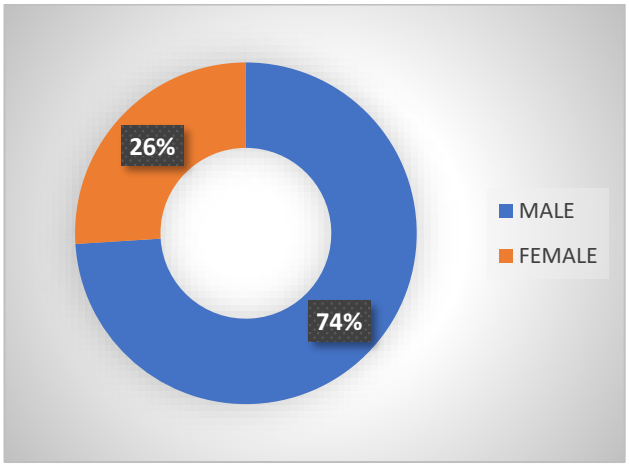

Fig 4. Distribution chart for fistula-in-ano affected Male and Female cases.

Comparative Distribution of Fistula Procedures

Table 2-Distribution of Fistula Procedures (n=457)

Fistula Type	Percentage (%)
Posterior	50.0%
Transphincteric	24.1%
Anterior	16.7%
Combined	33.3%
Supralevator Extension	21.0%
Extrasphincteric	0.4%

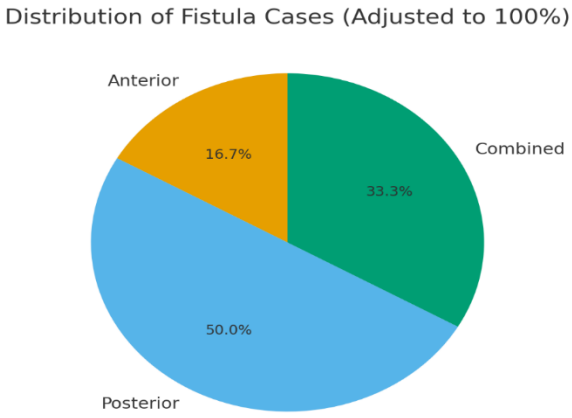

Fig 5. Distribution chart for fistula type and their percentage of fistula-in-ano cases.

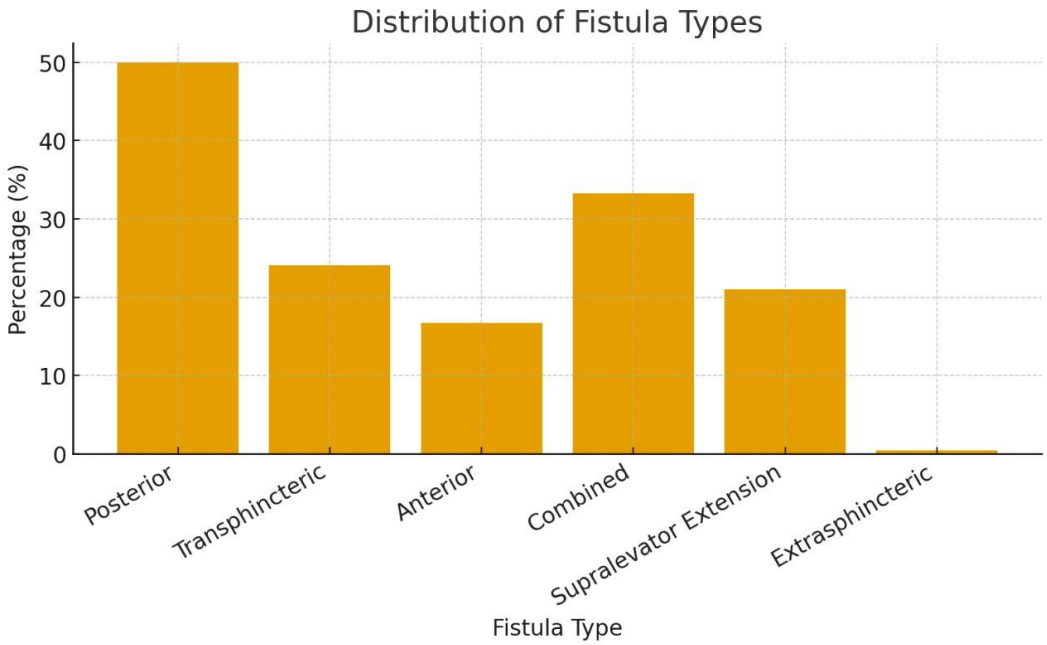

Fig 6. Bar Graph for fistula type vs percentage in fistula-in-ano cases.

Table 2 – Summary of Recurrent Fistula Cases

Case	Age/Sex	Fistula Type	First Procedure	Subsequent Procedure	Remarks
1	57/M	Complex; EO 6 & 11	Fistulotomy + TROPIS + lateral excision + curettage	Perianal hematoma evacuation	Wound healed
2	36/M	Suprasphincteric; EO 3, IO 2; 4 cm	Fistulectomy + curettage + drainage + TROPIS	Curettage + lay-open fistulotomy + biopsy	TB positive
3	48/M	Complex; EO 12–2	I&D + curettage	I&D + TROPIS	Wound healed
4	35/F	Anterior complex; multiple EOs	fistulectomy + curettage + lateral sphincterotomy	Seton placement & changes	Wound healed
5	35/M	Complex; IO 6, EO 4	TROPIS + tunnel fistulotomy	fistulectomy + biopsy	Wound healed
6	25/M	Complex; EO 5 & 7 + intersphincteric abscess	fistulotomy + MAD + drainage	TROPIS for low tract	Wound healed
7	39/M	Complex with abscess; IO 6, EO 10	I&D	Post-abscess drainage + curettage	Wound healed
8	31/F	Complex	Abscess drainage + curettage + fistulectomy + biopsy + repair	I&D + tract cleaning	Wound healed
9	37/M	Anterior long complex; EO at scrotum	fistulectomy + sphincterotomy + closure	—	Wound healed
10	34/M	Low intersphincteric; EO 7, IO 6	fistulectomy + biopsy	Curettage + biopsy	Wound healed
11	45/M	Complex; EO 6, IO 6	Curettage + TROPIS + lavage + drainage	fistulotomy + biopsy	Wound healed

12	35/M	Complex; IO 6, EO 3–10	fistulectomy + curettage + biopsy	Recurrent transsphincteric + deroofing	Wound healed
13	32/M	Multiple anterior horseshoe fistula; initial intersphincteric, later anterior transphincteric	**1 fistulotomy + curettage + biopsy + TROPIS 2 Redo anterior transphincteric excision + primary sphincter repair (post-chemotherapy for histiocytic lymphoma) 3 Recurrent anterior fistula fistulotomy + curettage + biopsy 4 Complex recurrent anterior fistula – Incision & drainage + wide excision of external opening + fistulotomy + curettage + irrigation + biopsy**	---	TB positive; Histiocytic lymphoma (post-chemotherapy); wound healed
14	55/M	Complex posterior; initial high transsphincteric with deep postanal extension	**1 Fistulotomy + TROPIS + deep postanal drainage 2 TROPIS + I&D 3 Recurrent high transsphincteric – Fistulotomy + wide excision of internal opening**	---	Multiple recurrences managed surgically; wound healed
15	40/M	Multiple with hidradenitis	excision + closure + tunnel fistulectomy	Transphincteric recurrence; fistulotomy + repair + biopsy	Wound healed
16	47/M	Suprasphincteric; EO 6	Core fistulectomy + sphincter repair	Recurrent transphincteric; fistulectomy + sphincterotomy + repair	Wound healed
17	40/M	Intersphincteric + supralevator	fistulectomy + TROPIS + curettage	Recurrent high transphincteric + deroofing + wide IO excision + curettage	TB positive; wound healed
18	45/M	Complex Fistula	I&D	Curettage + TROPIS + Lavage + Drainage	Wound healed
19	34/F	Complex Fistula	Quack treatment	TROPIS + fistulotomy + Abscess drainage + Curettage	Wound healed
20	14/M	Simple Fistula	I&D	fistulotomy + I&D	Wound healed
21	47/M	Complex Fistula	I&D	excision + Fistulectomy + Primary sphincter repair Redo surgery	Wound healed

“Recurrent Fistula-in-Ano Cases: Overview of 21 Patients”

Parameter	Summary
Total cases	21
Gender	17 M, 4 F

Age range	14–57 years
Fistula type	Complex: 17 Suprasphincteric: 2 Intersphincteric/low: 2 Horseshoe/anterior long complex: 2 Associated with hidradenitis: 1
Initial procedures	Fistulotomy/TROPIS/curettage/fistulectomy: majority Other: fistulotomy, abscess drainage, seton placement, sphincter repair
Subsequent procedures	Redo fistulotomy/fistulectomy, TROPIS, curettage, deroofing, seton changes, biopsy, primary sphincter repair
Special conditions	TB positive: 3 post-chemotherapy histiocytic lymphoma: 1
Recurrence pattern	Multiple recurrences in complex, suprasphincteric, or anterior/transsphincteric fistulas
Outcome	All wounds healed after repeat procedures

Abbreviations

- EO – External opening
- IO – Internal opening
- TROPIS – Transanal Opening of Intersphincteric Space
- I&D – Incision & drainage
- MAD – Multiple abscess drainage
- TB – Tuberculosis

Algorithm for Fistula Patient Evaluation and Surgical Management

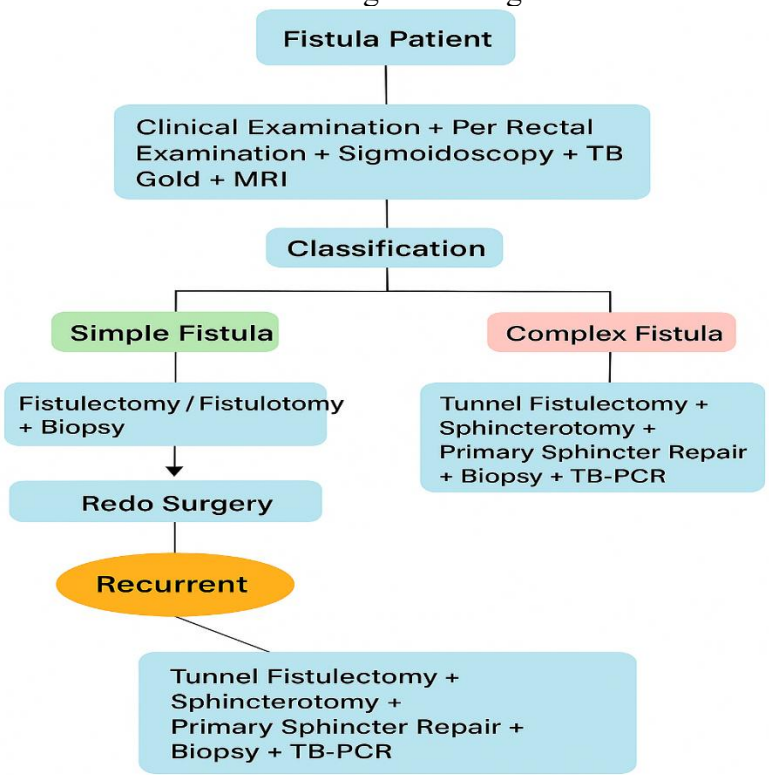

Fig 7. Workflow of patients' evaluation and surgical management in fistula-in-ano cases.

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2. METHODS AND MATERIALS:

All patients underwent detailed clinical evaluation, including history of inflammatory bowel disease or tuberculosis, digital rectal examination, sphincter tone assessment, and probing of the tract with documentation of external openings, internal opening, course, and any supralevator extension.

Investigations comprised flexible sigmoidoscopy, MRI fistulography, and microbiological tests. Discharge was analysed with TB-PCR, enabling rapid detection of *Mycobacterium tuberculosis* DNA even when smear or culture was negative, a key advantage in endemic regions. In addition, the QuantiFERON-TB Gold assay was performed to identify latent or active infection. Together, TB-PCR and QuantiFERON-TB Gold ensured accurate diagnosis or exclusion of tubercular aetiology, guiding surgical and medical management.

Pre-Implementation Cohort, patients underwent fistulectomy with curettage using a sphincter-preserving technique. The surgical approach was deliberately limited, entailing selective division of only the subcutaneous and superficial fibres of the external sphincter, thereby reducing the risk of sphincter injury and preserving continence.

Post-Implementation Cohort, the operative strategy was tailored to the configuration of the fistulous tract and intraoperative findings. Procedures included fistulectomy, tunnel fistulectomy, primary sphincter repair, curettage, biopsy, and sphincterotomy, as clinically indicated. Following advanced training in sphincter-cutting techniques, the surgical team adopted a more selective yet assured approach. In the post-implementation cohort, patients underwent a wide excision of the internal opening together with the associated cryptoglandular apparatus. The procedure also included division of a portion of the external anal sphincter—subcutaneous, superficial, deep, or all three components—depending on the anatomical type and complexity of the fistula tract. This approach ensured complete eradication of the infected glandular tissue while maintaining optimal sphincter function.

Postoperatively, patients were advised to attend follow-up once weekly for the first three weeks, and thereafter fortnightly until complete wound healing. Patients were initially advised to take a liquid diet for three days before resuming a normal diet after five days. At each visit, the wound was assessed for suture breakdown, infection, or erythema, while caregivers received guidance on proper wound care and handling to promote recovery and prevent complications.

In our cohort, 9.01% of patients were found to be TB positive, and initiation of anti-tuberculosis treatment (ATT) was advised for these individuals. The first patient, however, declined ATT, developed a recurrence, and required redo surgery, after which ATT was again recommended. Similarly, the second patient refused ATT, experienced recurrence, and was subsequently lost to follow-up.A patient was considered eligible if any of the following criteria were met: tuberculosis (TB) positivity, multiple external openings, recurrent fistula, supralevator extension, or the presence of pus for TB-PCR testing. TB positivity was confirmed either by a positive TB-PCR result from the specimen or by biopsy demonstrating any evidence of tuberculosis.

In our series, many patients underwent redo surgery two to three times. Some TB-positive patients, unable to complete anti-tubercular therapy, subsequently experienced recurrence.

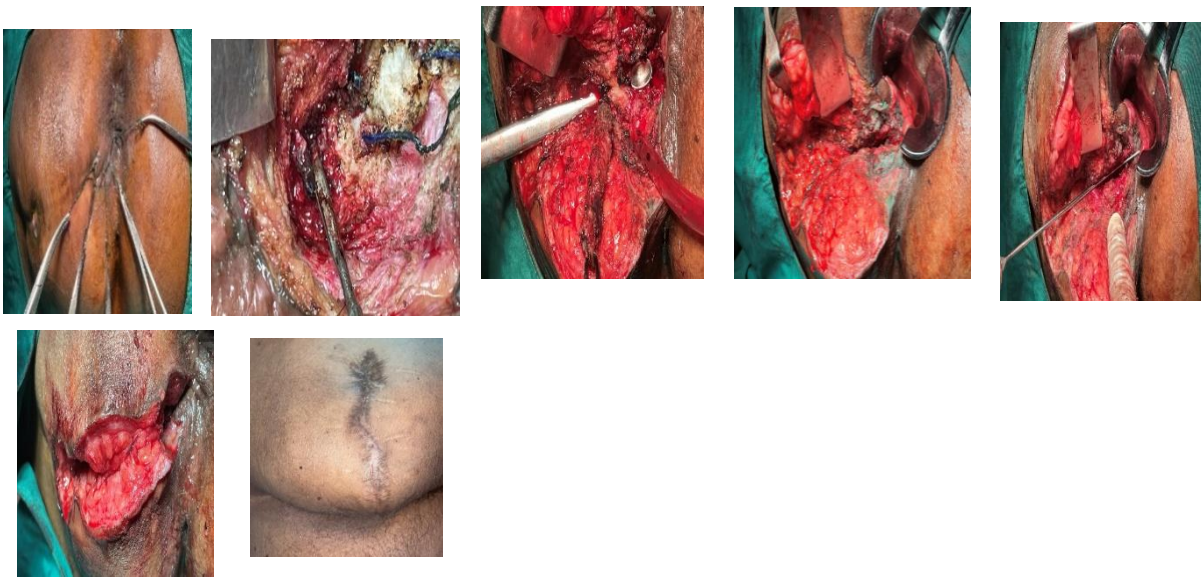


Fig 8. Fistula-in-ano surgery done for a 50-year-old male

A 50-year-old male presented with five setons placed in the anal canal and an external opening located at the 7 o'clock position, approximately 10 cm from the anal verge (Figure 8 (A)). Fistulectomy was performed with removal of all setons, followed by wide excision of the internal opening at the 6 o'clock position, encompassing the cryptoglandular complex (Figure 8 (B)). The ischiorectal space was thoroughly explored (Figures 8 (C) - 8 (E)). In Figure 8 (D), a curette is shown being passed above the deep part of the external anal sphincter prior to sphincterotomy, ensuring complete tract clearance. Figure 8 (E) demonstrates full exposure of the deep component of the tract, while Figure 8 (F) shows the passage of a fistula probe through the tract for confirmation of complete excision. The wound was subsequently closed with 2-0 interrupted sutures (Figure 8 (G)), and complete healing was achieved on follow-up.

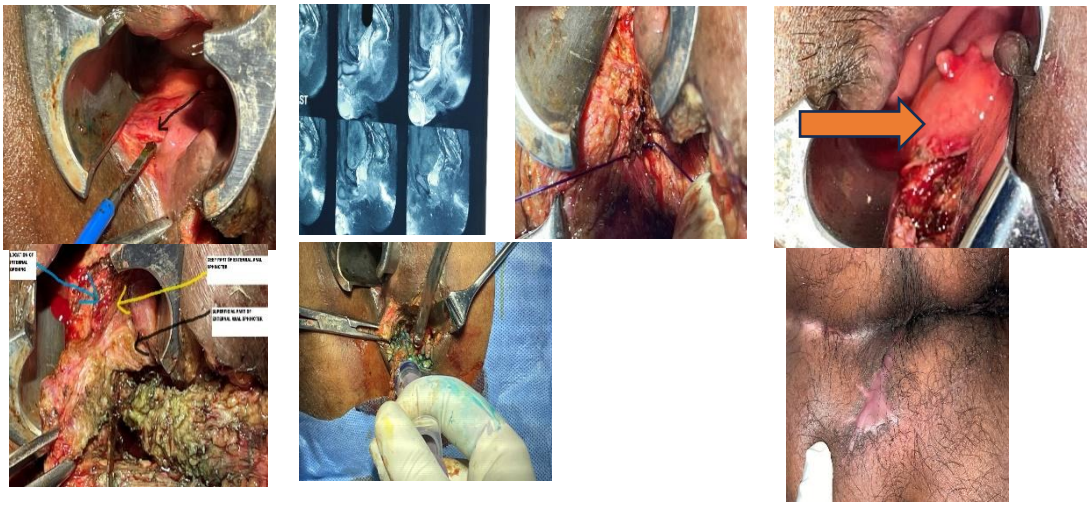


Fig 9. Fistula-in-ano surgery done for a 40-year-old male

A 40-year-old male with an external opening at 5 o'clock and an internal opening at 6 o'clock, showing a supralevator tract at the anorectal region. Total fistulectomy was performed. The deep part of the external sphincter was involved and repaired primarily using 2-0 sutures. The wound has healed with minimal scarring.

Fig 10. Fistula-in-ano surgery done for a 38-year-old male

A 38-year-old male with multiple external openings at 7 and 9 o'clock, with setons in place. A Y-shaped tract was noted, leading to a single internal opening at the 6 o'clock position. The ischiorectal fossa was fully explored.

2.1 TECHNIQUES:

All patients underwent tunnel fistulectomy, sphincterotomy, primary sphincter repair, curettage of the residual deep cavities at the level of puborectalis, and biopsy. Primary sphincter repair was performed using 2-0 polydioxanone (PDS) suture material, size 30 mm and length 70 cm, applied in a simple interrupted technique. Polydioxanone was specifically chosen for its long-lasting absorbable properties and minimal tissue reactivity, thereby providing durable support to the sphincter while reducing the risk of foreign-body reaction or early suture failure. The skin was left open.

Postoperatively, patients were advised to refrain from squatting, prolonged sitting, and the use of Indian-style toilets for a period of two weeks. A liquid diet was prescribed for the first five days to minimise strain during defecation and to facilitate early wound healing. Wound care was delegated to the patient's attendants, who were carefully instructed in home-based management. This typically consisted of gentle irrigation of the wound with clean tap water followed by the application of povidone-iodine powder. The mean duration of wound healing was approximately six to eight weeks.

Cleveland Clinic Florida Incontinence Score.

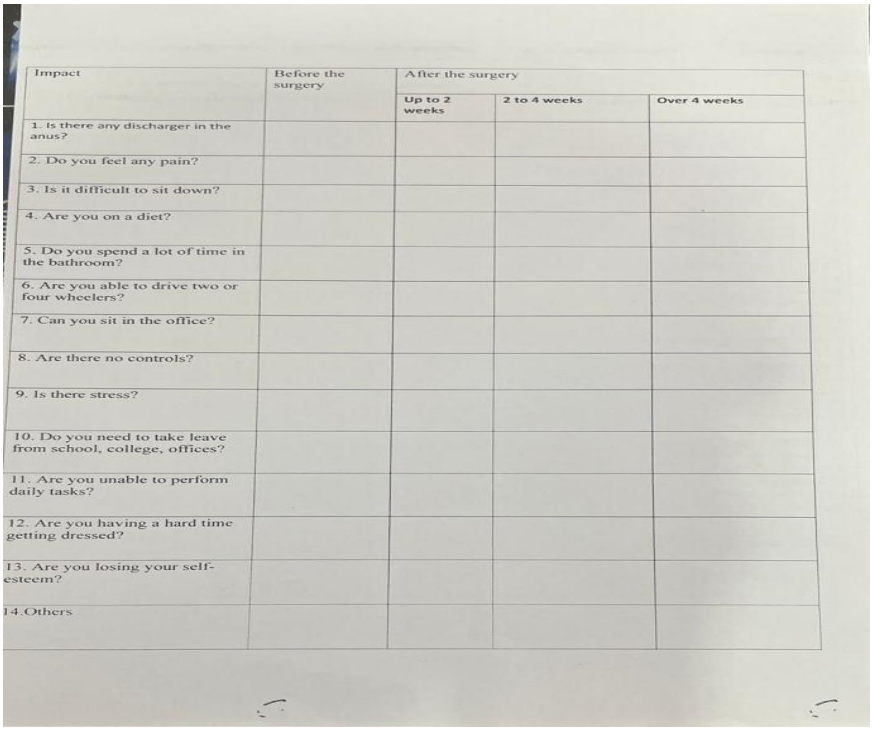
Cleveland Clinic Florida Fecal Incontinence Score

Type of incontinence	Frequency of incontinence				
	Never	Rarely	Sometimes	Usually	Always
Solid	0	1	2	3	4
Liquid	0	1	2	3	4
Gas	0	1	2	3	4
Pad usage	0	1	2	3	4
Impact on lifestyle	0	1	2	3	4

A score of 0 = perfect continence; 20 = complete incontinence
Never = 0; rarely = <1/month; sometimes = >1/month; usually = >1/week, <1/day; always = >1/day.

In our patients, the Cleveland Clinic Florida Fecal Incontinence Score was used to monitor continence. None of the patients experienced solid or liquid stool incontinence, and pad usage was not required. Gas leakage occurred during the first postoperative week, but there were no restrictions on lifestyle. The scoring chart was provided to 80% of the patients for self-monitoring and reference.

2.2 POSTOPERATIVE IMPACT ASSESSMENT QUESTIONNAIRE FOR FISTULA SURGERY PATIENTS:



Impact	Before the surgery	After the surgery		
		Up to 2 weeks	2 to 4 weeks	Over 4 weeks
1. Is there any discharger in the anus?				
2. Do you feel any pain?				
3. Is it difficult to sit down?				
4. Are you on a diet?				
5. Do you spend a lot of time in the bathroom?				
6. Are you able to drive two or four wheelers?				
7. Can you sit in the office?				
8. Are there no controls?				
9. Is there stress?				
10. Do you need to take leave from school, college, offices?				
11. Are you unable to perform daily tasks?				
12. Are you having a hard time getting dressed?				
13. Are you losing your self-esteem?				
14.Others				

Fig 11, Evaluation questionnaire on patient's recovery and quality of life.

This questionnaire is designed to systematically evaluate the patient's recovery and quality of life before and after fistula surgery. It helps assess physical comfort, daily activity levels, emotional well-being, and functional outcomes during the postoperative period.
Patients are asked to respond to each question based on their experience:

- **Before the surgery**
- **After the surgery** at three intervals:
  - *Up to 2 weeks*
  - *2 to 4 weeks*
  - *Over 4 weeks*

Each question addresses a specific impact area such as pain, discharge, sitting discomfort, dietary restrictions, personal care, stress, mobility, and social participation. The responses help clinicians monitor recovery progress, identify complications, and provide timely interventions or counselling when needed.
This scoring tool may also be used in audits or research to quantify postoperative recovery trends and patient satisfaction following different surgical techniques.

2.3 FOLLOW UP:

"During the follow-up period, patients were monitored closely for bowel function and wound healing. Stools were passed normally in all cases. In instances of constipation, laxatives were available; however, none of the patients required them for bowel evacuation. A few patients experienced increased bowel frequency, for which antidiarrhoeal medication was administered. Mild incontinence—either to stool or flatus—was observed in some patients during the first seven postoperative days.
The surgeon regularly evaluated the wound site for any evidence of suture breakdown, signs of infection, or abnormal erythema. Photographic documentation of the wound was undertaken at regular intervals to objectively assess healing progress. Attendants were instructed on proper wound care and handling techniques to ensure optimal healing and prevent postoperative complications.
Patients were reviewed weekly for the first two weeks and thereafter once every ten days.

3. SUMMARY OF FINDINGS:

This series included 21 patients with recurrent fistula-in-ano following primary procedures. The majority were complex fistulae (including suprasphincteric, transsphincteric, and horseshoe tracts).

- Healing rate: 21/21 patients achieved complete wound healing.
- Persistent issues: 1 patient had persistent pain, 1 had ongoing pus discharge, and 42 were diagnosed with TB-related fistulae.
- Common recurrence patterns: High transsphincteric tracts and supralevator extensions were more prone to recurrence.
- Management strategies: Secondary procedures included fistulotomy/fistulectomy, TROPIS, seton application, wide excision, and targeted abscess drainage.

Overall, despite the complexity of cases, a high rate of wound healing was achieved, highlighting the role of multimodal and sphincter-sparing techniques in recurrent fistula management.

4. DISCUSSION:

This single-surgeon audit spans from May 2019 to the present. Initially, a simple sphincter-preserving approach was employed, limited to fistulectomy with curettage and selective division of superficial external sphincter fibres, thereby reducing the risk of continence impairment.
With further training and experience, the operative strategy evolved to a more tailored approach based on tract configuration and intraoperative findings. Advanced procedures, including tunnel fistulectomy, primary sphincter repair, biopsy, and selective sphincterotomy, were introduced as indicated. Partial division of the internal sphincter was undertaken only when necessary to ensure drainage and clearance, with continence preservation remaining a priority.

Meticulous attention was also given to curettage of the internal opening, particularly in cases with raw surfaces or pilonidal components. Overall, the surgical philosophy shifted from a conservative technique to a selective, advanced approach, aiming to balance eradication of disease with preservation of function.

MRI is immensely beneficial to assess high fistulas, especially supralevator and suprasphincteric fistulas, and fistulas extending into the pelvis[5]

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