ORIGINAL RESEARCH PAPER

General Surgery

EFFECTIVENESS OF LASER SPHINCTEROTOMY IN ANAL FISSURE PATIENTS

KEY WORDS:

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ABSTRACT

An anal fissure is an oval or linear shape tear in the anal canal starting just below the dentate line and extending to the anal verge. It is caused by the passing of large or hard stools during bowel movements. It can easily be treated with oral medications or laser treatment or therapy. The most common site for anal fissure in males and females is the posterior midline. The study was done to determine fast recovery rate, and best surgical procedures in anal fissure patients. A prospective comparative observational study was carried out in different hospitals. The study was undertaken in 465 patients who underwent surgical procedures for anal fissure. From our study, we concluded Laser sphinctorotomy is more effective and it has a fast recovery rate when compared to open fissurectomy.

INTRODUCTION

Anal fissure is oval or linear shape tear in the anal canal starting just below the dentate line extending to the anal verge. It is caused by passing of large or hard stools during the bowel movement. This condition is not serious or life-threatening and it can easily be treated with oral medications or laser treatment or therapy.

Fissures are seen in both males and also in females. These are generally seen in middle-aged group of people and also in younger ones. It is also seen in children and elder people. The most common site for anal fissure in males and females is the posterior midline.

ETIOLOGY

The exact cause is not completely clear, but it results from trauma to the anal canal. This includes trauma to the anoderm during the passage of hard or large bowel movements, local irritation from diarrhoea, anorectal surgeries and anal intercourse. As a response to the fissure, patients will experience increased pressure within the anal canal. Several studies have shown that the resting pressure of the internal anal sphincter is higher in patients with fissures compared with normal controls.[1234567]

In people with anal fissure, there is evidence that the rectoanal inhibitory reflex is followed by an abnormal increased contraction. This could explain the sphincter pain and spasm that people with anal fissure experience with defecation.[8]

ANATOMY [9]

Anal canal:

It is the terminal part of the large intestine. The "anatomical" or "embryological" anal canal, which is of 2 cm, long which extends from the anal verge to the dentate line.

The "surgical" or "functional" anal canal is longer and it is roughly of 4 cm, and extends from the anal verge to the anorectal ring. This muscular ring, has great importance since during the anorectal surgery damage to this structure can lead to fecal incontinence.

It is lined with 4 different types of epithelium. The most proximal lining of it is a single layer of cuboidal columnar cells, similar to that of rectal mucosa. This layer will extends about 1 cm proximal to the dentate line. Below the dentate line, cutaneous part of the anal canal arises and it consists of modified squamous epithelium cells, which will lacks hairs or glands. The anal verge will point the lowest edge of the anal canal, distal to anal verge the lining becomes thicker, pigmented and also contains the features of normal skin such as hair follicles, apocrine glands.

Anal sphincter:

Anorectal area comprised of two muscle groups

- Sphincter and
- Lateral compressor muscles.

Internal Anal Sphincter (IAS):

It is of 2 to 3 mm thick and 2.5 to 4 cm long. Circular muscle composed of the distal long condensation of the inner circular muscle layers of the rectum. On physical examination the lower edges of the internal anal sphincter is about 1 cm distal to the dentate line.

External Anal Sphincter (EAS):

It is a cylinder of striated muscle that will covers the entire length of the inner tube of smooth muscles. The upper end of the external muscle combines with the puborectalis part of the levator ani muscle. The external anal sphincter ends slightly distal to the internal anal sphincter.

Conjoined Longitudinal Muscle:

This muscle is made of fanlike fibers that run through the internal anal sphincter, intersphinteric grove and also through the external anal sphincter. These fibers finally insert into the perianal skin forming the complex of smooth and striated muscles a functionally solid unit, which is essential in the defecation mechanism.

EPIDEMIOLOGY

Anal fissures are seen in any age groups, they are mostly seen in the pediatric and middle-age group people. Gender is equally affected, and about 2,500,00 of new cases are diagnosed every year in the United States.[10]

SYMPTOMS

Symptoms of an anal fissure include

Pain during bowel movements[11], Pain after bowel movements that long last up to several hours, Bright red blood in stool or on toilet paper after a bowel movement, A visible crack seen on the skin around the anal region, A small lump or skin tag on the skin near the anal fissure.

CAUSES

Less common causes of anal fissures are

Anal cancers, HIV, Tuberculosis, Syphilis, Crohn's disease or another inflammatory bowel disease Common causes of anal

fissures are

Passing larger or harder stools, Constipation and straining during the bowel movements Frequent Diarrhea, Anal intercourse, Parturition

COMPLICATIONS

Failure to heal: An anal fissure that fails to heal within eight weeks is considered chronic and may need further treatment.

A tear that extends to surrounding muscles: An anal fissure may extend into the ring of muscle that holds your anus closed is called the internal anal sphincter. An unhealed fissure may have pain and discomfort that may require medications or surgery to reduce the pain and to repair or remove the anal fissure.

Recurrence: Once people experienced an anal fissure, are more prone to have another one.

PATHOPHYSIOLOGY

Pathophysiology of it is not entirely clear. An acute injury will leads to local site pain and spasm to the internal anal sphincter. This spasm will resulting high resting anal sphincter pressure[13] leads to the reduced blood flow and ischaemia[14,15] and also poor healing.

In approximately 90% of the people the anal fissure is located in the posterior midline. It is hypothesised that this predilection for the posterior midline may occur because this portion of the anal canal is poorly perfused.[15,16] Anterior anal fissures affect approximately 10% of the people and it may have a different pathophysiology. They are associated with younger, mostly females, with the injury or dysfunction of external anal sphincter. In less than 1% the fissures are lateral or multiple.[17]

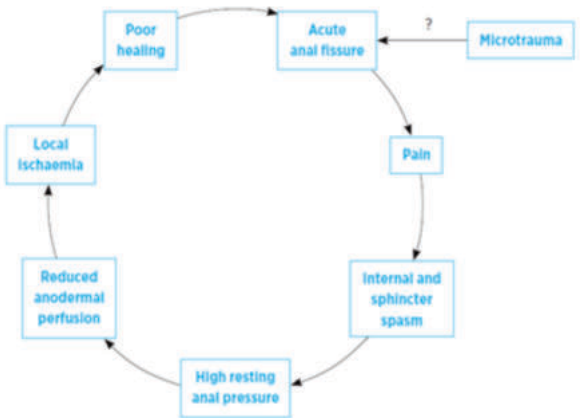


Fig 1 Pathophysiology of Anal Fissure

DIAGNOSIS

Medical history is taken and a physical examination is performed, including a gentle inspection of the anal region. Often the tear is visible.

A progressive, acute anal fissure will appear to be a fresh tear (paper cut). Chronic anal fissure likely has a deeper tear. It may also have the internal or the external growth. It is considered to be chronic if it will long last more than eight weeks of time.

A fissure that occurs on the side of the anal opening, rather than the back or front, is more likely to be a symptom of another disorder, such as Crohn's disease.

Chronic recurrent anal fissures, is examined under anesthesia. Evaluation of both acute and chronic anal fissures initially involves determining if it is a primary or secondary anal fissure.

Tests may include:

Anoscopy: An anoscope is a tubular device inserted into the anus to see the rectum and anus.

Flexible sigmoidoscopy: Insertion of a thin, flexible tube with a tiny video into the bottom portion of your colon. This test is done if the person is younger than 45 years of age and having no risk factors for the intestinal diseases or colon cancer.

Colonoscopy: This test involves inserting a flexible tube into the rectum to look at the entire colon. Colonoscopy may be done
Older than age 45.
Having risk factors for colon cancer.
Having symptoms of other conditions.
Having other symptoms, such as stomach pain or diarrhea.

TREATMENT

Anal fissures will heal within a few weeks with the proper treatment. Take steps to keep your stool soft, such as increasing your intake of fiber and fluids. After every bowel movement Soak in warm water for 10 to 20 minutes a day. It will help relax the sphincter and promote healing. If symptoms persist, you'll likely need further treatment.

Nonsurgical Treatments:

Externally applied nitroglycerin: This can help increase blood flow to the anal fissure and promote healing. It also can help relax the anal sphincter. It is considered to be the first line of medication when other conservative measures fail.
Topical anesthetic creams: such as Lidocaine (Xylocaine) may help relieve pain.
Onabotulinumtoxin A (Botox) injection: It will paralyze the anal sphincter muscle and relax spasms.
Blood pressure medicines: such as nifedipine or diltiazem, to help relax the anal sphincter. These medications are generally applied to the skin and also taken orally.

Surgical Treatment:

Chronic anal fissure that is resistant to other treatments, or if symptoms are severe, then surgery may recommended. Many other studies have been shown that surgery is more effective than any medical management for chronic fissure. However, surgery has a small risk of causing incontinence.

When conservative therapy fails then surgical intervention for definitive management of chronic anal fissures is considered.

Anal Dilation:

The concept of sphincter stretching was first described by Recamier in 1838 for the treatment of proctalgia fugax and anal fissure.[19] His technique involves inserting four fingers of each hand into the anal canal and expanse over the course of 3 to 4 minutes[20].

The Lord's procedure and has been mostly abandoned in recent days due to an unacceptably high risk of fecal incontinence, as well as its overall inferiority to lateral internal sphincterotomy.

Lateral Internal Sphincterotomy:

Historically, Brodie first documented an anal sphincterotomy in 1839. However, 1939 miles is credited with the operation in a paper.[21] Originally, the sphincter division was in the posterior midline. Bennett and Goligher reported a high incidence of impairment for flatus with posterior internal sphincterotomy 34% and a 15% incidence of incontinence with a 93% cure rate. [22]This will results in large wounds in the posterior midline with 'key-hole deformity."

Eisenhammer is credited with popularizing lateral internal

sphincterotomy, dividing one-half of the internal anal sphincter in an open fashion.[23]

Lateral internal sphincterotomy is performed with a radial incision in the anoderm laterally exposing the internal sphincter muscle fibers. Then, under direct vision, the distal four-fifths of the internal anal sphincter muscle is divided sharply with scalpel or scissors. The wound can be left open or closed primarily.

Other complications from internal sphincterotomy include ecchymosis, which is frequently noted around the edge of the wound. Hematoma and hemorrhage are exceptionally rare. Perianal abscess occurs after 1% of closed internal anal sphincterotomy and is almost always associated with anal fistula[24] Fistulas associated with postlateral internal sphincterotomy scenarios are typically very distal and may be submucosal or intersphincteric.

Lateral internal sphincterotomy is the surgical treatment of choice for refractory anal fissures and may be offered without pharmacologic treatment failure according to the practice parameters by the American Society of Colon and Rectal Surgeons.[25]

Advancement Flaps:
Endorectal advancement flaps are also been used in the treatment of chronic anal fissure. This procedure is typically involved with a subcutaneous flap with the incision made from anal verge extending caudally. The skin flap is then advanced into the anal canal and positioned to cover the anal fissure and sutured in place. It is an alternative method to lateral internal sphincterotomy and is particularly helpful in patients with low-pressure fissures.

Fissurectomy:
Fissurectomy is excision of the chronic granulation tissue, hypertrophied papilla, and scar, and is either left open or closed primarily.[26] In general, fissure excision does not improve healing rates when combined with sphincterotomy, and may lead to unnecessary risks of incontinence.

Sitz Baths:
Sitz baths have long been a part of the treatment algorithm for anal fissures. Proposed benefits include an improvement in hygiene, decreased pain, and also decrease in the hypertonicity of anal canal.

PREVENTIONS
Measures to prevent from constipation or diarrhea, Eat high fiber rich food, Drink plenty of fluids and Exercise regularly to keep from having to strain during bowel movements.

LIFESTYLE MANAGEMENT
Several lifestyle modifications may helps to relieve discomfort and promote healing of an anal fissure, as well as to prevent re occurrence Changes include

Drinking adequate fluids. Fluids help prevent constipation.

Adding fiber to your diet. Eating fiber daily helps stools soft and improves fissure healing. Which include fruits, vegetables, nuts and whole grains. Adding fiber to diet may cause bloating so increase the intake gradually.

Not straining during bowel movements. Straining during bowel movement will create pressure, where opening of a healing tear takes place or it may cause a new tear.

Sitting in a warm bath. Also called as sitz bath, soaking in warm water for 10 to 20 minutes several times a day can soothe the skin and promote relaxation. If possible, after every bowel movement take a sitz bath.

REVIEW OF LITERATURE
1. Richard L Nelson., 2012 conducted study on Non surgical therapy for anal fissure. They concluded that Medical therapy for chronic anal fissure, currently consisting of topical glyceryl trinitrate, botulinum toxin injection or the topical calcium channel blockers nifedipine or diltiazem in acute and chronic fissure and fissure in children may be applied with a chance of cure that is marginally better than placebo. For chronic fissure in adults all medical therapies are far less effective than surgery.

2. Magdy M A Elsebae., 2007 conducted study on A study of fecal incontinence in patients with chronic anal fissure: prospective, randomized, controlled trial of the extent of internal anal sphincter division during lateral sphincterotomy. They concluded that A mild degree of fecal incontinence may be associated with chronic anal fissure at presentation rather than as a result of internal sphincterotomy. Troublesome fecal incontinence after lateral internal sphincterotomy is uncommon. Sphincterotomy up to the dentate line provided faster pain relief and faster anal fissure healing, but it was associated with a significant postoperative alteration in fecal incontinence than was sphincterotomy up to the fissure apex. Care should be exercised in female patients with a history of previous obstetric trauma, as internal anal sphincter division may further compromise sphincter function.

3. J.Konsten M.D., 2000 conducted study on Hemorrhoidectomy vs Lord's method.They concluded Hemorrhoidectomy can be considered to be a safe procedure for treatment of hemorrdoidal disease,with excellent long term results.Anal dilation is associated with a high percentage of complaints of fecal incontinence.The procedure should be abandoned.

4. Adriano Tocchi., 2004 conducted study on Total lateral sphincterotomy for anal fissure. They concluded Total subcutaneous, internal sphincterotomy is a safe, effective procedure for the treatment of chronic anal fissure

5. **Nissim Hananel M.D., 1997** conducted study on Re examination of clinical manifestation and response to therapy of fissure in ano. They concluded that Anterior fissures are much more common in both men and women than previously reported, and constipation and hard bowel movement are not universally present in patients with fissure-in-ano.

6. Willem r.Schouten M.D.,1994 conducted study on Relationship between anal pressure and anodermal blood flow and they concluded that anodermal blood flow at the posterior midline is less than in the other segments of the anal canal.The perfusion of the anoderm at the posterior commissure is strongly related to anal pressure.The higher the pressure,the lower the flow.our findings support the hypothesis that anal fissures are ischemic ulcers.

NEED FOR THE STUDY
- To determine efficacy and safety of surgical procedures in anal fissure patients.
- To assess the complications caused to patient by the procedure in anal fissure patients.
- To assess the severity of Pain based on pain scale in anal fissure patients.

AIMS AND OBJECTIVES
- To determine the effectiveness of surgical procedure in anal fissure patients.
- To determine the fast recovery rate.
- To determine the best surgical procedures for anal fissure patients.

MATERIALS AND METHODS
This is a prospective comparative observational study

undertaken in 465 patients underwent surgical procedure for anal fissure. The present study was carried out at different hospitals during academic year 2022 -2023 .

The purpose of study was 'Effectiveness of laser Sphincterotomy in anal fissure patients.'

Study design : Prospective comparative observational study

Study place : Different Hospitals, Hanamkonda, Warangal.

Study Population : Anal Fissure patients

Sample size : 465 patients

Year of Study : 2022-2023

INCLUSION CRITERIA
1. Age groups 25-55
2. Acute and chronic anal fissure.

EXCLUSION CRITERIA
1. People who are not willing for the study.
2. People without co morbidities.
3. Pregnant women.

Methodology
All these women were thoroughly investigated before procedure. The work up included;
Details of patient
Investigations
Examination of vital signs
Counseling

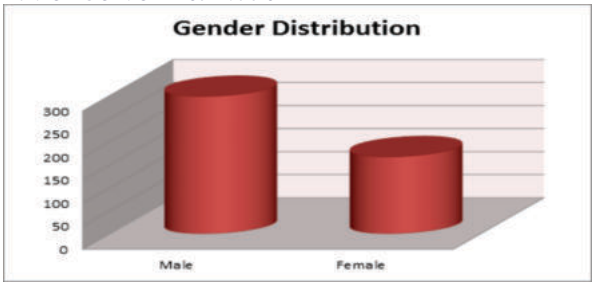
Such of those women who were willing to adhere to the protocol were include for the study, provided they fulfilled the inclusion criteria.

Details Of Patient
Name
Age, address
Socio economic status
Past Medical history
Surgical history
Family history
Examination of patient
General Examination
Rectal examination
Routine Investigations

An informed consent was obtained from these selected patients.

PATIENT COUNSELLING:
Drinking adequate fluids. Fluids help prevent constipation.
Sitting in a warm bath.
Adding fiber to your diet. Eating fiber daily helps stools soft and improve fissure healing.
Not straining during bowel movements. Straining creates pressure, which can open a healing tear or cause a new tear.

RESULTS
Table 1 Gender Distribution

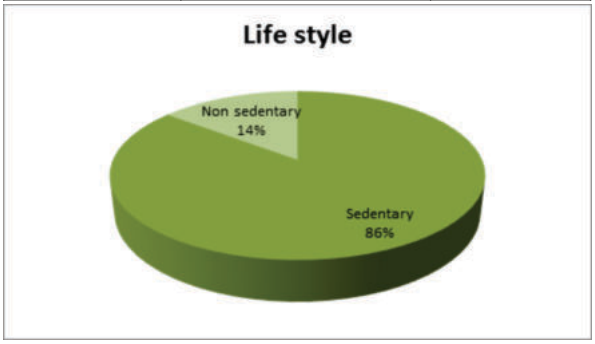


S.no	Gender	Total
1	Male	298
2	Female	167

In this study, 64% of patients with Anal Fissure are male and 36% of patients are female.

Table 2 Life Style

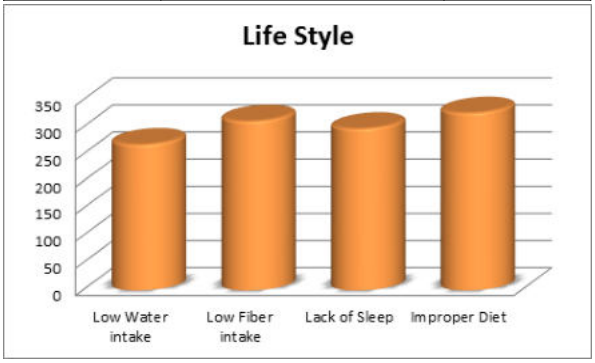
S.no	Lifestyle	Total
1	Sedentary	398
2	Non sedentary	67



In present study, 86% of the people with anal fissure are having sedentary lifestyle and 14% are of having non-sedentary lifestyle.

Table 3 Life Style

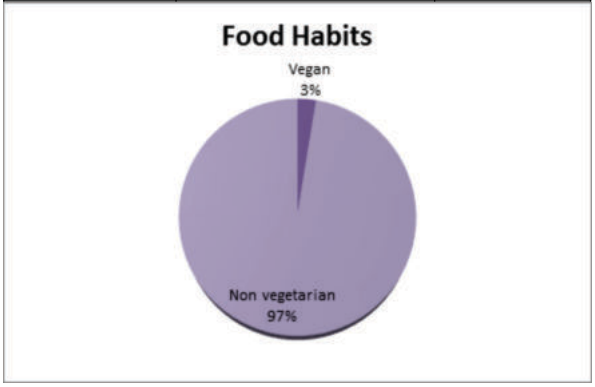
S.no	LifeStyle	Total
1	Low Water intake	269
2	Low Fiber intake	312
3	Lack of Sleep	298
4	Improper Diet	327



In this study, Majority of the people having improper diet and having low fiber diet is causing anal fissures.

Table 4 Food Habits

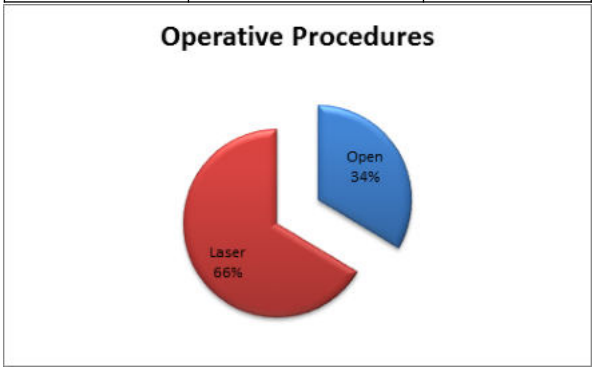
S.no	Food Habits	Total
1	Vegan	12
2	Non vegetarian	453



In this study, 97% of people are non vegetarian group and 3% are vegans.

Table 5 Operative Procedure

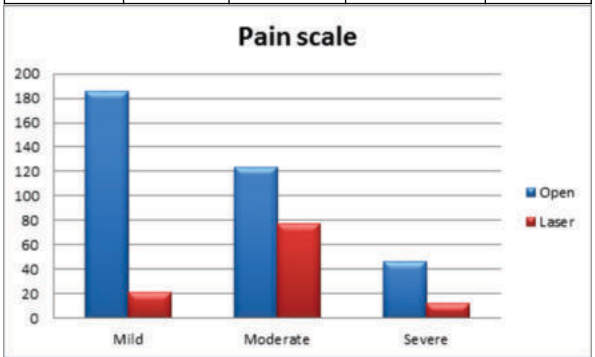
S.no	Operative Procedure	Total
1	Open	156
2	Laser	309



In present study, 66% of the patients with anal fissure went under laser surgery and 34% of the patients went under open surgery.

Table 6 Pain Scale

		Painscale		
S.no	Surgery	Mild	Moderate	Severe
1	Open	186	123	46
2	Laser	21	77	12



In this study, Majority of people with open surgery are having more pain than that of Laser surgery.

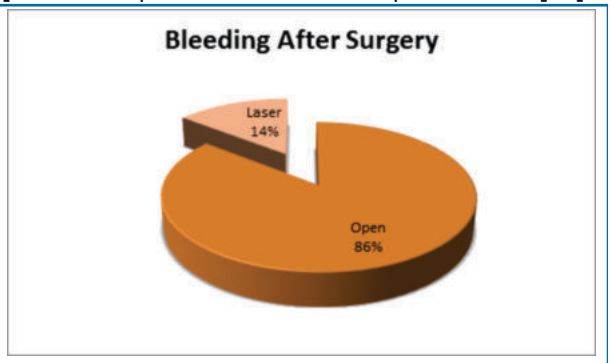
Table 7 Post op Dietary Adherence

S.no	Post op Dietary Adherence	Total
1	Dietary Adherence	398
2	Dietary non-Adherence	67

In present study, 86% of the patients having Dietary non adherence after post op dietary adherence and 14% of them are having Dietary adherence.

Table 8 Bleeding After Surgery

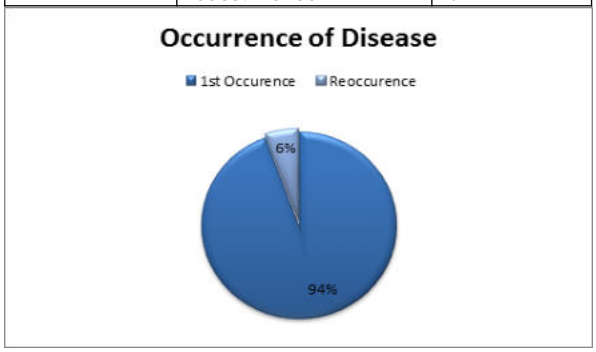
S.no	Bleeding After surgery	Total
1	Open	12
2	Laser	2



In this study, 86% of the people are having Bleeding after open surgery and 14% with Laser surgery.

Table 9 Occurrence Of Disease

S.no	Occurence of Disease	Total
1	1st Occurrence	439
2	Reoccurrence	26



In present study, 94% of the patients have 1st occurrence and 6% are having Reoccurrence.

DISCUSSION

- The sample size of our project was 465 members all the population were taken according to the inclusion criteria.
- Out of 465 members Male patients noted with anal fissure are 298(64%) and females are 167(36).Based on this study males are more prone for anal fissures when compared to that of female because of their lifestyle. Less water intake and poor dietary habits.
- Sedentary lifestyle is the common cause for most of the diseases. In my study most of the people 398(86%) are having sedentary lifestyle because of their occupations and Non-sedentary people were of 67(14%).
- In present study most common cause for anal fissure Low fiber intake, Water intake, Lack of sleep and Improper dietary habits. This will result in indigestion and Hard stool which leads to anal fissure.
- In this study non vegetarians are more in number than vegan because high protein intake high fiber intake will cause hard stool
- Hospital stay is longer than that of laser surgery and comparatively recovery rate was longer in open surgery than that of laser surgery. And also Blood loss during the surgery is very less in laser surgery than open.
- In this study comparatively post operative pain is more in fissurectomy.
- Laser sphincterotomy is high economical than that of fissurectomy but recovery rate of laser is more than that of open.
- The Re-occurrence of anal fissures does not depend on the type of surgery, it is mostly depends on the lifestyle of patient.

CONCLUSION

According to my study Laser sphinctorotomy is more effective and it has fast recovery rate when compare to open fissurectomy the reoccurrence of Anal fissure is depends upon the patient dietary habits and lifestyle.