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"COMPARISON OF FISTULECTOMY AND FISTULOTOMY WITH MARSUPIALIZATION IN THE MANAGEMENT OF SIMPLE ANAL FISTULA."

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INTRODUCTION

Fistula-in-ano, commonly referred to as anal fistula, represents a prevalent benign anorectal condition characterized by an abnormal pathological communication between the anal canal and the perianal skin. The condition consists of a primary opening within the anal canal at or near the dentate line and a secondary opening in the perianal tissue, typically lined with inflammatory granulation tissue and epithelialized sinus tract walls.[1] Anal fistulas represent the chronic manifestation of perianal abscess and result from infection of specialized anal glands located in the intersphincteric space.[2] The condition presents considerable clinical challenges in surgical management, primarily owing to its well-recognized high recurrence rate ranging from 7% to 57% depending on fistula characteristics and surgical technique employed, prolonged wound healing time, significant risk of postoperative complications including fecal incontinence and substantial impact on patient quality of life and social functioning.[2,3]

The prevalence of anal fistula demonstrates considerable geographic variation with recent European epidemiological studies reporting an overall prevalence of 18.37 (95% confidence interval: 18.20-18.55) cases per 100,000 individuals.[4] However, estimates from other regions vary considerably with incidence rates reported as 8.6 per 100,000 in Finland, 1.04 per 10,000 in Spain and 2.32 per 10,000 in Italy.[5] The condition demonstrates significant gender predisposition, affecting males more commonly than females with a consistent male-to-female ratio of approximately 1.8 to 2.0:1 across multiple populations. Anal fistula

predominantly affects individuals in their productive years of life with a mean age of presentation reported between 38 to 40 years, representing a considerable source of morbidity in the working-age population.[4,5] The epidemiology of anal fistula has shown a notable increasing trend in diagnosis after the year 2000, likely attributed to improved diagnostic capabilities, enhanced clinical awareness and increased utilization of sophisticated imaging modalities such as magnetic resonance imaging and endorectal ultrasound.[4]

Cryptoglandular infection accounts for the vast majority of anal fistulas, representing approximately 85-90% of all cases resulting from infection of specialized anal glands known as proctodeal glands, which are located within the intersphincteric space between the internal and external anal sphincters. According to the cryptoglandular theory initially proposed by Parks, infection of these glands is initiated by bacteria entering through the anal crypts at the dentate line, leading to obstruction of gland ducts and subsequent abscess formation within the intersphincteric space. However, anal fistulas may also develop secondary to various alternative etiological factors including Crohn's disease representing a particularly complex subset, anorectal trauma from obstetric injury or surgical procedures, radiation therapy to the pelvic region, specific infections such as tuberculosis and actinomycosis, sexually transmitted infections including chlamydial infections and rarely, underlying anorectal malignancy.[1,2] Simple anal fistulas, which constitute the focus of this comparative study are typically characterized as low-lying lesions with straightforward, readily identifiable tracts without complex anatomical relationships to the sphincter mechanism in marked contrast to complex fistulas that may traverse multiple sphincter complexes, possess multiple tracts, demonstrate circumferential involvement, or exhibit horseshoe configurations.[2,3]

The Parks classification system described by Parks, Gordon and Hardcastle in 1961, remains the internationally recognized gold standard for categorizing anal fistulas based on their precise anatomical relationship to the external and internal anal sphincter muscles. According to this seminal classification, anal fistulas are divided into four main anatomical types: intersphincteric (grade I) representing those with tracts confined to the intersphincteric space, transsphincteric (grade II) involving penetration through the external sphincter, suprasphincteric (grade III) extending above the external sphincter and extrasphincteric (grade IV) representing those with complex courses unrelated to the dentate line.[6] Epidemiological data demonstrates that approximately 70% of all cryptoglandular anal fistulas are intersphincteric in nature, followed by transsphincteric fistulas representing 20-25% of cases.[4,5] Additionally, fistulas are clinically categorized into two distinct groups: simple fistulas characterized by a readily palpable, uncomplicated tract from the external opening to the anal verge, typically involving minimal sphincter tissue, representing approximately 85% of cryptoglandular fistulas; and complex fistulas demonstrating secondary tracts, multiple openings, horseshoe configuration, or extensive sphincter involvement.[1,3]

The surgical treatment for anal fistula remains the complete eradication of the fistulous tract and associated sepsis while rigorously preserving the anorectal continence mechanism, a delicate balance representing the fundamental challenge in fistula surgery.[1] Multiple diverse surgical approaches have been developed and refined over decades for the management of simple anal fistulas, each with distinct and often

competing advantages and disadvantages regarding healing time, recurrence rates, continence preservation, patient morbidity and functional outcomes.[3,5]

Fistulotomy, also referred to as the laying-open technique, involves complete division and opening of the fistulous tract along its entire length with meticulous curettage of granulation tissue and subsequent healing by secondary intention.[3] This technique has been considered the time-honored gold standard for simple anal fistulas and remains the most widely performed procedure globally due to its technical simplicity and effective outcomes.[5] Extensive clinical experience and previous systematic reviews have demonstrated exceptional healing rates ranging from 85% to 98.6% in appropriately selected patients with simple fistulas, particularly when rigorous patient selection criteria are applied and patients demonstrate compliance with postoperative wound care. The technique possesses several inherent advantages including relative technical simplicity, straightforward operative approach, minimal operative time typically requiring less than 20 minutes and excellent long-term healing outcomes with reported recurrence rates as low as 0-18% depending on patient population and follow-up duration.[7,8]

Fistulectomy, in contrast, involves complete surgical excision of the entire fistulous tract in continuity, thereby theoretically eliminating the potential risk of missing secondary tracts and providing complete tissue removal for comprehensive histopathological examination to exclude malignancy. However, this approach is considerably more technically demanding and challenging, particularly in cases where fistula tract walls are poorly defined or characterized by minimal fibrosis. Complete tract excision frequently results in greater tissue trauma to surrounding structures including sphincter muscle fibers and adjacent tissues, potentially leading to increased morbidity.[9] Although fistulectomy offers the theoretical advantage of complete tract removal potentially reducing recurrence, it has been associated with prolonged wound healing time, increased postoperative pain, higher rates of wound complications and potentially greater sphincter defects with increased risk of minor incontinence compared to fistulotomy approaches.[10,11]

Marsupialization represents an innovative adjunctive surgical technique that involves partial epithelialization achieved by suturing the epithelialized margins of the laid-open fistulotomy tract to the underlying dermis and subcutaneous tissue, thereby substantially reducing the size of the raw unepithelialized wound surface requiring epithelialization. The underlying theoretical rationale for employing marsupialization is multifaceted: decreasing the total wound surface area requiring epithelialization by secondary intention, thereby accelerating the overall wound healing process; reducing postoperative blood loss and wound exudation; decreasing the duration and volume of wound discharge; potentially improving patient comfort and quality of life in the immediate and early postoperative period; and maintaining the advantages of fistulotomy regarding sphincter preservation while addressing the disadvantage of prolonged wound healing time.[12] Recent surgical innovations have introduced marsupialization as an increasingly utilized adjunct to both fistulotomy and fistulectomy techniques to optimize clinical outcomes and improve patient satisfaction.[13]

SURGICAL ANATOMY

A clear understanding of the anorectal anatomy is essential for accurate diagnosis and effective surgical management of fistula-in-ano.[14] The hindgut originates from the secondary yolk sac and develops into the rectum, upper anal canal and part of the genitourinary tract. The cloaca is formed and later divided by the urorectal septum into a dorsal rectum and a ventral urogenital sinus.[15] The lower anal canal develops from the proctodeum, while the upper part is derived from endoderm. The junction of these two parts corresponds to the level of the anal valves.[16]

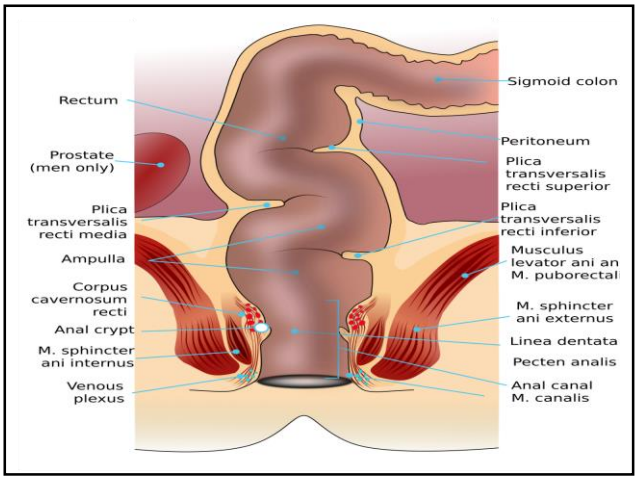


Fig. 1: Anatomy of the Rectum and Anal canal

The rectum extends from the rectosigmoid junction at the level of the third sacral vertebra to the anal canal, measuring approximately 18-20 cm. It follows the curvature of the sacrum and forms the anorectal angle of about 120° due to the pull of the puborectalis muscle. Internally, it contains mucosal folds known as the valves of Houston, with the middle (Kohlrausch's fold) being the most prominent and marking the rectal ampulla. The rectum is divided into upper, middle and lower thirds based on peritoneal covering. The lower third lacks peritoneum and contains important fascial layers - Denonvilliers' fascia anteriorly and Waldeyer's fascia posteriorly, which serve as key surgical landmarks. The rectum lies anterior to the bladder and reproductive organs, laterally to the levator ani and ischiorectal fossae and posteriorly to the sacrum. It is enclosed by fascia propria and supported by lateral ligaments attaching it to the sacrum.[17]

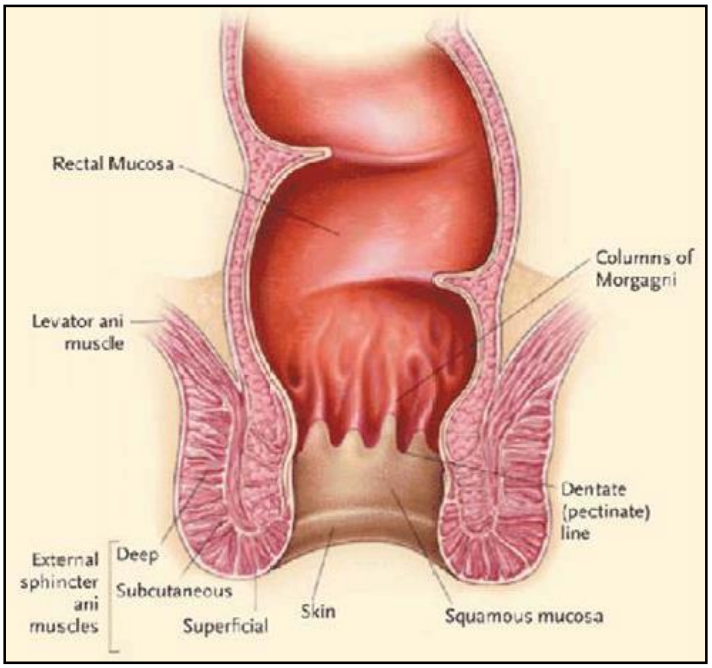


Fig. 2. Lower Rectum and Anal canal

The anal canal is about 4 cm long and extends downward and backward from the rectum to the anus. It is surrounded by internal and external anal sphincters which maintain continence. Posteriorly, it is related to the coccyx, anteriorly to the urethra in males or vagina in females and laterally to the ischiorectal fossae.[18] The mucosa of the upper anal canal resembles that of the rectum and is lined by columnar epithelium with a rich venous plexus.[19] The lower part is lined by non-keratinized stratified squamous epithelium, which gradually transitions into skin at the anal verge. Anal columns contain terminal branches of vessels and are connected by anal valves forming anal sinuses. These structures are important sites for hemorrhoids and infections. The region below the valves forms a transitional zone lined by non-keratinized squamous epithelium.[20]

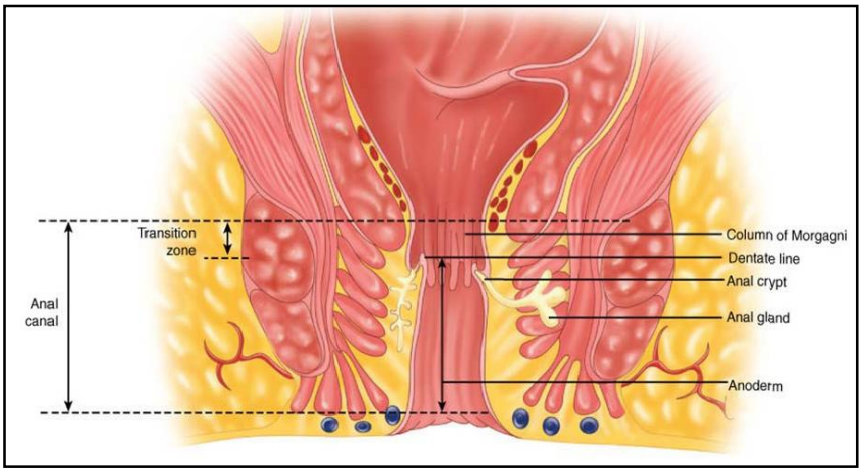


Fig. 3: The lining of the anal canal

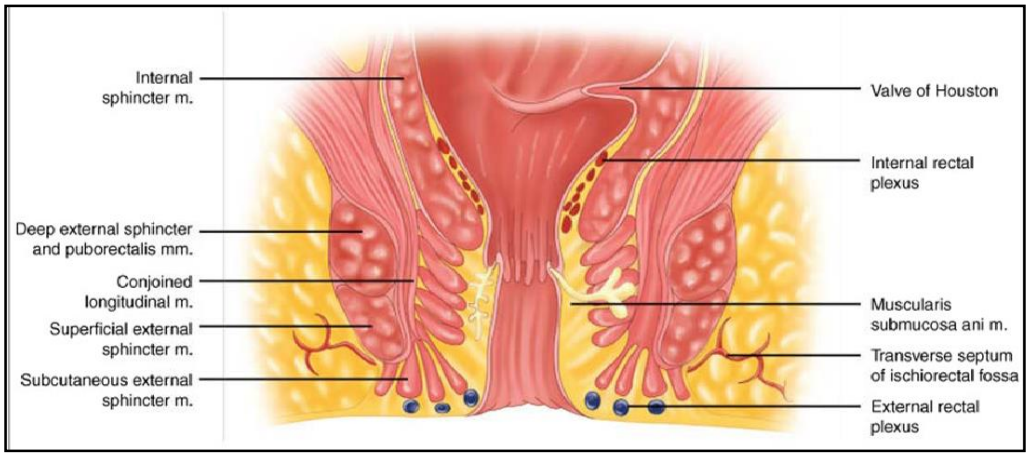


Fig. 4: The distal rectum and anal canal

The dentate (pectinate) line serves as a crucial anatomical landmark in the anal canal and represents the embryological boundary between visceral tissue above and somatic tissue below. The mucosa above this line receives autonomic innervation and is relatively insensitive to pain, whereas the skin below is supplied by the inferior rectal branch of the pudendal nerve and is highly sensitive. Venous drainage differs, with the upper part draining into the portal system and the lower part into the systemic circulation, influencing the spread of malignancy. Lymphatic drainage above the line follows rectal pathways, while below it drains toward inguinal lymph nodes. Internal hemorrhoids arise above this level, while fissures below it are painful. Infection of anal glands opening above the valves may lead to abscess formation and spread to perianal or ischiorectal spaces, and stimulation near this region can influence sphincter tone.[21]

The anal valves of Ball are crescent-shaped folds connecting the columns of Morgagni and forming the dentate line. These are remnants of embryological fusion of the post-allantoic gut with the proctodeum and have no functional significance in adults. The crypts of Morgagni are small recesses at the lower ends of the anal columns where anal glands open through narrow ducts. These ducts may extend into the internal sphincter and surrounding tissues. Infection of these glands is the most common cause of anorectal abscesses and fistula formation and may also represent a site of origin for adenocarcinoma.[20]

The musculature of the anal canal includes the internal and external sphincters along with supporting muscles. The internal anal sphincter is an involuntary smooth muscle formed by the continuation of rectal circular muscle and maintains resting tone. The external anal sphincter is a voluntary skeletal muscle composed of subcutaneous, superficial and deep parts, encircling the canal and providing voluntary control of continence. The longitudinal muscle extends from the rectum and blends with the sphincter complex, inserting into perianal skin. The levator ani muscle forms the pelvic diaphragm, with the puborectalis forming a sling at the anorectal junction that maintains the anorectal angle. These structures together form the anorectal ring, an important surgical landmark whose damage can result in fecal incontinence.[20,22]

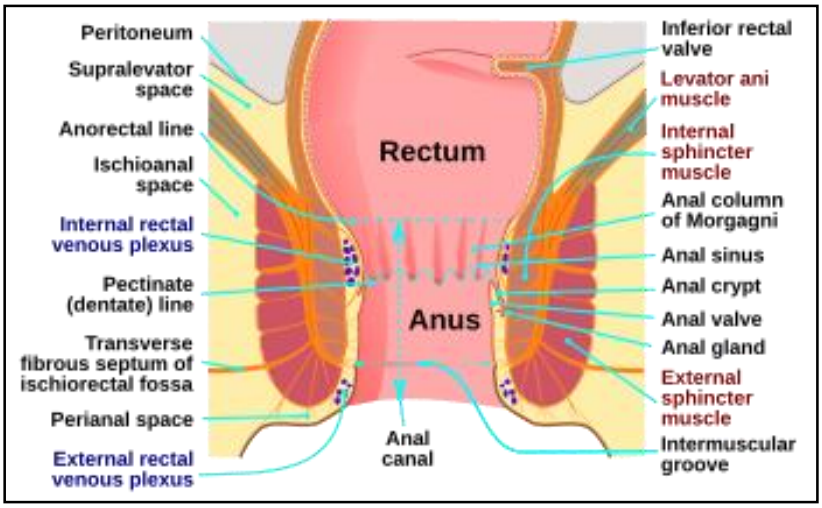


Fig 5. Anal Musculature

The spaces related to the anal canal include the perianal space, which contains fat and the lower part of the external sphincter, and the subcutaneous space located between the internal sphincter and mucosa containing the hemorrhoidal plexus. The supralevator space lies above the levator ani and communicates with surrounding spaces. The ischiorectal fossa is a fat-filled space on either side of the anal canal that allows spread of infection and communicates across the midline, leading to horseshoe abscess formation.[23,24]

The fascia lunata covers the ischiorectal fossa and extends medially over the levator ani and laterally over the obturator internus. It encloses the pudendal canal, which runs along the lateral wall of the ischiorectal fossa and contains the internal pudendal vessels and pudendal nerve supplying the anal region.[25]

The arterial supply of the rectum is mainly from the superior rectal artery, a continuation of the inferior mesenteric artery, with additional supply from the middle rectal artery from the internal iliac artery and the inferior rectal artery from the internal pudendal artery.[26] The middle sacral artery contributes to the posterior rectal supply and forms anastomoses with these vessels.[27]

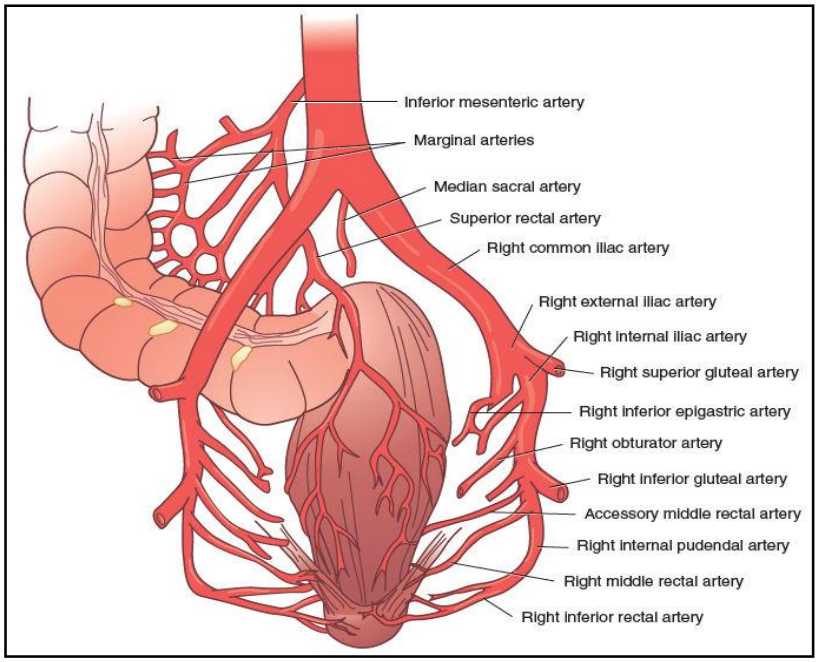


Fig. 6: Arterial Supply of Rectum and Anal Canal

Venous drainage is through internal and external rectal venous plexuses. The internal plexus drains into the portal system via the superior rectal vein, while the external plexus drains into the systemic circulation through the internal pudendal and internal iliac veins, forming a portosystemic anastomosis. Lymphatic drainage occurs through superior rectal, middle rectal and inguinal lymph nodes, depending on the level.38 The nerve supply of the rectum is through the autonomic nervous system via the hypogastric plexuses, with sympathetic and parasympathetic fibers supplying the internal sphincter. The external sphincter and levator ani receive somatic innervation from the pudendal nerve and sacral nerves, providing voluntary control.[28]

PHYSIOLOGY

Anorectal continence is preserved through several coordinated mechanisms. The primary factor is the action of the puborectalis muscle, which forms a sling around the anorectal junction and creates the anorectal ring. This muscular loop pulls the rectum forward and maintains the crucial angle necessary to prevent involuntary stool passage. Additional mechanisms include the inherent resting tone of the internal anal sphincter, voluntary contraction of the external anal sphincter and the compressive effect of the gluteus maximus acting on the fat within the ischiorectal and ischioanal fossae. Together, these maintain the anal canal and lower rectum in a collapsed, closed state.[29]

Several theories have been proposed to explain continence:[30]

1. **Pressure Zone Theory** - Continence is aided by the higher resting pressure in the anal canal (20–120 mmHg) compared to the rectum (less than 20 mmHg).
2. **Flutter Valve Theory** - The levator ani at the anorectal junction functions like a flutter valve, helping preserve continence.
3. **Sling Theory** - The puborectalis muscle acts as a sling around the anorectal angle, serving as the central mechanism for continence.
4. **Cryptoglandular Theory** - Most anorectal infections originate from the anal glands, particularly along the posterior midline. These glands empty at the dentate line and may become infected with suppuration spreading into adjacent sphincter muscles, eventually forming a fistula-in-ano.

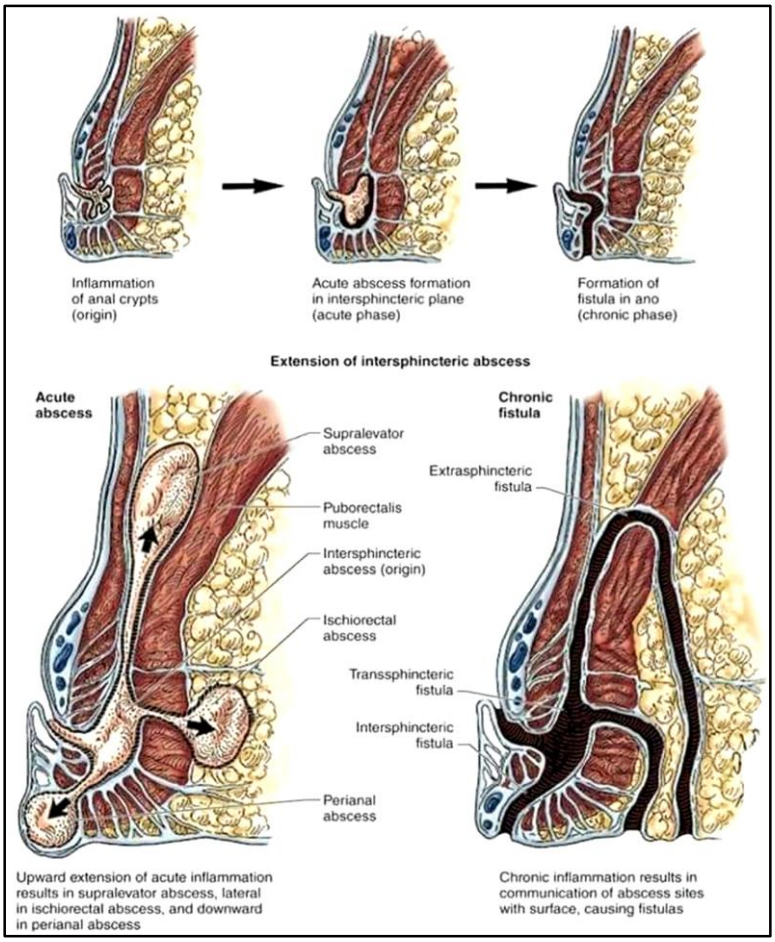


Fig. 7: Anorectal Abscess and Fistula in Ano Crypto glandular origin Theory

AETIOLOGY AND CLASSIFICATION

The term "fistula," derived from Latin for a reed or flute, in surgical terminology describes a chronic tract lined by granulation tissue that connects two epithelial surfaces either mucosal or cutaneous.[14] A fistula-in-ano is a granulating tract that opens internally into the rectum or anal canal and externally onto the perianal skin. On surgical exploration, the tract appears as a firm, fibrous tube lined internally with granulation tissue. When the fistula is laid open, the velvety granulation lining can be scraped away to reveal a white fibrous base, showing its full structure clearly.[30,31]

ETIOLOGY

Common causes of fistula-in-ano include:[32]

1. Previous pyogenic (perianal) abscess
2. Crohn's disease
3. Tuberculosis
4. Ulcerative colitis
5. Carcinoma of the rectum or anal canal
6. Lymphogranuloma venereum
7. Actinomycosis
8. Rectal or gynecological procedures

9. Pelvic inflammatory processes

PATHOLOGY

A fistulous tract typically has two openings - a primary opening within the anal canal or rectum and a secondary external opening on the skin. The tract is composed of fibrous tissue lined with unhealthy granulation tissue and remains chronically infected due to continuous contamination by fecal matter and anal flora through the internal opening. Poor vascularity of surrounding fat further delays healing. Usually, the internal opening is single, although multiple external openings may be present, especially in conditions like tuberculosis or inflammatory bowel disease. Fistulae are more common posteriorly due to higher concentration of anal glands.[33]

- **Previous pyogenic abscess**:- Most anorectal abscesses originate from infection in anal crypts or glands and rarely resolve completely, often progressing to fistula formation if drainage is inadequate. Persistent internal opening allows repeated contamination, perianal fat favors infection persistence and sphincter muscles may hinder proper drainage. In children, congenital gland cysts are a common cause, whereas in adults fistula-in-ano is more frequent.[34]
- **Crohn's disease**:- Crohn's disease is an important cause of anorectal abscesses and fistulae. The incidence increases with large bowel and rectal involvement, and histological features such as non-caseating granulomas are commonly seen in fistulous tracts.[35]
- **Tuberculosis**: Tuberculous infection can lead to anorectal abscesses and fistula formation particularly in patients with pulmonary tuberculosis. Infection may occur by ingestion of infected sputum entering through mucosal abrasions, although its incidence has declined in recent years.[36]
- **Ulcerative colitis**: Ulcerative colitis may also result in anorectal complications including fistula-in-ano, though the incidence is comparatively lower than in Crohn's disease.
- **Carcinoma of rectum and anal canal**: Advanced malignancies of the rectum and anal canal may cause abscess formation in surrounding tissues, which can subsequently rupture and lead to fistula formation.[37]
- **Lymphogranuloma venereum**: This condition, more common in women, can cause strictures leading to abscess and fistula formation due to sexually transmitted infection.[38]
- **Actinomycosis**: Actinomycosis of the anorectal region is rare but leads to chronic fistulae with characteristic sulfur granule discharge and may originate from gastrointestinal infection.
- **Previous surgery or trauma**: Fistula-in-ano may develop following surgical procedures, obstetrical injuries or trauma to the perineum, particularly due to improper healing or infection

CLINICAL MANIFESTATIONS

The most frequent complaint in patients with fistula-in-ano is persistent discharge from the perianal region, which may be purulent, serous or occasionally blood-stained and often leads to irritation, itching and discomfort of the surrounding skin. Patients commonly give a history of a previous anal abscess that ruptured and continued to discharge intermittently or continuously, although in chronic cases this history may be absent. Continuous moisture may result in pruritus ani and soiling of undergarments.[39] On inspection, one or more external openings may be seen, often appearing as small red nodules of granulation tissue that discharge fluid

on pressure, though sometimes they are subtle and only detectable on compression. The surrounding skin may show redness, thickening or surgical scars, and small openings may be hidden within skin folds. Palpation helps in identifying induration and the direction of the tract; in superficial fistulas, a firm cord-like structure may be felt, whereas deeper fistulas may not be palpable. Digital rectal examination may reveal induration or an internal opening, commonly located in the posterior midline. Probing of the tract should be done gently, preferably under anesthesia, to avoid false passages; the direction of the probe helps distinguish low from high fistulas and assists in identifying the internal opening, sometimes with the aid of dyes.[40]

Proctoscopy helps locate the internal opening by observing pus discharge and determining whether it lies in the anal canal or rectum, and also allows assessment of rectal mucosa. Sigmoidoscopy is useful to exclude associated rectosigmoid pathology and is particularly indicated in older patients or when inflammatory bowel disease is suspected. Radiological investigations have limited routine use but are valuable in complex or recurrent cases; MRI provides accurate mapping of fistulous tracts, while fistulography and endosonography may be used selectively. Additional investigations such as barium enema and chest X-ray help detect associated bowel disease or tuberculosis. Routine laboratory tests including blood counts, ESR, blood sugar and renal function are performed in all patients, while culture and sensitivity guide antibiotic therapy. Histological examination of the excised tract is essential to determine the underlying pathology and exclude specific causes such as tuberculosis, fungal infections or malignancy.[41,42]

Fig. 10: Fistulogram X-ray

DIFFERENTIAL DIAGNOSIS

Although clinical examination usually identifies fistula-in-ano, several conditions may mimic its presentation. In males, anterior fistulas may arise from the urethra, while in females they may originate from the anal canal or an infected Bartholin's gland. Extension of abscesses into the scrotum in men or labia in women may also simulate fistula formation. Posterior fistulas may resemble pilonidal sinus, which is typically located further from the anus, often contains hair and has a single midline opening with smooth edges.[43] Suppurative hidradenitis presents with chronic inflammation, multiple sinus openings and purplish skin discoloration but usually produces minimal pus. In some cases, no external opening is visible, suggesting a

concealed fistula with a healed external opening. Idiopathic pruritus ani may also mimic fistula due to moisture and staining of undergarments. In females, vaginal discharge may be mistaken for anal discharge, emphasizing the importance of careful evaluation.[44]

MANAGEMENT OF FISTULA IN ANO

The only dependable method of treating fistula-in-ano is surgery. Spontaneous healing is extremely uncommon, so the presence of a symptomatic fistula is an indication for operative intervention. However, surgery carries risks of recurrence and impaired continence, especially in high or complex fistulae. These risks can be reduced by a sound knowledge of anorectal anatomy, accurate assessment of the fistula's level in relation to the sphincters and anorectal ring and careful surgical technique. Postoperative wound care is equally important, as proper healing must occur from the base of the wound outward, avoiding premature closure of skin over incompletely healed cavities.[43]

The general principle of surgery for fistula-in-ano is that a tract lying beneath an epithelial surface will heal only when it is laid open and converted into a surface wound, allowing epithelium to grow from the edges. Buic outlined key principles: the internal opening must be identified, the full extent of the tract and any branches must be defined, all portions external to the primary tunnel should be converted into open channels and the wound must be managed so it heals from the depths outwards without formation of new tracts.[44]

TECHNIQUES OF FISTULECTOMY

Three main operative approaches are described: laying open the fistula with healing by granulation, excision of the tract with primary suturing and laying open followed by immediate skin grafting. The choice of method depends largely on the relation of the fistula to the anorectal ring.[14,31] In subcutaneous, low anal and submucous fistulae, the risk of incontinence is minimal and the classical lay-open technique is safe. In high anorectal and pelvirectal fistulae with internal openings above the ring, simple laying open would divide the ring and cause incontinence; therefore, alternative strategies such as staged division or Seton techniques are required.[32,45]

- **Pre-operative preparation**: Patients are admitted before surgery and the bowel is prepared with enemas. A low-residue diet is given for one to two days. The perineal region is shaved and prepared, including the thighs if grafting is planned.
- **Anesthesia**: General anesthesia is preferred as it provides better operative conditions and avoids complications associated with spinal anesthesia.
- **Position of the patient**: The lithotomy position is ideal as it provides good exposure of the anal region.
- **Rectal toilet**: The perianal area is cleaned with antiseptic solutions to reduce bacterial load, though complete asepsis is not possible.

- **Operative procedure**: The main methods include laying open the tract, excision with primary closure and laying open with skin grafting. In the classical method, the tract is opened into a groove and allowed to heal by granulation.

- **Perianal fistula**: In simple perianal fistula, the tract is laid open after confirming its path by gentle probing. The internal opening must be carefully identified and the tract widely opened to ensure proper drainage. Packing is used to maintain patency and modifications may be done to prevent premature superficial healing.

The Management of Sphincter Muscles and Preservation of Continence

The most important factor in the lay-open operation is the level of the fistulous tract in relation to the sphincters and especially the anorectal ring. A significant portion of the sphincter can be divided without permanent incontinence if the anorectal ring remains intact, whereas division of the ring leads to loss of continence and sometimes rectal prolapse.[46] Therefore, careful preoperative and intraoperative assessment is essential to determine whether the internal opening lies above or below the ring. Low anal, subcutaneous and submucous fistulae can be safely incised, while high anorectal fistulae with openings above the ring require special approaches and must be managed cautiously.[47]

(1) Detailed Technique of Laying – Open Operation

In subcutaneous or low anal fistulae, the tract is identified and a probe is passed through it. The overlying tissues are incised along the probe, converting the tract into an open groove. Granulation tissue is removed, secondary tracts are explored and the wound edges are trimmed to form a shallow saucer-shaped defect for effective drainage and healing. In ischiorectal or high posterior horseshoe fistulae, the tract often extends around the anal canal and involves the ischiorectal fossa. The tract is laid open from the external opening, extensions are identified and curetted and a thorough search is made for the internal opening.

In pelvirectal fistulae, the tract extends above the levator ani into the supralevator space. Adequate drainage is achieved by enlarging the opening in the levator, the cavity is curetted and the lower tract is treated similarly, sometimes requiring a combined abdominal approach in extensive cases. High intermuscular fistulae must be carefully distinguished from anorectal fistulae to avoid injury. These are opened into the rectum under direct visualization, and postoperative follow-up is essential to detect residual infection.[48]

Postoperative wound care is essential to ensure healing and prevent recurrence. Dressings are changed regularly, the wound is kept clean and open and stool softeners are used to maintain smooth bowel movements and reduce strain on the wound. Frequent review is necessary to ensure proper healing from the depth and to prevent formation of hidden pockets of infection. If discharge persists, further exploration is required. Regular examinations also help detect complications such as fibrosis or anal narrowing, which may require intervention. Healing is usually slow and depends on the extent of the fistula. Low fistulae generally heal within 4–5 weeks, whereas extensive or high fistulae may take 12–16 weeks.[7]

(2) Fistulectomy with primary closure

In fistulectomy with primary closure, the tract is first laid open, but the overlying skin and subcutaneous tissue are preserved to allow later closure. This technique is best suited for simple, direct fistulae where the tract can be fully excised.[11] Complex high fistulae or those with multiple branches are not ideal for this method. Once the tract is excised and all granulation tissue removed, the wound is closed in multiple layers: deep interrupted sutures reapproximate the sphincter muscles, subsequent layers close the subcutaneous tissue and fine sutures close the mucosa and skin. Goligher also advocated this method, ensuring complete excision and meticulous layered closure.[14,49]

(3) Laying open the fistula followed by immediate skin grafting

Hughes popularized immediate Thiersch skin grafting after classic lay-open fistulotomy. After creating a saucer-shaped wound with trimmed edges, thin split-skin grafts are harvested from the thigh and applied to the granulating surface, secured by sutures and firm packing. Although Hughes reported high success, later series such as Goligher's found variable graft take and noted the time and technical difficulty involved. Because of these limitations, immediate grafting is now less commonly used.[50,51]

A Seton is particularly useful when the tract passes through a large portion of the sphincter at a high level, where complete division in a single stage would risk incontinence. In such cases, only part of the muscle is divided and a Seton (usually a non-absorbable suture or similar material) is passed through the tract.[49] The Seton serves three main purposes: it promotes fibrosis around the sphincter so that later division does not cause gaping; it allows the surgeon to gauge how much muscle is involved beneath the tract; and it acts as a drain.

The internal sphincter is usually divided from the internal opening at the dentate line to its distal end and the overlying skin is incised to the secondary opening. The Seton is threaded through the tract and tied. The remaining sphincter muscle is often divided in a second stage, typically 6-8 weeks later, once sufficient fibrosis has developed. In some cases, the Seton is tightened periodically to achieve gradual pressure necrosis and staged division of the muscle. Setons are especially useful in high fistulae, anterior fistulae in women, patients with Crohn's disease, those with weak sphincters (e.g., elderly), in heavily scarred perineums after multiple operations and in cases with multiple tracts. This approach balances effective treatment with preservation of continence.[49,52]

TREATMENT OF CERTAIN SPECIAL TYPE OF FISTULA

Complete pelvirectal fistula: [Extrasphincteric Fistula with internal opening]

When a fistulous tract passes above the anorectal ring and ends in an internal opening in the lower rectum, simple laying open is not advisable as it would divide the sphincter and cause incontinence. Based on Goligher's experience, five main options are available:[53,54]

1. **Expectant treatment:** If symptoms are mild limited to slight discharge and occasional flatus leakage the patient can be managed conservatively with strict local hygiene, sitz baths and protective pads or cotton wool to prevent soiling. This approach may be continued indefinitely if symptoms remain tolerable.

2. **Temporary colostomy:** A defunctioning left iliac colostomy can reduce contamination, recurrent abscess formation and sometimes even allow the fistula to heal, after which the colostomy may be closed. It is usually maintained for 6–12 months before considering closure.

3. **Repair of the fistula**: If conservative management or colostomy does not control infection or discharge, direct repair may be attempted, although it is technically demanding. The sphincter is divided only below any subsidiary internal opening, preserving the upper sphincter. The tract is followed through the levator ani to the rectal wall defect, which is then trimmed and closed with non-absorbable sutures. The wound is packed and the patient is nursed on the opposite side or in the prone jack-knife position. Goligher reported success in 6 of 9 such operations.

4. **Use of a Seton**: A Seton may be used as previously described to control high tracts while protecting sphincter function.

5. **Excision of the rectum with permanent iliac colostomy**: If sepsis persists despite colostomy and attempts at fistula repair, rectal excision with permanent colostomy becomes the last resort.

Treatment of tuberculous anal fistula

Gabriel advised against aggressive surgery for superficial tuberculous fistulae and favored a more conservative approach. The overall outcome in these patients depends largely on effective control of pulmonary tuberculosis or other primary foci. A chest physician must assess disease activity first. If the chest is clear or stable and no other active focus (e.g., hip, seminal vesicles) explains the fistula, surgery may be performed in the same way as for non-tuberculous fistula with appropriate anti-tubercular therapy.[54]

4) VAAFT (Video Assisted Anal Fistula Treatment)

VAAFT is designed for complex and recurrent fistulae. The key elements are direct visualization of the internal opening, treatment of the fistula from within and airtight closure of the internal opening. The procedure has two phases: a diagnostic phase (identifying the complete tract and internal opening) and an operative phase (destroying the tract internally and closing the opening). Because the procedure is done from inside the tract, there is no perianal skin incision and no sphincter division, so the risk of fecal incontinence is minimized. Preoperative fistula classification is often unnecessary and endoanal wounds are avoided. Patients usually do not require significant postoperative medication and can often return to normal activities within a few days, making VAAFT suitable as a day-care procedure.

5) Fibrin glue for the treatment of fistulae in ano

Fibrin glue offers a simple, minimally invasive treatment that preserves sphincter function and has very low morbidity. It is best suited as a first-line option in simple fistulae, but its success rate is lower in complex tracts or those associated with inflammatory bowel disease. If the fistula has not healed within 3 months, further treatment is required and repeated gluing is usually not effective.

Anal fistula with Crohn's Disease

Management depends on the site of Crohn's involvement. When the disease affects the small bowel or proximal colon with a relatively normal distal colon and rectum, treatment is twofold:[55]

1. Resection of the diseased intestinal segment
2. Appropriate deroofing or treatment of the fistula.

Failure to recognize underlying Crohn's disease may lead to poor wound healing or recurrent fistula and such non-healing wounds often raise suspicion of previously undiagnosed regional ileitis.

Anal fistula with ulcerative colitis

Local surgical treatment alone is considered unsatisfactory and potentially risky, as it may precipitate a flare-up of colitis. Fistulas may heal temporarily as colitis improves, only to recur later. Definitive management usually requires radical surgery, most often total proctocolectomy with ileostomy, rather than repeated local procedures.[55]

Anal fistula with carcinoma

Anal or rectal carcinoma associated with fistula carries a poor prognosis, as spread to regional tissues and inguinal lymph nodes is common. In selected cases, an abdominoperineal excision of the rectum with wide local tissue removal and block dissection of groin nodes may offer one to two years of good palliation before recurrence. In inoperable cases, super-voltage radiotherapy may provide symptom relief, particularly in squamous carcinomas.[56]

RATIONALE OF THE STUDY

Simple anal fistula is a common anorectal condition that significantly affects patient quality of life due to symptoms such as pain, discharge and recurrent infections. The primary goal of surgical management is complete eradication of the fistulous tract while preserving continence. Among the commonly practiced procedures, fistulectomy and fistulotomy with marsupialization are widely used techniques. Fistulectomy involves complete excision of the fistulous tract, which may reduce recurrence but is associated with increased tissue loss, delayed wound healing, and a higher risk of postoperative complications, including incontinence. On the other hand, fistulotomy with marsupialization aims to minimize tissue damage, promote faster healing and reduce postoperative morbidity, but concerns remain regarding recurrence rates. Despite the frequent use of both procedures, there is limited consensus on the optimal surgical approach for simple anal fistula.

Therefore, this study is needed to compare the effectiveness, safety, healing outcomes and complication rates of fistulectomy versus fistulotomy with marsupialization to provide evidence-based guidance for selecting the most appropriate surgical technique.

EXPECTED OUTCOMES

- Fistulotomy with marsupialization is expected to demonstrate faster wound healing compared to fistulectomy.
- It is anticipated to have less postoperative pain and reduced morbidity due to limited tissue excision.
- The incidence of postoperative complications particularly incontinence is expected to be lower in the fistulotomy with marsupialization group.
- Fistulectomy may show slightly lower recurrence rates, but with increased healing time and complications.
- Overall, fistulotomy with marsupialization is expected to provide a better balance between efficacy and safety making it a preferable surgical option for simple anal fistula.

AIM AND OBJECTIVES

AIM:

To compare the outcomes of fistulectomy and fistulotomy with marsupialization in the management of simple anal fistula.

OBJECTIVES:

1. To evaluate the postoperative pain score in patients undergoing fistulectomy and fistulotomy with marsupialization.
2. To compare the healing time in patients undergoing fistulectomy and fistulotomy with marsupialization.
3. To compare the incidence of bleeding in patients who undergo fistulectomy and fistulotomy with marsupialization.
4. To compare the incidence of recurrence in patients who undergo fistulectomy and fistulotomy with marsupialization.

REVIEW OF LITERATURE

Sahakitrungruang C et al. (2011) evaluated whether marsupialization offers added benefit when combined with fistulotomy for simple, uncomplicated fistula-in-ano. Fifty eligible patients were randomly assigned to either standard fistulotomy or fistulotomy with marsupialization, excluding those with complex fistulas, pre-existing incontinence, immunosuppression, or bleeding disorders. Postoperative pain, pain after first defecation, analgesic requirements, complications, and recurrence were assessed. Although overall postoperative pain scores were similar between groups, significantly fewer patients in the marsupialization

group required pethidine injections compared with the fistulotomy-only group (4 vs. 13; p = 0.017). Pain after first defecation and paracetamol use over seven days showed no meaningful differences. All five recorded complications occurred in the fistulotomy-only group, though the statistical significance was borderline (p = 0.0501). No recurrences or cases of anal incontinence were noted in either group. The study concluded that marsupialization is a safe adjunct to fistulotomy and contributes to improved postoperative outcomes.[57]

Bhatti Y et al. (2011) conducted a study on 50 patients with low type fistula in ano to evaluate the outcomes of fistulotomy and fistulectomy. The patients were equally divided into two groups, with 25 undergoing fistulotomy (Group A) and 25 undergoing fistulectomy (Group B). Postoperative pain and bleeding were assessed, and patients were followed weekly until complete healing and then monthly for six months. The study found that postoperative pain was less frequent in the fistulotomy group, with 12% of patients reporting pain on the first postoperative day compared to 28% in the fistulectomy group. Similarly, postoperative bleeding was lower in group A (4%) than in group B (12%). No cases of incontinence or recurrence were observed in either group. The duration of hospital stay was shorter in the fistulotomy group, ranging from 1 to 4 days (median 1.5 days), compared to 1 to 6 days (median 2.5 days) in the fistulectomy group. Wound healing was also faster in group A, with an average healing time of 24 days (range 18–30 days), whereas group B required a longer duration of 35 days (range 28–42 days). Overall, fistulotomy was associated with less postoperative pain and bleeding, shorter hospital stay, faster healing and better patient compliance compared to fistulectomy.[58]

Jain BK et al. (2012) compared fistulectomy with fistulotomy plus marsupialization in forty patients with simple anal fistula, randomized into two equal groups. Group B, treated with fistulotomy and marsupialization, showed significantly faster wound healing than the fistulectomy group (4.85 ± 1.39 weeks vs. 6.75 ± 1.83 weeks). Operating time and postoperative pain on day one were similar in both groups and although fistulectomy resulted in slightly larger wounds, the difference was not statistically significant. Wound discharge also persisted longer after fistulectomy (4.10 ± 1.91 weeks) compared with the marsupialization technique (2.75 ± 1.71 weeks). No recurrence, incontinence, or impact on social or sexual activities was noted in either group during the twelve-week follow-up. Overall, fistulotomy with marsupialization provided quicker healing and shorter wound discharge without increasing operative time.[59]

Salem OT et al. (2012) conducted a study on 272 patients with fistula in ano to compare the efficacy of fistulectomy and fistulotomy, particularly in terms of recurrence, postoperative pain and hospital stay. Patients were divided into two groups, with 146 undergoing fistulectomy and 126 undergoing fistulotomy, and were followed for 1 to 24 months (mean 12 months). The study showed that recurrence was lower in the fistulectomy group (6%) compared to the fistulotomy group (10%). Postoperative pain was also less frequent in the fistulectomy group, with 17% experiencing pain on the first postoperative day compared to 26% in the fistulotomy group. No cases of incontinence were reported in either group. Hospital stay was slightly shorter in the fistulectomy group, averaging 2 days (range 1–4 days), compared to 3 days (range 1–5 days) in the fistulotomy group. Wound healing was faster in the fistulectomy group, taking approximately 3 weeks, whereas fistulotomy required around 4 weeks. A majority of patients (81%) were discharged within 3 days of

surgery. Overall, fistulectomy demonstrated lower recurrence rates, shorter healing time, reduced postoperative pain and shorter hospital stay, indicating better long-term outcomes compared to fistulotomy.[60]

Kamal Z (2012) conducted a comparative study on 76 patients with low fistula in ano to evaluate the outcomes and complications of fistulotomy and fistulectomy as primary treatment modalities. Among the patients, 32 underwent fistulotomy and 44 underwent fistulectomy, with follow-up for one year to assess healing time and complications such as bleeding, infection, incontinence and recurrence. Intraoperatively, 85.53% of cases were intersphincteric fistulae and 14.47% were low transsphincteric fistulae. The study demonstrated that operative time was shorter in the fistulotomy group (15–25 minutes) compared to the fistulectomy group (20–35 minutes). Healing time was also shorter with fistulotomy (26.38 days) than fistulectomy (38.64 days). Postoperative complications were minimal in both groups; bleeding occurred only in the fistulectomy group (2.27%), while infection rates were low and comparable (3.12% in fistulotomy vs 2.27% in fistulectomy). Minor incontinence was observed in 6.25% of fistulotomy patients and 11.36% of fistulectomy patients. Recurrence rates were similar in both groups (6.25% vs 6.82%) and occurred within 4–6 weeks postoperatively. Overall, fistulotomy showed advantages of shorter operative time and faster healing with comparable complication rates, making it an effective primary treatment for low fistula in ano.[61]

Chalya PL et al. (2013) conducted a randomized study comparing fistulectomy (Group A) and fistulotomy with marsupialisation (Group B) in the management of low fistula-in-ano, enrolling 162 patients evenly distributed between the two groups. Both groups were similar in baseline characteristics, including age, sex, symptom duration, fistula type, and distance of the external opening from the anal verge. The study found that wound healing took significantly longer in the fistulectomy group, whereas marsupialisation resulted in quicker healing ($P = 0.002$) and a shorter duration of postoperative wound discharge ($P = 0.012$). Operating time, wound size, pain scores, infection rates, and hospital stay showed no meaningful differences between the groups. Importantly, no patient in either group developed recurrence or anal incontinence, and both procedures had similar impact on physical, social, and sexual function. The authors concluded that fistulotomy with marsupialisation provides faster healing and shorter wound discharge than fistulectomy and should be recommended as the preferred surgical method for low fistula-in-ano.[62]

Ali IMS et al. (2015) conducted a prospective interventional study to compare marsupialization and lay open techniques in the management of simple fistula in ano, focusing primarily on healing time and secondarily on postoperative complications such as pain, bleeding, infection, incontinence and recurrence. A total of 80 patients with simple fistula were included and equally divided into two groups of 40 each, while those with comorbid conditions or who did not consent were excluded. The study found that the mean operative time was significantly shorter in the lay open group (7.5 ± 1.2 minutes) compared to the marsupialization group (10.3 ± 1.2 minutes) with a statistically significant difference ($P = 0.000$). However, postoperative pain showed no significant difference between the two groups during the first 24 hours ($P = 0.330$) and on the second postoperative day ($P = 0.120$). The mean healing time was significantly longer in the lay open group (8.4 ± 1.3 weeks) compared to the marsupialization group (5.9 ± 1.1 weeks) with a P value <0.001. There was no significant difference in postoperative complications such as pain, bleeding and

infection, and importantly, no cases of recurrence or anal incontinence were observed in either group during the three-month follow-up period. Overall, marsupialization demonstrated faster wound healing compared to the lay open technique, although it required a longer operative time, while both techniques showed comparable safety profiles with no major complications.[63]

Sheikh IA et al. (2015) conducted a comparative study on 262 male patients with low lying anal fistula to evaluate the efficacy of fistulotomy versus fistulectomy. Patients were randomly divided into two equal groups: group A (fistulotomy) and group B (fistulectomy), each comprising 131 patients. Only patients with simple low anal fistula without comorbidities were included, while those with recurrent or high fistula and associated conditions were excluded. The study demonstrated that operative time was significantly shorter in the fistulotomy group (14.29 ± 3.24 minutes) compared to the fistulectomy group (25.92 ± 3.60 minutes). Hospital stay was also shorter in group A (3.73 ± 0.65 days) than in group B (4.88 ± 0.35 days). Postoperative complications such as bleeding (0.8%), infection (2.2%) and recurrence (10.7%) were lower in the fistulotomy group compared to bleeding (3.1%), infection (3.8%) and recurrence (15.3%) in the fistulectomy group. Postoperative pain severity was higher in the fistulectomy group. Healing time was shorter in group A (4.04 ± 0.33 weeks) than in group B (4.57 ± 0.497 weeks), and patients undergoing fistulotomy resumed normal activities earlier (10.9 ± 2.05 weeks) compared to those undergoing fistulectomy (15.54 ± 0.51 weeks). Overall, fistulotomy showed better outcomes in terms of operative time, complications, healing and recovery, making it a more effective primary surgical option for simple low lying anal fistula.[64]

Elsebai O et al. (2016) conducted a prospective clinical study to compare the functional and clinical outcomes of fistulectomy and fistulotomy in the management of simple perianal fistula. A total of 30 patients were included and equally divided into two groups of 15 each, with group A treated by fistulectomy and group B by fistulotomy. Both groups were assessed using parameters such as operative time, postoperative pain, duration of wound healing, postoperative complications, incontinence and recurrence. The study demonstrated that fistulotomy had a significantly shorter operative time compared to fistulectomy ($P < 0.05$). In addition, patients in the fistulotomy group experienced significantly less postoperative pain and a shorter duration for complete wound healing ($P < 0.05$), indicating a faster recovery. However, no statistically significant difference was observed between the two groups regarding postoperative complications, incidence of anal incontinence or recurrence rates ($P > 0.05$). Overall, the findings suggest that fistulotomy is a simpler, safer and more efficient procedure for simple perianal fistula, offering advantages of reduced operative time, decreased postoperative discomfort and quicker healing, while maintaining comparable outcomes in terms of complications and recurrence when compared to fistulectomy.[65]

Ravi KH et al. (2016) conducted a clinical study on 300 patients with low fistula-in-ano to compare outcomes of fistulotomy and fistulectomy. All patients underwent detailed clinical evaluation including history of anorectal abscess or previous surgery, digital examination and proctoscopy, along with investigations such as complete blood count, blood sugar, HIV, HBsAg, sono-fistulogram and culture sensitivity of discharge. High anal fistulas and tuberculous fistulas were excluded. Among the 300 patients, 150 were treated with fistulotomy and 150 with fistulectomy. The study observed a higher incidence in males.

Recurrence was noted in 15 patients in the fistulectomy group, whereas no recurrence occurred in the fistulotomy group. The average hospital stay was around 4 days for both groups, and importantly, no cases of anal incontinence were reported. Histopathological examination in the fistulectomy group revealed nonspecific inflammation. Overall, the study concluded that fistulectomy has a higher recurrence rate compared to fistulotomy, while both procedures are safe in terms of continence, making fistulotomy a more effective surgical option for uncomplicated low fistula-in-ano.[66]

Saber A (2016) conducted a parallel prospective randomized clinical trial on 200 patients with low anal fistula, who were randomly divided into two groups: group A undergoing fistulotomy and group B undergoing fistulectomy. The study included patients with low anal fistula secondary to perianal abscess, while high fistulae and those with multiple external openings were excluded. The primary outcome assessed was anal incontinence, and secondary outcomes included operative time, postoperative pain, wound discharge, healing time, time off work and patient satisfaction. The results demonstrated that fistulotomy was associated with significantly shorter operative time, earlier cessation of wound discharge and faster complete wound healing compared to fistulectomy. No cases of permanent fecal incontinence were reported in either group; however, temporary incontinence was observed in 2 patients in the fistulotomy group and 4 patients in the fistulectomy group. Patient satisfaction scores were slightly higher in the fistulotomy group (90.6 ± 8.87) compared to the fistulectomy group (85.6 ± 13.2), although the difference was not statistically significant. Overall, fistulotomy was found to be a safe, simple and effective primary treatment for low anal fistula, with better postoperative recovery and high patient satisfaction.[67]

Kumar R et al. (2018) conducted a randomized controlled trial comparing fistulectomy with fistulotomy plus marsupialization in the treatment of simple anal fistula. One hundred forty patients were randomly assigned into two equal groups: 70 underwent fistulectomy (Group I) and 70 underwent fistulotomy with marsupialization (Group II). The study found that wound healing was significantly faster in the marsupialization group, with a mean healing time of 29.8 ± 13.6 days compared to 37.6 ± 11.9 days in the fistulectomy group ($p < 0.05$). The average hospital stay was similar between the two groups (4.4 ± 1.1 days vs. 4.8 ± 1.7 days; $p > 0.05$). Patients in the marsupialization group experienced noticeably less postoperative pain and blood loss than those in the fistulectomy group. There was no meaningful difference in postoperative adverse effects between the two groups. The authors concluded that fistulotomy with marsupialization results in quicker wound healing and reduced blood loss compared to fistulectomy, and they recommend it as a standard procedure for low fistula-in-ano, while noting that larger studies with longer follow-up are needed to further validate these findings.[68]

Barase AK et al. (2018) conducted a comparative study on 84 patients with simple low-lying fistula-in-ano, dividing them equally into fistulotomy and fistulectomy groups (42 patients each). Intraoperative and postoperative outcomes were assessed using statistical tests such as the Student's t-test and chi-square test. The mean operative time was similar between the two groups - 28.6 minutes for fistulotomy and 31.7 minutes for fistulectomy with no statistically significant difference ($p > 0.05$). However, wound healing was markedly faster in the fistulotomy group with a median healing time of 12 days compared to 21 days for the fistulectomy group

($p<0.001$). Incontinence occurred more frequently after fistulotomy, noted in 5 patients versus 1 patient in the fistulectomy group, representing a statistically significant difference. Recurrence was low and comparable, occurring in one patient from each group within six months. The authors concluded that while both procedures yield similar results regarding operative time, postoperative pain, and recurrence, fistulotomy leads to quicker healing but carries a higher risk of postoperative incontinence.[69]

Mallik NR et al. (2018) explained that fistulectomy involves complete excision of the entire fistulous tract, which minimizes the risk of leaving behind secondary extensions and allows thorough histopathological examination of the removed tissue, making it useful in identifying underlying pathology. In contrast, fistulotomy involves laying open the tract, converting it into a superficial wound that heals by secondary intention, resulting in a smaller unepithelialized surface and promoting faster healing. Their study was conducted to compare the effectiveness of these two procedures in the management of low anal fistula and to evaluate postoperative outcomes. The results demonstrated that fistulotomy had clear advantages over fistulectomy, including shorter operative time, quicker wound healing, less postoperative pain and earlier return to normal daily activities. Additionally, the simpler technique and better patient comfort associated with fistulotomy contributed to improved overall recovery. Based on these findings, fistulotomy was suggested as a more efficient and preferable standard surgical procedure for treating low fistula-in-ano.[70]

Mittal A et al. (2018) conducted a study on 75 patients with low fistula in ano to evaluate and compare the outcomes of fistulotomy and fistulectomy. Among these, 38 patients underwent fistulotomy (group A) and 37 underwent fistulectomy (group B). The comparison was based on postoperative pain, healing time, complications, hospital stay and recurrence. The study population had a mean age of 45 years with male predominance. The findings showed that postoperative pain persisted for a longer duration in the fistulectomy group compared to the fistulotomy group. Wound infection was significantly higher in group B (40.52%) than in group A (10.52%). Wound healing was faster in the fistulotomy group, and the mean hospital stay was shorter (2.86 days) compared to the fistulectomy group (4.32 days). No cases of anal incontinence were observed in either group. Recurrence was lower in the fistulotomy group (5.3%) compared to the fistulectomy group (18.9%). Overall, fistulotomy demonstrated better outcomes in terms of reduced pain, fewer complications, faster healing, shorter hospital stay and lower recurrence, and was therefore considered a superior surgical procedure for the management of low lying fistula in ano.[71]

Anan M et al. (2019) conducted a prospective randomized trial to evaluate whether marsupializing the edges of the opened fistula tract improves healing after fistulotomy for simple anal fistula. Sixty patients with a mean age of 40.8 years were evenly divided into two groups: group I underwent standard fistulotomy, while group II received fistulotomy with marsupialisation. The study found no significant differences between the groups in terms of operative time (16.8 vs. 18.4 minutes; $P = 0.054$), postoperative pain scores (1.6 vs. 1.2; $P = 0.22$), or complication rates. However, wound healing occurred significantly faster in the marsupialisation group, averaging 5.1 weeks compared to 6.7 weeks in the standard fistulotomy group ($P < 0.0001$). The authors concluded that marsupialisation leads to quicker wound healing without increasing complications or recurrence, making it a beneficial adjunct to fistulotomy in simple anal fistulas.[72]

Nour H et al. (2020) conducted a randomized study on 70 patients with simple anal fistula to determine the impact of marsupializing the fistulotomy wound. Participants were divided into two equal groups: group A underwent fistulotomy alone, while group B received fistulotomy with marsupialization. Baseline characteristics including demographics, clinical presentation, and pathology were comparable between the groups. Although operative time was shorter in the fistulotomy-only group, patients in the marsupialization group experienced significantly less late postoperative pain after one week. Rates of complications such as bleeding, incontinence, and urinary retention did not differ between groups. Importantly, wound healing was significantly faster in the marsupialization group, averaging 4.8 weeks compared to 6.8 weeks in the fistulotomy-only group. The study concluded that while marsupialization slightly increases operative duration, it provides notable benefits by reducing postoperative pain and promoting more rapid wound healing.[73]

Gupta R et al. (2020) evaluated outcomes of fistulectomy versus fistulotomy with marsupialization in 90 patients with simple low-lying fistula-in-ano, randomized into two groups: Group A (50 patients) underwent fistulectomy, while Group B (40 patients) underwent fistulotomy with marsupialization. The study found that wound healing occurred significantly earlier in the marsupialization group (4.30 ± 0.64 weeks) compared with the fistulectomy group (7.38 ± 1.83 weeks; $p = 0.0003$). Similarly, wound discharge stopped much sooner in Group B (2.23 ± 0.65 weeks) than in Group A (4.81 ± 0.79 weeks; $p = 0.0002$). Although operative times did not differ meaningfully, postoperative wounds were notably smaller in the marsupialization group (1.96 ± 0.52 cm^2) compared with the fistulectomy group (3.38 ± 0.46 cm^2). Pain scores and infection rates were similar in both groups. The authors concluded that fistulotomy with marsupialization offers faster wound healing and a shorter duration of wound discharge without prolonging operative time, making it superior to fistulectomy for simple low-lying fistulas.[74]

Aslam D et al. (2021) compared wound healing time and postoperative pain between fistulectomy and fistulotomy with marsupialization in low anal fistula. Sixty patients were evenly divided into two groups: group A underwent fistulectomy, while group B received fistulotomy with marsupialization. Postoperative pain was evaluated at 24 hours and during weekly and fortnightly follow-ups for six weeks, while wound healing was clinically assessed over the same period. The findings showed that group B experienced significantly less pain than group A (mean VAS score 2.40 ± 1.52 vs. 3.6 ± 1.99; $p = 0.01$), and healing occurred notably faster in group B (4.23 ± 0.77 weeks vs. 5.80 ± 0.41 weeks; $p = 0.0005$). The study concluded that fistulotomy with marsupialization is a simpler, easier, and more effective option than fistulectomy for managing simple perianal fistula.[75]

De Hous N et al. (2021) conducted a study to evaluate the efficacy of fistulectomy with primary sphincteroplasty (FIPS), a technique that involves immediate reconstruction of the sphincter following excision of the fistulous tract, in the management of simple anal fistula and in preventing the development of keyhole deformity often seen after conventional fistulotomy. The procedure was performed in 24 patients with a median age of 52.8 years. After a median follow-up period of 3.0 (2.0, 6.3) months, a high overall healing rate of 95.8% (23 out of 24 patients) was observed, indicating good short-term effectiveness of the procedure. However, early postoperative wound dehiscence occurred in 6 patients (25%), which subsequently led to the

development of keyhole deformity. Among these, most patients were symptomatic, commonly presenting with complaints of soiling. The deformity was typically diagnosed at a median time of 6.0 (3.8, 7.5) months postoperatively. The study further found that the occurrence of wound dehiscence and subsequent deformity was significantly associated with posteriorly located fistulas ($p = 0.02$), suggesting a site-specific limitation of the technique. Overall, the findings indicate that FIPS is a simple, effective and relatively quick procedure that successfully prevents keyhole deformity in the majority of patients, although its outcomes are less favorable in posterior fistulas, and it can be considered a valuable alternative approach in the treatment of simple anal fistula.[76]

Hiremath SC et al. (2022) carried out a randomized study comparing fistulotomy and fistulectomy in the treatment of simple fistula-in-ano. Fifty patients were enrolled and divided into two groups of 25 each: Group I underwent fistulotomy, while Group II underwent fistulectomy. Key outcomes included operating time, hospital stay, wound healing time, postoperative pain, and complications. The sample consisted of 39 males (78%) and 11 females (22%), with a mean age of 40.62 ± 12.86 years. Fistulotomy showed clear advantages its operating time was significantly shorter (21.96 ± 1.90 minutes vs. 31.32 ± 2.99 minutes; $p \leq 0.001$), and patients had a shorter hospital stay (1.32 ± 0.47 days vs. 2.32 ± 0.69 days; $p \leq 0.001$). Postoperative pain scores were lower in the fistulotomy group at 6 hours and at discharge, and postoperative complications were also less frequent compared with the fistulectomy group. Based on these findings, the authors concluded that fistulotomy offers better overall outcomes than fistulectomy and should be considered the preferred treatment method for simple, low-lying fistula-in-ano.[77]

Hadi A (2022) conducted a comparative study on 48 patients with low fistula in ano to evaluate postoperative outcomes of fistulectomy and fistulotomy. Patients were equally divided into two groups of 24 each, with ages ranging from 23 to 65 years (mean 37.5±6.5 years) and a male predominance (male:female ratio 7:1). Preoperatively, most patients had subcutaneous fistulae (81.25%), followed by intersphincteric (12.5%) and transphincteric (6.25%) types. The study showed that postoperative morbidity was higher in the fistulectomy group, with pain reported in 75% compared to 41.7% in the fistulotomy group, and wound discharge in 50% versus 37.5%, respectively. Recurrence was also slightly higher in fistulectomy (8.3%) compared to fistulotomy (4.2%). Operative time was significantly shorter in fistulotomy (15–25 minutes) than fistulectomy (30–40 minutes) ($p=0.04$), and wound healing time was also faster in fistulotomy (4–6 weeks) compared to fistulectomy (6–8 weeks) ($p=0.04$). However, hospital stay was similar in both groups (1–2 days) with no significant difference ($p=1.00$). Overall, fistulotomy demonstrated better postoperative outcomes with reduced morbidity, shorter operative time and faster healing, making it a more favorable procedure for low fistula in ano.[78]

Ali S et al. (2023) compared the effectiveness of fistulotomy versus fistulotomy with marsupialization in treating simple anal fistula. Sixty patients were randomly assigned into two equal groups, with group A undergoing fistulotomy alone and group B receiving fistulotomy with marsupialization. The main outcome measured was complete wound healing time, while secondary outcomes included operative time, postoperative pain, incontinence, recurrence, and patient satisfaction. The study found significantly faster

healing in the marsupialization group (4.7 ± 0.74 weeks) compared with the fistulotomy group (6.4 ± 0.85 weeks; p = 0.0001). Both groups had similar operative times, postoperative pain levels, and rates of incontinence, recurrence, and overall satisfaction. The authors concluded that fistulotomy with marsupialization offers quicker healing without increasing operative time and should be considered the preferred surgical option for simple anal fistulas.[79]

Rahman MM et al. (2023) conducted a prospective randomized controlled trial involving 60 patients with simple anal fistula to evaluate the outcomes of marsupialization. Thirty patients underwent fistulotomy alone (group A), while another thirty received fistulotomy with marsupialization (group B). The primary endpoint was wound healing time, while secondary measures included operating time, wound size, postoperative pain (VAS), bleeding, infection, incontinence, recurrence, and patient satisfaction. The marsupialization group demonstrated significantly better outcomes in several areas: wounds healed much faster (3.85 ± 1.19 vs. 6.55 ± 1.3 weeks; P < 0.0001), wound discharge lasted a shorter duration, postoperative bleeding was markedly less frequent (10% vs. 53.33%; P = 0.0003), and wound size was smaller. Although the marsupialization group had a slightly longer operating time, they experienced significantly less pain on the first postoperative day (VAS 4.05 ± 1.47 vs. 5.15±1.32; P = 0.0035). Importantly, postoperative complications such as incontinence, recurrence and sepsis did not differ between groups. The study concluded that marsupialization significantly enhances healing, reduces postoperative bleeding and wound size, and offers clear advantages without increasing major complications.[80]

Choudhury CT et al. (2023) conducted a prospective study on 50 patients with low variety fistula in ano to assess duration of healing and hospital stay after surgical management. Patients with low anal fistula having internal opening below the anorectal ring were included, while high fistula, horseshoe fistula, tuberculosis, inflammatory bowel disease and malignancy were excluded. The patients were divided into two equal groups of 25 each, with group A undergoing fistulectomy and group B undergoing fistulotomy. All surgeries were performed under spinal anesthesia with preoperative administration of ceftriaxone and metronidazole, and patients were discharged on the second postoperative day with appropriate instructions and followed up at 7 days and 4 weeks. The study population mainly consisted of patients aged 20–70 years, with a higher incidence in males and individuals from lower socioeconomic groups, many having a history of anorectal abscess. The findings showed that hospital stay was longer and postoperative pain scores were higher in the fistulectomy group compared to the fistulotomy group. In contrast, fistulotomy was associated with less postoperative pain and shorter hospital stay, indicating faster recovery and better patient comfort. The study concluded that fistulotomy is a more effective procedure for low variety anal fistula, while also emphasizing the importance of proper identification of the fistulous tract to prevent recurrence.[81]

Shahbaz M et al. (2023) conducted a prospective comparative study on 90 patients aged above 18 years with low anal fistula to evaluate outcomes of fistulotomy and fistulectomy. Patients were equally divided into two groups, with 45 undergoing fistulectomy and 45 undergoing fistulotomy, and were followed up for three months. The study population had a mean age of 39.66±10.80 years with a predominance of males (86.7%). The results showed that the mean operative time was significantly longer in the fistulectomy group

(35.31±7.48 minutes) compared to the fistulotomy group (31.33±5.39 minutes) (P=0.005). Similarly, the mean healing time was significantly higher in the fistulectomy group (28.69±4.56 days) compared to the fistulotomy group (24.87±4.79 days). There was no significant difference in postoperative complications, including flatus incontinence and pain, and no cases of recurrence were observed in either group during the follow-up period. Overall, fistulotomy demonstrated better outcomes with shorter operative time, faster healing and fewer complications, making it a more effective option for the management of low anal fistula.[82]

Mohamed AG et al. (2024) conducted a prospective study comparing fistulectomy with fistulotomy plus marsupialization in sixty patients with uncomplicated low perianal fistula. All patients underwent full medical evaluation before surgery. The intersphincteric fistula type was the most prevalent in both groups, with no significant difference between them (P = 0.8). Wound healing occurred significantly faster in the marsupialization group compared with the fistulectomy group (P = 0.001). Postoperative complications such as urinary retention, bleeding, infection, and incontinence were more frequent in the fistulectomy group. Overall, the study concluded that fistulotomy with marsupialization promotes quicker recovery and shorter wound discharge duration, making it a reliable and effective alternative to fistulectomy for simple perianal fistulas.[83]

Soni D et al. (2024) conducted a study to evaluate the impact of marsupialization on fistulotomy wound edges in patients with simple perianal fistula. A total of 100 patients with uncomplicated, non-recurrent fistulas (ASA I–II) were divided into two groups: Group A underwent standard fistulotomy, while Group B received fistulotomy with marsupialization. Patients with complex or secondary fistulas, anal incontinence, previous anal surgery, or conditions affecting wound healing were excluded. The findings showed that operative time was shorter in Group A, whereas Group B experienced significantly less late postoperative pain one week after surgery. Rates of complications including bleeding, urinary retention, and incontinence were similar between both groups. The study concluded that although marsupialization slightly prolongs operative time, it leads to better wound healing and reduced long-term postoperative pain without increasing the risk of complications, making it a valuable addition to fistulotomy in simple perianal fistula.[84]

Basa SK et al. (2024) conducted a comparative study to evaluate fistulotomy with marsupialization versus fistulectomy in the management of simple low-lying anal fistulas, focusing on healing time, recurrence, and postoperative complications such as incontinence. A simple fistula was defined as having a single internal and external opening with a clearly palpable tract. Fifty patients were enrolled and matched for age, sex, and other physical factors, with 25 undergoing fistulotomy with marsupialization (Group I) and 25 undergoing fistulectomy (Group II). The mean operative time was similar between the groups - 29.5 minutes for fistulotomy and 32.2 minutes for fistulectomy with no statistical significance (p = 0.891). Healing occurred significantly sooner in the fistulotomy group (12 ± 2.5 days) compared with the fistulectomy group (21 ± 5.5 days; p = 0.004). Postoperative pain scores were comparable, and while anal incontinence was more frequent after fistulotomy (10% vs. 2.5%), the difference was not statistically significant (p = 0.191). Recurrence was low and identical in both groups, with one case each (2.5%). The authors concluded that fistulotomy offers faster healing and slightly shorter operative time, though at the cost of a higher yet statistically insignificant

rate of incontinence. They emphasized that procedure selection should be tailored to individual patient characteristics and fistula anatomy.[85]

Aziz AT et al. (2025) compared postoperative wound infection rates between fistulectomy alone and fistulotomy with marsupialization in patients with low anal fistula. Patients were randomized into two groups - Group A undergoing fistulectomy and Group B receiving fistulotomy with marsupialization each containing 170 participants. All procedures were performed by the same surgical team under spinal anesthesia. Wound infection was assessed clinically and confirmed by culture at the 10-day follow-up. Among the overall study population, whose mean age was 36.3 ± 12.2 years and predominantly male (80.9%), 58 patients (17.1%) developed postoperative wound infections. Group B showed a significantly lower infection rate (10.0%) compared with Group A (24.1%) ($p = 0.001$). Subgroup analyses demonstrated that the advantage of marsupialization remained consistent across age, sex, fistula type, and disease duration, with most differences statistically significant. The study concluded that fistulotomy with marsupialization markedly reduces postoperative wound infection rates compared with standard fistulectomy in low fistula-in-ano.[86]

Modi J et al. (2025) conducted a study on 60 patients with low anal fistula to compare outcomes of fistulectomy and fistulotomy. Patients were randomly divided into two groups, with group A undergoing fistulectomy and group B undergoing fistulotomy. The study demonstrated that the mean operative time was shorter in the fistulotomy group (42.83 ± 8.38 minutes) compared to the fistulectomy group (50.17 ± 7.71 minutes). The duration of postoperative wound discharge was also significantly less in fistulotomy (20.47 ± 5.22 days) than fistulectomy (33.53 ± 5.58 days). Similarly, wound healing time was shorter in the fistulotomy group (35.97 ± 7.32 days) compared to fistulectomy (47.07 ± 7.72 days). Hospital stay was also slightly shorter in fistulotomy (mean 2.37 days) than fistulectomy (3.03 days). The study also noted a higher incidence of fistula in males, particularly among young adults, with intersphincteric fistulae being more common than transsphincteric types. Overall, fistulotomy showed advantages in terms of operative time, faster healing and reduced postoperative discharge compared to fistulectomy.[87]

Singh U et al. (2026) conducted a comparative study on 120 patients with low anal fistula to evaluate clinical outcomes, postoperative complications and recurrence rates between fistulectomy and fistulotomy. The patients were randomly allocated into two equal groups, with 60 patients undergoing fistulectomy and 60 undergoing fistulotomy. The study assessed important parameters including operative time, postoperative pain, wound healing duration, complications, continence status and recurrence. The findings revealed that fistulotomy had a significantly shorter operative time compared to fistulectomy, indicating a technically simpler and quicker procedure. In addition, patients in the fistulotomy group experienced less postoperative pain and demonstrated faster wound healing, leading to improved patient comfort and earlier recovery. However, there was no statistically significant difference between the two groups regarding recurrence rates or continence, suggesting that both procedures are comparable in terms of long-term safety and effectiveness. Overall, fistulotomy was found to be a more efficient and patient-friendly procedure due to reduced operative time, lower postoperative morbidity and quicker healing, making it a preferred surgical option in selected cases of low anal fistula.[88]

MATERIALS AND METHODS

STUDY DESIGN: Prospective comparative study.

STUDY AREA: The study was conducted in the Department of General Surgery, National Institute of Medical Science and Research, Jaipur.

STUDY PERIOD: 18 months (1stJULY 2024 to 31stDECEMBER2024)

STUDY POPULATION: All patients diagnosed with simple anal fistula and requiring surgical intervention was included in the study in Department of general surgery, National Institute of Medical Science and Research, Jaipur.

SAMPLING TECHNIQUES: Purposive sampling techniques.

SELECTION CRITERIA

Inclusion Criteria:

1. Patients diagnosed with simple anal fistula.
2. Patients aged above 18 years.
3. Patients who give written informed consent.

Exclusion Criteria:

1. Patients with high anal and complex anal fistula.
2. Patients with a history of previous fistula surgery.
3. Pediatric age <18 years, pregnant and lactating mother.
4. Patients with crohn's / HIV / Tuberculosis.
5. Patients with a history of bleeding disorders.
6. Patients who are not willing to give written consent.

SAMPLE SIZE AND SAMPLING TECHNIQUE:

Sample size was calculated using following formula -

$$\eta = \frac{\left(z_{\alpha/2} + z_{1-\beta}\right)^2 * (\sigma_1^2 + \sigma_2^2)}{\Delta^2}$$

$$= \frac{(1.96+0.84)^2 * (0.5^2 + 0.48^2)}{(0.35)^2}$$

= 30.7 ≅31 Samples/group

Total sample size:62

where,

$z_{\alpha/2}$ is the inverse probability of normal distance at 95% confidence interval

$z_{1-\beta}$ is the inverse probability of normal distance at 80% power of the test

σ_1 &σ_2 is the standard deviation of VAS score after 24 hours of both group

Δ is the expected mean deviation of VAS score of both groups.

METHODOLOGY AND TECHNIQUE

The present study was conducted as a prospective comparative study over a defined period from 1st July 2024 to 31st December 2025. The study was carried out in the Department of General Surgery at National Institute of Medical Sciences and Research (NIMS), Jaipur, a tertiary care teaching hospital. Prior to the commencement of the study, approval was obtained from the Scientific and Institutional Ethics Committee, ensuring that the study adhered to ethical standards for research involving human subjects. Ethical clearance was obtained before initiation of the study, and all procedures were conducted in accordance with institutional ethical guidelines. Participation in the study was entirely voluntary. Written informed consent was obtained from all patients in a standardized and approved format after explaining the nature, purpose, potential benefits, and risks of the study.

Preoperative Evaluation and Optimization

All enrolled patients underwent a comprehensive baseline clinical evaluation. This included detailed history taking and thorough physical examination. Special emphasis was given to cardiopulmonary assessment to ensure fitness for surgery. Patients were subjected to necessary laboratory investigations and radiological evaluation, including MRI fistulogram, which was performed to accurately determine the site, type, and extent of fistula-in-ano. Any patient requiring preoperative medical optimization due to associated comorbid conditions was appropriately managed before surgery to minimize perioperative risks. All patients were evaluated, investigated, and prepared for surgery as per the standard unit protocol of the Department of General Surgery, NIMS.

Study Groups and Surgical Intervention

After preoperative assessment, patients were allocated into two groups. The allocation was done based on the computer generated randomization Only patients diagnosed with simple fistula-in-ano and meeting inclusion criteria were included. The surgical technique for each group was standardized and followed consistently throughout the study period.

Intraoperative Assessment

During surgery, detailed operative data were recorded for each patient. This included:

- Duration of the surgical procedure
- Intraoperative findings
- Any intraoperative complications
- Associated procedures performed, if any

Postoperative Care and Hospital Stay

Following surgery, all patients were kept under close postoperative observation in the hospital. Patients were monitored until they became fully ambulatory and achieved normal bladder and bowel function. Standard postoperative care protocols were followed for all patients, including pain management, wound care, and monitoring for early complications.

Follow-up and Outcome Assessment

All patients were followed up at regular intervals for a period of 3 months postoperatively. During each follow-up visit, patients were evaluated for both clinical recovery and complications. The outcomes were systematically recorded and compared between the two groups to evaluate the effectiveness and safety of the surgical techniques.

STATISTICAL ANALYSIS

Statistical analysis was performed using SPSS version 28.0. The collected data were entered and analyzed using appropriate statistical methods. Frequency and descriptive statistics were used to summarize demographic variables and clinical characteristics, expressed as mean ± standard deviation for continuous variables and percentages for categorical variables. The Chi-square test was applied to assess the association between categorical variables, while the independent t-test was used to compare the means between the two groups for continuous variables. A p-value of <0.05 was considered statistically significant for all analyses.

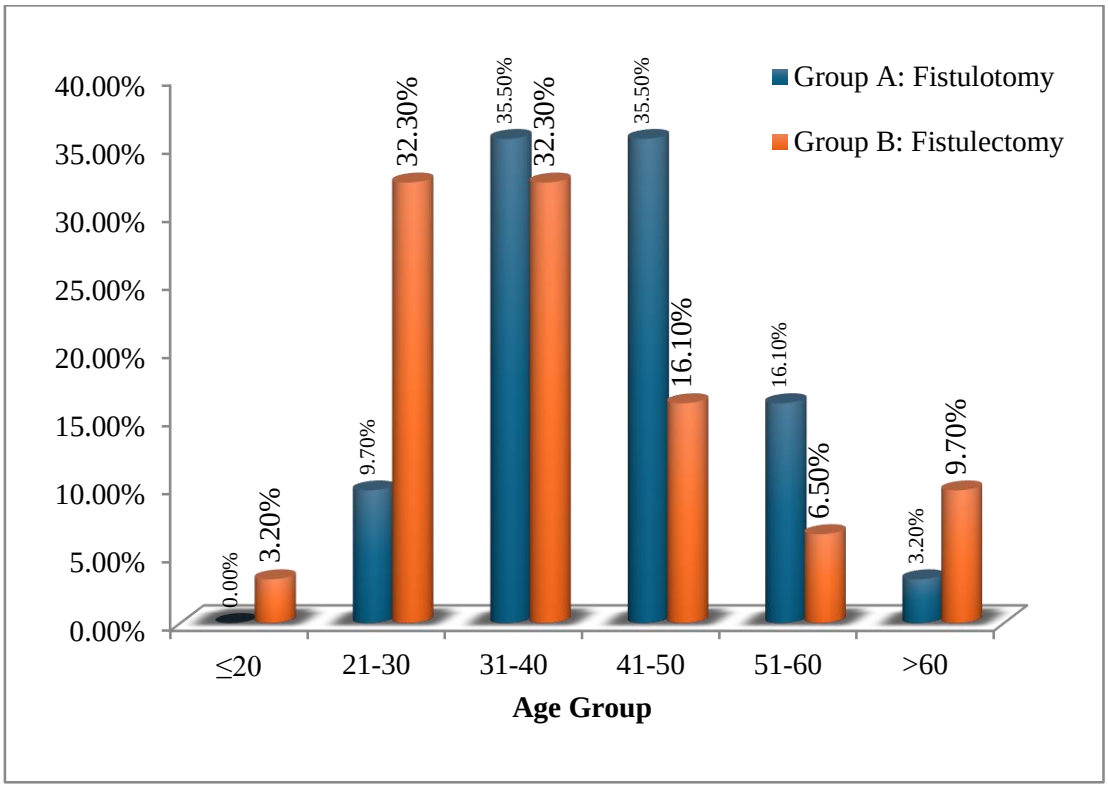
RESULTS

Table 1: Age-wise distribution among both the groups

Age Group	Group A: Fistulotomy		Group B: Fistulectomy		Total	
	No.	%	No.	%	No.	%
≤20	0	0.0%	1	3.2%	1	1.6%
21-30	3	9.7%	10	32.3%	13	21.0%
31-40	11	35.5%	10	32.3%	21	33.9%
41-50	11	35.5%	5	16.1%	16	25.8%
51-60	5	16.1%	2	6.5%	7	11.3%
>60	1	3.2%	3	9.7%	4	6.5%
Total	**31**	**100.0%**	**31**	**100.0%**	**62**	**100.0%**
Mean±SD	**41.81±9.772**		**37.58±13.957**			

$\chi 2=35.667$; p=0.390 (Not significant p>0.05)

The age-wise distribution of patients showed that the majority of cases were concentrated in the 31–40 years age group (33.9%), followed by 41–50 years (25.8%). In Group A (Fistulotomy), the highest proportion of patients was observed equally in the 31–40 years and 41–50 years groups (35.5% each), whereas in Group B (Fistulectomy), most patients belonged to the 21–30 years and 31–40 years groups (32.3% each). Very few patients were seen in the extreme age groups (≤20 years and >60 years). The mean age was slightly higher in Group A (41.81±9.77 years) compared to Group B (37.58±13.96 years). However, this difference was statistically not significant ($\chi^2=35.667$, p=0.390), indicating comparable age distribution between the two groups.



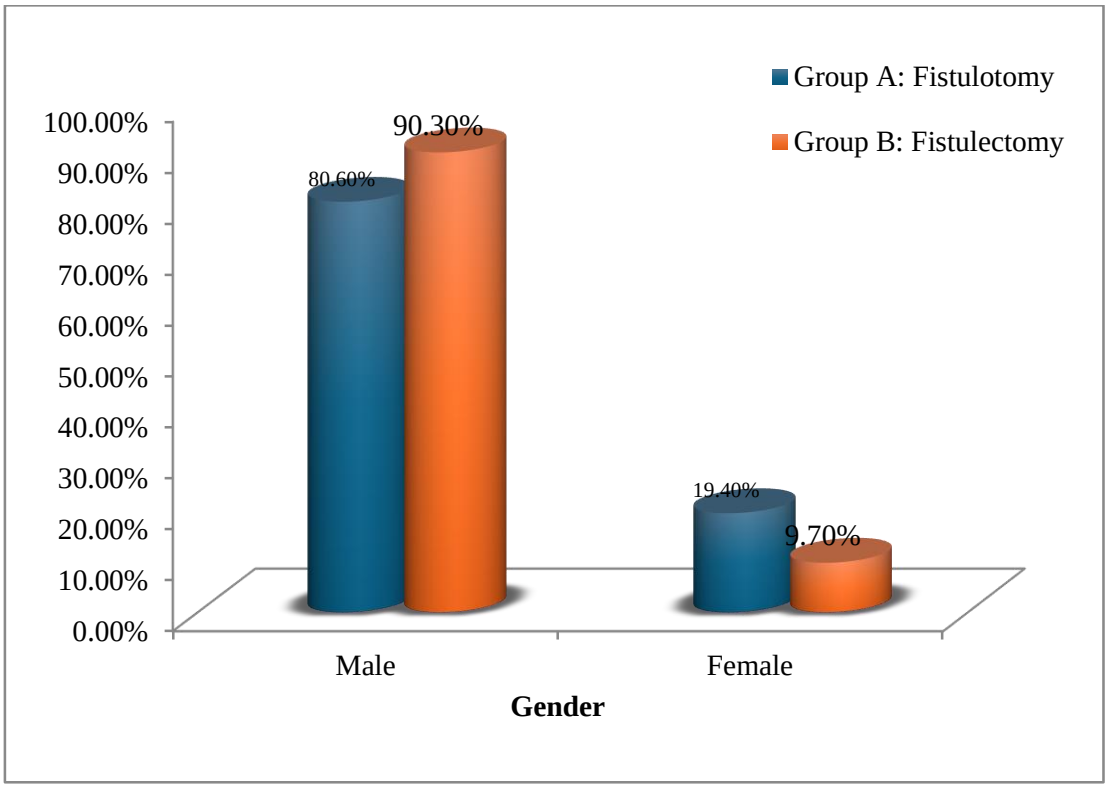
Graph 1: Age-wise distribution among both the groups

Table 2: Gender-wise distribution among both the groups

Gender	Group A: Fistulotomy		Group B: Fistulectomy		Total	
	No.	%	No.	%	No.	%
Male	25	80.6%	28	90.3%	53	85.5%
Female	6	19.4%	3	9.7%	9	14.5%
Total	**31**	**100.0%**	**31**	**100.0%**	**62**	**100.0%**

$\chi 2=1.170$; p=0.279 (Not significant p>0.05)

The gender distribution revealed a clear male predominance in both groups. Overall, 85.5% of patients were males, while only 14.5% were females. In Group A, 80.6% were males and 19.4% females, whereas in Group B, 90.3% were males and 9.7% females. This indicates that fistula-in-ano was more common among males in both treatment groups. The difference in gender distribution between the groups was found to be statistically not significant ($\chi^2=1.170$, p=0.279), suggesting that both groups were comparable in terms of gender characteristics.



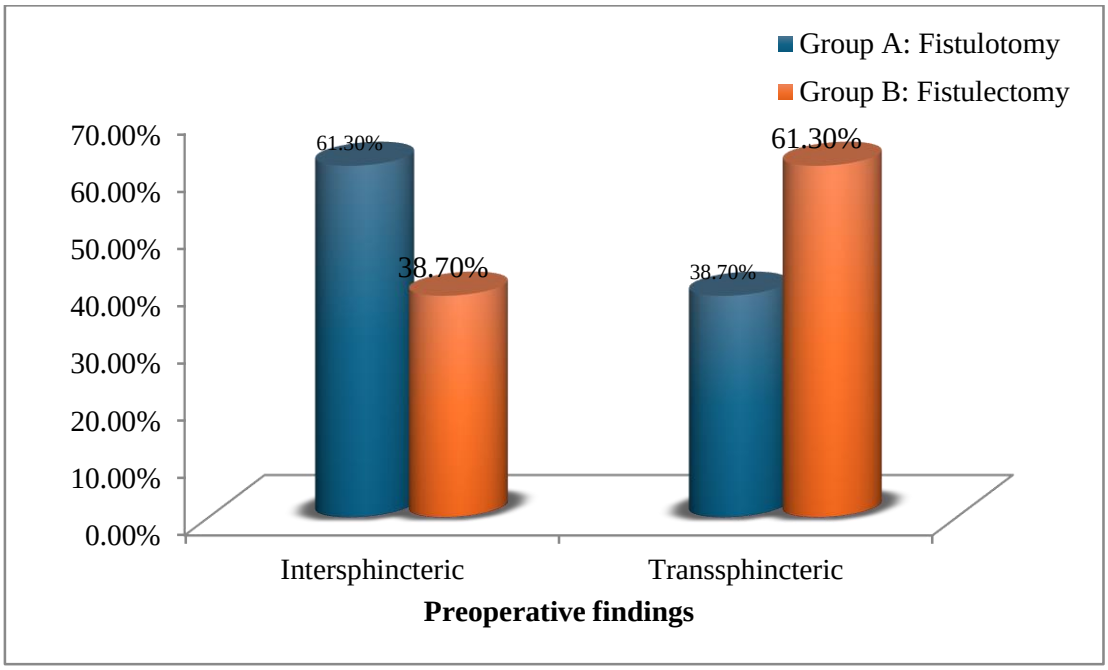
Graph 2: Gender-wise distribution among both the groups

Table 3: Preoperative findings among both the groups

Preoperative findings	Group A: Fistulotomy		Group B: Fistulectomy		Total	
	No.	%	No.	%	No.	%
Intersphincteric	19	61.3%	12	38.7%	31	50.0%
Transsphincteric	12	38.7%	19	61.3%	31	50.0%
Total	**31**	**100.0%**	**31**	**100.0%**	**62**	**100.0%**

$\chi 2=3.161$; $p=0.075$ (Not significant $p>0.05$)

The preoperative findings showed that intersphincteric and transsphincteric fistulas were equally distributed overall (50% each) among the study population. In Group A (Fistulotomy), intersphincteric fistulas were more common (61.3%), while transsphincteric fistulas accounted for 38.7%. Conversely, in Group B (Fistulectomy), transsphincteric fistulas predominated (61.3%), with intersphincteric type accounting for 38.7%. Although there was a variation in distribution pattern between the two groups, the difference was statistically not significant ($\chi^2=3.161$, $p=0.075$). This indicates that both groups had a relatively balanced and comparable distribution of fistula types preoperatively.



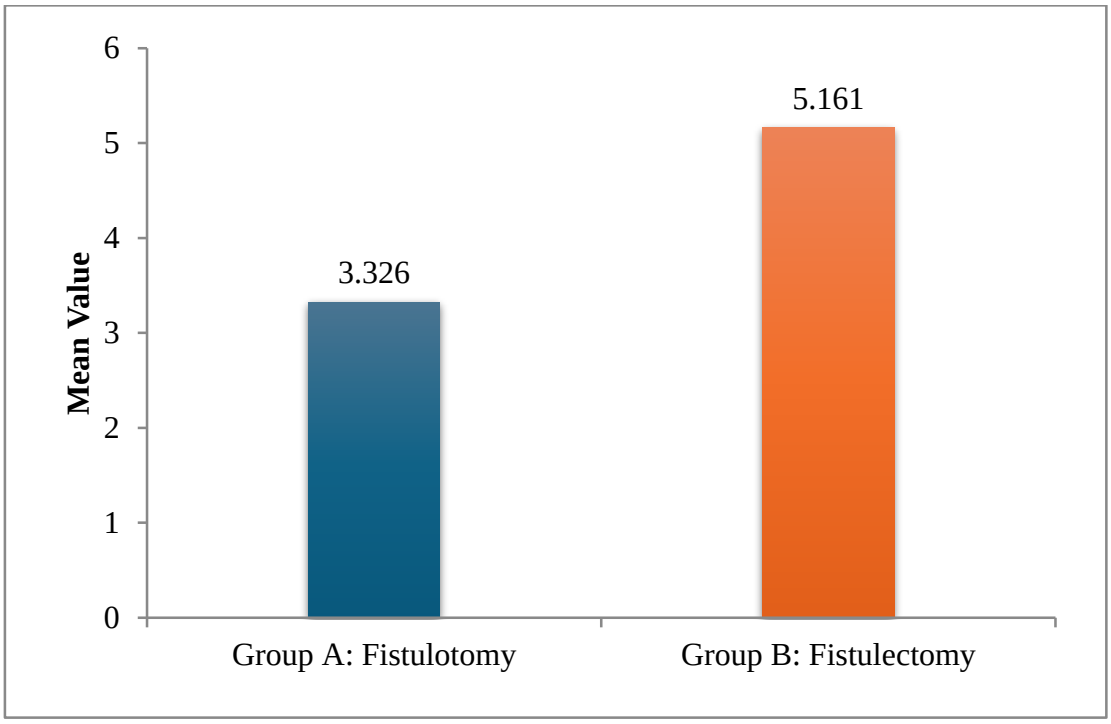
Graph 3: Preoperative findings among both the groups

Table 4: Mean VAS Score for pain among both the groups

Group	Mean	Std. Deviation	t-value	p-value
Group A: Fistulotomy	3.326	1.2633	5.714	0.001*
Group B: Fistulectomy	5.161	1.2659		

* Significant ($p<0.05$)

The assessment of postoperative pain using the Visual Analogue Scale (VAS) demonstrated a notable difference between the two groups. Patients in Group A (Fistulotomy) reported a significantly lower mean VAS score of 3.326±1.263, whereas patients in Group B (Fistulectomy) had a higher mean VAS score of 5.161±1.266. This indicates that postoperative pain was considerably less in the fistulotomy group compared to the fistulectomy group. The difference was found to be highly statistically significant (t=5.714, p=0.001), highlighting that fistulotomy was associated with better postoperative pain outcomes.



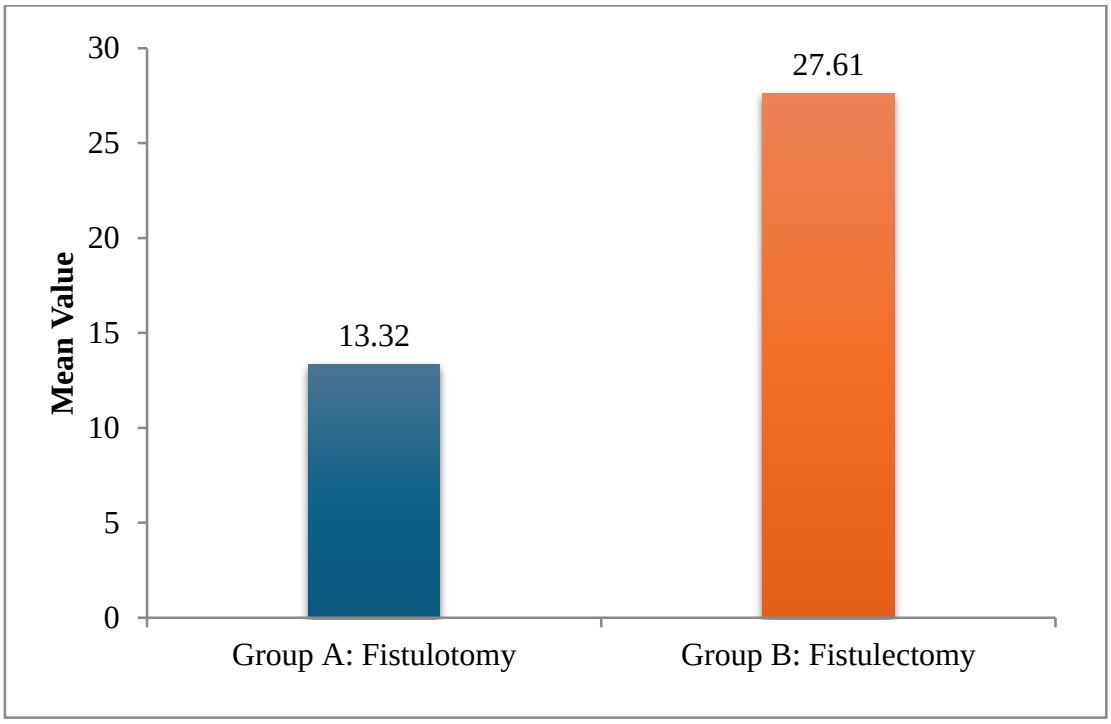
Graph 4: Mean VAS Score for pain among both the groups

Table 5: Mean OT Time among both the groups

Group	Mean	Std. Deviation	t-value	p-value
Group A: Fistulotomy	13.32	2.688	15.623	0.001*
Group B: Fistulectomy	27.61	4.326		

* Significant ($p<0.05$)

The comparison of operative time revealed a substantial difference between the two surgical techniques. The mean operative time for Group A (Fistulotomy) was 13.32±2.688 minutes, whereas for Group B (Fistulectomy) it was significantly higher at 27.61±4.326 minutes. This clearly indicates that fistulotomy required considerably less operative time compared to fistulectomy. The difference was statistically highly significant (t=15.623, p=0.001), suggesting that fistulotomy is a quicker procedure, which may have implications for operative efficiency and patient turnover.



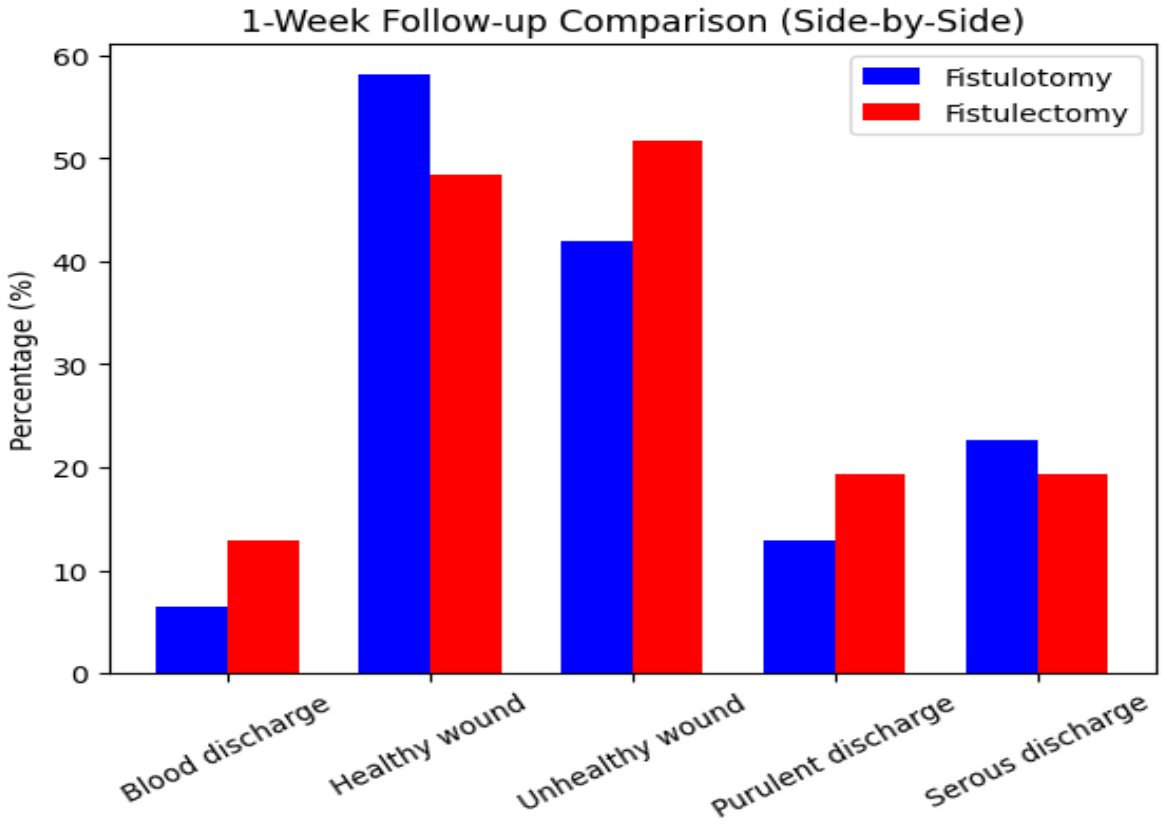
Graph 5: Mean OT Time among both the groups

Table 6: Follow-up after 1 week among both the groups

Follow-up after 1 week		Group A: Fistulotomy		Group B: Fistulectomy		Total		p-value
		No.	%	No.	%	No.	%	
Blood discharge		2	6.5%	4	12.9%	6	9.7%	0.702
Wound status	Healthy	18	58.1%	15	48.4%	33	53.2%	
	Unhealthy	13	41.9%	16	51.6%	29	46.7%	
	Healed	0	0.0%	0	0.0%	0	0.0%	
Discharge	Purulent discharge	4	12.9%	6	19.4%	10	16.1%	
	Serous discharge	7	22.6%	6	19.4%	13	21.0%	
Incontinence		0	0.0%	0	0.0%	0	0.0%	-

At the 1-week follow-up, wound status assessment showed variable healing patterns in both groups In Group A, a higher proportion of patients showed healthy wound status (58.1%) compared to Group B (48.4%), indicating a relatively better early healing trend following fistulotomy. Conversely, unhealthy wound status and purulent discharge were slightly more frequent in Group B (51.6% and 19.4%, respectively) than in Group A (41.9% and 12.9%), suggesting a marginally higher degree of inflammation or infection in the fistulectomy

group. Serous discharge, which reflects normal healing, was comparable between the groups, being slightly higher in Group A (22.6%) than Group B (19.4%). Blood discharge was observed more in Group B (12.9%) than in Group A (6.5%); however, this difference was not statistically significant (p = 0.702). Importantly, no patients in either group achieved complete wound healing at 1 week, which is expected in the early postoperative period, and no cases of incontinence were reported. Overall, the graph indicates that both procedures have similar early outcomes, with a slight but not statistically significant advantage of fistulotomy in terms of wound healing and lower infective complications.



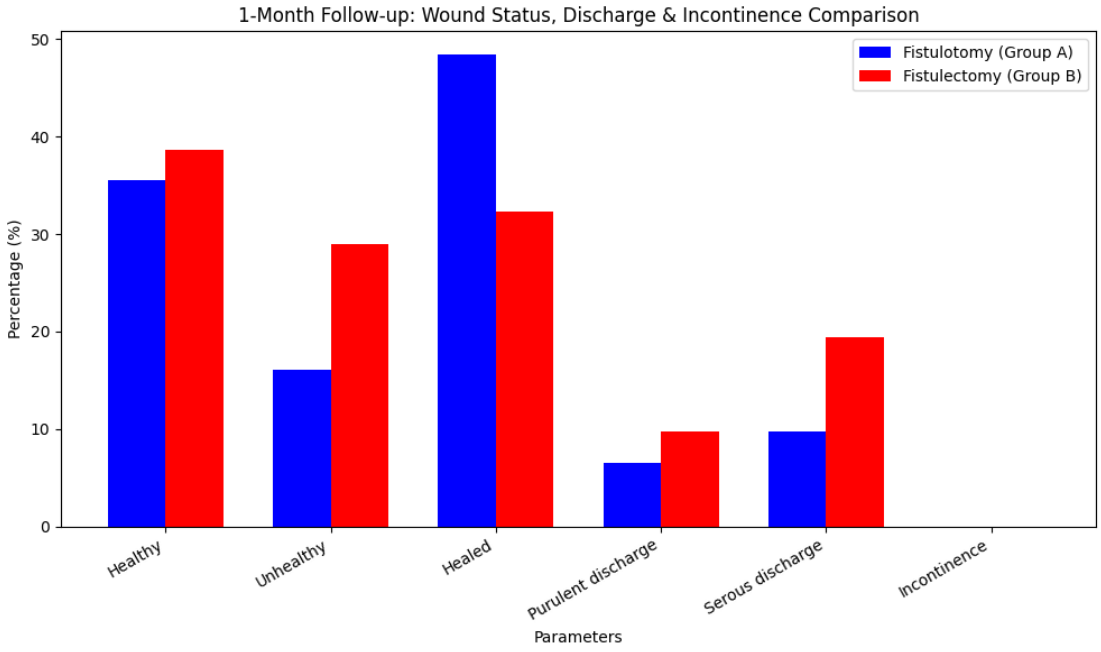
Graph 6: Follow-up after 1 week among both the groups

Table 7: Follow-up after 1 month among both the groups

Follow-up after 1 month		Group A: Fistulotomy		Group B: Fistulectomy		Total		p-value
		No.	%	No.	%	No.	%	
Wound status	Healthy	11	35.5%	12	38.7%	23	37.1%	
	Unhealthy	5	16.1%	9	29.0%	14	22.6%	
	Healed	15	48.4%	10	32.3%	25	40.3%	**0.675**
	Purulent discharge	2	6.5%	3	9.7%	5	8.1%	

Discharge	Serous discharge	3	9.7%	6	19.4%	9	14.5%	
Incontinence		0	0.0%	0	0.0%	0	0.0%	

At 1-month follow-up, there was marked improvement in wound healing in both groups. Group A (Fistulotomy) and Group B (Fistulectomy). A higher proportion of patients in Group A showed healthy wound status (35.5%) compared to Group B (38.7%) Conversely, unhealthy wounds were more frequent in Group B (29.0%) than in Group A (16.1%), A higher proportion of patients in Group A showed healed wound status (48.4%) compared to Group B (32.3%) suggesting relatively delayed healing in the fistulectomy group. With regard to wound discharge, purulent discharge was slightly higher in Group B (9.7%) compared to Group A (6.5%), and serous discharge was also more common in Group B (19.4%) than in Group A (9.7%), indicating a greater persistence of postoperative discharge in the fistulectomy group.



Graph 7: Follow-up after 1 month among both the groups

Table 8: Follow-up after 3 months among both the groups

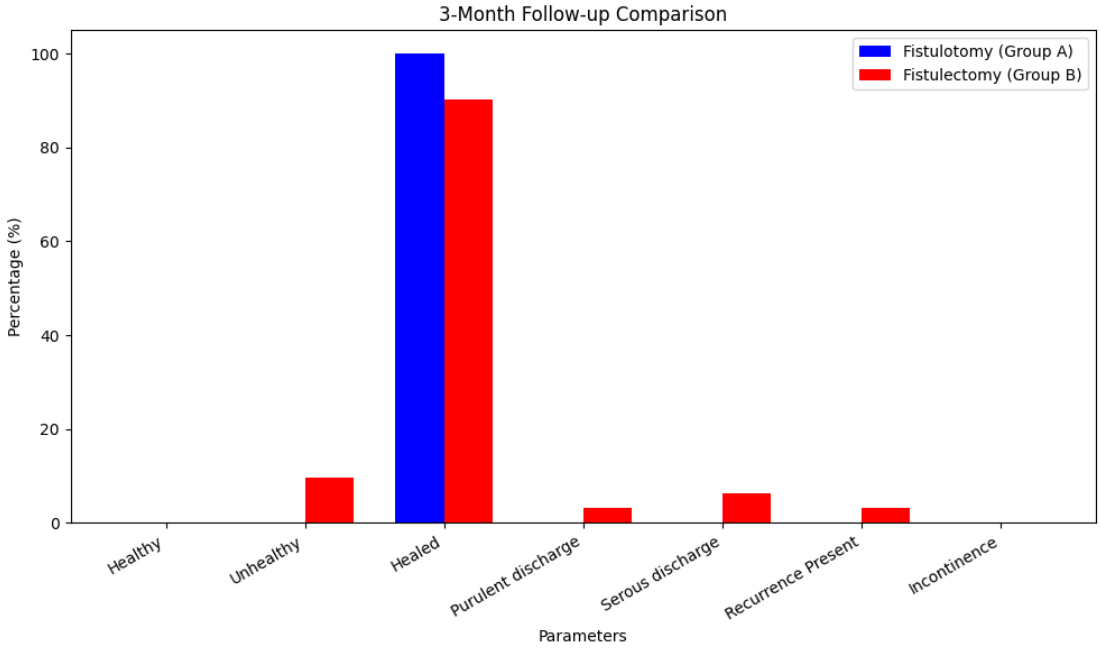
Follow-up after 3 months		Group A: Fistulotomy		Group B: Fistulectomy		Total		p-value
		No.	%	No.	%	No.	%	
Wound status	Healthy	0	0.0%	0	0.0%	0	0.0%	0.046*
	Unhealthy	0	0.0%	3	9.7%	3	4.8%	
	Healed	31	100.0%	28	90.3%	59	95.2%	
Discharge	Purulent discharge	0	0.0%	1	3.2%	1	1.6%	
	Serous discharge	0	0.0%	2	6.4%	2	3.2%	
Recurrence	Absent	31	100.0%	30	96.8%	61	98.4%	0.313
	Present	0	0.0%	1	3.2%	1	1.6%	
Incontinence		0	0.0%	0	0.0%	0	0.0%	-

* Significant ($p<0.05$)

At the 3-month follow-up, almost complete healing was observed in both groups, with superior outcomes in Group A (Fistulotomy) and Group B (Fistulectomy), with clearly superior outcomes in Group A. All patients in Group A (100%) showed healthy and completely healed wounds, whereas in Group B, (100%) showed healthy and 90.3% achieved complete healing while 9.7% remained with unhealthy wounds and persistent serous discharge (6.4%) and purulent discharge (3.2%), indicating delayed healing in the fistulectomy group.

With respect to wound discharge, no cases of purulent discharge were observed in either group at this stage, while a small proportion of patients in Group B (9.7%) continued to have serous discharge, whereas none were seen in Group A. This further supports better wound resolution in the fistulotomy group.

Regarding recurrence, no cases were reported in Group A, whereas one case (3.2%) was observed in Group B; however, this difference was not statistically significant ($p = 0.313$). Importantly, no cases of incontinence were reported in either group



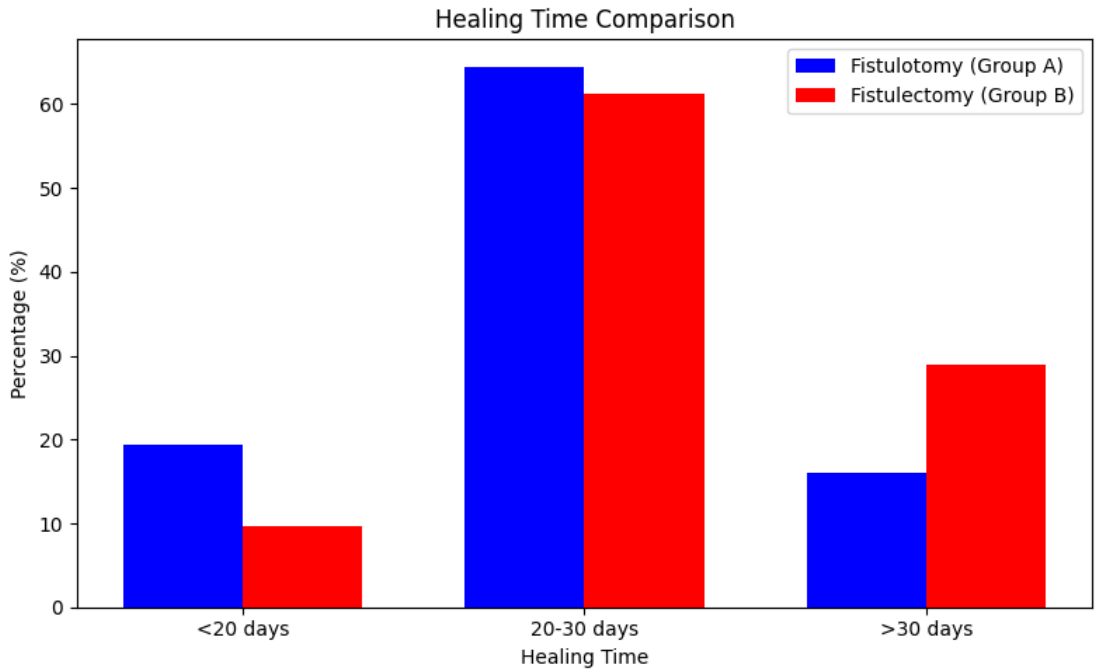
Graph 8: Follow-up after 3 months among both the groups

Table 9: Mean Healing Time among both the groups

Healing Time	Group A: Fistulotomy		Group B: Fistulectomy		Total		P - Value
	No	%	No	%	No	%	
<20 days	6	19.4%	3	9.6%	9	14.5%	0.224
20-30 days	20	64.5%	19	61.3%	39	62.9%	
>30 days	5	16.1%	9	29%	14	22.6%	

Group A (Fistulotomy) compared to Group B (Fistulectomy). The patients in Group A (19.4%) achieved wound healing within 20 days, whereas a comparatively lower proportion of patients in Group B (9.6%) healed within the same time period.

The majority of patients in Group A (64.5%) achieved wound healing between 20-30 days, whereas a comparatively lower proportion of patients in Group B (62.9%) healed within the same time period. Conversely, delayed healing of more than 30 days was observed in 16.1% of patients in Group A, compared to a higher proportion of 29.0% in Group B.

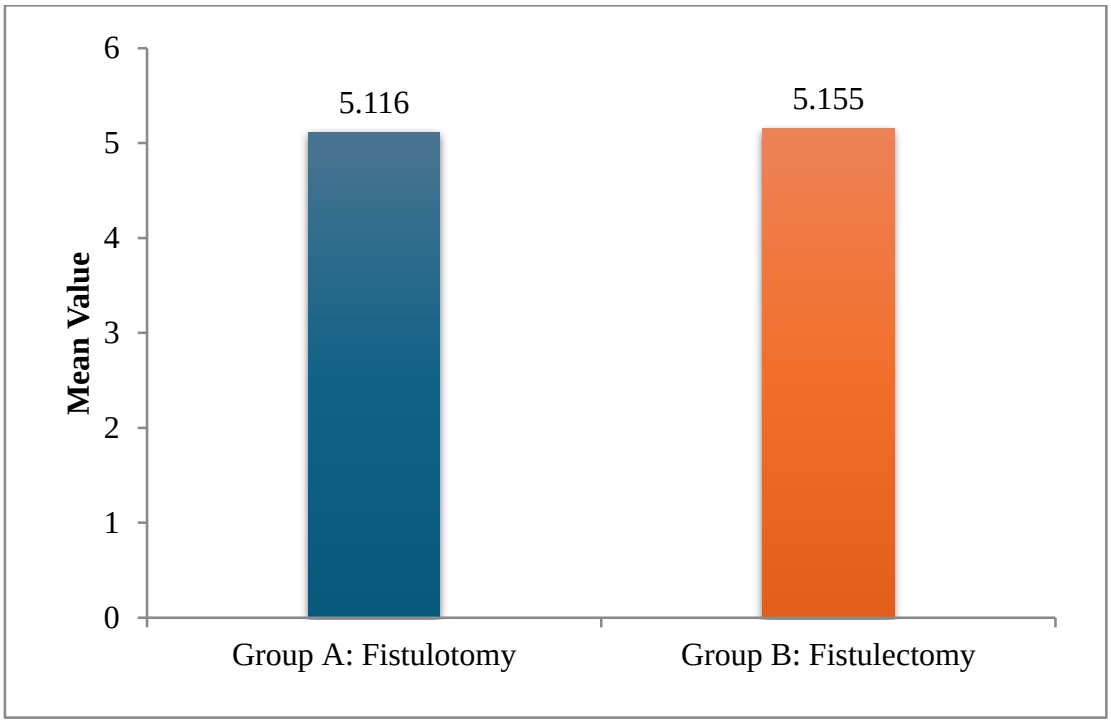


Graph 9: Mean Healing Time among both the groups

Table 10: Mean duration of Hospital Stay (days) among both the groups

Group	Mean	Std. Deviation	t-value	p-value
Group A: Fistulotomy	5.116	.8691	0.175	0.862
Group B: Fistulectomy	5.155	.8744		

The comparison of mean duration of hospital stay between the two groups showed that patients in Group A (Fistulotomy) had a mean hospital stay of 5.116±0.869 days, while those in Group B (Fistulectomy) had a mean stay of 5.155±0.874 days. The difference between the two groups was minimal, indicating that both surgical techniques resulted in a nearly similar duration of hospitalization. Statistical analysis revealed that this difference was not significant (t=0.175, p=0.862), suggesting that the choice of surgical procedure did not have a measurable impact on the length of hospital stay.



Graph 10: Mean duration of Hospital Stay (days) among both the groups

DISCUSSION

Anal fistula is a common anorectal condition that primarily affects young and middle-aged adults and often requires surgical management for definitive treatment. Among the various surgical options, fistulotomy and fistulectomy are the most widely practiced procedures for simple fistula-in-ano. The choice of technique depends on multiple factors, including fistula type, extent of disease and the need to preserve anal sphincter function while ensuring effective healing. The present study was conducted to compare these two surgical modalities in terms of demographic characteristics, operative parameters, postoperative pain, and healing outcomes over a defined follow-up period. The findings of this study were analyzed and compared with previously published literature to evaluate the relative efficacy and safety of both procedures.

In the present study, the highest proportion of patients was observed in the 31–40 years age group (33.9%), followed by 41–50 years (25.8%). The mean age was slightly higher in Group A: Fistulotomy (41.81±9.77 years) compared with Group B: Fistulectomy (37.58±13.96 years), but this difference was statistically not significant (p=0.390), showing that both groups were comparable with respect to age distribution. This finding was comparable with **Aslam et al. (2021)**[75], who reported a mean age of 37.20±10.65 years among patients with low anal fistula, with group-wise mean ages of 36.40±7.26 years in the fistulectomy group and 38.00±13.29 years in the fistulotomy with marsupialization group. Similar to the present study, their groups were also comparable in terms of age.

Similarly, **Kumar et al. (2018)**[68] reported that the mean age was 38.8±15.6 years in the fistulectomy group and 39.4±14.4 years in the fistulotomy with marsupialisation group, with no significant difference between groups. They also observed that most patients belonged to the 20–30 years and 31–40 years age groups, which supports the present finding that anal fistula commonly affected younger to middle-aged adults. **Barase et al. (2018)**[69] also showed comparable age distribution, reporting mean ages of 37.21±12.2 years in

the fistulotomy group and 39.52±10.3 years in the fistulectomy group, with p=0.66. In another similar study, **Gupta et al. (2020)**[74] reported that most patients were between 26 and 45 years, with mean ages of 37.22±12.62 years in the fistulectomy group and 34.98±10.76 years in the fistulotomy with marsupialization group. Likewise, **Ali et al. (2023)**[79] reported a mean age of 36.8±10.03 years, with group-wise mean ages of 35.93±9.68 years and 37.66±10.46 years. Their observation that patients commonly presented between 20–45 years was also consistent with the present study.

In the present study, there was a clear male predominance, with 85.5% males and 14.5% females overall. In Group A (Fistulotomy), males constituted 80.6%, while in Group B (Fistulectomy), males accounted for 90.3% of the cases. Although the proportion of males was slightly higher in the fistulectomy group, the difference between the two groups was statistically not significant (p=0.279), indicating that both groups were comparable in terms of gender distribution. These findings were consistent with **Hiremath et al. (2022)**[77], who reported a predominance of males (78% males and 22% females) among patients with fistula-in-ano, with no significant difference between study groups. Similarly, **Mohamed et al. (2024)**[83] also observed a higher incidence of fistula-in-ano among males, although their study reported no significant difference between treatment groups in baseline characteristics including gender. In another study, **Aslam et al. (2021)**[75] reported that the majority of patients were males, which was attributed to higher exposure to risk factors such as infection and occupational strain. Likewise, **Chalya et al. (2013)**[62] demonstrated that both groups were comparable with respect to sex ratio, with a predominance of male patients. Furthermore, **Aziz et al. (2025)**[86] reported that 80.9% of patients were males, again confirming the higher prevalence of anal fistula in males.

In the present study, the distribution of fistula types showed that intersphincteric and transsphincteric fistulas were equally represented overall (50% each). However, within groups, Group A (Fistulotomy) had a higher proportion of intersphincteric fistulas (61.3%), whereas Group B (Fistulectomy) showed predominance of transsphincteric fistulas (61.3%). Despite this variation, the difference between the groups was statistically not significant (p=0.075), indicating that both groups were comparable with respect to the type of fistula. These findings were comparable with **Mohamed et al. (2024)**[83], who reported that intersphincteric fistula was the most common type, and importantly, there was no statistically significant difference between the two study groups (p=0.8) in terms of fistula type distribution. Similarly, **Chalya et al. (2013)**[62] demonstrated that both groups were comparable with respect to type of fistula, including intersphincteric and transsphincteric types. In another study, **Aslam et al. (2021)**[75] described that low anal fistulas, particularly intersphincteric and low transsphincteric types, constituted the majority of cases, which is consistent with the present study. Furthermore, **Barase et al. (2018)**[69] reported that intersphincteric fistulas accounted for approximately 45% and transsphincteric for around 40% of cases, indicating that these two types are the most common presentations of simple fistula-in-ano.

In the present study, postoperative pain assessed using the Visual Analogue Scale (VAS) showed a clear difference between the two groups. Patients in Group A (Fistulotomy) had a significantly lower mean VAS score of 3.326±1.263, whereas patients in Group B (Fistulectomy) reported a higher mean VAS score of

5.161±1.266. This difference was found to be highly statistically significant (p=0.001), indicating that fistulotomy was associated with significantly less postoperative pain compared to fistulectomy. These findings were in agreement with **Aslam et al. (2021)**[75], who reported that the mean pain score in the fistulotomy with marsupialization group was 2.40±1.52 compared to 3.60±1.99 in the fistulectomy group (p=0.01). Similarly, **Kumar et al. (2018)**[68] observed that postoperative pain and blood loss were significantly lower in the fistulotomy with marsupialisation group compared to fistulectomy, further reinforcing that fistulotomy-based techniques offer better pain outcomes. However, **Jain et al. (2012)**[59] reported mean VAS scores of 4.05±1.47 (fistulotomy) vs 4.50±1.32 (fistulectomy) with no statistically significant difference (p=0.221). Likewise, **Ali et al. (2023)**[79] also reported no statistically significant difference in postoperative pain scores between groups, suggesting that pain outcomes may vary depending on operative technique and perioperative management protocols. Furthermore, **Rahman et al. (2023)**[80] demonstrated that VAS scores were significantly lower in the fistulotomy with marsupialization group compared to fistulectomy (p=0.035), which aligns closely with the present study findings.

the mean operative time (OT time) was significantly lower in Group A (Fistulotomy: 13.32±2.688 minutes) compared to Group B (Fistulectomy: 27.61±4.326 minutes). The difference was highly statistically significant (p=0.001), indicating that fistulotomy is a much quicker procedure than fistulectomy. These findings were consistent with **Hiremath et al. (2022)**[77], who reported a mean operative time of 21.96±1.90 minutes in the fistulotomy group and 31.32±2.99 minutes in the fistulectomy group (p<0.001). Although their operative times were slightly higher than the present study, the trend of shorter operative time in fistulotomy was similar. Similarly, **Barase et al. (2018)**[69] observed that the mean duration of surgery was 28.6 minutes in the fistulotomy group and 31.7 minutes in the fistulectomy group, though the difference was not statistically significant (p>0.05). In contrast, **Jain et al. (2012)**[59] reported almost equal operative times between groups (28.00±6.35 minutes vs 28.20±6.57 minutes, p=0.925), suggesting no significant difference. Likewise, **Chalya et al. (2013)**[62] also found no statistically significant difference in operative time between fistulotomy with marsupialisation and fistulectomy groups, supporting that operative duration may vary depending on study setting. Additionally, **Soni et al. (2024)**[84] reported that operative time was shorter in the fistulotomy group compared to the marsupialization group, reinforcing the concept that simpler procedures require less operative time.

In the present study, early postoperative follow-up at 1 week showed that the majority of patients in Group A (Fistulotomy) had a healthy wound (58.1%), compared to 48.4% in Group B (Fistulectomy), while discharge (serous, purulent, or blood) was slightly higher in the fistulectomy group. At 1 month follow-up, there was marked improvement in both groups. The healed was higher in Group A (48.4%) compared to Group B (32.3%). By 3 months follow-up, complete healing was achieved in 100% of patients in Group A, whereas 90.3% in Group B showed healing, with 9.7% still unhealed. This difference became statistically significant (p=0.046). These findings were consistent with **Jain et al. (2012)**[59], who reported that wound healing occurred earlier in the fistulotomy with marsupialization group (4.85±1.39 weeks) compared to fistulectomy (6.75±1.83 weeks, p=0.035), supporting the observation of faster healing with fistulotomy-based procedures. Similarly,

Aslam et al. (2021)[75] demonstrated that mean wound healing time was significantly shorter in the fistulotomy with marsupialization group (4.23±0.77 weeks) compared to fistulectomy (5.80±0.41 weeks, p=0.0005), which correlates with the higher healing rates seen in the present study at 1 month and 3 months. **Chalya et al. (2013)**[62] also reported significantly faster healing and shorter wound discharge duration in the fistulotomy with marsupialisation group, although early postoperative parameters such as complications and hospital stay were similar between groups. In addition, **Kumar et al. (2018)**[68] observed that healing time was significantly shorter in the fistulotomy with marsupialisation group (29.8±13.6 days) compared to fistulectomy (37.6±11.9 days).

In the present study, wound healing following fistulotomy (Group A) was compared with fistulectomy (Group B). It was observed that a higher proportion of patients in the fistulotomy group (19.4%) achieved early healing within 20 days compared to the fistulectomy group (9.6%). Additionally, delayed healing beyond 30 days was more frequent in the fistulectomy group (29.0%) than in the fistulotomy group (16.1%). Although these findings suggest a trend toward faster healing with fistulotomy.

In the present study, the mean duration of hospital stay was almost identical in both groups, with 5.116±0.869 days in Group A (Fistulotomy) and 5.155±0.874 days in Group B (Fistulectomy). The difference between the two groups was statistically not significant (p=0.862), indicating that the type of surgical procedure did not have a significant impact on the length of hospital stay. These findings were consistent with **Chalya et al. (2013)**[62], who also reported no statistically significant difference in hospital stay between fistulectomy and fistulotomy with marsupialization groups. Similarly, **Kumar et al. (2018)**[68] observed that the mean hospital stay was 4.4±1.1 days in the fistulectomy group and 4.8±1.7 days in the fistulotomy with marsupialisation group, with no significant difference (p>0.05). In another study, **Hiremath et al. (2022)**[77] reported that the mean postoperative hospital stay was significantly shorter in the fistulotomy group (1.32±0.47 days) compared to the fistulectomy group (2.32±0.69 days). Additionally, **Barase et al. (2018)**[69] found that the duration of hospital stay was comparable between groups, with no statistically significant difference.

SUMMARY

- Majority of patients were in 31–40 years (33.9%), followed by 41–50 years (25.8%); mean age was 41.81±9.77 (fistulotomy) vs 37.58±13.96 (fistulectomy) with no significant difference.
- There was male predominance (85.5%), with 80.6% males in fistulotomy and 90.3% in fistulectomy, showing comparable gender distribution.
- Intersphincteric (50%) and transsphincteric (50%) fistulas were equally distributed overall; fistulotomy had more intersphincteric (61.3%) while fistulectomy had more transsphincteric (61.3%), with no significant difference.
- Mean hospital stay was almost identical: 5.11±0.86 days (fistulotomy) vs 5.15±0.87 days (fistulectomy), showing no significant difference.

- Postoperative pain was significantly lower in fistulotomy with VAS 3.32±1.26 vs 5.16±1.26 in fistulectomy (p=0.001).
- Operative time was significantly shorter in fistulotomy (13.32±2.68 min) compared to fistulectomy (27.61±4.33 min) (p=0.001).
- At 1 week, no patients healed (100%); healthy wound seen in 58.1% (fistulotomy) vs 48.4% (fistulectomy) with comparable discharge patterns.
- At 1 month, healing was higher in fistulotomy (83.9% vs 71.0%), with fewer unhealed cases (16.1% vs 29.4%), though not statistically significant.
- At 3 months, complete healing was 100% in fistulotomy vs 90.3% in fistulectomy (p=0.046); recurrence was minimal (0% vs 3.2%) and no incontinence observed.

Conclusion

The present study demonstrated that both fistulotomy and fistulectomy are effective surgical procedures for the management of simple fistula-in-ano, with comparable baseline characteristics and similar duration of hospital stay. However, fistulotomy showed clear advantages in terms of operative and postoperative outcomes. It was associated with significantly shorter operative time and significantly lower postoperative pain, indicating a less invasive and more patient-friendly procedure.

Furthermore, although early postoperative outcomes were comparable between the two groups, fistulotomy showed better healing trends at 1 month and achieved significantly higher complete healing rates at 3 months. The incidence of complications, recurrence was minimal, and no incontinence found in either case and comparable in both groups. Overall, fistulotomy proved to be a safer, quicker, and more effective procedure with superior long-term healing outcomes, making it a preferable surgical option for the treatment of simple anal fistula.

Limitations of the study

- The sample size was relatively small (n=62), which may limit the generalizability of the findings.
- The study duration and follow-up period were limited to 3 months, which may not adequately capture long-term recurrence or late complications.
- Being a single-center study, the results may reflect institutional practices and may not be applicable to other settings.
- The study included only simple fistula-in-ano, so results cannot be extrapolated to complex fistulas.
- Postoperative outcomes like pain were assessed using subjective scales (VAS), which may vary between individuals.

- No assessment of quality of life or patient satisfaction was included.

Recommendations

- Fistulotomy should be preferred as the primary surgical procedure for simple fistula-in-ano due to its shorter operative time, less postoperative pain, and better healing outcomes.
- Fistulotomy with marsupialization can be considered to further enhance wound healing and reduce postoperative complications.
- Early diagnosis and timely surgical intervention should be encouraged to prevent progression and complications.
- Standardized postoperative care protocols (wound care, hygiene, follow-up) should be implemented to improve healing outcomes.
- Longer follow-up (≥6–12 months) is recommended in future studies to assess recurrence and long-term complications more accurately.
- Larger multicentric studies should be conducted to improve generalizability and validate the findings.
- Inclusion of patient-reported outcomes such as quality of life and satisfaction should be incorporated in future research.
- Comparative studies involving complex fistulas and newer techniques (LIFT, advancement flap, VAAFT) are recommended for broader clinical application.

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ANNEXURES

ANNEXURE 1: PARTICIPANT INFORMATION SHEET

Thesis Title: *Comparison of Fistulectomy and Fistulotomy with Marsupialization in the Management of Simple Anal Fistula*

Study Overview

This research is being conducted to evaluate and compare two established surgical techniques for the management of simple anal fistula:

- **Fistulectomy** (complete excision of the fistula tract)
- **Fistulotomy with Marsupialization** (laying open the fistula tract followed by suturing of the wound edges)

The objective is to assess differences in healing time, postoperative pain, recurrence rates, and overall patient outcomes.

Rationale

Simple anal fistula is a common anorectal condition requiring surgical intervention. While both fistulectomy and fistulotomy with marsupialization are widely practiced, there is limited comparative data on their effectiveness. This study aims to provide evidence-based insights to guide surgical decision-making.

Participant Selection

Patients diagnosed with **simple anal fistula** who meet the inclusion criteria will be recruited. Exclusion criteria include complex fistulas, recurrent fistulas, or patients with significant comorbidities that may affect healing.

Study Procedure

- Eligible patients will be enrolled after obtaining informed consent.
- Participants will undergo either fistulectomy or fistulotomy with marsupialization, performed by qualified surgeons.
- Standard preoperative and postoperative care will be provided.
- Follow-up assessments will be conducted at regular intervals to document wound healing, pain scores, complications, and recurrence.

Data Collection

Clinical data will be collected prospectively, including:

- Demographic details
- Operative findings
- Postoperative pain (using standard pain scales)
- Wound healing time
- Complications (infection, bleeding, incontinence)
- Recurrence rates

All data will be anonymized to maintain confidentiality.

Risks and Benefits

Both procedures are standard surgical treatments. Risks include pain, bleeding, infection, and recurrence. Benefits include resolution of the fistula and contribution to medical knowledge that may improve future patient care.

Ethical Considerations

- Participation is voluntary.
- Patients may withdraw at any stage without affecting their treatment.
- Confidentiality of patient information will be strictly maintained.
- The study has been approved by the Institutional Ethics Committee.

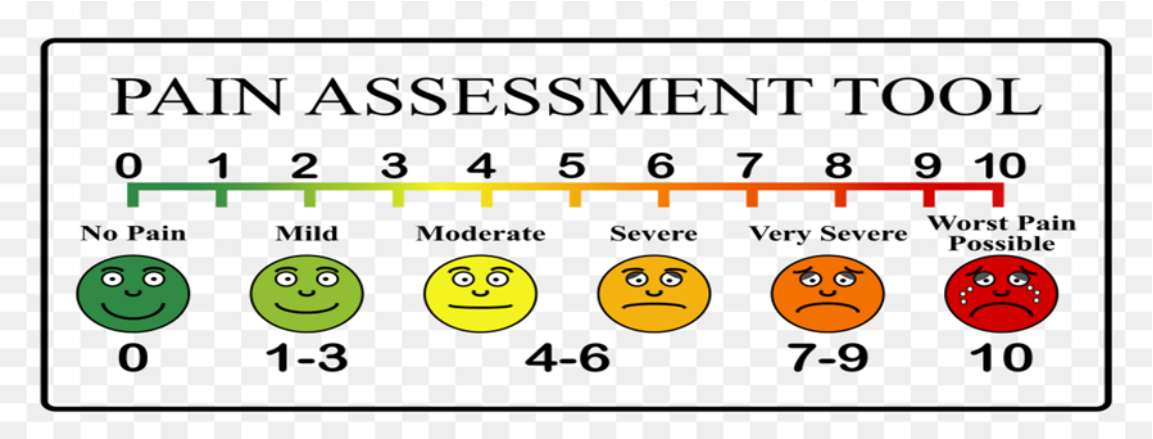
Researcher's Note

This information sheet is intended to provide transparency about the study design, methodology, and ethical safeguards. It ensures that participants are fully informed before consenting to take part in the research.

ANNEXURE 2: CASE PROFORMA

PATIENT INFORMATION			
Name		**IPD**	
Age		**Sex**	
Date of Admission		**Date of Operation**	
Date of Discharge		**Hospital Stay**	
Chief Complaints			
Past Illness			
Personal History			
General Examination			

Pulse		**BP**	
SpO2		**Temp**	
Systemic Examination			
CNS			
CVS			
RESPI			
P/A			
Per Rectal Examination			
Inspection			
Perianal Excoriation	Present / Absent		
Number of Opening			
Nature of Discharge	Purulent / Serous / Other		
Palpation - PR Finding			
Patient Tolerating Rectal Examination	Yes / No		
Sphincter Spasm	Present / Absent		
Tenderness	Present / Absent		
Proctoscopy Finding			
Operative Finding			

Surgery Details	
Surgery	FISTULOTOMY / FISTULECTOMY
OT Duration	
Healing Time	
Post Operative Pain Score: VAS (Visual Analog Scale)	
	
Follow Up - 1st Week	
Wound Status	
Discharge	
Incontinence	
Follow Up - 1st Month	
Wound Status	
Discharge	
Incontinence	
Follow Up - 3rd Month	
Wound Status	

Discharge	
Incontinence	
Recurrence	

FOLLOW UP SUMMARY			
Parameter	**1st Week**	**1st Month**	**3rd Month**
Wound Status			
Discharge			
Incontinence			
Recurrence	N/A	N/A	

ANNEXURE 3: INFORMED CONSENT FORM (ENGLISH)

Study title: *Comparison of Fistulectomy and Fistulotomy with Marsupialization in Management of Simple Anal Fistula*

Principal investigator / Hospital: _____

Patient name: _____ Age: _____ ID: _____

Purpose: You are invited to join a study comparing two standard surgical treatments for simple anal fistula. The goal is to find which gives better healing and fewer complications.

Procedures: You will be randomly assigned to one of two procedures: fistulectomy (removal of the tract) or fistulotomy with marsupialization (laying open the tract and suturing wound edges). Both are performed under anaesthesia.

Benefits: Possible faster healing, relief of symptoms, and contribution to medical knowledge.

Risks and discomforts: Pain, bleeding, wound infection, delayed healing, scarring, recurrence of fistula, and possible bowel control problems (incontinence) if sphincter muscle is affected. General surgical risks (anaesthesia, chest infection, blood clots) also apply.

Alternatives: Conservative care, seton placement, plug, or other procedures as advised by your surgeon. Choosing not to participate will not affect your standard care.

Confidentiality: Your records will be kept confidential; data used for research will be anonymized.

Voluntary participation: Participation is voluntary. You may withdraw at any time without affecting your care.

Consent statement: I have read (or had read to me) the information. I understand the procedures, risks, benefits, and alternatives. My questions were answered. I consent to participate.

Patient signature: _____ Date: _____

Witness / Interpreter: _____ Date: _____

Investigator signature: _____ Date: _____

ANNEXURE 3: INFORMED CONSENT FORM (HINDI)

अध्ययन का शीर्षक: सरल एनल फिस्टुला के प्रबंधन में फिस्टुलेक्टॉमी बनाम फिस्टुलोटॉमी विथ मार्सुपियलाइज़ेशन की तुलना

रोगी का नाम: _____ आयु: _____ आईडी: _____

उद्देश्य: आपको इस अध्ययन में शामिल होने के लिए आमंत्रित किया जा रहा है, जिसमें दो मानक शल्य प्रक्रियाओं की तुलना की जाएगी।

प्रक्रिया: आपको यादृच्छिक रूप से दो में से एक प्रक्रिया दी जाएगी: फिस्टुलेक्टॉमी (ट्रैक्ट निकालना) या फिस्टुलोटॉमी व मार्सुपियलाइज़ेशन (ट्रैक्ट खोलकर किनारों को सिलना)। दोनों सामान्यतः एनेस्थीसिया में की जाती हैं।

लाभ: लक्षणों में राहत, बेहतर उपचार और चिकित्सा ज्ञान में योगदान।

जोखिम: दर्द, रक्तस्राव, घाव में संक्रमण, धीमी भरपाई, निशान, फिस्टुला का पुनरावृत्ति, और मल नियंत्रण की समस्या (इनकॉन्टिनेंस) यदि स्नायुगत मांसपेशी प्रभावित हो। सामान्य शल्य जोखिम भी लागू होते हैं।

वैकल्पिक: सेटन, प्लग, या अन्य उपचार; भाग न लेने पर आपकी सामान्य देखभाल प्रभावित नहीं होगी।

गोपनीयता: आपकी जानकारी गोपनीय रखी जाएगी और शोध के लिए नाम हटाकर उपयोग की जाएगी।

स्वैच्छिक भागीदारी: आप कभी भी वापस ले सकते हैं बिना देखभाल प्रभावित हुए।

रोगी के हस्ताक्षर: _____ तारीख: _____

साक्षी / दुभाषिया: _____ तारीख: _____

अनुसंधानकर्ता: _____ तारीख: _____

ANNEXURE 4: IEC APPROVAL CERTIFICATE

NIMS UNIVERSITY RAJASTHAN, JAIPUR

Fully empowered & incorporated as a regular & full-fledged University under NIMS UNIVERSITY ACT, 2008 duly recognized by Government of India under the provisions of the Sections 2(f) and 22 of the UGC Act, 1956.

OFFICE OF THE INSTITUTIONAL ETHICS COMMITTEE

NECRBHR,DHR File No.-EC/NEW/INST/2024/RJ/0118

Ref. No.: NIMSUR/IEC/2024/1032 Date:21/05/2024

From

Office of the Institutional Ethics Committee
Nims University Rajasthan, Jaipur
NH- 11 C, Jaipur-Delhi Highway, Jaipur

To,

The Principal Investigator
DR. DRASHTI BUTANI
Department of General Surgery
Proposal No. IEC/P-656/2024

Dear DR. DRASHTI BUTANI

Institutional Ethics Committee Nims University Rajasthan, Jaipur had received & reviewed your application to conduct the research study titled" **Comparison of fistulectomy and fistulotomy with marsupialisation in the management of simple anal fistula**" on 21/05/2024.

The following documents were reviewed:

a. Protocol

b. Patient Information Sheet and Informed Consent Form in English and vernacular language

c. Proposed methods for subject accrual to be used for the purpose

d. Principal Investigator's current CV

ANNEXURE 4: IEC APPROVAL CERTIFICATE

NIMS UNIVERSITY RAJASTHAN, JAIPUR

Fully empowered & incorporated as a regular & full-fledged University under NIMS UNIVERSITY ACT, 2008 duly recognized by Government of India under the provisions of the Sections 2(f) and 22 of the UGC Act, 1956.

OFFICE OF THE INSTITUTIONAL ETHICS COMMITTEE

The following members of the ethics committee were present at the meeting held on 21/5/2024 at 12:00 Noon in Board room, Hotam administration block, Nims University Rajasthan, Jaipur.

S. No.	Name of the member	Designation of the member
1	Dr. Kunal Kothari	Chairman
2	Dr. Mahaveer Singh	Member Secretary
3	Dr. Hemant Garg	Basic Medical Scientist
4	Dr. Seema Chauhan	Basic Medical Scientist
5	Dr. Vineet Chaudhry	Clinician
6	Dr. Sushma BJ	Basic Medical Scientist
7	Dr. Anumeha Jain	Clinician
8	Mr. Sunil Kumar Sharma	Legal Expert
9	Mrs. Mridula Chandra	Social Scientist
10	Mrs. Kusum Sharma	Lay Person

We approve the study to be conducted in its presented form in your Department, at Nims University Rajasthan, Jaipur. This approval is valid till the completion of the study.

Please note that the committee is constituted as per ICH-GCP, Schedule-Y and ICMR guidelines and follows them.

It is confirmed that neither you nor any of the study team members have participated in the decision making procedures of the Committee.

You are required to submit the following reports to the EC.

- 6 monthly/annual study reports about the progress of the study.
- A copy of the final study report at the completion of the study.
- You need to inform & resubmit your protocol in case of any addition or deletion in your objectives or methods of approved protocol.

The Ethics Committee expects to be informed immediately about:

- All serious adverse events (SAE) occurring at the site within 24 hours to IEC.
- Any change to or deviation to the protocol approved by this Ethics Committee that you implement to eliminate hazards to the study subjects.
- New information that may affect adversely the safety of the subjects or the conduct of the study.

Yours truly

Member Secretary
Institutional Ethics Committee,
Nims University Rajasthan, Jaipur

MEMBER SECRETARY
Institutional Ethics Committee,
NIMS University Rajasthan, Jaipur

ANNEXURE 5: PLAGIARISM

NIMS UNIVERSITY RAJASTHAN, JAIPUR

Fully empowered & incorporated as a regular & full-fledged University under NIMS UNIVERSITY ACT, 2008 duly recognized by Government of India under the provisions of the Sections 2(f) and 22 of the UGC Act, 1956.

OFFICE OF RESEARCH AND INNOVATION CELL

CERTIFICATE OF PLAGIARISM CHECK FOR THESIS

Author Name	DR. DRASHTI DINESHBHAI BUTANI		
Department	MS GENERAL SURGERY		
Batch	2023-2026		
Guide (Designation)	DR. SANJEEW KUMAR CHOWDHARY (Professor, Department of General Surgery)		
Co-guides		*Name*	*Designation and Department*
		-	-
Topic	COMPARISON OF FISTULECTOMY AND FISTULOTOMY WITH MARSUPIALIZATION IN THE MANAGEMENT OF SIMPLE ANAL FISTULA		
Total Similarity/Plagiarism (%)	10%		
Submission Date	27/04/2026		

Checked by: - Dr. Sourav Debnath

Dr. Sumit Rajotiya
Clinical Research Associate - RAIC
Assistant Professor – Department of Pharmacy
Nims University Rajasthan, Jaipur

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ANNEXURE 6: MASTERCHART

S. No.	Name	Age	Sex	IPD No.	DOA	Symptoms	PR Finding	Pre-op Finding	Intra-op Finding	T. Duration	Procedure	DOS	DOD	Hospital Stay (days)	Post-op Pain Score	Healing Time (days)	1st Week Follow-up			2nd Week Follow-up			4th Week Follow-up			Recurrence
S. No.	Name	Age	Sex	IPD No.	DOA	Symptoms	PR Finding	Pre-op Finding	Intra-op Finding	T. Duration (min)	Procedure	DOS	DOD	Hospital Stay (days)	Post-op Pain Score	Healing Time (days)	Wound Status	Discharge	Incontinence	Wound Status	Discharge	Incontinence	Wound Status	Discharge	Incontinence	Recurrence
1	Mr. Raghunath	38	Male	202406130370	13-06-2024	Pus discharge from perianal region	Single external opening at 5 o'clock, 2cm from anal verge	Intersphincteric	Intersphincteric fistula internal opening 6 o'clock	10 MIN	Fistulotomy	15-06-2024	18-06-2024	5	5	15	Unhealthy	Purulent discharge	Nil	Unhealthy	Purulent discharge	Nil	Healed	No Discharge	Nil	Absent
2	Mr. As Mohammad	31	Male	202407010458	01-07-2024	Pus discharge from perianal region	Single external opening at 1 o'clock, 1cm from anal verge	Transsphincteric	Transsphincteric fistula internal opening 1 o'clock	13 MIN	Fistulotomy	03-07-2024	05-07-2024	4	2	25	Healthy	No Discharge	Nil	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Absent
3	Mr. Fateh Singh	43	Male	202407080236	08-07-2024	Pus discharge from perianal region	Single external opening at 11 o'clock, 1.5cm from anal verge	Intersphincteric	Intersphincteric fistula internal opening 11 o'clock	12 MIN	Fistulotomy	10-07-2024	14-07-2024	6	3	22	Unhealthy	Blood discharge	Nil	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Absent
4	Mr. Ram Singh	63	Male	202407120430	12-07-2024	Pus discharge from perianal region	Single external opening at 7 o'clock, 2.5cm from anal verge	Transsphincteric	Transsphincteric fistula internal opening 7 o'clock	17 MIN	Fistulotomy	13-07-2024	17-07-2024	5	4	21	Healthy	No Discharge	Nil	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Absent
5	Mr. Shashank	44	Male	202407300378	30-07-2024	Pus discharge from perianal region	Single external opening at 6 o'clock, 3cm from anal verge	Intersphincteric	Intersphincteric fistula internal opening 6 o'clock	12 MIN	Fistulotomy	01-08-2024	05-08-2024	4	2	32	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Healed	No Discharge	Nil	Absent
6	Mr. Prem Singh	44	Male	202409060459	06-09-2024	Pus discharge from perianal region	Single external opening at 5 o'clock, 1cm from anal verge	Intersphincteric	Intersphincteric fistula internal opening 6 o'clock	10 MIN	Fistulotomy	08-09-2024	12-09-2024	6	4	28	Unhealthy	Serous discharge	Nil	Unhealthy	Serous discharge	Nil	Healed	No Discharge	Nil	Absent
7	Mrs. Lali Devi	31	Female	202409210105	21-09-2024	Pus discharge from perianal region	Single external opening at 1 o'clock, 2cm from anal verge	Transsphincteric	Transsphincteric fistula internal opening 1 o'clock	15 MIN	Fistulotomy	23-09-2024	26-09-2024	5	2	18	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Healed	No Discharge	Nil	Absent
8	Mr. Rajkumar Jat	46	Male	20241009118	09-10-2024	Pus discharge from perianal region	Single external opening at 7 o'clock, 3.5cm from anal verge	Intersphincteric	Intersphincteric fistula internal opening 6 o'clock	17 MIN	Fistulotomy	12-10-2024	15-10-2024	6	1	25	Healthy	No Discharge	Nil	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Absent
9	Mr. Uday Singh	39	Male	202411050197	05-11-2024	Pus discharge from perianal region	Single external opening at 5 o'clock, 2cm from anal verge	Intersphincteric	Intersphincteric fistula internal opening 6 o'clock	13 MIN	Fistulotomy	06-11-2024	09-11-2024	4	4	22	Unhealthy	Serous discharge	Nil	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Absent
10	Mr. Jitendra Jatav	34	Male	202411250382	25-11-2024	Pus discharge from perianal region	Single external opening at 2 o'clock, 1cm from anal verge	Intersphincteric	Intersphincteric fistula internal opening 2 o'clock	10 MIN	Fistulotomy	27-11-2024	30-11-2024	5	4	26	Healthy	No Discharge	Nil	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Absent
11	Mr. Mahavir Sharma	46	Male	202412250315	25-12-2024	Pus discharge from perianal region	Single external opening at 11 o'clock, 2.5cm from anal verge	Intersphincteric	Intersphincteric fistula internal opening 11 o'clock	12 MIN	Fistulotomy	27-12-2024	01-01-2025	7	5	25	Unhealthy	Blood discharge	Nil	Unhealthy	Serous discharge	Nil	Healed	No Discharge	Nil	Absent
12	Mr. Jagdish Prasad	38	Male	202412300235	30-12-2024	Pus discharge from perianal region	Single external opening at 6 o'clock, 1cm from anal verge	Transsphincteric	Transsphincteric fistula internal opening 6 o'clock	17 MIN	Fistulotomy	01-01-2025	05-01-2025	6	3	22	Unhealthy	Serous discharge	Nil	Healed	No Discharge	Nil	Healed	No Discharge	Nil	Absent
13	Mr. Vijay	37	Male	202412300482	30-12-2024	Pus discharge from perianal region	Single external opening at 11 o'clock, 2cm from anal verge	Transsphincteric	Transsphincteric fistula internal opening 11 o'clock	18 MIN	Fistulotomy	31-12-2024	03-01-2025	4	3	20	Unhealthy	No Discharge	Nil	Healed	No Discharge	Nil	Healed	No Discharge	Nil	Absent
14	Mr. Satyapal	59	Male	202502100233	10-02-2025	Pus discharge from perianal region	Single external opening at 1 o'clock, 3cm from anal verge	Transsphincteric	Transsphincteric fistula internal opening 1 o'clock	15 MIN	Fistulotomy	12-02-2025	15-02-2025	5	4	26	Unhealthy	Serous discharge	Nil	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Absent
15	Mr. Dharamveer Singh	30	Male	202502220249	22-02-2025	Pus discharge from perianal region	Single external opening at 5 o'clock, 2cm from anal verge	Intersphincteric	Intersphincteric fistula internal opening 6 o'clock	10 MIN	Fistulotomy	24-02-2025	27-02-2025	5	2	25	Unhealthy	Purulent discharge	Nil	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Absent
16	Mr. Rahul Chaudhary	32	Male	202503180399	18-03-2025	Pus discharge from perianal region	Single external opening at 11 o'clock, 1cm from anal verge	Intersphincteric	Intersphincteric fistula internal opening 11 o'clock	13 MIN	Fistulotomy	20-03-2025	24-03-2025	6	1	22	Healthy	No Discharge	Nil	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Absent
17	Mr. Rikesh	43	Male	202507220532	22-07-2025	Pus discharge from perianal region	Single external opening at 6 o'clock, 3.5cm from anal verge	Transsphincteric	Transsphincteric fistula internal opening 6 o'clock	15 MIN	Fistulotomy	24-07-2025	26-07-2025	4	2	34	Healthy	No Discharge	Nil	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Absent
18	Mr. Bhagwan Das	52	Male	202507280457	28-07-2025	Pus discharge from perianal region	Single external opening at 5 o'clock, 2cm from anal verge	Transsphincteric	Transsphincteric fistula internal opening 6 o'clock	17 MIN	Fistulotomy	30-07-2025	03-08-2025	6	3	26	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Healed	No Discharge	Nil	Absent
19	Mr. Gopal Jatav	55	Male	202508300391	30-08-2025	Pus discharge from perianal region	Single external opening at 2 o'clock, 1.5cm from anal verge	Transsphincteric	Transsphincteric fistula internal opening 2 o'clock	15 MIN	Fistulotomy	01-09-2025	03-09-2025	4	5	25	Unhealthy	Purulent discharge	Nil	Unhealthy	Purulent discharge	Nil	Healed	No Discharge	Nil	Absent
20	Mr. Birendra Jatav	35	Male	202509050458	05-09-2025	Pus discharge from perianal region	Single external opening at 6 o'clock, 1cm from anal verge	Intersphincteric	Intersphincteric fistula internal opening 6 o'clock	10 MIN	Fistulotomy	06-09-2025	10-09-2025	5	2	22	Healthy	No Discharge	Nil	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Absent
21	Mr. Satya Dev	56	Male	202509100468	10-09-2025	Pus discharge from perianal region	Single external opening at 1 o'clock, 2.5cm from anal verge	Transsphincteric	Transsphincteric fistula internal opening 1 o'clock	15 MIN	Fistulotomy	06-09-2025	10-09-2025	5	2	22	Healthy	No Discharge	Nil	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Absent
22	Mr. Lakhan Singh	41	Male	202509150407	15-09-2025	Pus discharge from perianal region	Single external opening at 5 o'clock, 2cm from anal verge	Intersphincteric	Intersphincteric fistula internal opening 6 o'clock	15 MIN	Fistulotomy	12-09-2025	16-09-2025	6	4	17	Unhealthy	Serous discharge	Nil	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Absent
23	Mr. Ankit Singh	28	Male	202509210019	21-09-2025	Pus discharge from perianal region	Single external opening at 2 o'clock, 2cm from anal verge	Intersphincteric	Intersphincteric fistula internal opening 2 o'clock	10 MIN	Fistulotomy	17-09-2025	19-09-2025	4	5	20	Unhealthy	Serous discharge	Nil	Healed	No Discharge	Nil	Healed	No Discharge	Nil	Absent
24	Mrs. Siya Pal	49	Female	202510060292	06-10-2025	Pus discharge from perianal region	Single external opening at 11 o'clock, 1cm from anal verge	Transsphincteric	Transsphincteric fistula internal opening 11 o'clock	12 MIN	Fistulotomy	23-09-2025	26-09-2025	5	3	24	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Healed	No Discharge	Nil	Absent
25	Mr. Mubeen	42	Male	20251009452	09-10-2025	Pus discharge from perianal region	Single external opening at 7 o'clock, 2.5cm from anal verge	Transsphincteric	Transsphincteric fistula internal opening 7 o'clock	15 MIN	Fistulotomy	08-10-2025	10-10-2025	4	4	35	Unhealthy	Serous discharge	Nil	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Absent
26	Mr. Dinesh Diwan	38	Male	202510130833	13-10-2025	Pus discharge from perianal region	Single external opening at 5 o'clock, 2cm from anal verge	Intersphincteric	Intersphincteric fistula internal opening 6 o'clock	10 MIN	Fistulotomy	11-10-2025	15-10-2025	6	5	22	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Healed	No Discharge	Nil	Absent
27	Mr. Talwar Singh	42	Male	202510260032	26-10-2025	Pus discharge from perianal region	Single external opening at 7 o'clock, 3.5cm from anal verge	Intersphincteric	Intersphincteric fistula internal opening 6 o'clock	12 MIN	Fistulotomy	15-10-2025	18-10-2025	5	3	18	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Healed	No Discharge	Nil	Absent
28	Mr. Moolchand Kumar	60	Male	202510270549	27-10-2025	Pus discharge from perianal region	Single external opening at 2 o'clock, 2cm from anal verge	Intersphincteric	Intersphincteric fistula internal opening 2 o'clock	13 MIN	Fistulotomy	27-10-2025	30-10-2025	4	1	17	Healthy	No Discharge	Nil	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Absent
29	Mr. Khemchand	43	Male	202602100236	10-02-2026	Pus discharge from perianal region	Single external opening at 3 o'clock, 2.5cm from anal verge	Intersphincteric	Intersphincteric fistula internal opening 3 o'clock	10 MIN	Fistulotomy	29-10-2025	01-11-2025	5	5	32	Healthy	No Discharge	Nil	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Absent
30	Mr. Naveen	31	Male	202602180458	18-02-2026	Pus discharge from perianal region	Single external opening at 7 o'clock, 2cm from anal verge	Intersphincteric	Intersphincteric fistula internal opening 3 o'clock	12 MIN	Fistulotomy	11-02-2026	16-02-2026	5	3	15	Unhealthy	Purulent discharge	Nil	Unhealthy	Serous discharge	Nil	Healed	No Discharge	Nil	Absent
31	Mrs. Pooja	26	Female	202602260429	26-02-2026	Pus discharge from perianal region	Single external opening at 5 o'clock, 1.5cm from anal verge	Transsphincteric	Transsphincteric fistula internal opening 6 o'clock	18 MIN	Fistulotomy	19-02-2026	23-02-2026	4	4	35	Healthy	No Discharge	Nil	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Absent

ANNEXURE 6: MASTERCHART

S. No.	Name	Age	Sex	IPD No.	DOA	Symptoms	PR Finding	Pre-op Finding	Intra-op Finding	T. Duration	Procedure	DOS	DOD	Hospital Stay (days)	Post-op Pain Score	Healing Time (days)	1st Week Follow-up			2nd Week Follow-up			4th Week Follow-up			Recurrence
S. No.	Name	Age	Sex	IPD No.	DOA	Symptoms	PR Finding	Pre-op Finding	Intra-op Finding	T. Duration (min)	Procedure	DOS	DOD	Hospital Stay (days)	Post-op Pain Score	Healing Time (days)	Wound Status	Discharge	Incontinence	Wound Status	Discharge	Incontinence	Wound Status	Discharge	Incontinence	Recurrence
1	Mrs Jayanti	26	Female	202406200429	20-06-2024	Pus discharge from perianal region	Single external opening at 5 o'clock, 2cm from anal verge	Transsphincteric	Transsphincteric fistula internal opening 6 o'clock	25 MIN	Fistulectomy	22-06-2024	26-06-2024	6	7	35	Purulent discharge	Purulent discharge	Nil	Unhealthy	Serous discharge	Nil	Healed	No Discharge	Nil	Absent
2	Mr Lalit	28	Male	202407050426	05-07-2024	Pus discharge from perianal region	Single external opening at 12 o'clock, 3cm from anal verge	Transsphincteric	Transsphincteric fistula internal opening 12 o'clock	32 MIN	Fistulectomy	07-07-2024	11-07-2024	6	6	25	Healthy	Not Healed	Nil	Healed	No Discharge	Nil	Healed	No Discharge	Nil	Absent
3	Mr. Ram Kumar	26	Male	202407100458	10-07-2024	Pus discharge from perianal region	Single external opening at 11 o'clock, 1cm from anal verge	Transsphincteric	Transsphincteric fistula internal opening 11 o'clock	37 MIN	Fistulectomy	12-07-2024	16-07-2024	6	6	22	Healthy	Not Healed	Nil	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Absent
4	Mr. Juharu	61	Male	202407200401	20-07-2024	Pus discharge from perianal region	Single external opening at 6 o'clock, 3cm from anal verge	Intersphincteric	Intersphincteric fistula internal opening 6 o'clock	25 MIN	Fistulectomy	22-07-2024	25-07-2024	6	5	21	Healthy	Not Healed	Nil	Healed	No Discharge	Nil	Healed	No Discharge	Nil	Absent
5	Mr. Mommad Javed	28	Male	202409020263	02-09-2024	Pus discharge from perianal region	Single external opening at 2 o'clock, 2cm from anal verge	Intersphincteric	Intersphincteric fistula internal opening 2 o'clock	23 MIN	Fistulectomy	03-09-2024	06-09-2024	4	6	32	Purulent discharge	Purulent discharge	Nil	Unhealthy	Purulent discharge	Nil	Healed	No Discharge	Nil	Absent
6	Mr. Arshad Ali	34	Male	202409100322	10-09-2024	Pus discharge from perianal region	Single external opening at 1 o'clock, 2.5cm from anal verge	Intersphincteric	Intersphincteric fistula internal opening 1 o'clock	27 MIN	Fistulectomy	12-09-2024	16-09-2024	4	4	28	Healthy	Not Healed	Nil	Healed	No Discharge	Nil	Healed	No Discharge	Nil	Absent
7	Mr. Sunil Sharma	30	Male	202409251256	25-09-2024	Pus discharge from perianal region	Single external opening at 6 o'clock, 2cm from anal verge	Transsphincteric	Transsphincteric fistula internal opening 6 o'clock	29 MIN	Fistulectomy	27-09-2024	01-10-2024	6	7	18	Healthy	Not Healed	Nil	Healed	No Discharge	Nil	Healed	No Discharge	Nil	Absent
8	Mr. Kana Ram Jat	24	Male	202410200100	20-10-2024	Pus discharge from perianal region	Single external opening at 7 o'clock, 2.5cm from anal verge	Intersphincteric	Intersphincteric fistula internal opening 6 o'clock	20 MIN	Fistulectomy	22-10-2024	26-10-2024	6	6	25	Blood discharge	Blood discharge	Nil	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Absent
9	Mr. Mahesh	49	Male	202411080216	08-11-2024	Pus discharge from perianal region	Single external opening at 5 o'clock, 3.5cm from anal verge	Transsphincteric	Transsphincteric fistula internal opening 6 o'clock	35 MIN	Fistulectomy	10-11-2024	13-11-2024	5	5	22	Serous discharge	Serous discharge	Nil	Unhealthy	Blood discharge	Nil	Healed	No Discharge	Nil	Absent
10	Mr. Jagdish Prasad	37	Male	202412120356	12-12-2024	Pus discharge from perianal region	Single external opening at 11 o'clock, 3cm from anal verge	Intersphincteric	Intersphincteric fistula internal opening 11 o'clock	25 MIN	Fistulectomy	13-12-2024	17-12-2024	6	5	26	Healthy	Not Healed	Nil	Healed	No Discharge	Nil	Healed	No Discharge	Nil	Absent
11	Mr. Vinod Kumar	33	Male	20241226002	26-12-2024	Pus discharge from perianal region	Single external opening at 6 o'clock, 2.5cm from anal verge	Transsphincteric	Transsphincteric fistula internal opening 6 o'clock	33 MIN	Fistulectomy	28-12-2024	02-01-2025	7	5	25	Healthy	Not Healed	Nil	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Absent
12	Mr. Jitendra	32	Male	202501280498	28-01-2025	Pus discharge from perianal region	Single external opening at 1 o'clock, 1cm from anal verge	Intersphincteric	Intersphincteric fistula internal opening 1 o'clock	27 MIN	Fistulectomy	30-01-2025	03-02-2025	6	5	22	Purulent discharge	Purulent discharge	Nil	Unhealthy	Serous discharge	Nil	Healed	No Discharge	Nil	Absent
13	Mr. Vijay Ram	51	Male	202502060052	06-02-2025	Pus discharge from perianal region	Single external opening at 12 o'clock, 2cm from anal verge	Intersphincteric	Intersphincteric fistula internal opening 12 o'clock	25 MIN	Fistulectomy	08-02-2025	11-02-2025	3	5	20	Blood discharge	Blood discharge	Nil	Healed	No Discharge	Nil	Healed	No Discharge	Nil	Absent
14	Mr. Hardeep Singh	40	Male	202502100484	10-02-2025	Pus discharge from perianal region	Single external opening at 2 o'clock, 1.5cm from anal verge	Intersphincteric	Intersphincteric fistula internal opening 2 o'clock	23 MIN	Fistulectomy	12-02-2025	15-02-2025	5	4	26	Purulent discharge	Purulent discharge	Nil	Unhealthy	Purulent discharge	Nil	Unhealthy	Serous discharge	Nil	Present
15	Mr. Gurudayal	32	Male	202502270298	27-02-2025	Pus discharge from perianal region	Single external opening at 5 o'clock, 2cm from anal verge	Transsphincteric	Transsphincteric fistula internal opening 6 o'clock	32 MIN	Fistulectomy	01-03-2025	03-03-2025	4	4	25	Serous discharge	Serous discharge	Nil	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Absent
16	Mr. Verma Shankar	43	Male	202503060309	06-03-2025	Pus discharge from perianal region	Single external opening at 6 o'clock, 3.5cm from anal verge	Transsphincteric	Transsphincteric fistula internal opening 6 o'clock	28 MIN	Fistulectomy	07-03-2025	10-03-2025	4	4	22	Serous discharge	Serous discharge	Nil	Unhealthy	Blood discharge	Nil	Healed	No Discharge	Nil	Absent
17	Mr. Raghav Yadav	20	Male	202503210386	21-03-2025	Pus discharge from perianal region	Single external opening at 12 o'clock, 2.5cm from anal verge	Transsphincteric	Transsphincteric fistula internal opening 12 o'clock	25 MIN	Fistulectomy	23-03-2025	26-03-2025	6	5	34	Healthy	Not Healed	Nil	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Absent
18	Mr. Radheshyam	50	Male	20250910507	10-09-2025	Pus discharge from perianal region	Single external opening at 11 o'clock, 1cm from anal verge	Transsphincteric	Transsphincteric fistula internal opening 11 o'clock	30 MIN	Fistulectomy	12-09-2025	16-09-2025	6	5	26	Healthy	Not Healed	Nil	Healed	No Discharge	Nil	Healed	No Discharge	Nil	Absent
19	Mr. Shri Lal Rawat	77	Male	202509220462	22-09-2025	Pus discharge from perianal region	Single external opening at 6 o'clock, 2.5cm from anal verge	Intersphincteric	Intersphincteric fistula internal opening 6 o'clock	25 MIN	Fistulectomy	24-09-2025	27-09-2025	5	5	25	Serous discharge	Serous discharge	Nil	Healed	No Discharge	Nil	Healed	No Discharge	Nil	Absent
20	Mrs. Soniya	31	Female	202510270610	27-10-2025	Pus discharge from perianal region	Single external opening at 2 o'clock, 3cm from anal verge	Transsphincteric	Transsphincteric fistula internal opening 2 o'clock	33 MIN	Fistulectomy	29-10-2025	01-11-2025	5	6	22	Serous discharge	Serous discharge	Nil	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Absent
21	Mr. Brajmohan Jatav	33	Male	202511030500	03-11-2025	Pus discharge from perianal region	Single external opening at 12 o'clock, 2.5cm from anal verge	Transsphincteric	Transsphincteric fistula internal opening 12 o'clock	27 MIN	Fistulectomy	05-11-2025	08-11-2025	5	5	17	Healthy	Not Healed	Nil	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Absent
22	Mr. Raj Kumar Khuswah	44	Male	202511050487	05-11-2025	Pus discharge from perianal region	Single external opening at 7 o'clock, 1cm from anal verge	Transsphincteric	Transsphincteric fistula internal opening 6 o'clock	25 MIN	Fistulectomy	07-11-2025	10-11-2025	5	7	20	Healthy	Not Healed	Nil	Healed	No Discharge	Nil	Healed	No Discharge	Nil	Absent
23	Mr. Pawan	26	Male	202511170779	17-11-2025	Pus discharge from perianal region	Single external opening at 1 o'clock, 2.5cm from anal verge	Transsphincteric	Transsphincteric fistula internal opening 1 o'clock	30 MIN	Fistulectomy	19-11-2025	23-11-2025	6	5	24	Healthy	Not Healed	Nil	Healed	No Discharge	Nil	Healed	No Discharge	Nil	Absent
24	Mr. Arvesh	22	Male	202511210135	21-11-2025	Pus discharge from perianal region	Single external opening at 5 o'clock, 3cm from anal verge	Intersphincteric	Intersphincteric fistula internal opening 6 o'clock	20 MIN	Fistulectomy	23-11-2025	26-11-2025	5	5	35	Healthy	Not Healed	Nil	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Absent
25	Mr. Jagram Singh	57	Male	202511302055	30-11-2025	Pus discharge from perianal region	Single external opening at 2 o'clock, 2cm from anal verge	Transsphincteric	Transsphincteric fistula internal opening 2 o'clock	25 MIN	Fistulectomy	01-12-2025	05-12-2025	5	4	22	Blood discharge	Blood discharge	Nil	Unhealthy	Purulent discharge	Nil	Healed	No Discharge	Nil	Absent
26	Mr. Akram Khan	65	Male	202601170180	17-01-2026	Pus discharge from perianal region	Single external opening at 11 o'clock, 2cm from anal verge	Transsphincteric	Transsphincteric fistula internal opening 11 o'clock	30 MIN	Fistulectomy	19-01-2026	23-01-2026	6	4	38	Healthy	Not Healed	Nil	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Absent
27	Mr. Govind	21	Male	202601250025	25-01-2026	Pus discharge from perianal region	Single external opening at 2 o'clock, 2.5cm from anal verge	Intersphincteric	Intersphincteric fistula internal opening 2 o'clock	27 MIN	Fistulectomy	27-01-2026	30-01-2026	5	5	17	Healthy	Not Healed	Nil	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Absent
28	Mr. Nand Kishor	32	Male	202602020477	02-02-2026	Pus discharge from perianal region	Single external opening at 6 o'clock, 1cm from anal verge	Transsphincteric	Transsphincteric fistula internal opening 6 o'clock	25 MIN	Fistulectomy	04-02-2026	07-02-2026	5	7	32	Purulent discharge	Purulent discharge	Nil	Unhealthy	Serous discharge	Nil	Unhealthy	Serous discharge	Nil	Absent
29	Mrs. Mamta	36	Female	20260210398	10-02-2026	Pus discharge from perianal region	Single external opening at 12 o'clock, 2cm from anal verge	Intersphincteric	Intersphincteric fistula internal opening 12 o'clock	23 MIN	Fistulectomy	12-02-2026	15-02-2026	5	2	40	Serous discharge	Serous discharge	Nil	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Absent
30	Mr. Mustakeem Khan	49	Male	202603020477	02-03-2026	Pus discharge from perianal region	Single external opening at 7 o'clock, 2.5cm from anal verge	Transsphincteric	Transsphincteric fistula internal opening 6 o'clock	35 MIN	Fistulectomy	04-03-2026	06-03-2026	4	7	35	Purulent discharge	Purulent discharge	Nil	Unhealthy	Serous discharge	Nil	Unhealthy	Purulent discharge	Nil	Absent
31	Mr. Mohad Irfan	28	Male	202603101398	10-03-2026	Pus discharge from perianal region	Single external opening at 5 o'clock, 2cm from anal verge	Transsphincteric	Transsphincteric fistula internal opening 6 o'clock	30 MIN	Fistulectomy	12-03-2026	14-03-2026	4	2	32	Blood discharge	Blood discharge	Nil	Healthy	No Discharge	Nil	Healed	No Discharge	Nil	Absent

ANNEXURE 7: DECLARATION

DECLARATIONS

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Conflicts of Interest: The authors declare no conflicts of interest.

Data Availability: The raw study data are available from the corresponding author upon reasonable request.

Ethics Approval: The study protocol was approved by the Institutional Ethics Committee of NIMS University, Jaipur.

IEC Approval Number: IEC/P-656/2024

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