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# CURRENT PERSPECTIVES ON TREATMENT STRATEGIES FOR FISTULA IN ANO: AN INTEGRATIVE REVIEW

## *RUNNING TITLE:* AN INTEGRATIVE REVIEW OF VARIOUS TREATMENT MODALITIES OF FISTULA IN ANO

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**ABSTRACT**
An abnormal hollow tract or cavity with granulation tissue lining that connects the anal canal's primary entrance to the perianal skin's secondary opening is known as a fistula-in-ano. Secondary tracts may branch off from the same primary opening and may be numerous. It is a well-known chronic suppurative condition with persistent perianal pus discharge, frequent exacerbations, and recurrences after treatment. Fistula-in-ano is most commonly caused by infection that spreads from perirectal abscess to the anal crypt glands.Symptoms can range from mild discomfort and discharge that cause hygiene issues to sepsis, and they frequently have a substantial impact on quality of life. Fistula-in-ano therapy is still difficult.Surgery is the preferred method of treatment since it can drain an infection, seal a fistulous tract, stop the spread of the disease and retain the function of the anal sphincter. Additionally, it must be acknowledged that much more research is necessary to understand the etiopathology of fistula in ano, the position of tracks, and the nature and extent of surgical procedures. Because of this, there is still a lot to discover about this condition's research and treatment in general. Fistulectomy is the preferred treatment for fistula-in-ano by most surgeons. The success rate can be increased by choosing a specific operation for each patient. A study analyzed the effectiveness of surgical treatment in terms of relief, wound healing, recurrence, and post-operative complications, including functional anal defects. The review of fistula in ano from texts and other review articles available on Research Gate, PubMed, Google Scholar, etc. served as the foundation for this study. The current article aims to compile and review the disease; fistula in ano. The information gathered supports the idea of fistula in ano. Additionally, it emphasises the significance of its diagnosis andtreatment. Fistulas appear as a result of persistent neglect combined with an infection of the sebaceous gland or hair follicle. The main symptom is pus discharge from the perianal region. There may be a link between *Bhagandar*(Fistula in Ano) and this illness. Ayurvedicparasurgical procedures for *Bhagandara* include *Ksharsutra* and

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*Agnikarma*, for instance. Every type of *Bhagandara*, excluding *Pitaja*, suggests *Agnikarma*. Fistula in ano is a condition that needs to be addressed because it is very common in humans.

**Keywords –**Fistula in ano,Fistulectomy, *Kshar sutra*, Pus discharge, Anal sphincter, *Bhagandar, Agnikarma*

## INTRODUCTION

Fistula-in-ano is a common anorectal disease that affects individuals of all ages and genders. It is a chronic condition characterized by an abnormal communication or tract between the anal canal or rectum and the skin around the anus. The disease can cause severe pain, discharge, and fecal incontinence, which significantly affects the quality of life of affected individuals. The incidence of fistula-in-ano is estimated to be around 8 per 100,000 individuals per year, with higher rates reported in men and in individuals with Crohn's disease [1]

Several treatment modalities have been described for fistula-in-ano, including medical, surgical, and alternative therapies. The choice of treatment depends on the type, location, and complexity of the fistula, as well as the patient's overall health status, preferences, and expectations. Medical therapy includes antibiotics, immunosuppressants, and biologics, which aim to control infection, inflammation, and fistula output. However, medical therapy alone is usually not curative and is mostly used as adjunctive therapy to surgical treatment [2].

Surgical therapy remains the mainstay of treatment for fistula-in-ano, and numerous techniques have been described, including fistulotomy, fistulectomy, seton placement, advancement flap, and fibrin glue injection. The main goal of surgical therapy is to remove the fistula tract completely while preserving sphincter function and achieving wound healing. Each technique has its advantages and disadvantages, and the choice of technique depends on several factors, including the fistula anatomy, the degree of sphincter involvement, and the surgeon's experience and preference[3]. Alternative therapies, such as herbal medicine, homeopathy, and acupuncture, have been used in the treatment of fistula-in-ano, but their efficacy and safety are not well established. Some studies have reported promising results with these therapies, but their findings are often limited by small sample size, short follow-up, and lack of rigorous methodology[4].

Despite the numerous treatment options available, the management of fistula-in-ano remains challenging, and the recurrence rate after surgery is reported to be around 20-30%[5]. Recurrence is often attributed to incomplete removal of the fistula tract, missed secondary tracts, or inadequate healing of the wound. To improve the success rate of surgical therapy, several adjunctive measures have been proposed, including the use of antibiotics, biologics, and fibrin sealants, as well as modifications of the surgical technique, such as the use of laser, radiofrequency, or video-assisted surgery[6]. An integrative review of various treatment modalities of fistula-in-ano is needed to evaluate the efficacy, safety, and feasibility of each treatment option and to identify the factors that influence treatment outcome. Such a

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review can provide evidence-based recommendations for the management of fistula-in-ano and can guide future research in this field. The aim of this article is to perform an integrative review of various treatment modalities of fistula-in-ano, including medical, surgical, and alternative therapies, and to summarize the current evidence on their efficacy, safety, and feasibility.

Fistula-in-ano is a chronic condition characterized by abnormal tracts connecting the anal canal to the skin, often causing persistent pus discharge and recurrent episodes despite treatment. It typically arises from infected anal glands leading to abscess formation.[8]

Anal fistulas often stem from infections in anal glands, forming abscesses that may naturally drain or require surgical removal. These abscesses create a persistent connection between the infected area and the skin near the anus, resulting in a fistula. While surgery is a common treatment, nonsurgical options exist. They typically affect adults over 40, with a higher prevalence in males.[9]

**Causes-**

1. Foreign body
2. Radiation
3. Infection or Inflammatory Bowel Disease- The most frequent cause of anorectal fistula is infection, which is assumed to result from an obstruction of the anal glands and crypts. Anal tuberculosis rarely manifests as anal fistulas.
4. People who have STIs of the anus and rectum, which are often linked to anal receptive intercourse, may be more prone to developing perianal abscess and fistulas. The most frequent causes of these ano-rectal STIs are gonorrhoea, chlamydia, syphilis (Treponemapallidum), and herpes simplex. [10]
5. Epithelializatio[11]
6. Neoplasm
7. Distal obstruction

**Classification-**

Anal fistulae are divided into four separate categories under the Park's Classification System
As shown in figure [12]
1) Trans-sphincteric fistula
2) Inter-sphincteric fistula (most common)
3) Extra-sphincteric fistula
4) Supra-sphincteric fistula (least common) [13]

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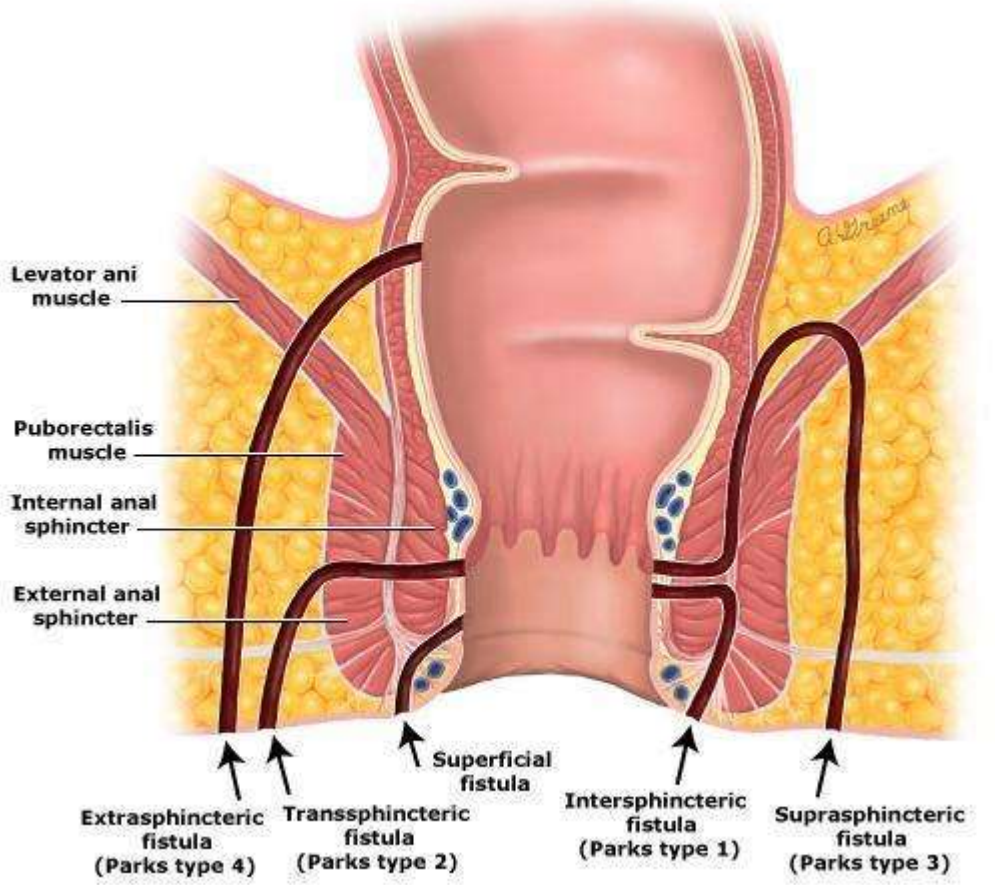


Figure 1 Parks' classification

**Trans-sphincteric fistula-**

A trans-sphincteric fistula is an anal fistula that traverses the external anal sphincter muscle and extends into the surrounding skin. The term "trans" denotes crossing to the other side. These fistulas involve both sphincters, making their management challenging and often requiring complex or staged approaches. To preserve continence, a seton can be employed to gradually loosen the connection with the external sphincter, allowing the tract to migrate, potentially enabling a fistulotomy at a later stage..

**Inter-sphincteric fistula** –

An inter-sphincteric fistula is an anal fistula that runs horizontally between the internal and external anal sphincter muscles. This type is common as most abscesses form where these sphincters meet. The tract of this fistula crosses the internal sphincter and extends to the outside of the anus. A fistulotomy, which involves laying open the fistulous tract, effectively treats these fistulas without affecting the external sphincter, thus rarely causing incontinence. Between 50 and 80 percent of cryptoglandular fistulas are inter-sphincteric.

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**Extra-sphincteric fistula:**

An extra-sphincteric fistula is a rare type of anal fistula that forms a connection from the rectum to the perineum, extending laterally to involve both the internal and external sphincter muscles. These fistulas, comprising only 5% of cases, pose significant treatment challenges due to the need to preserve the sphincter complex. They often result from surgeries in the higher rectum rather than the anus, with an external opening in the perianal region and an internal opening superior to the dentate line.

**Supra-sphincteric fistula:**

A supra-sphincteric fistula extends above the puborectalis muscle, typically reaching into the ischiorectal fossa. These fistulas pass through the puborectal muscle and over the external sphincter before looping back caudally to their external opening. Although perirectal abscesses associated with these fistulas may not be visibly apparent, they are usually painful upon digital rectal examination. Due to their higher tract, the use of a seton may be considered instead of a fistulotomy. Like a fistulotomy, a fistulectomy involves the complete removal of the fistula tract through cutting or cauterization.

The classifications MelcheorGoz, Milligan Morgan & Goligher's, Ernst Mile's, Steltzner's, and Park's (as per relation with sphincters) are among those that may be found in contemporary literature; however, Milligan Morgan & Goligher's classification is most frequently applied.

**Low level fistula:** Below the ano rectal ring, low level fistulas enter the anal canal.Submucosal, subcutaneous, suprasphincteric, and intersphincteric fistula are other classifications.

**High level fistula**: At or above the anorectal ring, a high level fistula opens into the anal canal.Pelvic rectal, Trans sphincteric, and extra sphincteric or supra levator fistula are further subdivided.

**Epidemology:**

Anal fistulas are a common condition, with an incidence of approximately 1-2 per 10,000 individuals per year[14]. Trans-sphincteric fistulas are the most common type, accounting for 70-80% of all anal fistulas, followed by inter-sphincteric fistulas at 20-25%, and supra-sphincteric or extrasphincteric fistulas at 1-5% [15,16]. Fistulas are more common in men than women, with a male to female ratio of 2-3:1[17]. The incidence of anal fistulas increases with age, with peak incidence in the fourth and fifth decades of life[18]. Inflammatory bowel disease, particularly Crohn's disease, is a major risk factor for the development of anal fistulas, with up to 30% of patients with Crohn's disease developing anal fistulas[19].

**Evaluation:**

Fistula in ano is a common condition that can be challenging to diagnose and manage. The evaluation of a patient with suspected anal fistula requires a detailed history and physical examination, as well as imaging studies in some cases. In this article, we will discuss the various methods used to evaluate

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fistula in ano.

**History and Physical Examination-**

The evaluation of a patient with suspected anal fistula begins with a thorough history and physical examination. The history should include the duration and frequency of symptoms, such as pain, drainage, and swelling. The clinician should also inquire about any previous episodes of anal abscess or surgery. A complete physical examination should be performed, including a digital rectal examination to assess the location and extent of the fistula tract.

**Imaging Studies**

Imaging studies are often necessary to confirm the diagnosis and determine the anatomy of the fistula tract. The most commonly used imaging modalities for fistula in ano include transanal ultrasound (TAUS), magnetic resonance imaging (MRI), and computed tomography (CT) scan.

**Transanal Ultrasound**

TAUS is a non-invasive imaging modality that uses high-frequency sound waves to visualize the anal canal and surrounding tissues. TAUS can accurately identify the internal opening, fistula tract, and associated abscesses or secondary tracks. TAUS is particularly useful for evaluating simple fistulas, such as inter-sphincteric and low trans-sphincteric fistulas. However, it may not be as reliable for complex fistulas or those with a high trans-sphincteric component [20]

**Magnetic Resonance Imaging**

MRI is a non-invasive imaging modality that provides high-resolution images of the anal canal and surrounding structures. MRI is particularly useful for evaluating complex fistulas and those with a high trans-sphincteric component. MRI can accurately identify the internal opening, fistula tract, and associated abscesses or secondary tracks. It can also detect associated conditions such as Crohn's disease or malignancy [21]. However, MRI is more expensive than TAUS and may not be readily available in all centers.

**Computed Tomography Scan**

CT scan is a non-invasive imaging modality that provides high-resolution images of the anal canal and surrounding structures. CT scan can accurately identify the internal opening, fistula tract, and associated abscesses or secondary tracks. CT scan is particularly useful for evaluating complex fistulas and those with a high supra-sphincteric component. However, CT scan is more expensive than TAUS and may not be readily available in all centers[22]

**Symptoms-**

1. Pain
2. Boil at anal region
3. Redness
4. Swelling around anus
5. Pus discharge from anus
6. Bleeding from anus
7. Painful bowel movements or urination
8. Fever
9. Foul-smell [23]

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**Pathophysiology-**

An anal fistula, which is an epithelial connection between the external peri-anal area and the anal canal, is distinguished by its inflammatory tissue and granulation tissue. The distal occlusion prevents the fistula from healing. The fistula tract is constantly blocked with debris and fails to heal because of the rapid cell turnover. The use of a seton and how it promotes the healing of fistulas is proof of this, since Setons permit continuous drainage of the fistula and typically lead to migration and healing. [24]

**Treatment and management:**

1. **Fistulotomy**–In a fistulotomy, the appropriate track is cut open with a knife, then the unhealthy granulation tissues on the fistula wall are scraped away. As shown in figure 2 [25, 26]

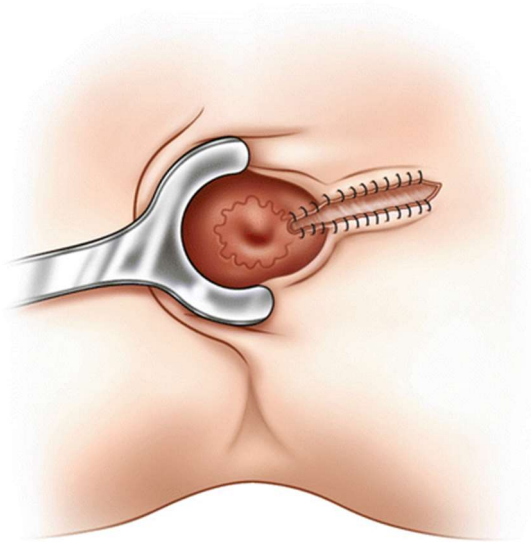

Figure 2 Fistulotomy and Lay Open Technique

2. **Fistulectomy**–This involves cutting open the appropriate track and then excising the entire track, including the fibrous tissue. Roller gauze wrung with antiseptic solution is stuffed within the cavity. Depending on the type of fistula, the recurrence rate after fistulectomy can be as high as 9%. [27]
3. **Ligation of Intersphincteric Fistula Tract (LIFT)-** It is a relatively new technique for the management of fistula in ano. It involves the dissection of the intersphincteric plane and ligation of the fistula tract at the level of the internal opening. This procedure avoids cutting through the external anal sphincter and has a potential advantage in preserving anal continence. Several studies have reported favorable outcomes with LIFT, with success rates ranging from 63% to 96% [28,29]. A systematic review and meta-analysis of LIFT showed a pooled success rate of 79.8% with low morbidity[30]. However, the technique has a steep learning curve and is associated with a higher risk of recurrence in complex fistulas[31]. The procedure can also be challenging in patients

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with high trans-sphincteric fistulas, horseshoe fistulas, and those with significant comorbidities. As shown in figure 3. [30] Therefore, careful patient selection and meticulous surgical technique are essential for the success of the LIFT procedure[31]

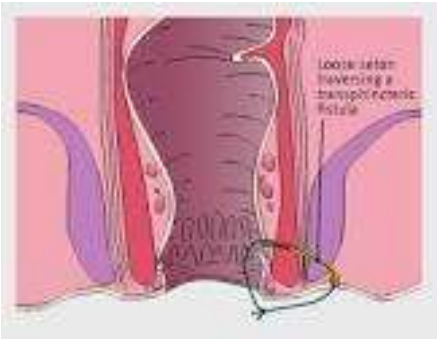

Figure 3 LIFT

4. **Seton techniques-**In cases when the fistula passes through a substantial portion of the anal sphincter muscle, the surgeon might recommend a seton first. A seton, or piece of surgical thread, is left in the fistula for a few weeks to keep it open. Instead of having to cut the sphincter muscles, this lets it drain and aids in its healing. Although they do not treat fistulas, loose setons allow them to drain. A fistula can be treated by slowly cutting it through with tighter stitches. It can be accomplished by multiple procedures, including multiple fistulotomies in which each time a little portion of the fistula is carefully opened. [32]
5. **Advancement flap procedure**-An advancement flap procedure is a different treatment option for fistulas that extend into the anal sphincter muscles and for which a fistulotomy carries a high risk of producing incontinence. It is necessary to cut or scrape out the fistula in order to accomplish this, and then to cover the opening where it entered the gut. To conceal the fistula's entry point, a flap of tissue must be removed from the rectum. Despite having a lower success rate than a fistulotomy, this prevents the anal sphincter muscles from being cut. [33] As shown in figure 4 about advancement flap procedure.[34]

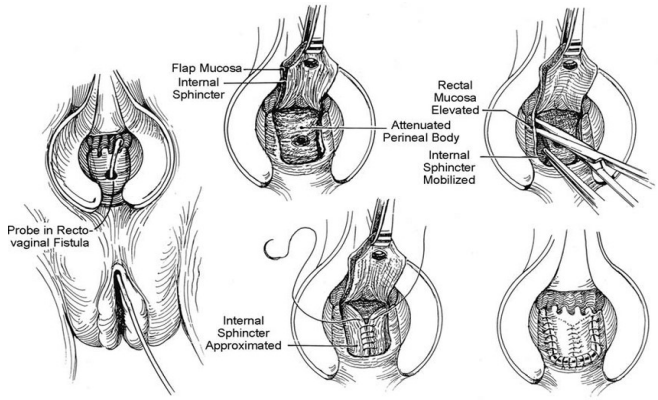


Figure 4 Advancement flap procedure in fistula in ano

6. **Endoscopic ablation-**An endoscope (a tube with a camera on the end) is inserted into the fistula during this procedure. The fistula is subsequently sealed using an electrode that is inserted

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through the endoscope. Endoscopic ablation functions effectively and there are no significant safety issues. [35]

7. **LASER surgery**-A tiny LASER beam is used in the radially emitting LASER fibre treatment to close the fistula There are questions about how effectively it functions, but there are no significant safety issues. [36] As shown in figure 5 in intra operative field.[37]

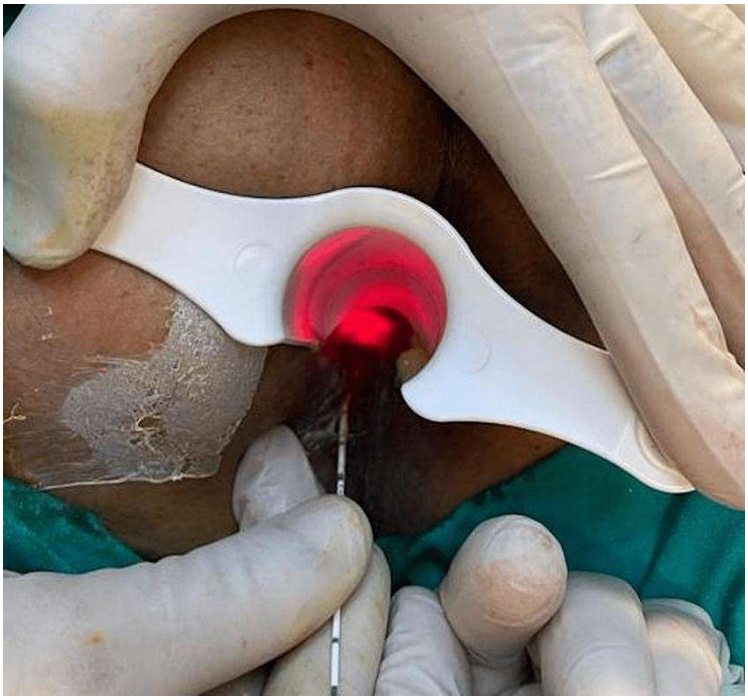

Figure 5 LASER USE IN SURGERY

8. **Fibrin glue Treatment**-Using fibrin glue is the only non-surgical treatment for anal fistulas at the moment. While the patient is under a general anaesthetic, the surgeon injects adhesive into the fistula. As shown in figure 6.[38]The fistula is sealed off by the adhesive, which also promotes healing. It may be a good alternative for fistulas that flow through the anal sphincter muscles

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since they do not require cutting, but it is typically less effective than fistulotomy for uncomplicated fistulas and the effects may not be long-lasting.

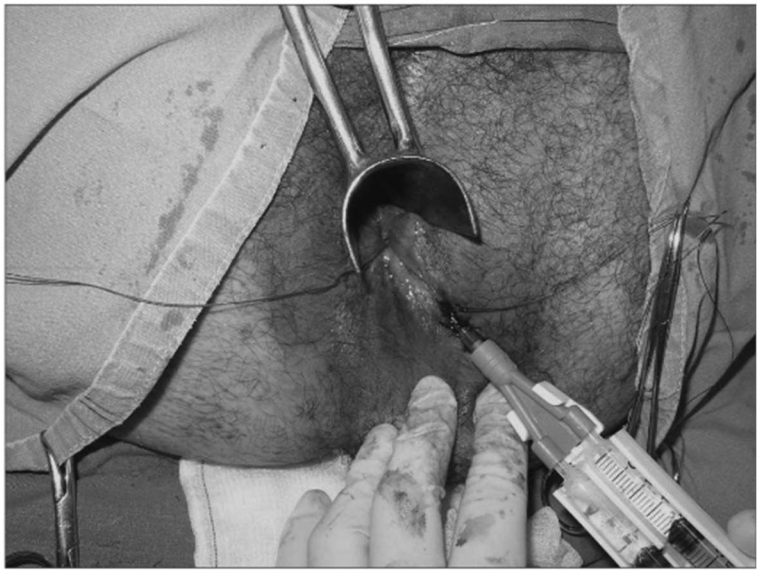

Figure 6 FIBRIN GLUE IN THE MANAGEMENT OF FISTULA IN ANO

9. **Bioprosthetic plug-**Inserting a bioprosthetic plug is another choice. To stop the fistula's internal opening, a cone-shaped plug composed of animal tissue is employed. There are no significant safety concerns with this method of anal fistula plugging.[39]
10. **Video-Assisted Anal Fistula Treatment (VAAFT)**

    An innovative method for treating anal fistulas is video-assisted anal fistula treatment, or VAAFT. It entails inserting a miniature endoscope called a "fistuloscope" through the fistula tract's exterior opening in order to inspect the tract for its interior opening. Abscesses or adjacent areas are noted. Under direct visualisation, diathermy is used to destroy the tract, and, like with plug therapy, the tract is debrided with a brush. After localization and debridement, the interior opening is stitched shut. For patients who failed the initial VAAFT, repxeating the procedure safely was possible and was related with reduced discomfort, duration of stay, and wound secretion. [40] As shown in figure 7. [41]

Figure 7 Video-Assisted Anal Fistula Treatment

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### 11. Photo-dyanamic Therapy (PDT)

The PDT was initially used to treat anal fistulas in Arroyo et al's 2017 study. In order to cause photooxidative damage to specific tissues or cells, photodynamic therapy (PDT) mixes light energy with photosensitizers. Prior to now, cancer treatment was its primary purpose. Arroyo et al. demonstrated through two lengthy prospective observational trials that PDT was a successful sphincter-sparing therapy with a straightforward surgical procedure, high safety, and a healing rate ranging from 65.3 to 80% that can be taken into consideration as a different option for patients with complex anal fistulas. However, there has only been a small amount of clinical research done on PDT to date, and because it is more expensive than standard surgery, practitioners must carefully consider its cost-effectiveness when making treatment decisions.

12. **IFTAK-** Though *Ksharsutra* therapy is big revolution in the field of fistula in ano, but it has some disadvantages like it is time consuming process, severe post-procedural pain, big scar mark. So, in present era IFTAK is emerging as an advanced innovative technique for the management of fistula in ano along with betterment in the consequences of conventional method of *Ksharsutra* therapy. Sherkhane et al have stated that IFTAK (Interception of Fistulous tract and application of Ksharsutra) technique is conventionally used in trans-sphincteric fistula in ano which shows a great potential in management by minimizing the duration of treatment, mild post procedural pain and minimum scar mark. They have concluded that, IFTAK is a safe, effective and advanced technique which minimizes the post-operative time along with betterment in mild post procedural pain and minimum scar mark.[42,] As shown in figure 8. [43]

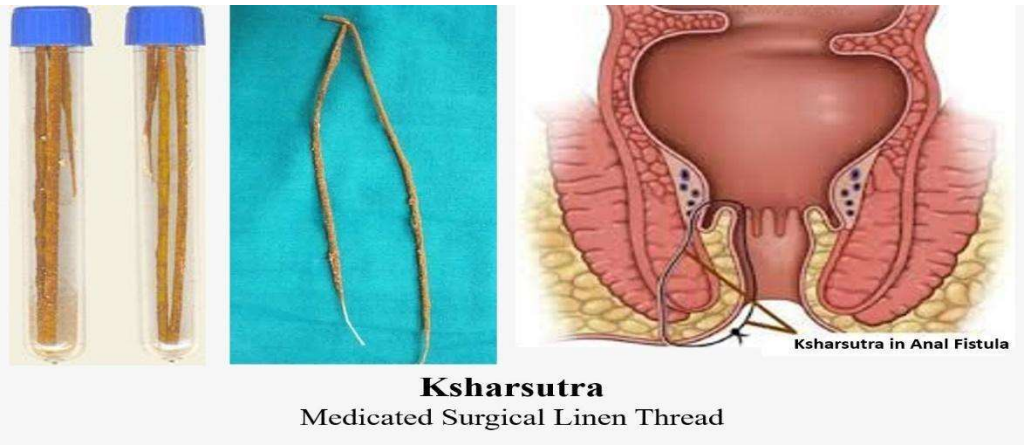


*Figure 8 Ksharsutra In Fistula in ano*

**Advanced Techniques**
**Modified Seton**
A preliminary improvement method of drainage Seton (loose Seton) was proposed, which forms continuous drainage of the fistula through medical thread, rubber band, and other materials to prevent

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the formation of abscess, taking into account the inadequate anal sphincter protection during the treatment of anal fistula by cutting Seton. The long-term recurrence rate for complex anal fistula treatment was shown to be up to 20–80%, despite the drainage Seton's total preservation of the sphincter and reduction of anal incontinence. In summary, rerouting Seton around the EAS combined with a mucosal advancement flap has made Seton-based techniques like pulling Seton, EAS-sparing Seton after rerouting, and rerouting Seton around the EAS more effective than the traditional Seton method for treating high anal fistulas.

**Modified LIFT**

It is suitable for transsphincteric fistulas with well defined fistulas, such as the most difficult anal fistulas, recurring anal fistulas, and fistulas that fail after other surgical treatments, but not for early fistulas. *Rojanasakul et al*. devised the successful and inexpensive sphincter-sparing procedure known as LIFT. In order to effectively prevent recurrent infections brought on by faecal particles, the LIFT procedure primarily ligates and slices the fistula between the sphincters, scrapes the contaminated tissue of the fistula wall, and tightens the fistula tract with ligation.. "Medialization of the external opening to the intersphincteric wound" was proposed as one of the remedial methods in LIFT failure situations in order to increase the healing rate of the technique. Another indication is the possibility of treating 50% of patients with LIFT failures by inserting a Seton followed by a fistulotomy and a rectal advancement flap.

The LIFT approach has been more and more well-liked in recent years, and various improved LIFT-based techniques have also been put out. For instance, enhanced the LIFT approach and demonstrated in a prospective observational trial that ligation of the intersphincteric fistula, but not excision, was safe and efficacious for treating anal fistula. Another modified LIFT technique was used for LIFT by lateral approach, in which the fistula is cut along from the external entrance till the sphincter space is exposed, the internal anal sphincter is ligated, and then the ligated distal portion is removedThe recurrence rates for the previously mentioned two techniques, however, are somewhat high, at 21 and 18%, respectively. In 2016, a multi-center prospective randomised trial showed that the LIFT-plug method, which is an improved LIFT procedure by addition of a bioprosthetic anal fistula plug, increased the healing rate from 83.9 to 94% and decreased the amount of time needed for healing when compared to the simple LIFT technique. The results of a long-term retrospective cohort research using the LIFT-plug approach as a practical means of treating transsphincteric perianal fistulas revealed that it resulted in a high healing rate, less trauma, and efficient anal sphincter protection. Placing a "biological mesh" in the plane between the sphincters (BioLIFT) is another variation to the LIFT method. Based on these trials, we came to the conclusion that BioLIFT and LIFT-plug were two additional treatments for transsphincteric anal fistula. However, further prospective trials are required to confirm the enhanced benefits of these novel approaches.

**OTSC® (Over-the-Scope-Clip) Proctology Device**

By positioning the OTSC® proctology device on the internal fistula opening, one can utilise an elastic nitinol alloy closure clip system to shut the fistula tract from the inside. In many ways, including postoperative discomfort, anal sphincter protection, recovery time, and duration of hospital stay, the clinical outcomes of OTSC® proctology device treatment were superior to those of fistulectomy and

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primary sphincteroplasty.

**FIPS**

The two main downsides of the classic fistulotomy are the high incontinence rate and keyhole deformity, despite the fact that it is still the favoured method for treating minor anal fistulas. Despite growing acceptance of the sphincter-sparing technique in recent years, colorectal surgeons continue to face significant difficulties due to the high recurrence rate. FIPS is an instantaneous sphincter repair method that enhances fistulotomy. FIPS lowers the risk of postoperative keyhole deformity and faecal incontinence compared to standard fistulotomy. Moreover, FIPS lowers the recurrence rate following surgery when compared to the majority of sphincter preservation methods.

**Filling Therapy**

Anal fistula plug and fibrin glue-based derivative techniques have also been proposed and developed recently. The synthetic material of the implanted fistula plug has been modified in order to primarily improve these approaches. For instance, a unique biomaterial model for creating anal fistula plugs is established as a new method of treating anal fistula. They discovered that the acellular dermal matrix plug might merge with the tissue and overproliferate in the fistula. Additionally, the surgical procedure was straightforward, and the recovery period following the procedure was brief.

**Differential Diagnosis**.

Fistula in ano can present with a variety of symptoms and physical findings, and it is important to consider a differential diagnosis when evaluating a patient. Other conditions that may present similarly include perianal abscess, rectal abscess, pilonidal cyst, anal fissure, rectal prolapse, and rectal cancer[44]. Perianal abscesses and rectal abscesses can present with similar symptoms such as pain, swelling, and drainage, but they differ from fistula in ano in that they are typically isolated collections of pus and do not involve a tract connecting to the anus or rectum[45]. Anal fissures are also a common differential diagnosis, and they may present with similar symptoms of pain and discharge; however, they are typically located at the midline of the anal canal and are not associated with a tract[46]. It is important to distinguish these conditions from fistula in ano in order to provide appropriate treatment and avoid complications.

**Complications**

Complications of fistula-in-ano are generally related to the underlying disease process and its treatment modalities. Inadequate surgical techniques or incomplete removal of the fistula tract can lead to recurrence of the fistula, which is seen in up to 50% of cases[47]. Other complications include bleeding, infection, fecal incontinence, and anal stenosis. Anal stenosis is a rare complication but can occur due to repeated surgeries or long-standing disease leading to fibrosis and narrowing of the anal canal[48]. Fecal incontinence may be a consequence of sphincter damage during surgery or the involvement of the anal sphincter by the disease process. The incidence of fecal incontinence ranges from 0 to 38%, depending on the surgical technique and the location of the fistula tract. Rarely, fistulas may progress to become malignant, although the risk is very low, estimated to be

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less than 1%[49]. In addition, patients with Crohn's disease-associated fistulas may have complications related to their underlying inflammatory bowel disease such as nutritional deficiencies, abscess formation, and sepsis[50]. Careful consideration of the patient's underlying disease process, comorbidities, and surgical technique can help prevent and manage these complications.

*BHAGANDAR* - The old Ayurvedic writings provide a comprehensive and all-encompassing explanation of *Bhagandar* (fistula in ano). The clinical characteristics of "Fistula in Ano" and "*Bhagandar,"* as described in Ayurvedic scriptures, are identical. *Bhagandar* is a sickness or ailment that causes intense referred pain to the perineum, anus, and pelvis.[51] If the abscess around the perianal region is not correctly treated, it can burst and turn into a discharging track known as a *Bhagandar*, which is the initial symptom of the manifestation.

**Etiology**-
According to *SushrutaSamhinta, nidanasevan (VataPrakopakAharVihara*), which causes them to enter the *Guda,* become localised, and vitiate the *Rakta and Manmsa*, is the root cause of *VataPrakopa, Pitta, and Kapha*. This is the initial state. This *Pidika*will turn into a*PakvaPidika* if it is not treated and *NidanaSevan* continues. *Puya*will develop, leading to the formation of *Darana, Gudanalika,* and *Bhagandara.*[52]
**Types-**Five varieties of *Bhagandar* were explained by *AcharyaSushruta*, Ayurvedic classifications areas follows:
1. ***Shatponak (Vataj) Bhagandar***- After being aroused, focused, and rendered immobile by an unhealthy diet, the *Vayu* produces a pustule that is one to two fingers away from the rectum (anal region, or —*Guda*) by vitiating the flesh (areolar tissue) and blood (of the locality). It develops a vermilion colour and is characterised by different pricking, piercing pains. If a pustule is initially overlooked, it will eventually turn into suppuration. The abscess or suppurated pustule develops hundreds of small pores that resemble sieves and secretes a type of slimy material because it is so close to the bladder. Large amounts of a continuous foamy discharge are emitted from theseopenings.In this way, the ulcer appears to be being beaten with a rod, poked with a sharp object, knifed, and punctured with needles. The area of the anus ruptures and fractures, releasing jets of semen, flatus (*Vata*), urine, and faeces through these sieve-like openings.

2. ***Ushtagreev* (*Pittaj*) *Bhagandar*** - A little, elevated, red pustule with a shape akin to a camel's neck develops when the furious *Pittam* lodges there after being transported down by the *Vayu* and lodges there. This pustule is accompanied by a variety of painful sensations, including sucking, etc. The pustule develops suppuration if it is not initially medicated. The accidental ulcer exudes a hot, foul-smelling fluid and appears to be being burned with fire or alkali. If the ulcer is not properly treated with medicine, jets of urine, flatus (*Vata*), faeces, and semen will come from it.

3. ***Parisraavi* (*Kaphaj*)*Bhagandar***-A white, hard, itchy pustule that is accompanied by various itching

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aches, etc. develops in the area where the furious *Kaphaj* is trapped after being brought down by the *Vayu* (into the rectum). If left untreated from the beginning, it quickly develops suppuration. The accidental ulcer grows hard and bloated, with frequent scratching and a continuous flow of slimy fluid as symptoms. If the ulcer is not treated correctly from the start, it may erupt with jets of urine, faeces, flatus, and semen.

4. ***Shambukavart* (*Sannipataj*) *Bhagandar***–The outcome is a pustule the size of a first toe that is loaded with piercing pain, burning, itching, and other unpleasant sensations, along with the inflamed *Pitta* and *Kaphaj* and the enraged *Vayu* that is drawn downward and lodges (in the area of the rectum). Such a pustule soon suppurates if it is initially ignored, and the associated ulcer discharges secretions of different colours. This accidental ulcer is characterised by a swirling sensation that radiates in the direction of the involutedindentures (inside the grooves of the rectum), resembling that felt inside the body of a river or fresh water mollusk.

5. ***Unmargi* (*Kshataj*) *Bhagandar***- Consuming cooked meat by an irresponsible, gluttonous person, *ApanaVayu* (into the rectum) may transport bone pieces, which could potentially abrade or scrape the anus margin or burrow into the rectum if they are evacuated through the incorrect pathways (transverse or horizontal postures). Because a patch of muddy ground will soon swarm with a spontaneous germination of parasites similar to it, the scratch or abrasion quickly turns into a filthy ulcer that is infected with worms and parasites. These worms and parasites are eating away at the anus region or have already largely burrowed into it, and jets of flatus (*Vayu*), faeces, and urine have been seen to come out of these holes. It is known as *UnmargiBhagandaram*.[53]

*Bhagandar* types listed in the *CharakaSamhita* are- *KshatajBhagandar*, *Pittaj*, *Kaphaj*, *Tridoshaj*, and *Vataj*.[54]According to *Sushruta*, the *Vataj*, *Pittaj*, and *Kaphaj* forms of *Bhagandar* are *Kashtsadhya* (difficult to treat), whereas the *Sannipataj*&*Aagantuj* types are *Asadhya* (non-curable).

***Nidan* (Aetiological factors)-**
The following categories can be used to group the causes of Bhagandara:
• ***Aharaja* Factors**
1) Intake of *Ruksha* (dry) food.
2) Intake of *Kashaya* (Pungent) food
3) Intake of *Apathya* (Contraindicated) food
4) Intake of Improper (*Mithyaahara*) food
5) Intake of *Asthi*Dhatu dominant/*AsthiYuktaAharaSevanaa* food
• ***Viharaja* Factors**
1) Sitting on Uncomfortable floor
2) A lot of sexual activity
3) Elephant and Horse riding
4) Forced defecation

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• ***Agantuja*** **Factors**
1) Trauma by *Asthi*
2) Improper use of *Basti - Netra*
3) Trauma by *Krimi*
• ***Manasika*** **Factors -**i. e. (Mental Disorders)[55]
1) *Paapkarma*
2) *SadhuSajjanninda*.

**Management of *Bhagandara*-**

*Bhagandar's* therapy has been brilliantly explained by *AcharyaSushruta* in terms of stages. He has argued that "*Apatarpan*" to "*Virechana*" measures of "*Vranchikitsa*" (wound management) should be practised when the *Pitika* (Boil) is still in the unripen stage, and that "*Snehana*, *AvagahSwedan*" (oleation and fomentation) of the peri anal region should be practised when the *Pitika* (Boil) reaches the ripening stage. Additionally, if the *Pitika* does not heal, a fistula probe should be used to explore the track (fistulotomy). Following fistulotomy, the ulcer's investigated bed should either receive cauterization or *Kshara* (medicated caustic paste).There are various treatment modalities for *Bhagandar* at various phases (*Awastha*). It is determined by two factors:

1.*Bhagandarchikitsa* i. e. in *Pakvawastha*
2. Bhagandarpidikachikitsa i. e. in Apakvawastha[56]

Four main categories can be used to categorise *Bhagandar's* management:
1) Preventive measures
2) Surgical measures
3) Para-surgical measures
4) Adjuvant measures [57]
It contains,
1. *Bhagandarpidikachikitsa*
2. Avoidance of causative factor
With *aptarpana* as the first step and *virechana* as the last, there are eleven steps that should be taken to control the *Bhagandarapidika* (*Apakvawastha*). *Vimlapana*, *Alepa*, *Parisheka*, *Abhyanga*, *Swedana*, *Upnaha*, *Aptarpana*, *Pachana*, *Vistravana*, *Snehana*, *Vamana*, and *Virechana*.

**Surgical Procedure**: The type of excision (*Chhedankarma*) and incision (*Bhedankarma*) that should be carried out over the track will depend on the type of fistula, according to *AcharyaSushrut*.

Para Surgical Management (Ambulatory Treatment): In addition to surgery, parasurgical techniques have been used to control *Bhagandar*, either separately or in combination. The most often used parasurgical techniques are described as –
1. *Agnikarma* (Thermal cautery)

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2.*Raktamokshana* (Bloodletting)
3.*Kshara* Karma (Chemical cauterization)
In Ayurvedic surgical practise, fistula in ano is treated. As a result of its inexpensive cost of care and low recurrence rate, *ksharasutra* therapy is considered the gold standard method. Even though it is a very good procedure, there are some drawbacks, such as the fact that the patient may become irritated if the treatment takes too long, there is discomfort during thread replacement, exterior openings are bridged and drainage is stopped, necessitating frequent surgical widening. If we apply the wonderful effects of *Kshara*, such as *Chedana*, *Bhedana*, *Lekhana*, *Sodhana*, and *Ropana*, in the form of *PratisarniyaKshara* to low anal fistula right after fistulotomy, we may be able to shorten the length of treatment as well as prevent recurrence. [58]

*Kshara*-therapy, which is applied with the use of thread, is known as *ksharsutra*. Although *Kshara* has traditionally been used as an adjunct to the surgical procedure in *Bhagandar*, the *Ksharsutra* stands out for being a thorough treatment for *Bhagandar* without the use of any operating method.

**DISCUSSION –**

In his book *Sushruta Samhita Acharya Sushruta*, the father of surgery, explained *Bhagandara* in great detail. This disease can also be connected to fistula in ano. The description, aetiology, kinds, *purvaroop* (prodromal features), *roop* (clinical manifestation), stage-by-stage care, and even the consequences of *bhagandara* have all been accurately described by *Acharya*. Fistulas develop as a result of sebaceous gland or hair follicle infection and ongoing neglect. Pus discharge from the perianal area is the primary symptom. Tenderness and pain are evident. He talked about *BhagandaraPidika*, which, if improperly treated, results in an abscess and, ultimately, a fistula in ano. He defined different sorts of *Bhagandara* as perdoshic involvement and a specific *Bhagandara's* symptom. *Bhagandara's* treatment has been mentioned by *AcharyaSushruta* in terms of stages.He has argued that "*Snehan*, *AvagahSwedan*" (oleation and fomentation) of the peri anal region should be practised when the *Pidika* (Boil) reaches the ripening stage and that "*Apatarpan*" to "*Virechan*" measures of "*Vranachikitsa*" (wound management) should be used when the *Pidika* (Boil) is still in the unripe stage. *Ksharsutra* and *Agnikarma* are examples of ayurvedicparasurgical treatments for *bhagandara* Except for *Pitaja*, all kinds of *Bhagandara* suggest *agnikarma*. Agni Karma's primary goals are cauterising the granulation tract lining and stopping the bleeding.*Ksharsutra* is the gold standard treatment since it has a lower risk of recurrence and fewer chances of incontinence than contemporary surgical technique.[60]

All forms of *Bhagandara*, with the exception of *Pittaja*, suggest *Agnikarma*. The primary goals of *agnikarma* are to cauterise the granulation tract lining and stop the bleeding. For the surgical care of *Bhagandara*, he mentioned *ChedanShastrakarma*, or the radical excision of the fistulous tract. Despite numerous developments in this field, the Ayurvedicpara-surgical approach *Ksharsutra* is still more effective and acceptable than contemporary surgical care of fistula in ano because it has a lower recurrence rate and fewer likelihood of incontinence. We made an effort to gather all of the fragmented information on *Bhagandara* that was strewn throughout several Ayurvedicliterature, and we also included contemporary information.

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When the *Pidika* (Boil) reaches the ripening stage, *Snehan*, *Avagah*, and *Swedan* take "*Apatarpan*" to "*Virechan*" measures of "*Vranachikitsa*" (wound management). Fistula-in-ano recurrence is more common in obese persons, smokers, and people who have had an anal operation in the past. [61]

The anatomical features associated with a higher risk of recurrence include many fistula tracts, high transphincteric fistula, the failure to locate an internal opening, seton implantation, and horseshoe abscesses. The management of fistula-in-ano is difficult and associated with a high risk of recurrence. Repeated operations could result in incontinence and a lower quality of life. [62]

The percentage of intersphincteric fistulae recorded in the literature, according to the Parks classification, is 70%. Additionally, 5% of suprasphincteric, 25% of extrasphincteric, and 1% of transphincteric fistulae are present. [63]

Patients with intermittent pain and purulent discharge, frequently bloody perianal discharge who have a common history of anorectal abscess drainage may typically only be diagnosed by physical examination. While a physical exam is typically sufficient for diagnosing uncomplicated abscess fistula illness, imaging tests such contrast fistulography, ultrasound, or MRI may be helpful in determining whether the disease is complex or recurring. [64] Recurrence of the fistula occurs frequently within the first year of therapy.

The fistula-in-Ano usually as a sequel to some perennial abscess which has either been allowed to rupture spontaneously or has been incised late or in an inadequate or incorrect manner.[65]

To manage infection or gradually cut through the sphincter muscle in the case of complex fistulas, the seton placement has been recommended.[66] It may also be used as a bridge between two partial fistulotomies.[67]

Infection and procedural mistakes are the main causes of anal fistula recurrence. One of the causes of internal opening wounds not healing was infection, which led to the internal sphincter's closure wound breaking down[68]. Anal fistula recurrence is typically brought on by infection and operative errors. One of sense behind failure in healing of internal opening wound is Infection, calculating in internal sphincter's closure wound filing. Thus, an ongoing anal abscess or infected incisional wounds may make treatment ineffective[69]. All of our failure cases had preoperative endorectal ultrasonography to determine the relationship between the anal sphincter's anatomy and the fistula tract, secondary tract, as well as any collections or abscesses.[70] Fistula in ano produces a constant strain on the patient as well as on the surgeon. Anal fistulas can be treated surgically in a variety of ways, all of which aim to close the fistula tract and reduce incontinence and recurrence[71]. A fistulotomy, for example, causes a high rate of faecal and gas incontinence. A seton insertion and more recent techniques such as advancement flaps have been set side by side to the traditional fistulotomy, but no single surgery has yet emanated as the authoritative method for fixing fistulas.[72]

An innovative method of treating anal fistula closure is fibrin glue therapy[73]. In terms of patient comfort, preserved sphincter function, shorter hospital stays overall, lessened need for postoperative analgesics, and reduced operating trauma, wound pain, problems, and adverse responses, it is superior to conventional surgical treatment[74]. All patients can resume regular activities quickly after the operation since it is straightforward, reproducible, uncomplicated, and less invasive[75]. It works well for treating

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low, single-tracked anal fistulas that have not previously undergone surgical therapy. [76]Anal fistulas can be treated with fibrin glue in a straightforward, safe, and painless manner. The injections can be repeated to speed up the healing process without preventing more surgical treatments from being necessary in the future. Due to these factors, this approach gained popularity over the past ten years, but due to the poor long-term outcomes, there are still many questions regarding the fibrin glue procedure today. [77]Ayurvedictechnique for diagnosis of symptoms of *Bhagandara* mentioned in Ayurvedic texts are closely related to the disease Fistula in Ano of Modern medicine.

The management of fistula in ano is challenging due to its complex anatomy and varied etiology. This integrative review aimed to evaluate the effectiveness of various treatment modalities for fistula in ano. The review included studies that compared surgical and non-surgical approaches, as well as studies that assessed the efficacy of specific surgical techniques. Non-surgical treatments such as fibrin glue injection, seton placement, and anal fistula plug have shown promising results in select cases of fistula in ano. [78,79]However, the efficacy of these non-surgical treatments depends on the patient's anatomy and the complexity of the fistula[80,81]

Surgical treatments such as fistulotomy and fistulectomy remain the most commonly used techniques for the management of anal fistula. The choice of technique depends on the location and complexity of the fistula, as well as the patient's overall health status[82]. Other surgical approaches, such as the LIFT and VAAFT techniques, have also shown good outcomes in selected cases[83,84]

Recurrence rates following surgical treatment vary widely and depend on several factors, including the type of surgical technique used and the patient's health status[85]. Complications such as incontinence, fecal urgency, and impaired healing can also occur after surgical treatment.[86]

The use of biomaterials in fistula management is an emerging field with promising results.[77] The use of stem cells and platelet-rich plasma in combination with surgical treatments has also shown potential for improving healing and reducing recurrence rates.[87,88]

Overall, the management of fistula in ano requires a personalized approach that considers the individual patient's anatomy and health status. While surgical treatment remains the mainstay of management, non-surgical treatments and the use of biomaterials are emerging as promising alternatives. Further studies are needed to evaluate the long-term outcomes and efficacy of these treatments.

## CONCLUSION –.

Despite the latest technological advancements, the colorectal surgeon still finds it difficult to treat fistula-in-ano. Treatment continues to focus on eradicating perianal sepsis, effectively closing the fistula, relieving symptoms, preventing recurrence, protecting the anal sphincter, and hastening patient recovery. Even while innovations like fibrin glue have promised to improve outcomes, conventional fistula surgery has its place in the literature-reported success.

Having a thorough understanding of perianal anatomy and pathophysiology is necessary for managing fistula in ano. Nearly all surgeons, including *AcharyaSushruta*, Hippocrates, and even modern eminent surgeons, have acknowledged the difficult course of this ailment and have offered various surgical, parasurgical, and medicinal treatments for it.[89] Despite several improvements in surgical methods, fistula in ano still poses a problem, even for diligent and experienced surgeons. The gold

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standard treatment method for *Bhagandara* still used by ayurvedic surgeons is *ksharsutra* therapy. [90]

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