

A DISSERTATION ON

“A COMPARATIVE STUDY BETWEEN DILTIAZEM 2% GEL FOR LOCAL APPLICATION AND LATERAL SPHINCTEROTOMY FOR CHRONIC FISSURE IN ANO”

Dissertation submitted to

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for the Award of the degree

M.S., BRANCH-I

GENERAL SURGERY



DEPARTMENT OF GENERAL SURGERY

STANLEY MEDICAL COLLEGE

MAY 2020

CERTIFICATE BY THE DEPARTMENT

This is to certify that dissertation entitled “**A comparative study between Diltiazem 2% gel for local application and Lateral sphincterotomy for chronic fissure in ano**” is a bonafide original work of **Dr. S Arunarumugam in the Department of General Surgery, Stanley Medical College, Chennai, during Post Graduate course from MAY 2017-MAY 2020. This is submitted** in partial fulfilment of the requirements for M.S., Branch-I (General Surgery) Examination of the Tamil Nadu Dr. M.G.R. Medical University to be held in May 2020 under my guidance and supervision.

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CERTIFICATE BY THE GUIDE

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DECLARATION

I **Dr. Arunarumugam.S.** hereby solemnly declare that the dissertation titled “**A comparative study between Diltiazem 2% gel for local application and Lateral sphincterotomy for chronic fissure in ano**” is done by me at Stanley Medical College, Chennai during 2018-2019 under the guidance and supervision of **Prof. Dr. G. Venkatesh M.S.**, This dissertation is submitted to The Tamil Nadu Dr.M.G.R Medical University, Chennai towards the partial fulfilment of requirements for the award of M.S. Degree (Branch-I) in General Surgery to be held in May 2020.

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I am extremely thankful to all the Members of the **Institutional ethical committee** for giving approval for my study. I also thank all the patients who were part of the study and my colleagues for their support and criticism.

CONTENTS

S.No	TITLE	PAGE NO
1.	INTRODUCTION	1
2	AIM OF THE STUDY	3
3	REVIEW OF LITERATURE	4
4	MATERIALS AND METHODS	68
5	PREOP INSTRUCTIONS	69
6	ANALYSIS AND RESULTS	70
7	SUMMARY	80
8	CONCLUSION	82
9	BIBLIOGRAPHY	
10	ANNEXURES	

INTRODUCTION

Anal fissure (fissure-in-ano) is a common condition affecting anorectum. It can be a very troubling condition because, if acute, the severity of pain induced patient discomfort and extent of disability far exceeds that we would be expecting from such a trivial lesion.

Acute anal fissures frequently respond well to conservative treatment with stool softeners and proper local hygiene. Most anal fissures heal spontaneously. However, a small proportion of acute fissures do not heal and become chronic fissures (traditionally defined as symptoms lasting more than six weeks in duration). Once patients have had symptoms for this period, they usually do not respond to conservative management and have traditionally needed to be treated by surgery, which includes either a partial division of the internal sphincter (sphincterotomy) or maximal manual dilatation of the anus. Surgical treatment for this condition has been associated with the post-operative complication of incontinence in up to 30% of patients. Therefore, a non-surgical method for the treatment of chronic anal fissures is highly desirable. Among conservative modalities, diltiazem 2% gel is rising as first line medical treatment as it breaks the vicious cycle and relaxes the sphincter tone and promote the healing of chronic anal fissures. These agents cause transient relaxation of the internal anal sphincter by blocking the calcium channels involved in muscle contraction.

This treatment is sometimes termed a “chemical sphincterotomy,” and it is not accompanied by the risk of irreversible incontinence. The major side effect of diltiazem gel therapy for anal fissures is that up to 20% of patients using this treatment experience headaches. On the other hand, topical modality takes longer duration for the healing of fissure.

Due to our social traditions and taboos, patients especially ladies do not readily accept the surgical treatment and ultimately suffer for a long period of time. This study was to compare between diltiazem 2% gel and lateral sphincterotomy in treatment of chronic fissure in ano.

AIM OF THE STUDY

Though fissure in ano is a very old and common entity controversy exists in the management of anal fissure.

The purpose of this study is to

To study the aetiology and predisposing factors

Age and sex incidence

Clinical presentation

Position of fissure

Associated features

Comparative study of local Diltiazem gel (2%) over Lateral Internal anal sphincterotomy.

Complications associated with medical and surgical management

REVIEW OF LITERATURE

McLeod and Evans, in an article published in 2002, identified a total of nine randomized controlled trials in which the Diltiazem efficacy was studied. Lund and Scholefield randomized 70 patients consecutively to receive treatments with topical 2% Diltiazem or a placebo. There were significant differences observed in fissure healing among any of the treatment groups. The primary side effect was headache.

Pitt and colleagues treated 1998 patients with 2% Diltiazem. They found that a sentinel pile presence affected the outcome adversely. To put it another way, the more chronic the fissure, the less likely Diltiazem will be helpful.

Others have opined that Diltiazem (2%), on the basis of their randomized, placebo-controlled, double-blind trial, failed to demonstrate any advantage inspite of demonstrable increased anal canal blood flow and reduced anal canal pressures. A similar study was conducted by Haseem Ahmed and Tariq Islam in D.H.Q Allied hospital, Faridabad from November 2000 to October 2002 whose study showed that topical Diltiazem gel treatment took more duration and poorly effective in the healing of fissure in ano compared with Lateral anal sphincterotomy. Topical Diltiazem produced headache in most of the patients.

Table showing impaired anal continence after lateral anal spincterotomy

S	No. of Patients	Healed (%)	Recurrence (%)	Impaired Anal Continence (%)		
				Soiling	Flatus	Stool
Hoffman and Goligher, 1970 ^[35]	99	97	3	1.0	6.1	7.1
Notaras, 1971 ^[36]	82	100	0	1.4	2.7	5.5
Rudd, 1975 ^[37]	200	99.5	0.5	0	0	0
Boulos and Araujo, 1984 ^[38]	23	100	0	0	17.9	NA
Pernikoff et al., 1994 ^[39]	500	97	3	4	3	1
Garcia-Aguilar et al., 1996 ^[40]	549	89	11	22	28	8
Hananel and Gordon, 1997 ^[41]	312	99	1	1	1	1
Nyam and Pemberton, 1999 ^[42]	487	96	4	8	6	1

NA - Not Available

ANATOMY OF THE ANAL CANAL

Development

The lowest part of the gastrointestinal tract consists of the rectum and anal canal. Useful components of the food are absorbed and waste material is expelled through the anus, the external opening of the anal canal visible in the perineum. Anal canal is guarded heavily by the sphincters and it subjected to many maladies. Properly timed and balanced food decreases these maladies.

Upper 15mm develops primarily from the primitive anorectal canal and is lined by simple columnar epithelium.

Lower part below the pectinate line (lower 15+8mm) is formed from invagination of ectoderm., i.e. proctodeum (Greek - on the way to). Lined by stratified columnar and stratified squamous epithelium.

Failure to maintain continuity of the two parts of anal canal results in imperforate anus.

Situation:

Anal canal is situated below the pelvic diaphragm level. It lies in the posterior triangle of perineum in between the left and right ischioanal fossae, which allows its expansion during passage of the faeces. The sacculations and taeniae of large bowel are absent here.

Location and Description

Length, Extent and Direction

The anal canal is 3.8 cm in length. It extends from the anorectal junction to the anus. It is directed backwards and downwards. The anal canal is surrounded by inner involuntary(smooth) and outer voluntary sphincters(striated) which keep the lumen closed in the form of a slit compressed anteroposteriorly.

The anorectal junction is localised by the convexity anteriorly of the perineal flexure of the rectum and lies 2-3cm anterior and slightly downwards to the tip of the coccyx. Here the ampulla of the rectum narrows suddenly and then pierces the pelvic diaphragm. Apex of the prostate corresponds to this level in male patients. The surface opening of the anal canal is anus, situated about 4 cm downwards and in front of the tip of the coccyx in the intergluteal cleft. There is pigmented surrounding skin which is placed in radiating folds and contains large apocrine glands in a ring pattern.

RELATIONS OF THE ANAL CANAL

Anteriorly

1. Both sexes: Perineal body.
2. Males: Bulb of penis and membranous part of urethra.
3. Females: Vagina lower end

Posteriorly

1. Anococcygeal ligament.
2. Coccyx tip

Laterally: Ischiorectal fossae

Circumferentially: Sphincter muscles surrounds the anal canal, their tone keeps the anal canal closed.

Anatomical anal canal

It is the portion of anal canal extending from anal verge up to the dentate line.

Surgical anal canal

Portion of anal canal extending from anal verge to the anorectal junction.

Structure

The mucous membrane of the upper half of the anal canal is derived from Endoderm of hindgut. The **Dentate line** or **pectinate line** indicates the level where the anal canal upper half and lower half join.

INTERIOR OF THE ANAL CANAL

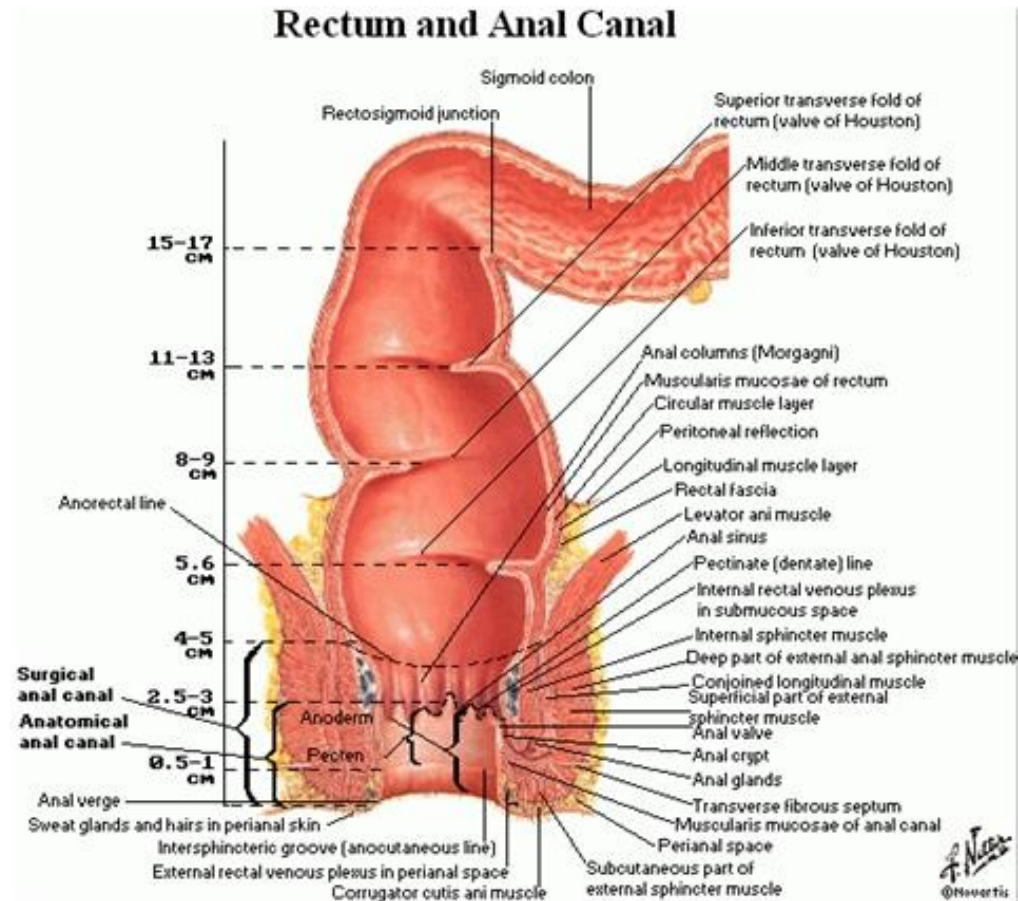


FIG 1. INTERIOR OF THE ANAL CANAL

The anal canal interior shows many discrete features and is divided into three parts: the upper part about 1.5cm in length; the middle part about 1.5 cm in length; and the lower part 0.8 cm in length. Each part is lined by a characteristic epithelium and reacts in peculiar manner to various diseases.

Upper Mucous Part

1. This part is 1.5 cm in length. It is lined by mucous membrane and endodermal in origin.
2. The mucous membrane shows:
 - a. 6 to 10 vertical folds; these folds are called the Morgagni anal columns.
 - b. The lower ends of these columns are united by transverse folds of mucous membrane; these folds are called the anal valves.
 - c. Above each valve, a depression in the mucosa is present which is called the anal sinus.

The anal valves together form a transverse line that runs circumferentially around the anal canal, and is called the pectinate line. It is located opposite the middle part of internal anal sphincter, the junction of ectodermal and endodermal region. Less frequently these anal valves show epithelial projections called anal papillae and are remnants of embryonic membrane of anal canal.

Anal sinus contains glands of anal canal. The secretion from these glands produce peculiar smell which is essential in lower animals to attract opposite sex.

Middle Part/ Transitional Zone/ Pecten

1. The next 1.5 cm of anal canal is also lined by mucous membrane, but anal columns are absent here. The mucosa here has purplish blue hue because of a dense venous plexus that lies between it

and the muscle layer. Mucosa is fixed compared to that of in the upper part of the anal canal. This region is referred to as the transitional zone or Pecten. The lower limit of the pecten often has a whitish appearance and is referred to as the White line of Hilton. Hilton's line is situated at the level of the space between the lower border of internal anal sphincter and the subcutaneous part of external anal sphincter.

2. It marks the lower limit of pecten or stratified squamous epithelium which is thin, pale and glossy and is devoid of sweat glands.

Lower Cutaneous Part

It is about 0.8 cm in length and is lined by true skin containing appendages. The epithelium of the lowest part resembles that of pigmented skin surrounding the perineum in which sebaceous glands, sweat glands and hair are present.

A. ANAL CANAL MUSCULATURE

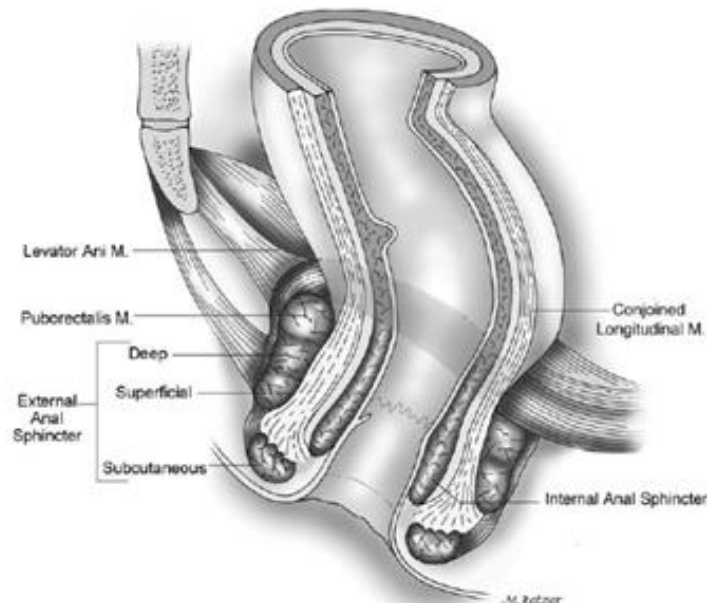


FIG 2. MUSCULATURE OF ANAL CANAL

Anal Sphincters: The internal anal sphincter is involuntary by nature. It is derived from the thickened circular muscle coat of lower part of the gut. It surrounds the upper three-fourths, i.e. 3 cm of anal canal extending from upper end of the canal to the white line of Hilton in Pecten.

The external anal sphincter is voluntary in control. It consists of striated muscles and is innervated by the perineal branch of the fourth sacral nerve and inferior rectal nerve. It extends through the whole length of the anal canal and has three parts -Deep, Superficial and subcutaneous parts.

In contrast to earlier idea, the external anal sphincter forms a single anatomic and functional entity. Uppermost fibres blend with puborectalis muscle fibres. Anteriorly few fibres decussate with superficial transverse perinei muscle and posteriorly few fibres get inserted into anococcygeal raphe

Middle fibres covers the lower part of internal anal sphincter. Fibres are attached anteriorly to perineal body and posteriorly to coccyx via anococcygeal ligament. Few fibres on each side decussate and form a commissure in the midline, lower fibres lie below internal anal sphincter level and separated by submucosa from anal epithelium.

In males transverse perinei muscles and bulbospongiosus insert in perineal centre, and so there is surgical plane of cleavage between anal canal and urogenital triangle.

In females, the puborectalis muscle is isolated from external anal sphincter. Also its anterior part is thin and short.

In addition, transverse perinei muscle and bulbospongiosus fuse with external sphincter in lower perineum in females.

Longitudinal conjoint Coat

It is formed at the anorectal junction by combination of the puborectalis with the longitudinal muscle layer of the rectum. It lies between the internal and external sphincters. Downwards it becomes fibroelastic and at the level of the Hilton's line it breaks up into a numerous of fibroelastic septa which spreads out, pierces the external sphincter subcutaneous part and are attached to the skin surrounding the anus and called as corrugator cutis ani. The most lateral septum forms the perianal fascia. The most medial septum forms, the intermuscular anal septum, which is attached to the Hilton's line. Some septa pass obliquely through the internal sphincter and end in the submucosa below the anal valves

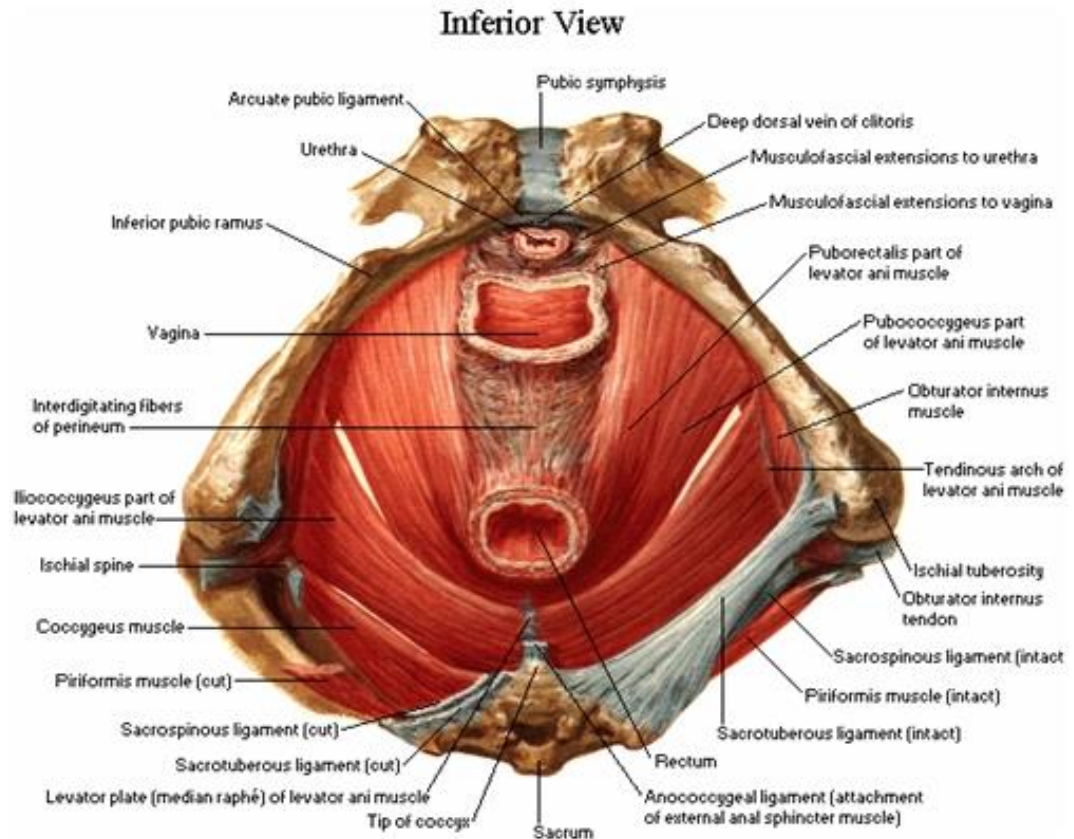


FIG 3. CONJOINT LONGITUDINAL MUSCLE COAT

Anorectal Ring

Muscular ring present at the anorectal junction. It is formed by the combination of the puborectalis, uppermost fibres of external sphincter and the internal sphincter. It is easily felt by digital rectal examination. Iatrogenic injury to this ring leads to rectal incontinence. This ring is less marked anteriorly where puborectalis fibres are absent/thinner.

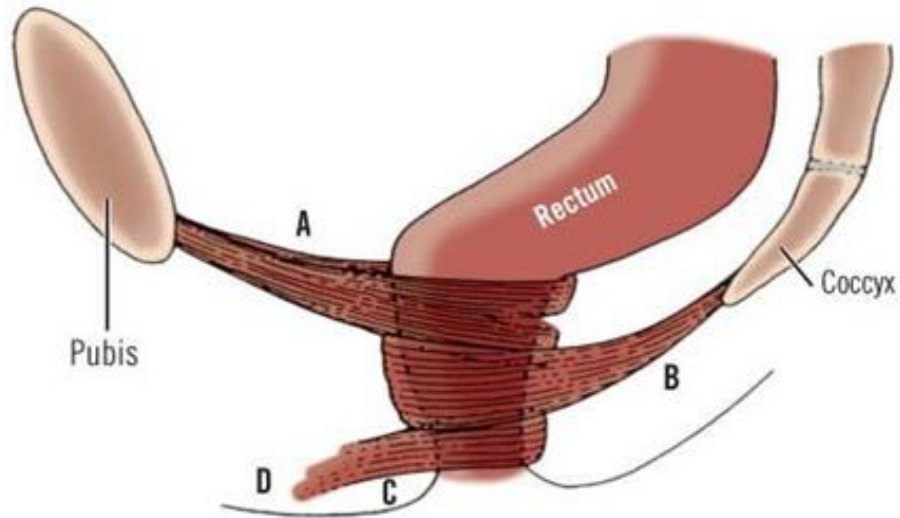


FIG 4- ANORECTAL RING

Surgical Spaces Related to the Anal Canal

1. The ischiorectal space or fossa lies on each side of the anal canal.
2. The perianal space surrounds the anal canal below the white line. It contains the fibres of external sphincter, the external rectal venous plexus, inferior rectal vessels and nerves terminal branches. Infection in this space tends to spread to the anal canal at the Hilton line or to the surface of the perineal skin rather than to the ischiorectal space.
3. The submucous space of the canal lies above the Hilton line between the internal sphincter and mucous membrane. It contains the internal rectal venous plexus and lymphatics

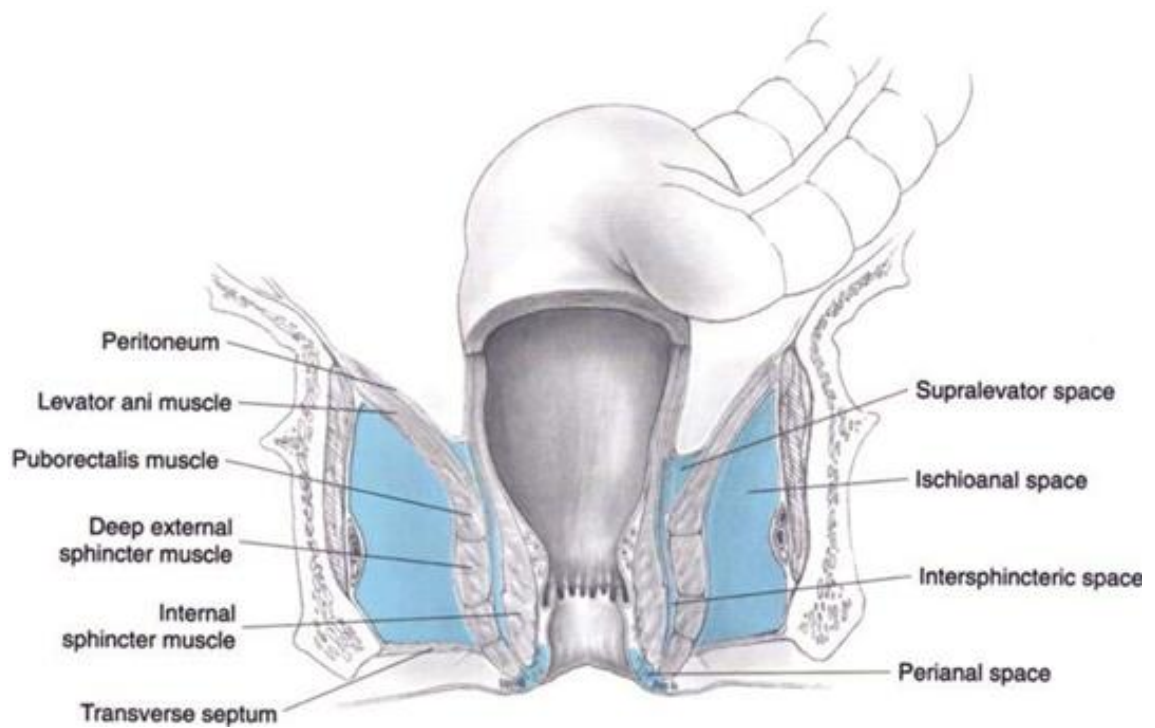


FIG 5 - ANAL CANAL SPACES

Blood Supply

Arteries

The arterial supply of upper half is similar to that of the hindgut , the **superior rectal artery**, terminal branch of the inferior mesenteric artery. The arterial supply of lower half is through the **inferior rectal artery**, which is a branch of the internal pudendal artery which is a branch of internal iliac artery.

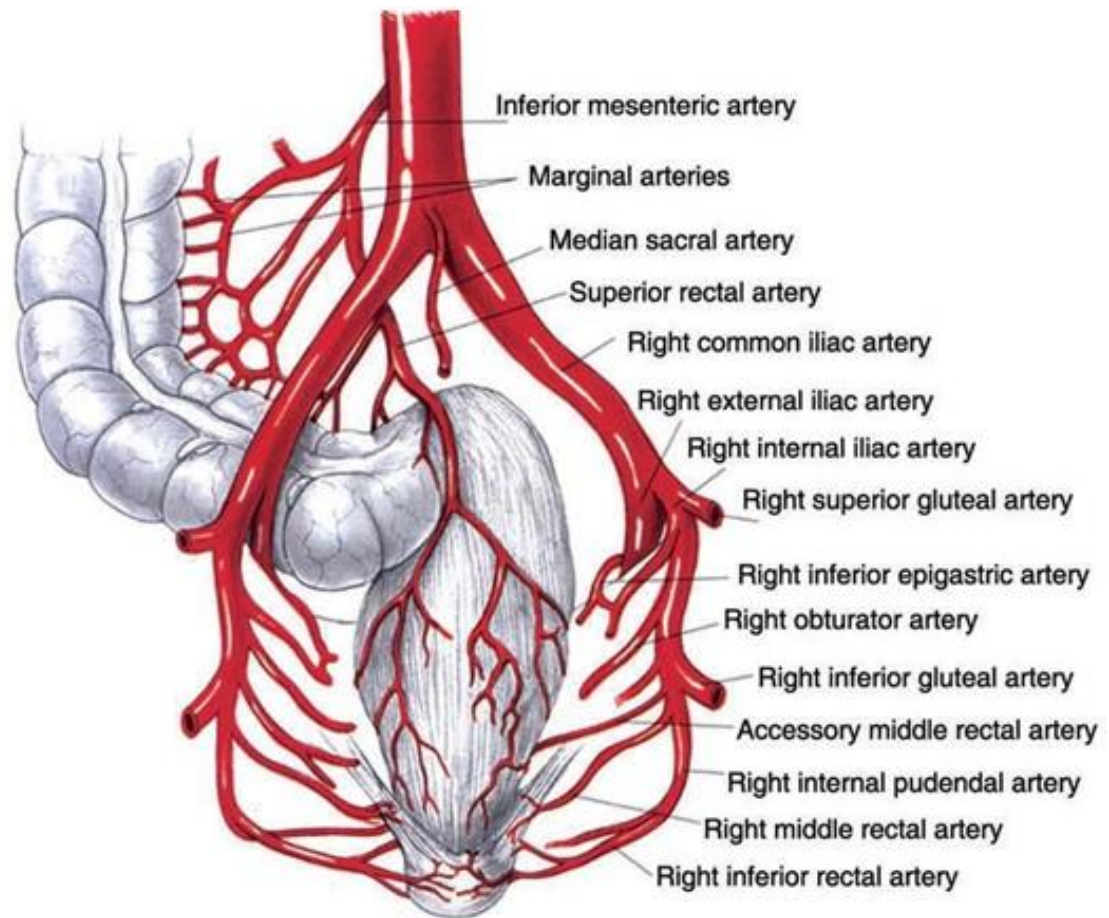


FIG 6. ARTERIAL SUPPLY

Venous Drainage

The internal rectal venous plexus or haemorrhoidal plexus lies in the submucosa of the anal canal. It drains mainly into the superior rectal vein, but communicates freely with the external plexus and thus with the middle and inferior rectal veins. The internal plexus is, therefore, an important site of portosystemic communication . The internal hemorrhoidal plexus is a series of dilated venous pouches connected by transverse branches around the anal canal. Veins present in the three anal columns situated at 3,7 and 11 o'clock positions as seen

in the lithotomy position are large and constitute potential sites for the formation of primary internal haemorrhoids.

2. The external rectal venous plexus lies below the muscular coat of the rectum and anal canal, and it freely communicates with the internal venous plexus. The lowest part of the external plexus drains into inferior rectal vein and it drains into internal pudendal vein; middle part into middle rectal vein which drains into internal iliac vein; and the upper part by superior rectal vein and that continues as the inferior mesenteric vein upwards.

3. The anal veins are radially arranged around the anal verge. These veins communicate with the internal rectal plexus and inferior rectal veins. Excessive straining while in defaecation may rupture these veins, forming a perianal haematoma subcutaneously known as external haemorrhoids.

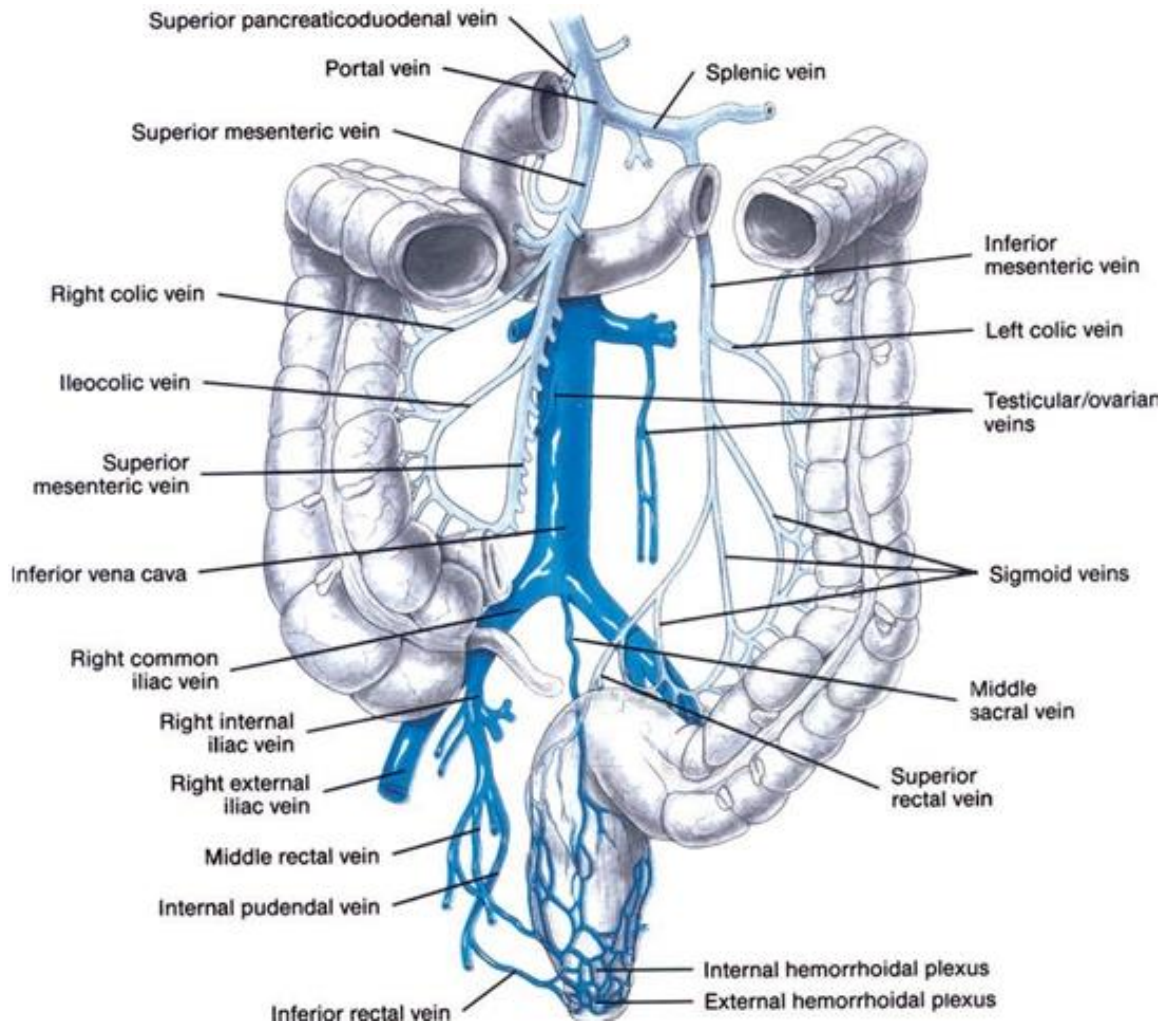


FIG 7. VENOUS SUPPLY

Lymphatic Drainage

Lymph vessels from the part above the pectinate line, drains similar to that of the rectum i.e, into the internal iliac nodes.

Lymphatics from the anal canal below the pectinate line drain into the medially placed horizontal group of the superficial inguinal nodes.

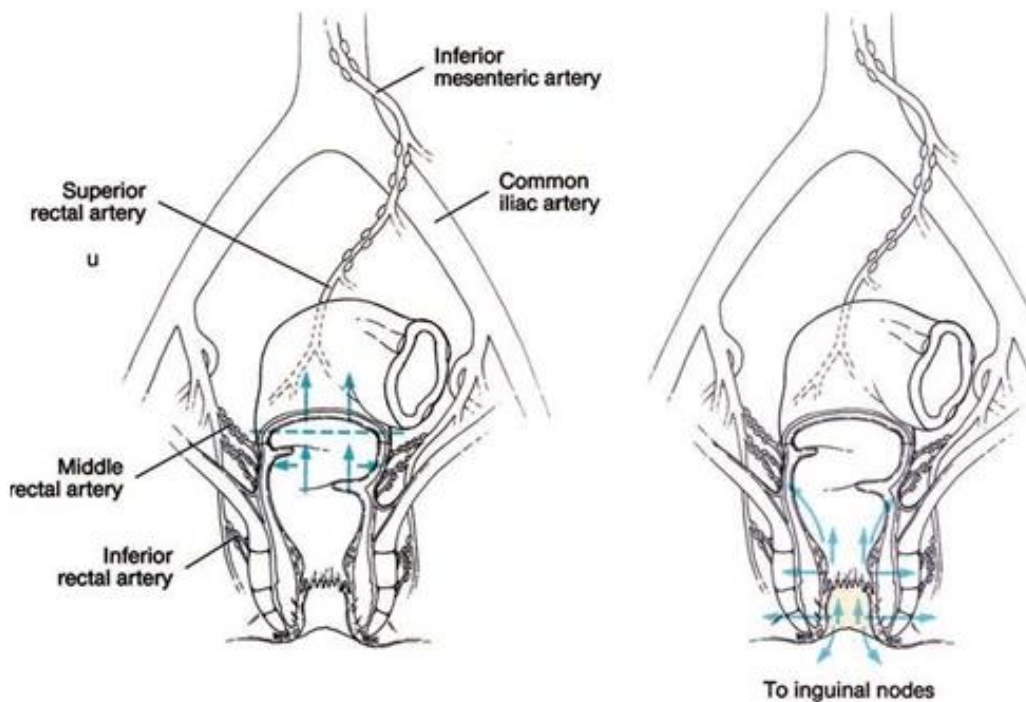


FIG 8. LYMPHATIC DRAINAGE

Nerve Supply

Motor Innervation

The internal anal sphincter is supplied by both parasympathetic and sympathetic nerves and innervates muscle through the same pathway as that of to the lower rectum. The parasympathetic supply inhibits the internal sphincter. Sympathetic supply to the internal sphincter is contrasting. Wright ,Shepherd and Lubowski et al. found it to be inhibitory whereas Carlstedt et al. found it to be excitatory.

Section shows there is a avascular areolar space between rectum and seminal vesicles and the location of the neurovascular bundle.

The external sphincter is supplied by the perineal branch of the fourth sacral nerve and the inferior rectal branch of the internal pudendal nerve. The pudendal nerve traverses the greater foramen sciatica and traverses the sacrospinous ligament along with the internal pudendal vessels. The pudendal nerve lies on the lateral walls of the ischiorectal fossa, and it gives off the inferior rectal nerve, which traverses the ischiorectal fossa with the inferior rectal vessels to reach the external sphincter.

Gruber et al. studied the anatomic relationship of the pudendal nerve to the pudendal vessels and the spine of ischium. In 58 right and 58 left pelvis the course of the pudendal nerve and vessels at the ischial spine were evaluated. Multi-trunked pudendal nerves were found in 41.5% with a left-vs-right ratio of 1.45:1.55. The single-trunked nerves diameters ranged from 1.2 to 6.8 mm. In 76.9% the pudendal nerve was found to accompany

internal pudendal artery in medial relation. The distance to the artery ranged from 16.2mm medial to 7mm lateral. The ischial spine distance ranged from 12.4mm medial to 8.4mm lateral. Close spatial relationship between the pudendal nerve and the internal pudendal artery is crucial for local anaesthetic infiltration technique and surgical procedure. In 35% cases, a direct branch from the fourth sacral nerve innervates the external sphincter additionally. This explains even with a bilateral pudendal block causes complete paralysis of the external sphincter in only about half, though with sensory loss over the area supplied by the pudendal nerves. The puborectalis muscle is supplied by the third and fourth sacral nerves, which lie above the pelvic floor. The levator ani has dual supply from fourth sacral and pudendal nerves.

Sensory Innervation

The sensory nerve supply of the anal canal is through inferior rectal nerve, a branch of the pudendal nerve. The anal canal epithelium is highly innervated with sensory nerve endings, especially around the dentate line. Pain in the anal canal can be felt 1.5cm proximal to the dentate line from the anal verge. The anal canal can sense touch, pressure and temperature.

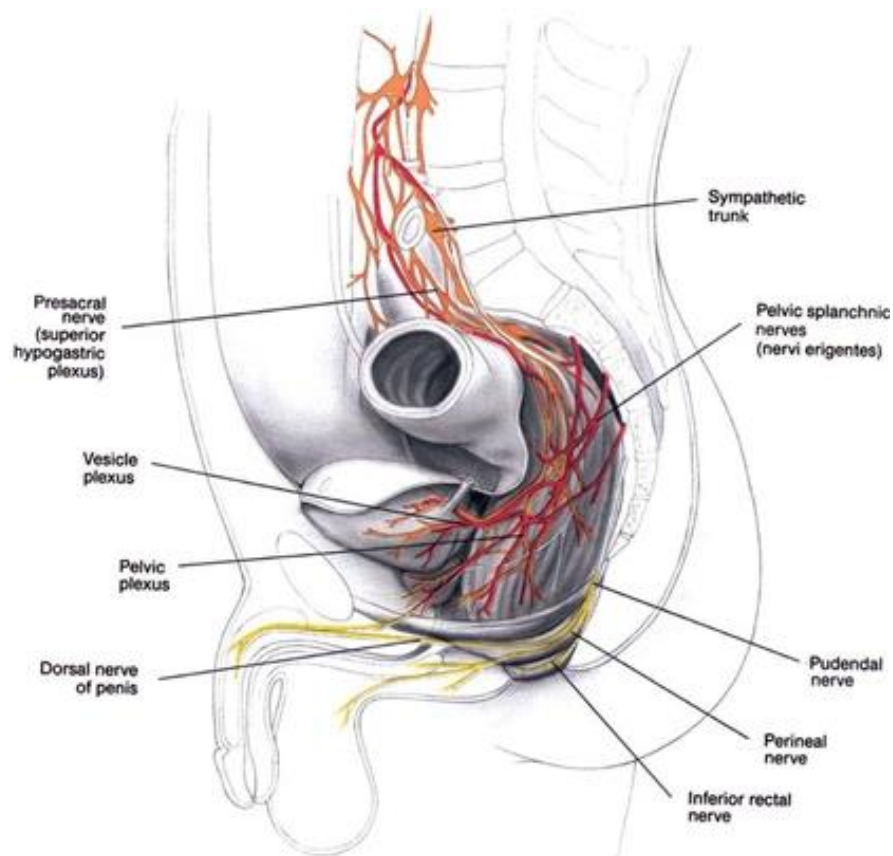


FIG 8. NERVE SUPPLY OF ANAL CANAL

PHYSIOLOGY OF THE ANORECTUM

The mechanism that maintains anorectal continence and facilitate defecation are complex and interlinked. Newer modalities like anal manometry and electromyography has opened up the mechanism of complex anorectal physiology.

Factors Maintaining Faecal Continence:

1. High pressure zone in anal canal - (Anal sphincter mechanism)
2. Co-ordinated activity of the pelvic floor musculature and anorectal angle
3. Anorectal reflex and sensory mechanisms
4. Distensibility, capacity and 'tone' of rectum
5. Rectal motility and evacuation ability
6. Transit in colon
7. Motility of anal canal
8. Consistency and stool volume

Anal Canal High Pressure Zone:

The average length of the high pressure zone is 4 cm in Anal Canal. When anal sphincter squeeze, the canal lengthens, whereas during straining it shortens.

The IAS & EAS surround the anal canal and are the reason for maintaining resting and producing squeeze pressures. The highest resting pressure is recorded in the region 1-2cm proximal to anal verge. The average resting pressure in anal canal is about 90cm H₂O. IAS contributes to majority of resting tone of the anal canal about 85% of the total.

Fissure in ano patients have an elevated resting anal pressure measured by balloon manometry.

SQUEEZE PRESSURE:

It is generated by contraction of the puborectalis and EAS muscle. Squeeze pressure is usually unequally distributed around the anal canal. Maximum squeeze pressure peak lasts less than 1 minute, because the sphincter fatigues rapidly after that time.

ANORECTAL ANGLE:

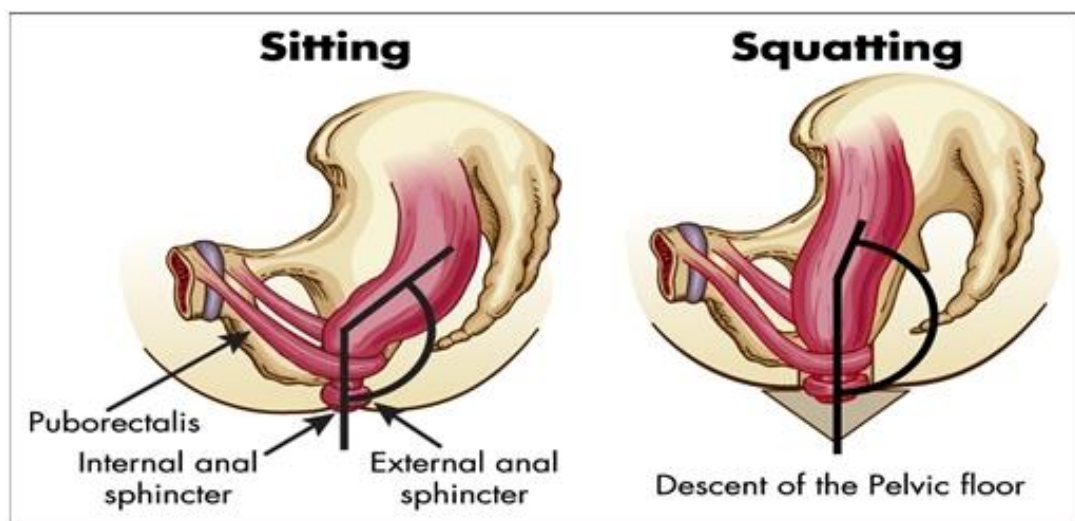


FIG 9. ANORECTAL ANGLE IN SQUATTING POSITION

Angle maintains hourly faecal continence and mediated mainly by the anteriorly directed pull of the puborectalis muscle as it envelops anorectum at the level of Anorectal ring. The average angle is 102 ± 13 degree at rest. Standing changes the angle lightly, sitting widens this angle significantly to 119 ± 17 . Valsalva sharpens the angle acutely to 81 ± 19 .

It helps the anterior wall of the rectum to act like a 'flap valve' at the anorectal ring. However the abdominal pressure increases, the anal canal walls flatten as they pass through an anteroposterior slit like opening in the pelvic diaphragm in order to maintain continence.

Finlay et al found that, expulsion of air was brought about by sharpening of anorectal angle (acute angulation), increase in anal canal and rectal pressure. In contrary, expulsion of liquids was done by widening of anorectal angle (obtuse angulation), decreasing anal canal pressure and increasing intra rectal pressure.

Rectal Anal sphincter inhibitory response (RASIR):

With acute rectal distention, the rectal wall reflexively contracts, causing the proximal portion of the anal canal to relax (IAS) and distal portion contracts (EAS).

The role of the Rectal Anal sphincter inhibitory response is unclear.

Rectal Distensibility and Capacity:

The Rectum accommodates to distention passively - intra luminal pressure remains low, when intra luminal volume increases. Tolerable maximum volume in healthy individuals is about 400 ml.

Motility of Rectum and Anal Canal:

Less commonly small amplitudes of contraction have been recorded in the rectum in electro encephalic studies. The average amplitude of these contractions is about 10+3 cm H₂O.

Three types of contractions have been observed. They are:

1. Simple contractions 5-10 cycles / min frequency
2. Contractions with amplitude as high up to 100cm H₂O
3. High amplitude slow contraction.

Patients with fissure in ano, have increased slow contractions with high amplitude. Patients with anal fissures demonstrated to have abnormal 'over shoot' contraction of their IAS after reflexive relaxation due to rectal distention.

DEFECATION

Rectal distension provides the stimulus for the initiating defecation. It is indirectly related to the critical threshold of sigmoid and descending colon distension. Till faecal matter is retained in the descending and sigmoid colon, the rectum is empty and there is no urge to defecate by individuals. This does not depend on sphincter function as its due to reservoir continence. Left colon distension initiates contractions and peristaltic waves, which propel the faecal matter downward. Distension of rectum induces reflexive relaxation of the internal anal sphincter, which leads to contraction of the external anal sphincter. This induces sphincter continence. If the situation allows the individual decides to go with to the urge, a squatting position is assumed. This makes the angulation

between the rectum and the anal canal to straighter. A Valsalva maneuver is the second partially voluntary stage. It is to overcome the resistance of the external sphincter (produced by contraction) by voluntarily upstaging the intrathoracic and intra-abdominal pressures. There is a descent of pelvic floor and the transmitted pressure on the faecal mass in the rectum increases intrarectal pressure. External anal sphincter inhibition by nervous supply allows passage of the bolus of faecal matter. Once rectal evacuation has been completed, the anal canal and the pelvic floor muscles regain their resting position, and the anal canal is closed again by contraction of the external anal sphincter.

DEFECATION REFLEX

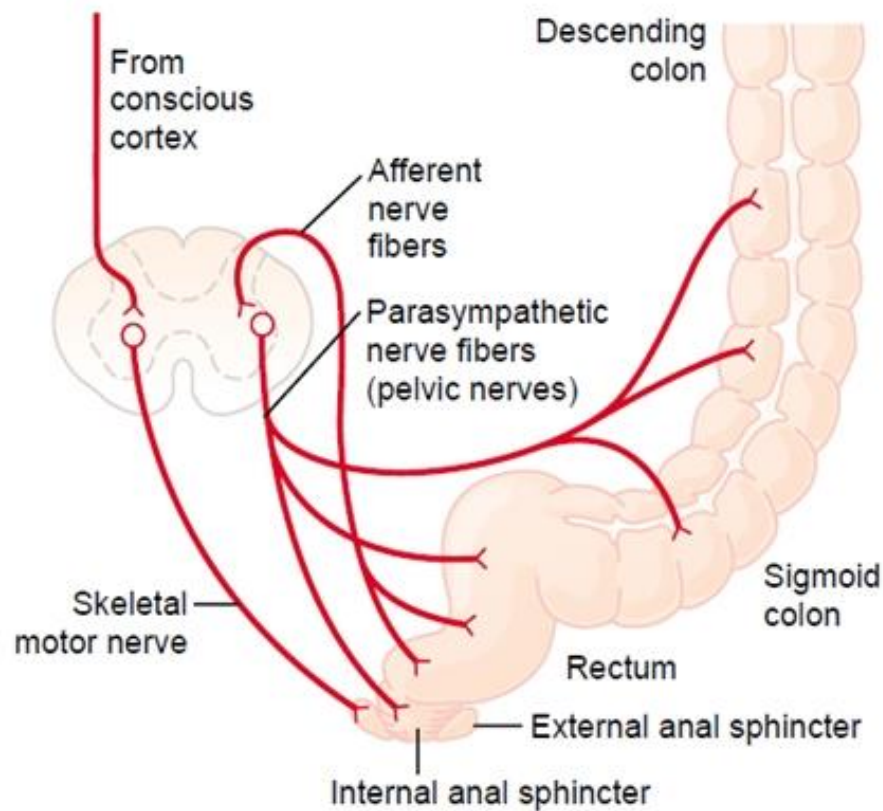


FIG 10. DEFECATION REFLEX

There are two types of defecation reflexes:

1. First reflex is intrinsic and is mediated by the enteric nervous system in the rectal wall. This reflex is relatively weak in functioning on its own. Faeces entering rectum distends it and this in turn initiates action potentials and afferent signals which spreads all through those local myenteric nervous plexus, thus initiating propulsive peristalsis in the descending colon, sigmoid colon and rectum pushing formed faeces towards the anus for expulsion starting from rectum. The peristaltic waves reaching anus causes relaxation of IAS. Concurrently if external anal sphincter is voluntarily relaxed, defecation occurs

2) Following the intrinsic reflex is the parasympathetic defecation reflex-This involves sacral segments and covers up the weaker intrinsic reflex. Nerve endings in the rectum after being stimulated produce signals which get transmitted to the lower segment of spinal cord. Reflex signals from spinal cord are transmitted through pelvic nerves, which are spread across the left descending colon, sigmoid colon and the rectum. These parasympathetic impulses travelling through the pelvic nerves hugely amplify peristalsis and these impulses relaxes the IAS. Concurrently if external anal sphincter is voluntarily relaxed, defecation occurs. Other effects like breathing deep, glottis closure and abdominal wall muscles contraction are initiated by the defecation impulses reaching spinal cord and these effects synchronously force the colon contents down and concurrently relax pelvic floor inferiorly and the anal ring is pulled outward in order to evaginate the faeces. Defecation reflex causes autonomous emptying of the lower bowel during day time at inconvenient places in new born babies and individuals with transection of spinal cord segments due to lack of conscious control exercised by voluntary contraction and relaxation of EAS.

The defecation act follows either one of the following patterns:

1) Mass peristalsis of distal colon and emptying of rectal contents, this causes clearance the bowel in a single continuous movement.

2)Several spikes of straining leading to expulsion of faeces in fragments. This pattern is highly based on the bowel habit of the individual and faeces consistency.

Propagating waves of high amplitude arising from the ascending colon are produced by sacral segment stimulation. These high amplitude waves are essential for proper emptying of stools. In particular these waves originate especially after an individual awakens from sleep and after a meal.

ACCOMMODATION RESPONSE

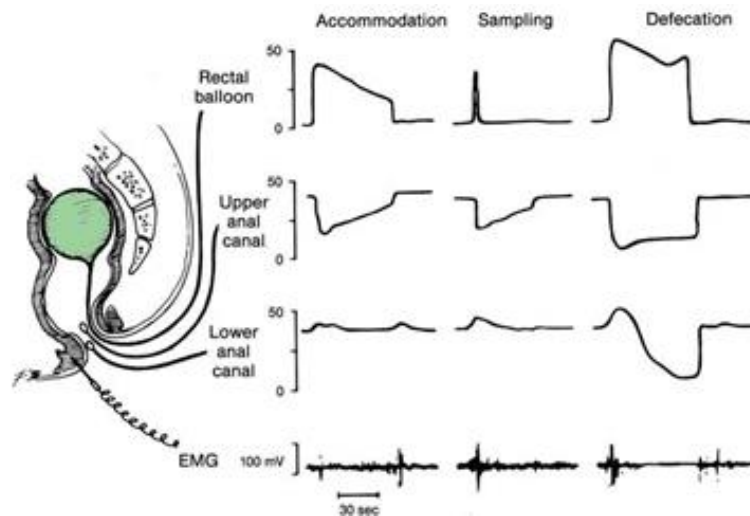


FIG 11. ACCOMMODATION RESPONSE

Receptive rectal ampullary relaxation to house the stools is called accommodation response. A gradual rise of intra-rectal pressure in stepwise pattern occurs with increasing volume of faeces, depending upon the individual's age defecation urge is felt. This urge wanes off in few seconds as rectum accommodates to the stimulus. When rectum is filled acutely with huge faecal volume, accommodation response failure is encountered and leads to rapid rectal emptying. Levator ani muscle and ampulla of rectum harbour the sensory nerve endings responsible for the accommodation response.

The spinal centre for this reflex is in the lumbosacral region of spinal cord with higher centre control to allow suppression of this urge to defecate.

Incontinence of anal canal

A crippling disorder socially is studied using various investigations including manometry of anal canal, electromyography, and nerve stimulation techniques is used for delineation of the incontinence cause. Anal manometry differentiates which sphincter is the reason behind incontinence. This is essential in planning the treatment modality for the patient. If IAS is the reason, sphincter repair is not going to treat the patient. Therefore use of manometry clinically in patient with faecal incontinence is under query.

For example, in a study about 45% of patients with incontinence were in normal value range in both MRAP and MSAP .On the other hand 10% individuals normally continent had low MSAP. So it is clear that anal incontinence cannot be assessed by anal manometry.

Bard et al. proposed the balloon-retaining test, and it consists of filling a distensible intrarectal balloon progressively in the sitting position of a patient. Pressure within the balloon is monitored, and the patient advised to retain the balloon and indicate when the first, constant, and maximal tolerable sensation is felt. Balloon here simulates solid and semisolid stools.

Researchers believe balloon test a proper approach to faecal continence evaluation than the anal manometry and rectal saline infusion tests. Balloon test evaluates the sphincter competence, rectal reservoir capacity and rectal sensation concurrently and allows evaluation of effects of various treatment in patients.

A modern computer based model, Derry et al. produced vectography of anal canal pressure by manometric technique to detect anal canal sphincter injuries.

Abnormal vector exposed even occult sphincter injuries and helped investigators to decide on whom sphincter repair surgeries would be helpful.

Occult sphincter injuries is also detected using endoanal sonography. With endoanal sonography the pathogenesis, management of faecal incontinence is improved. Vaginal delivery cause third degree perineal tear in about 2% females. Inadequate repair of such injuries is common. Ali et al. investigated and found that 50% of post repair of these injuries suffered urgency and faecal incontinence. These defects in sphincter is detected in 87% of these women using endoanal sonography. Sonography of anal canal revealed that one out of four primi delivering vaginally suffered from permanent defect affecting one or both sphincters. 95% of women incontinent with obstetric damage as the risk factor had abnormality of one or both the sphincters.

Child birth is identified as the most common cause of faecal incontinence in healthy women.

Biofeedback treatment is seen to improve faecal continence in many patients recently.

Definition

An anal fissure is defined as a vertical ulcer or break in the squamous epithelial lining of anal canal that covers the anal canal from anal verge up to dentate line. It is classified as acute and chronic, affects any age group but more common in young adults with equal sex distribution. Otherwise called as an ischemic ulcer. Fissure in ano pathogenesis is not clear yet but hypothesis like, elevated tone of internal sphincter and decreased perfusion of the anterior and posterior anoderm are proposed. Over 95% of fissure affect the posterior midline region. Anal fissures commonly heal spontaneously but few enter the repeated cycle of pain, constipation, faecal trauma and spasm of sphincter.



FIG 12. CHRONIC FISSURE IN ANO

AETIOLOGY AND PATHOGENESIS

Aetiology - Usually passage of a large hard faecal mass leads to mechanical trauma to the anal canal and it is identified as the most common cause.

Among the predisposing factors are -

- IBD.
- History of hemorrhoidectomy.
- Child birth.
- Chronic laxatives and purgatives abuse.
- Prolapse of haemorrhoids and anal papillae lead to traction on anal canal epithelium
- Self medication using ointment over perianal region predisposes to thinning of skin
- Iatrogenic injury which instilling enema by the nozzle tip
- Foreign body in stools

PATHOPHYSIOLOGY:

IAS spasm is the main pathology behind fissure as it prevents its healing by inverting the ulcer edges and hampering drainage from ulcer .Studies reveal elevated resting pressure in IAS than normal individuals. Usually distension of rectum causes adaptive reflex i.e, relaxation of IAS and contraction of EAS . Anal fissure patients have pathological abnormal contraction of IAS after adaptive reflex. Treatment modalities aim at resolving this IAS contraction.

SPHINCTER RELAXATION PHYSIOLOGY

Intracellular calcium determines resting tone of IAS. IAS consists of many smooth muscles and contraction is initiated by calcium influx through voltage gated channels, but also modulated by $\alpha 1$ receptor stimulation. $\alpha 2$ receptor stimulation causes IAS relaxation. Relaxation is incited by reducing the calcium influx and promoting intracellular cGMP and cAMP. Entry of potassium adversely reduces calcium levels and thus relaxation of IAS. $\beta 2$ receptor stimulation promotes intracellular cAMP which returns calcium into sarcoplasmic reticulum and relaxation occurs.

Neurotransmitters that are inhibitory mediate NANC relaxation, like nitric oxide and vasoactive intestinal peptide. Intracellular cGMP is elevated by NO which acts as the major neurotransmitter mediating IAS relaxation. VIP increases cAMP and IAS relaxation. L-arginine, an amino acid relaxes IAS smooth muscle by serving as a substrate for NOS(Nitric Oxide Synthase).Researches found that decreased levels of NOS in fissure patients than healthy individuals.

Posterior fissure more common?

Anal fissure in posterior region accounts for more than 90% in both sex.

Hypothesis are

- A weak area is exposed in posterior midline by EAS origin from coccyx.
- Inapparent infection are common in anal crypts which are more obvious in the posterior region.
- EAS is not a circular muscle in its lower part, and is composed of muscle fibres passing postero-anteriorly and splits around the anus. Anal mucosa is supported both laterally and anteriorly and therefore fissure is more common posteriorly. In women lack of support anteriorly also predisposes to anterior fissures.
- Dockhart Pummery postulated EAS is not a full circle based on its origin. Anal mucosa is properly supported both laterally and anteriorly leaving posterior end unsupported, which explains the common site of occurrence. In women anteriorly also EAS is defective thus higher incidence of anterior fissure among them. In cadavers too anal canal stretching leads to posterior tear.
- Clasterbalfen et al. studied the blood supply of anal canal and identified that posterior region is poorly perfused. Relative ischemia of the posterior region is a risk factor for fissure occurrence in this region. In addition branches from inferior rectal artery passes through IAS and is prone to be compressed and contused by muscle contraction. Cadaveric studies also supports the findings.

- Mchouten et al. studied the anal canal blood flow using doppler flowmetry. It revealed decreased blood flow in posterior commissure. Sphincterotomy reduced anal canal pressure and thus improving local blood flow and helping in fissure healing. Ischemia proved to a factor inciting fissure. Repeated studies also revealed reduced blood supply to the posterior part of anal canal.
- Child birth in women causes anterior fissure due to break down of old healed tears.

Acute and Chronic fissures

Base- longitudinal muscle fibres then it is called acute anal fissure.

Base- circular muscle fibres then it indicates chronic anal fissure.

Infection and oedema leads to sentinel pile formation.

Abscess forms when ulcer base is infected and it spontaneously ruptures either through base or perianal skin producing short subcutaneous fistula. No clear definition exists for chronic fissure in ano .Accepted guidelines is that when the ulcer is well recognised and circumscribed it is called chronic fissure in ano

A chronic fissure thus has following characteristic features -

- (1) Indurated edges in a tub shaped ulcer.
- (2) Floor is formed by deep circular fibres of IAS.
- (3) Superiorly a hemispherical swelling called anal papillae(hypertrophied) is found.
- (4) Inferiorly a skin tag is found called sentinel pile.

Why fissure reluctant to heal?

Few fissures spontaneously heal and remaining become chronic is an unanswered query.

- Infection, poor blood supply and obliteration of lymphatics due to chronic infection may be relevant explanation.
- Skin tag and anal papillae formation is decoded by the hypothesis that body attempts to heal the defect in fissure by overgrowth from proximal and distal ends, when healing does not occur across the defect.

Atypical fissures

An anal fissure located distant from the midline usually arises secondary to a primary pathology within the anal canal like a polyp, huge haemorrhoids or a hypertrophied anal papilla. If primary cause has not been identified alarm raising suspicion of underlying chronic disease (Tuberculosis, IBD, Syphilis, Leukemia, Sarcoidosis)

Fissure associated with inflammatory bowel disease usually appears to be multiple, broad and located distant from the midline. The IAS spasm usually associated with a nonspecific fissure is minimal or absent.

HISTOPATHOLOGY

Histopathology is of no diagnostic value in case of fissure in ano. Histopathological examination of excised anal fissure specimen section slides would reveal nonspecific chronic inflammatory changes in the background which is of no diagnostic value. Benjamin and his colleagues conducted a study in which 18 consecutive patients were followed up prospectively and those patients underwent internal laterally placed anal sphincterotomy for chronic type of fissure in ano and the base of the fissure was biopsied and another biopsy was taken from the muscle also before division of the muscle in sphincterotomy. Histopathological examination of these biopsies revealed chronic inflammatory changes and the presence of fibrosis. These findings were lacking in those examined from controls.

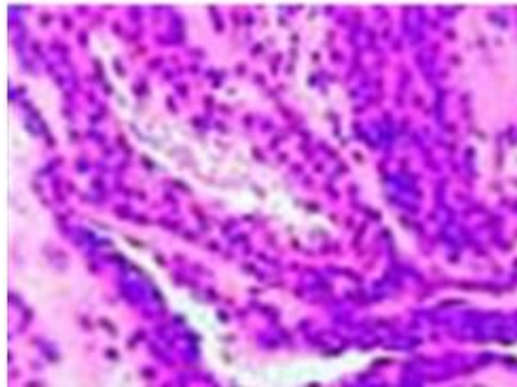


FIG 13. HISTOLOGY IN CHRONIC ANAL FISSURE

CLINICAL FEATURES

ACUTE FISSURE

PAIN

Pain of burning, cutting, tearing type is experienced during defecation and is present for variable period following defecation is the symptom. With abscess formation the pain becomes typically continuously throbbing. During each attempt to defecate the fear of pain leads to habitual postponement of defecation and leads to constipation. A repeating cycle of pain, constipation, pain is formed and the patient suffers.

Pain experienced in anal fissure is easily distinguished from that of Proctalgia fugax where there will be accompanying pelvic discomfort not related to the bowel movements and action. Discomfort is felt in anal fissure also but is localised to the anal canal but in Proctalgia fugax it is felt deeper and higher at the level of pelvis. Other commonly presenting painful anal canal condition is thrombosed hemorrhoidal mass, here there will be an accompanying lump with the pain localised to the anal canal. It is distinguished from anal fissure by the absence of lump in anal canal.

BLEEDING

Bleeding is usually around a few drops or rarely more in quantity and it is bright red in colour. It is usually noticed over the surface of the stools passed onto the sanitary pan.

· Dysuria occurs reflexively and few individuals experience pain radiating into thighs.

CHRONIC FISSURE

A different complex of symptoms are complained by the individuals with chronic anal fissure (long standing).

In chronic fissure, pain which is irritating nature is felt, itching around the perianal region is felt and discharge soiling the clothes are present.

Usually bleeding may or may not be present.

An oedematous swollen skin tag is usually present in chronic cases (sentinel pile) as an attempt to heal the fissure.

Disturbance of bladder habitus (e.g., retention, urgency, frequency) and dyspareunia rarely occur along with the symptoms of both acute and chronic fissure in ano.

EXAMINATION OF ACUTE FISSURE

Lower end of the fissure is usually visualised when a gentle traction is applied to the anal verge with pre-procedure advise of discomfort.

Mandatory application of local anaesthetic gel over the fissure region is essential before attempting a digital rectal examination.

In an acute fissure in ano the ulcer is shallow hence impalpable mostly, but the sphincter is in severe spasm experienced by very high resistance to digital rectal examination. Thorough proctoscopy in these patients is not advisable. Rectal examination with digits on palpation will usually reveal a spastic anal sphincter or anal canal tightness and increases the discomfort of patient. The wound which is open in the anal canal is usually not palpable by examining fingers in acute anal fissure, as the break in the epithelial surface is usually superficial with no accompanying fibrosis.

POSITIONING:

Position of the inverted prone Jack-knife on examination table is most known and is commonly used in the Western countries , but the Sim's position-patient positioned in the left lateral aspect with the gluteal region projecting very little beyond the edge of the examining table is easy for examination and is much more acceptable with the patient positioned at ease compared to Jack-knife position. It is a wrong ideology with the prone Jack-knife position the rectosigmoid colon straightens and this leads to easy and high level passage of the sigmoidoscope. The acute angulation of anorectal ring cannot be bypassed by altering the patient's position or induction of general anaesthesia to relax all muscles in body. The inverted Jack-knife position is contra indicated in many situations: such as eye disorders like acute glaucoma, retinal detachment, severe cardiac arrhythmia, old age, debilitation, pregnancy and recent undergone abdominal surgery.

ANOSCOPY:

Anoscopy is the examination of the anal canal, as it goes by the name. With anoscope lower part of rectal mucosa, internal and external hemorrhoidal plexus are visualised along with anoderm and dentate line. Proper rectal digital examination prior to anoscopy is a must. For clear visualisation through anoscope in many cases enema is not required. Obturator should always be in place while inserting the anoscope to avoid unnecessary injury to the anoderm. During examination the obturator is removed and is inserted back before rotating the anoscope to avoid injury to the anoderm. Examination table should not be tipped more than 10 to 15 degrees in inverted Jack-knife position to avoid complications, and the right gluteal region needs to be pulled up by assistant in a left lateral position is used for proper exposure.

Here patients are asked to strain during examination, to detect any mucosal prolapse of rectum and anal cushion co existing with fissure. Prolapsed haemorrhoids is indicated by anodermal excoriation, metaplasia of the covering mucosa and friable mucosa.

CHRONIC FISSURE

Lower end of the fissure has skin tag (Sentinel pile).

At the upper end hypertrophied anal papilla may be present in chronic fissure in ano.

Proctoscopy done gently will reveal the occult presence of coexisting haemorrhoids, hypertrophied anal papilla or a fibrous polyp.

Diagnosis is made clinically but a sigmoidoscopy is done must after resolution of the acute phase or at least before planning surgery to rule out other associated conditions like IBD or associated pathology.

MANOMETRY

Manometric assessment of anorectum measures the function of the IAS and EAS. Anorectal manometry has no standard guideline, how it has to be performed. Most commonly perfused fluid-filled open-tipped catheters and closed balloon systems is practised. With modern developments, micro transducers are routinely used to reduce the hinderance in measurement and deficiencies associated with perfused open-tipped catheters and closed balloon systems. With these modern manometric devices, which is composed of a miniature pressure sensor located at the tip of the manometric catheter, they offer many advantages.

No local complications such as perianal skin irritation is caused by the continuous perfusion and leakage from the anus is encountered. Manometric recordings are not biased by factors like compliance, perfusion rate and hydrostatic factors. These micro transducer-tipped catheters are many folds expensive than that of conventional devices.

During the anal canal pressure measurement, the transducer probe must be withdrawn from the rectum in a slow, continuous manner at a constant rate to record pressure in segments of the anal canal. Better evaluation of the anal canal pressure and functional sphincter length is assessed with this continuous slow pull-through method along the rectum and anal canal. Peak pressure of this method recorded is called as the maximal resting anal pressure[MRAP]. Regular fluctuations in resting pressure in the anal canal is exhibited throughout the day and is influenced by the individual's posture and presence or absence of faecal material in the rectum. Fluctuations in pressure mostly present as slow waves with a frequency of 10 to 20 waves/min and the amplitude ranging between 5 and 25 cm H₂O. These are found in normal healthy individuals but not recorded continuously. Ultraslow waves are recorded less commonly, with an amplitude ranging from 30-100cm H₂O and frequency of less than 3waves/min. These ultraslow waves are associated with abnormally high resting anal pressures.

Differential Diagnosis

An ulcer located away from the median plane always should immediately arise suspicion of-A **traction fissure**, which is caused by factors that lies within the anal canal which is excluded by digital and proctoscopic examination.

Primary chancre- induration is present along with inguinal lymphadenopathy. Multiple fissure are seen in secondary syphilis.

Microbiological tests like the Wassermann reaction is strongly positive.

Tuberculous ulcer- has undermined edges and with a discharge that is thin and watery. The presence of a primary lesion in the chest, elevated ESR, sputum examination and a biopsy with HPE may be essential to conclude on a diagnosis.

A malignant ulcer- indurated, with raised and everted edges and resistant to the local treatment. Biopsy with HPE is required for the diagnosis.

Fissure associated with IBD are numerous, indolent and are usually resistant to local treatment. Colonoscopy reveals the pathology within the rectum and large bowel.

Numerous acute anal fissure may be contracted following sodomy, in which a history of **anal intercourse** is revealed. HIV infection transmission through this route is common between sexual partners.

Idiopathic stenosis of IAS - It usually occurs in older patients usually women, who have been exposed to chronic abuse of laxatives over many years so the anal canal has been altered for long duration the normal dilation during passage of normal solid stools. Due to this prolonged inactivity the IAS undergoes fixed contraction and is complicated by the fibrosis of muscle fibres. This is usually asymptomatic but when severe, patient experience difficulty passing stools.

TREATMENT

- Conservative
- Medical
- Surgical

CONSERVATIVE MANAGEMENT

(Life style and dietary modifications.)

Over a period of 2-3 weeks usually most fissures heal.

History pain usually accompanies these superficial lesions.

Contrary to these chronic fissures are usually resistant to conservative management.

With only temporary relief of symptoms, they tend recur and increase the morbidity of the affected patients.

Treatment of acute anal fissure is usually nonsurgical unless the fissure is due to traction where excision primary pathology (fibrous polyp/ anal papilla) will eliminate its recurrence.

- Adequate hydration.
- **High fibre diet.** A diet should be rich in vegetables, fruits and brown rice.
- **Bulk forming agents** such as psyllium husk and bran can be taken after meals.
- Recurring anal trauma by passage of hard stools can be prevented by using laxatives such as liquid paraffin and lactulose syrup. These tend to produce soft easy passage of stools. Overt usage to be avoided as frequent passage of loose stools also causes discomfort.
- Local anaesthetic ointment (5% Xylocaine) acting on skin surface and oral analgesics are helpful to reduce pain.

- An appropriate broad-spectrum antibiotic with metronidazole will fasten healing and recovery.
- Adequate and repeated Sitz bath are soothing and help to decrease the sphincter spasm.

MEDICAL LINE OF MANAGEMENT

Also called **chemical sphincterotomy** and almost always combined with conservative treatment.

The object of medical management are -

Pain relief.

Relaxation of the internal sphincter.

Healing of the fissure

Medical management of acute fissure in ano - Is by using an agent which produce relaxation of internal sphincter, and so healing of the fissure is induced, this process is known as “Chemical Sphincterotomy”. Some of the agents used for chemical sphincterotomy are -

Glyceryl trinitrate.

Calcium channel blockers- Nifedipine and Diltiazem

Neurotoxins

- Botulinum toxin
- Gonyautoxin

Newer Agents: These drugs are under trial

- Phosphodiesterase inhibitors -Topical Sildenafil.

Potassium channel openers-Minoxidil.

- L-Arginine - Precursor of NO.

- Adrenergic antagonist -Indoramin
- ACE(Angiotensin converting enzyme)inhibitors-Topical Captopril
- Hyperbaric Oxygen.

Some of the obsolete agents and methods are -

- Sclerotherapy.
- Cholinergic Agonist -Bethenecol cream.
- Solcoderm - 5 Fluoro uracil and salicylic acid ointment.

Calcium Channel Blockers

Nifedipine and Diltiazem - are antihypertensive vasodilators and act by blocking the transport of calcium, inhibiting ion channels. Local application are better effective than oral medications. Side effect are headache, postural hypotension and perianal itching.

Nifedipine: Nifedipine tablets taken orally as 20 mgs BD or applied as 0.5% cream BD for 4 to 6 weeks.

Diltiazem: Diltiazem (DTZ) is another calcium channel blocker that has been preferred as an alternative for the treatment of chronic anal fissure.

Diltiazem tablets taken orally 60mgs BD or applied as 2% cream BD for 4 to 6 weeks

Glyceryl trinitrate (GTN) -a vasodilator and smooth muscle relaxant. It releases nitric oxide which is an inhibitory neuro-transmitter. The drug is used as 0.2% ointment applied locally to the anal canal BD or TDS for 6 to 8 weeks. When applied as an 0.2% ointment to the anal canal produce sufficient relaxation of the sphincter to allow the fissure to heal in majority of patients. Glyceryl trinitrate also a vasodilator improves blood flow to the fissure and this helps healing. Conversely glyceryl trinitrate ointment may produce severe head ache.

Isosorbide dinitrate - As 1% ointment was used in past to produce IAS relaxation but has headache as a significant side effect.

Botulinum Toxin - a muscle relaxant mostly striated and acts by inhibiting acetylcholine release at the NMJ. Botulinum Toxin A 30 units is injected into the IAS on either side of the fissure once a month. The average healing rates of 50 to 67% was observed. Local side effects of flatus incontinence, increased urinary retention, muscle weakness, faecal soiling is encountered.

Gonyautoxin- a phycotoxin produced by shellfish, is used in anal fissure management. Recent studies cite that gonyautoxin was used 33 patients. All these patients were injected with 100 units of the toxin in the IAS once in 4 days. Complete cure was attained in all patients within 1-2 weeks. No relapse of symptoms were observed during the mean 10 month follow-up. No complications were noted.

SURGICAL LINE OF MANAGEMENT

The operative approach is chosen based on the physical findings and the duration of symptoms in fissure in ano patients treatment. The main objective of surgery in anal fissure is to alter the IAS function and prevent it from going into spasm and also to improve the anal canal diameter to aid in easy passage of stools with least resistance.

- Stretching sphincter
- Internal anal sphincterotomy - which may be Posterior or Lateral anal sphincterotomy depending on the site of division.
 - Open method
 - Closed method

Anal canal outlet stretching as directed by Reynold, is utilised in the treatment of acute fissure resistant to conservative management, usually done under general anaesthesia. The principle behind stretching anal canal is by graded application of pressure that leads to paralysis of IAS and EAS over a temporary period of time and helps in fissure healing. Following stretching no residual wound is found and the patient can return back to work on day care basis. With accompanying complication of incontinence, the procedure has been withdrawn from use. Stretching is not useful in the presence of primary pathology, such as traction fissure due to huge internal haemorrhoids, as fissure tends to recur following stretching due to haemorrhoid prolapse.

Sphincterotomy

Posterior sphincterotomy

Internal anal sphincterotomy was first advised Eisenmenger. In the lower part of sphincter, it is divided using electro cautery in the posterior midline using the fissure it is divided in its lower half in the midline through posterior aspect of the fissure itself. As the procedure is done through the fissure, healing takes long period to heal leading to **key-hole deformity**. **The classic Gabriel procedure involves excision of a triangular area of skin along with a sphincterotomy in the posterior midline**. Residual wound is large and it takes long period to heal with very low recurrence rate (1-2%) with hospitalisation for at least a few days.

LATERAL SPHINCTEROTOMY

Internal Anal Sphincterotomy

In 1842, Brack performed an anal sphincterotomy for the first time. He indicated the surgery for “premature contraction of sphincter in anal canal”. In 1853, Miller reinforced that sphincterotomy should be the treatment for anal ulcer. Gill coined the term the pecten band for the surgical division of sphincter among surgeons and familiarised the term among surgeons.

In 1947, Eisenmenger described internal anal sphincterotomy for anal fissure treatment and was aware of the structure divided in the procedure. IAS is derived from the lower part of outer circular muscle layer of rectum. IAS covers the anal canal for the entire length. In the anal verge IAS can be palpated in the intersphincteric groove for sphincterotomy. EAS subcutaneous part is found to lie lateral to the groove. IAS is involuntary in action, this keeps the anal canal closed. EAS is striated muscle. EAS along with levator ani maintains the voluntary control of the anal canal. Even with complete transection of the IAS without affecting the significantly the faecal continence.

Technique

The classical operation of IAS sphincterotomy is done in the midline posteriorly. Key-hole deformity is encountered as the complication due to prolonged healing of wound, though it completely cures the disease. Duckworth and Lewis found out that there was an higher level for flaws and in controlling faeces with posterior midline sphincterotomy. There was a commendable cure rate with the midline posterior sphincterotomy but with associated significant morbidity.

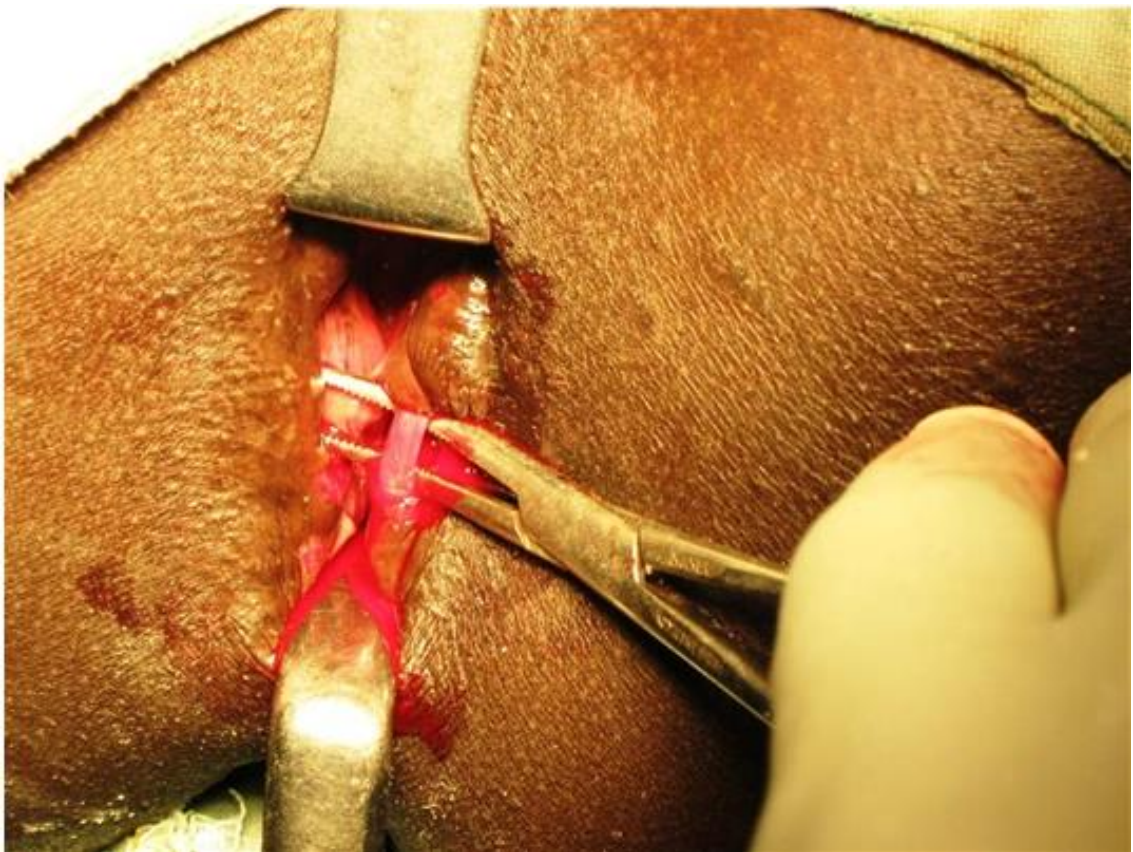


FIG 14. INTERNAL ANAL SPHICTER

Eisenmenger proposed the sphincterotomy to be positioned laterally, dividing half of the muscle in an open technique. In 1967, Notaras claimed the closed technique of internal anal sphincterotomy with the help of narrow bladed scalpel placed in the lateral position. In 76 patients managed, 6% of patients faecal soiling. Later the procedure was elaborated by Notaras by scalpel used for surgery in the eye. This technique consists of inserting a knife in the intersphincteric groove and placing an outward incision. Mucosal injury risk is reduced and serves as advantage though it is a blind technique, cutting without the knowledge of the depth at which the cut is placed, making EAS prone to injury during procedure.

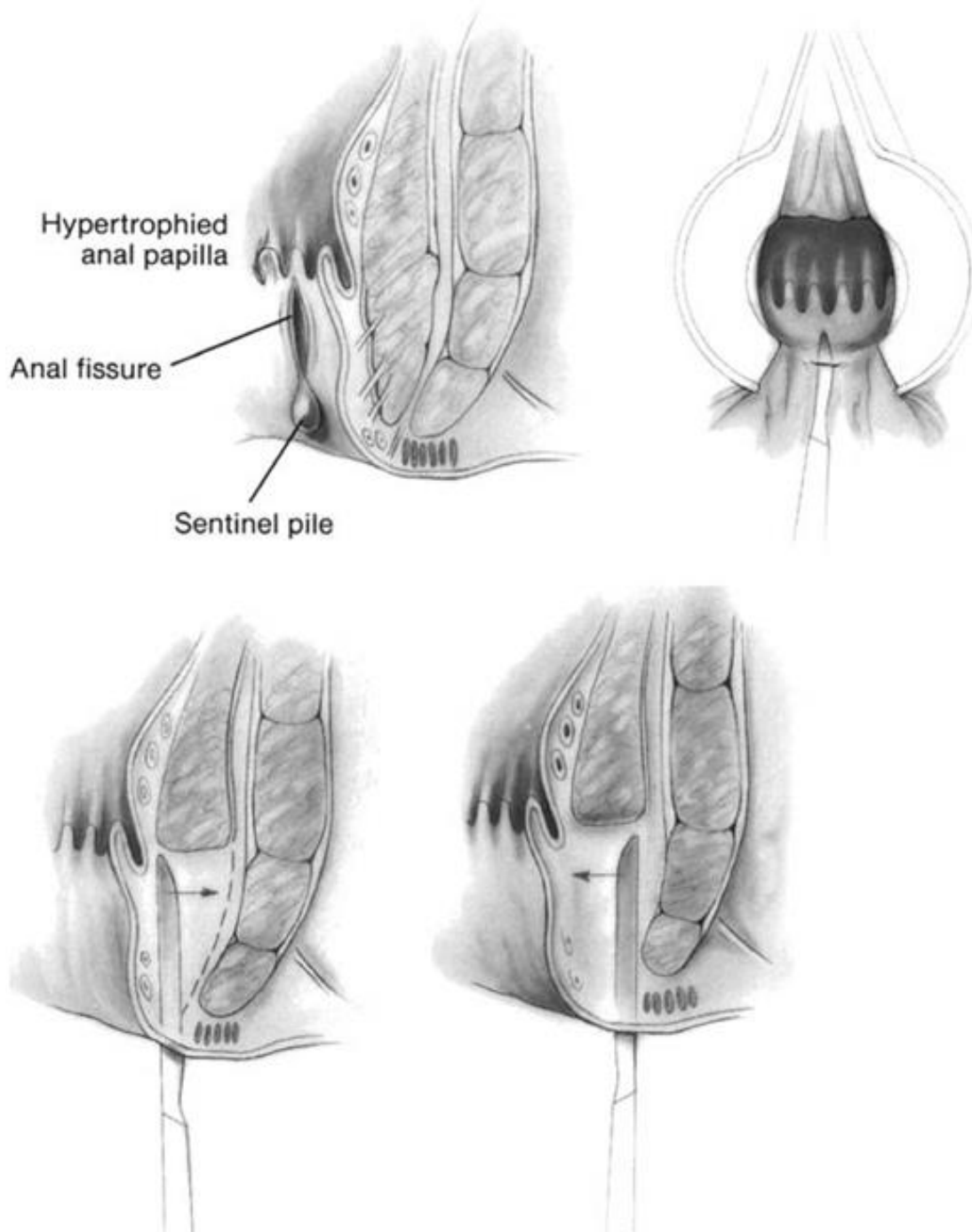


FIG 15. LATERAL INTERNAL ANAL SPHINCTEROTOMY BY NOTARAS

The surgery is done as day care surgery under local anaesthesia (e.g., 0.5% bupivacaine in 1:200,000 adrenaline) or as office procedure

using a short-acting general anaesthesia, sub arachnoid block or with conscious sedation. Patient is placed in lithotomy position using stirrups, Sim's or prone Jack-knife position and it depends on the surgeon's decision and the availability of the appropriate equipment. Females are better comfortable with the lithotomy stirrups and tolerant over this position. Male patients are commonly conscious about positioning and are restless with lithotomy position. It is better to do the procedure under anaesthesia cover always to avoid unwanted discomfort to both the patient and the operating surgeon.

When performed as office procedure local anaesthesia is the fissure is infiltrated around the fissure and also at the site of insertion of knife in the right or left lateral position. A Hill-Ferguson retractor is used to retract and visualise the anal canal. The knife is inserted in the intersphincteric groove after it is palpated in the left lateral aspect(commonly). Various instruments are used like 11 blade, fine scissors, hooked knife, but Beaver cataract blade is commonly used. A very small wound is created following usage of knife as the stiletto. Right lateral sphincterotomy is easily performed by a left dominant surgeon. By anatomical positioning of haemorrhoidal column, it is better to operate on the right lateral position due to the presence of haemorrhoid in anterior and posterior areas, but there is a disadvantage of right dominant surgeon to be operated in the back hand. All the above procedures are described to be performed in the lithotomy position.

With the tip of the blade medially angled, and the tip pointing just superior to the dentate line, and the lower part of IAS one-half is divided. As the procedure is done knife is visualised through the intact anal mucosa, by then it is withdrawn. Residual sphincter fibres are broken using the sides of fingers. If blunt dissection is done by the surgeon, there is a risk of tearing the mucosa producing bleeding, infection and development of fistula. Direct pressure for few minutes over the bleeding site from the wound if any is easily controlled. When a tag or papilla is found it is removed using scissors or cauterisation. No dressings are required, and the patient is discharged when alert.

Another method to undertake the surgery is without the use of a retractor in anal canal. The index finger used to feel the knife blade just inside the anal mucosa, and the finger dissection of residual IAS fibres is used in breaking. Another technique of the lateral internal anal sphincterotomy is by open method. This also can be done in OPD or in the hospital. Main disadvantage associated with this technique is it takes longer to perform and needs suturing. Most of the surgeons prefer this technique as it has direct visualisation of both the EAS and IAS before dividing them.

Procedure involves making a small, radial incision laterally, at the lower border of the IAS and extended into intersphincteric groove. Also, a curvilinear incision outside the anal verge is utilised. As this is associated with an open wound and a risk of bleeding, it is ideal to infiltrate the area with a

local anaesthetic containing adrenaline solution. The lower IAS is held with a atraumatic forceps and is isolated using blunt dissection with haemostasis in check. The lower one-third to one-half is cut with scissors. The wound is sutured with absorbable suture preferably chromic catgut, and dressing is applied.

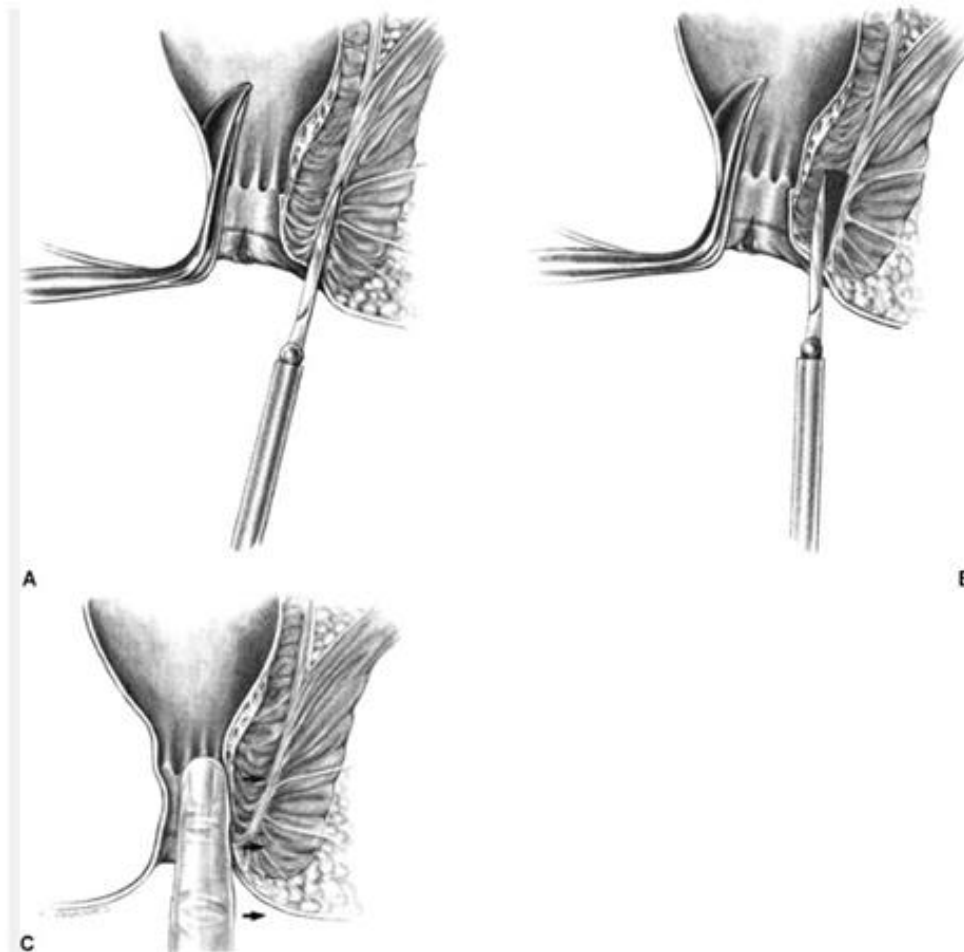


FIG 16. LATERAL INTERNAL ANAL SPHINCTEROTOMY USING THE CLOSED TECHNIQUE WITH RETRACTOR.

A: A knife is inserted through the intersphincteric groove

B: Lower IAS one third to one half of the is divided

C: The residual fibres are broke using finger.

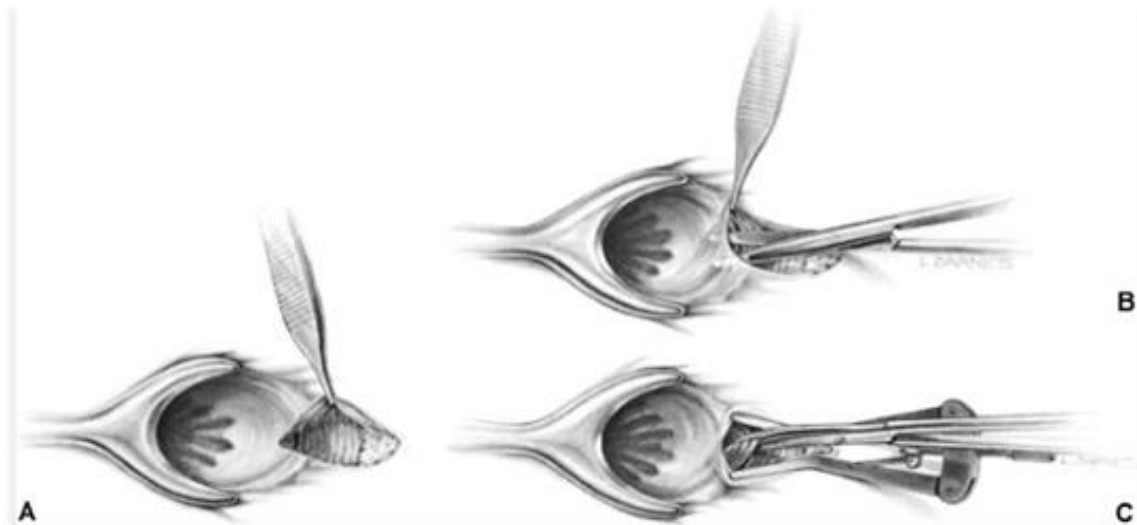


FIG 17. LATERAL INTERNAL ANAL SPHICTEROTOMY USING OPEN TECHNIQUE IN LATERAL OR JACKKNIFE POSITION

A: A radial incision is made across the intersphincteric groove. A narrow Hill-Ferguson retractor is used.

B: IAS is isolated from the anoderm by blunt dissection.

C: IAS is divided. The wound is closed or left open to heal.

Postoperative Care

Warm (sitz) baths are soothing and analgesics are advised in postoperative period. Pain experienced is usually milder than that of preoperative pain, and most patients return to their routine activities within 1-2 days.

Complications

Surgery for fissure in ano is accompanied by a number of complications, most of which are avoided by the use of appropriate surgical technique and of course, with the clear understanding of anorectal and perineal anatomy.

Ecchymosis is usually noticed in the entrance wound, when the closed technique is used, but it is of no significance. Hematoma is infrequent and commonly results from failure to apply adequate pressure to operative site. Similarly, haemorrhage is extremely rare with either the closed or open method, but with increased risk of occurrence with the open technique. Suture ligation is needed to secure haemostasis.

Perianal **abscess** is encountered in 2% of patients undergone closed technique of IAS sphincterotomy. These abscess usually pathogenesis into perianal fistula tract. It is advocated that this follows the inadvertent injury to the anal mucosa by the scalpel blade. This complication is not encountered commonly as chances of mucosal injury is very rare. Management involves incision and drainage of the abscess, tracing the fistula tract and proceeding with fistulotomy. Commonly these fistulas are low lying, submucosal or intersphincteric provided IAS is cut in the groove.

Complete faecal incontinence after a perfectly carried out IAS sphincterotomy is obsolete. But patients complain of flatus incontinence and soiling of clothes and is of more social significance in female patients due to their hygiene issues. Anand et al studied and reported that IAS sphincterotomy in females involved division of more of sphincter compared to men, and it is due to the shorter length of anal canal. Extra caution to be exercised in women with previous obstetric history of trauma, and women with ectopic anus.

Ramleela and co-workers studied the post-operative alterations in both anatomical and functional aspects following lateral sphincterotomy of IAS in 22 subjects with incontinence and 13 symptom free subjects. Conclusion was that incontinent patients revealed to have lengthier division of IAS compared to other subjects. Adding on there was also thinned out EAS in incontinent subjects, exposing the preoperative defect in the anal canal that resulted in faecal incontinence which became evident following IAS division in lateral sphincterotomy. David et al conducted a prospective serial study of patients with the use of calibrator maximally up to 3cm diameter to localise the sphincterotomy to fissure region, this resulted in faster relief of pain and improved healing and decreased incidence of incontinence.

Posterior midline IAS sphincterotomy along with excision of fissure leads to Key-hole deformity which is problematic complication associated with the above procedure. This defect is associated with mucus discharge, itching, oedema, staining of clothes.

Lateral IAS anal sphincterotomy is the preferred procedure for uncomplicated fissure in ano and posterior midline sphincterotomy with fissure excision should be avoided to prevent Key-hole deformity. Deformity is managed conservatively with bowel habit modification programs and perineal hygiene maintenance methods, resistant deformities are corrected with surgical procedure, an anoplasty.

Infection: The commonly encountered complication following sphincterotomy is infection and subsequent fistula formation in one half of patients undergoing surgical treatment for fissure. This predisposes the patient to incontinence of anal canal and repeated occurrence of fissure or resistant fissure.

Incontinence: True/ Total incontinence of anal canal (i.e., the total loss of bowel control) must not be encountered after a sphincterotomy surgery, as the IAS serves only as a small part among the factors involved in the maintenance of anal continence. Contrary to fact stated above there is no relationship between the length for which sphincterotomy is performed and the incidence of incontinence in patients. Debakey and Notoras who first described the lateral sphincterotomy reported that out of 94 patients observed following the IAS lateral sphincterotomy, 7 had staining of clothes, 5 suffered from flatus incontinence and 3 suffered from faecal staining of clothes.

Recurrence: Success of the procedure is measured with the number of patients experiencing delay in the process of fissure healing or repeated occurrence. Reappearance of the fissure or poor healing indicates failure of treatment.

Persistent fissure in ano following conservative management are treated with re-do sphincterotomy. In this procedure there is more lenient division of IAS fibres and remains the procedure of choice for persistent fissure in ano. Delay in healing of fissure following sphincterotomy must alert the surgeon to investigate the patient with thorough study of the whole alimentary tract to look out for co-existing other pathological conditions affecting the GI tract, like inflammatory bowel disease (Crohn's or Ulcerative colitis) .

Open versus Closed

Johnny and his associates proposed after prospectively studying patients subjected to lateral internal anal sphincterotomy for anal fissure and consequent stenosis in more than four hundred patients. Sphincterotomy is usually done at the discretion of operating surgeon following various available techniques (open, closed, multiple) and procedure is also being performed under different situations, so it is injustice to compare and interpret the results. After extensive analysis of results, it is clear that closed technique of IAS lateral sphincterotomy is associated with lowest rate of complications (15%) and majority of patients with complications were from the open technique of sphincterotomy (45%). Fistula in ano was seen in five patients (1.5%). Through the whole pool of patients, 20% complained of different symptoms following sphincterotomy, and with very stringent factors regarding the evaluation of morbidity, minor complications was reported in 32%.

DERMAL FLAP COVERAGE OF THE FISSURE

Patients undergoing sphincterotomy is given an additional procedure of fissure excision and is subsequently covered with mucosal or dermal advancement flap.

Advancement flaps:

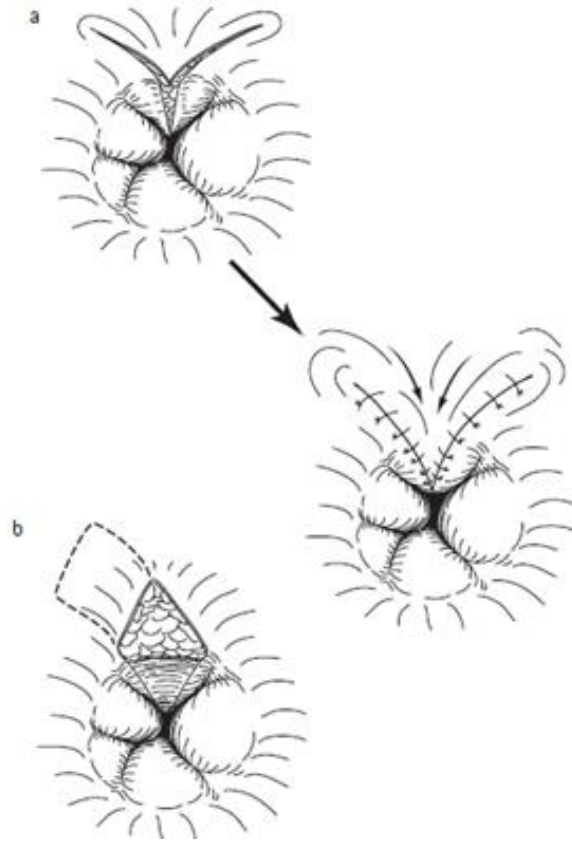


FIG 18. Y-V ANAL ADVANCEMENT FLAP

(a) **Y-V** advancement flap in anal canal is an easy surgery for treatment of anal canal stenosis. **Y** incision is made at the anterior anal verge and is closed in **V fashion**, mobilising healthy tissue into the pathological anus.

(b) Fissure in ano chronic type is excised and a flap from local region consisting of healthy perianal skin and subcutaneous tissue is mobilised over the defect to cover it. A diamond shaped defect is created following excision of fissure. The margins of the defect is marked.

The flap will be a pedicle flap with blood supply from the donor site. The defect due to flap mobilisation is left to heal by secondary intention or suture closed.

A chronic fissure in ano which is resistant to treatment may present with variable degree of continence impairment or found to have EAS injury induced by delivery associated damage is managed by fissure excision, preservation of IAS integrity with diamond shaped anal advancement flap to mobilise healthy, well-vascularised tissue for covering the fissure bed.

Fissures in association with IBD (Crohn's disease) are often multiple, atypical, and away from the midline. As a rule, surgical management must be avoided. Other causes of chronic ulcer affecting anal canal like carcinoma anal canal, secondary to cytomegalovirus (CMV) or bacterial infection. When in doubt the patient must be examined under anaesthesia thoroughly and look out for infections and a biopsy must be taken.

A recent analysis of patients showed that maximal anal dilation resulted in higher rate of fissure persistence than sphincterotomy. Anal guarded retractors and catheters with dilating balloon tips are utilised for anal dilation in fissure treatment. With modern devices, controlled dilation of anal canal produces equally effective results as compared to IAS sphincterotomy. But it should be discouraged as there is no standard guidelines for the procedure also there is risk of injury to both IAS and EAS in irregular fragments leading to incontinence ranging from 10% to 20% affecting the patients with incomplete cure of the disease.

MATERIALS AND METHODS

This study is based on analysis of 100 patients with fissure in ano who underwent treatment in Govt. Stanley Medical College hospital, Chennai, from August 2018 to August 2019.

These patients were divided broadly into two groups of 50 patients each, they were subjected to medical and surgical treatments. For all patients in the study basic investigations and clinical examination were done following standard guidelines, investigations consisting of blood for random sugar, renal function test and ECG. Chest X-ray mandatory for all cases.

Patients placed into medical management group were treated with 2% diltiazem gel applied topically over the perianal region bi-daily for 4 weeks. They were also advised diet high in fibre content, proper hydration and antibiotics tablet Ciprofloxacin 500 mg BD and Tablet Metronidazole 500mg TDS for 5 days. All patients were advised sitz bath bi-daily.

Patients placed under surgical management group were subjected to treatment with open lateral anal sphincterotomy. Post operatively they were advised bi-daily sitz bath along with diet high in fibre content and proper hydration and antibiotics for 5 days (tablet Ciprofloxacin 500 mg BD and Tablet Metronidazole 500mg TDS).

Anticipated complications were observed for in patients. Discharged from the hospital on the 5th post-operative day, patients advised to review in OPD on weekly basis for a period of 1 month. discharged on 5th day.

PRE-OPERATIVE INSTRUCTIONS

1. Informed written consent obtained.
2. Routine basic investigations
3. NPO from 03.00 pm of previous day
4. IV fluids
4. Inj Tetanus toxide 0.5 cc IM
5. Inj Lignocaine test dose
6. Pre-operative antibiotic prophylaxis with Inj Cefotaxime 1g IV after test dose
7. T.Dulcolex 2 HS
8. T.Diazepam 5mg HS as anxiolytic
9. Preparation of perineum, abdomen and back.
10. Soap water enema on 8 pm of previous day and 6 am on the day of surgery.

ANALYSIS AND RESULTS

This study is based on the analysis of 100 patients who were treated for Chronic Fissure in Ano in Govt. Stanley Medical College hospital, Chennai from August 2018 to August 2019.

AGE AND SEX DISTRIBUTION

The age and sex distribution of these 100 patients are shown in the table 1.

Out of these, 67 were male and 33 were female.

Male to female ratio is approximately 2:1.

Lowest age of patients in study - 16.

Highest age of patient in study- 62 years.

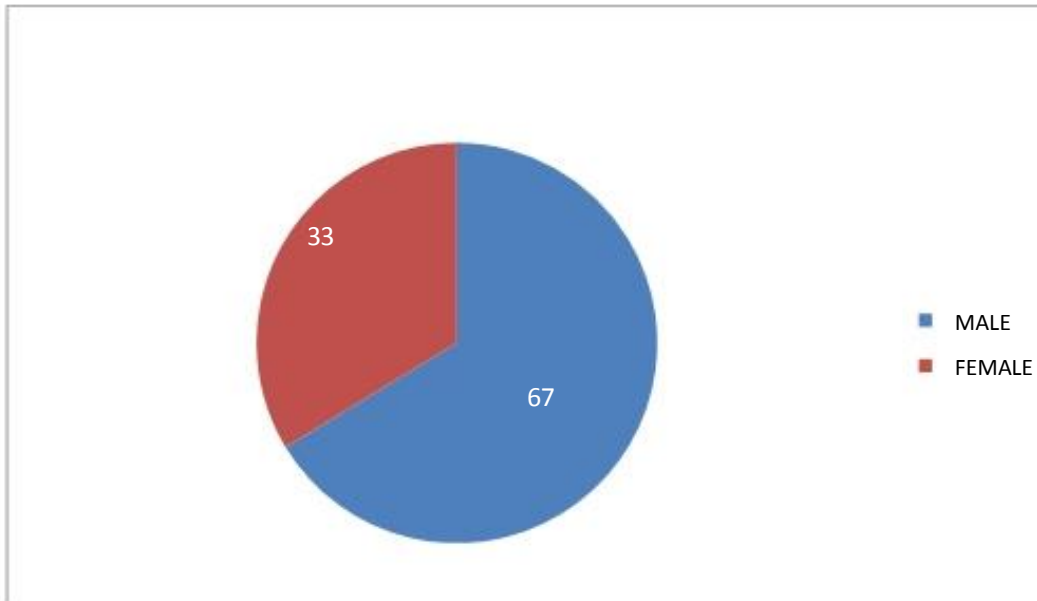
The maximum numbers of patients are in the age group of 41-50years.

TABLE 1

AGE AND SEX DISTRIBUTION

AGE GROUP	MALES	FEAMLES	TOTAL	%
11-20	4	2	6	7.7
21-30	14	6	20	19.2
31-40	15	10	25	24
41-50	25	10	35	36.5
51-60	5	4	9	7.7
>60	3	2	5	4.8

SEX DISTRIBUTION



SYMPTOMATOLOGY

The symptomatology of these patients are shown in the table.
 Most of the patients experienced pain during defecation and bleeding per rectum during defecation. Other symptoms were swelling in the perianal region and urinary retention.

TABLE 2
SYMPTOMATOLOGY

SYMPTOM	NO. OF CASES	%
Pain during defecation	90	89.3
Bleeding per rectum	4	3.8
Both	4	4.8
Swelling	2	1.9

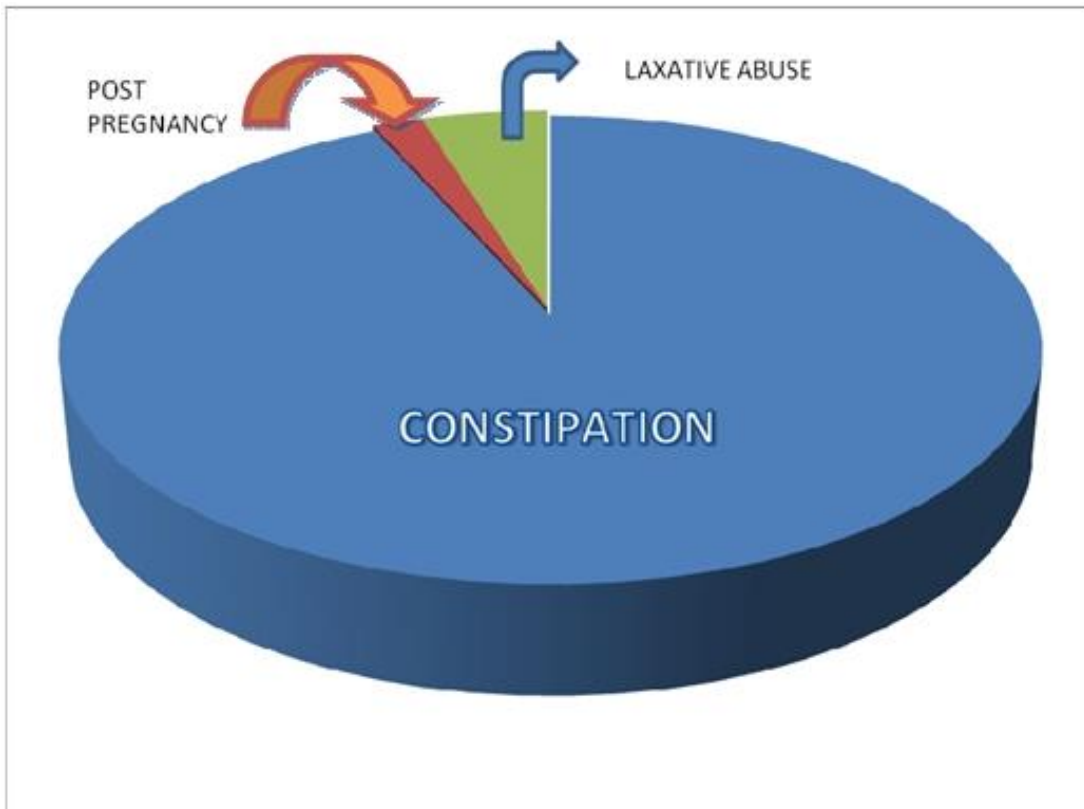
PREDISPOSING FACTORS AND AETIOLOGY

Constipation was found to be the major predisposing factor among patients.

TABLE 3

AETIOLOGY AND PREDISPOSING FACTORS

AETIOLOGY	NO. OF CASES	PERCENTAGE
Constipation	93	92.2
Post pregnancy	3	2.9
Laxative abuse	4	3.8



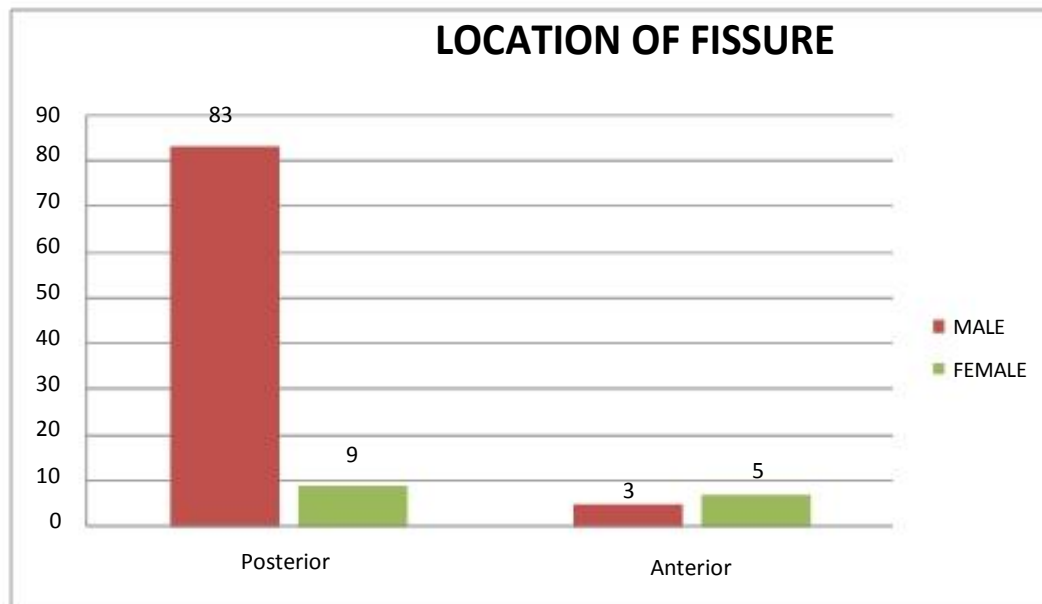
LOCATION OF FISSURE

Fissure in the posterior location seems to be the most commonly encountered position of fissure in anal canal after digital rectal examination.

Anteriorly placed fissure were found in few subjects and it was more common female subjects. Lateral fissure present in few patients, the details are shown in the table.

TABLE 4
LOCATION OF FISSURE

LOCATION	TOTAL	MALE	FEMALE
Posterior	92	83	9
Anterior	8	3	5



ASSOCIATED FACTORS

As discussed earlier chronic fissure are associated with sentinel skin tag and hypertrophied anal papilla in superior and inferior aspects of fissure.

TABLE 5
ASSOCIATED FACTORS

ASSOCIATED FACTORS	NO. OF CASES	PERCENTAGE
Sentinel skin tag	92	92.3
Hypertrophied papilla	8	7.6

MANAGEMENT

MEDICAL

50 patients out of 100 were subjected to medical and conservative management. All patients were advised diet high in fibre content and proper hydration and antibiotics per orally.

All patients were administered with 2% Diltiazem gel bi-daily topically after sitz bath for 4 weeks duration.

All patients were followed up on weekly basis in OPD for 4 weeks.

Results were assessed based on the pain relief and fissure healing. 36 out of 50 patients had relief of symptoms, which constitutes about 70% of patients who were managed with medical treatment.

Other patients suffered from pain persistence and consequences like headache.

TABLE 6

	NO. OF PATIENTS	MALE	FEMALE	PERCENTAGE
RELIEF OF SYMPTOMS	36	26	10	70
FAILURE	14	11	3	27

COMPLICATIONS OF MEDICAL MANAGEMENT

14 of the 50 patients suffered from pain persistence and 10 patients suffered from headache as the complication of Diltiazem gel application, while few others encountered perianal itching.

These 14 patients with resistant fissure needed surgical intervention due to failure of medical treatment.

SURGICAL MANAGEMENT

50 patients out of 100 were subjected to surgical treatment. All patients treated with open lateral anal sphincterotomy performed under regional anaesthesia.

Duration of surgery on an average performed for about thirty minutes.

44 out of 50 patients had relief of pain and healing of fissure, which corresponds to 89.5%. Some of the patients had complications as follows.

TABLE 7

	NO. OF PATIENTS	MALE	FFEMALE	PERCENTAGE
RELIEF OF SYMPTOMS	44	34	12	89.5
NO RELIEF	6	6	0	11.1

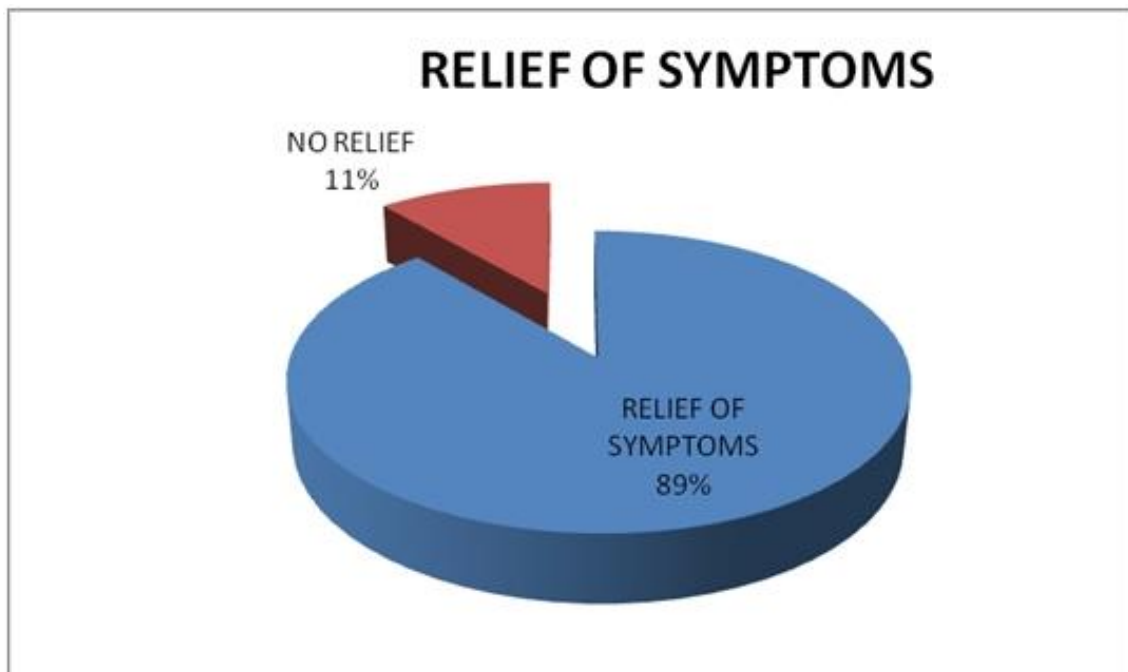


TABLE 8
COMPLICATIONS OF SURGERY

COMPLICATIONS	NO. OF PATIENTS
PAIN	7
SEROMA	2
HEMATOMA	1
INFECTION	2
PERIANAL ABSCESS	1
FISTULA	NIL
INCONTINENCE	NIL

Most of the complications following surgical treatment resolved by two weeks and patient were symptom free and without any morbidity.

SUMMARY

1. During the period of study (August 2018 - August 2019), 100 patients were studied.
2. These patients were broadly segregated into a group of 50 each who were treated by medical and surgical methods respectively by non-randomised control study.
3. During the study, males were found to be commonly affected compared to females.
4. The most common age group were 41-50yrs.
5. Fissure in ano is rare in children and old age
6. Most common symptom of the patients was pain during defecation.
7. Constipation was the major predisposing factor among all cases.
8. Posterior midline was the most common location of fissure.
9. Sentinel skin tag and hypertrophied anal papilla were found in almost all chronic fissure in ano patients
10. Anterior fissures found to more common among female patients.
11. No patients studied suffered from inflammatory bowel disease.
12. Patients subjected to surgical intervention by means of open partial lateral anal sphincterotomy were observed to have better relief of symptoms.

13. Around 29% patients treated medically by 2% DTZ had no relief of symptoms after one month of treatment and discontinued medical treatment also requiring conversion to surgical intervention.
14. Complication of Diltiazem is headache and was encountered in most of patients.
15. Patients treated with surgery had very less complications in the post-operative period and they resolved by two weeks.
16. Pain was the very common post-operative complication of lateral anal sphincterotomy. It was encountered by about 10% of the patients subjected to IAS sphincterotomy surgery.

CONCLUSION

This prospective study was performed in the Department of General Surgery, Stanley Medical College. Following the study, it can be concluded that most of the acute fissure in ano heal with conservative management. Fissures that become chronic might respond to conservative management Diltiazem 2% topical gel application. Persistent fissures and symptomatic patients should be considered for lateral anal partial internal sphincterotomy. So, in chronic anal fissure 2% Diltiazem gel application can be considered as an initial line of management.

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treatment of patients with chronic and fissure.

PROFORMA

Name:

Address:

Age/sex:

O.P. No:

I.P. No:

D.O.A:

D.O.S:

D.O.D:

CHIEF COMPLAINTS:

1. Pain : Duration:

2. Bleeding per rectum : Present/ Absent Duration:

3. Constipation : Present/ Absent Duration:

HISTORY OF PRESENTING ILLNESS:

1. Pain : Duration

Relation to defecation : Before/ After

Character of pain :

2. Discharge : Present/ Absent Duration:

Nature : Bloody/ Mucous

3. Bleeding per rectum : Present/ Absent

Relation to defecation: Before ()

During ()

After ()

Type of bleeding : Spurting ()

Linear streak ()

Droplet ()

4. Pruritis : Present/ Absent

5. Bowel habits : Regular/ Irregular

Habitual constipation : Present/ Absent

Nature of stools : Hard () Soft () Semisolid ()

Strain factor : Yes/ No

6. Laxative abuse: Yes/ No

PAST HISTORY:

1. Anal fissure and treatment : Yes/ No

2. Underwent surgery for fissure earlier? : Yes/ No

3. Perianal abscess : Present/ Absent

4. Tuberculosis : Present/ Absent

5. Crohn's disease : Present/ Absent
6. Ulcerative colitis : Present/ Absent
7. Treatment with herbal medicine (topical) : Present/ Absent
8. Parturition : Present/ Absent

No. of deliveries _____

FAMILY HISTORY

1. History of tuberculosis : Present/Absent
2. History of ulcerative colitis : Present/Absent
3. History of Crohn's disease : Present/Absent

PERSONAL HISTORY:

1. Diet : High fibre diet/Low fibre diet :
2. Intake of fluid Adequate/ Inadequate
(2-4 litres)/ (1-2 litres)
3. Alcoholic : Yes/No
4. Bowel habits : Regular/ Irregular
5. Pregnancy : Normal labour/ Difficult labour

GENERAL PHYSICAL EXAMINATION:

1. Nourishment : Good/ Poor
2. Anaemia : Present/ Absent
3. Jaundice/ Cyanosis/ Clubbing/ Oedema:

Vitals: PR :

BP :

RR :

Temperature:

Weight : () kg

LOCAL EXAMINATION:

A. Per rectal examination

1. Position of the patient: Left lateral position/ Lithotomy position

2. Inspection: Sphincter spasm : Present/ Absent

Site of fissure : Anterior/ Posterior/ Both

Number of fissure : ()

Sentinel pile : Present/ Absent

Hypertrophied papilla : Present/ Absent

Nature of discharge from ulcer: purulent ()

mucopurulent ()

blood stained ()

3. Palpation:

Fissure : Indurated/ Non- indurated

Tenderness : Present/ Absent

SYSTEMIC EXAMINATION: Inspection/ Palpation/ Percussion/
Auscultation.

1. Respiratory System:

2. Per Abdomen:

3. Cardiovascular System:

4. Central Nervous System:

INVESTIGATIONS:

1. Complete hemogram

2. Fasting and postprandial blood sugar, urea and creatinine

3. Urine examination

4. Bleeding time, Clotting time

5. ECG

6. HIV, HbSAg

7. Chest X ray

PROVISIONAL DIAGNOSIS:

FINAL DIAGNOSIS:

TREATMENT:

Medical line of management/ Surgical line of management:

I. Medical line of management:

1. 2% Diltiazem gel for local application
2. High fibre diet
3. Plenty of oral fluids
4. Laxatives

Adverse effects:

Headache : Present/ Absent

Local irritation : Present/ Absent

Pain : Present/ Absent

Healing of fissure : Present/ Absent

II. Surgical line of management:

PROCEDURE :

ANAESTHESIA :

METHOD :

OPERATIVE NOTES:

Adverse effects: Bleed per rectum : Present/ Absent

Infection : Present/ Absent

Pain : Present/ Absent

Seroma : Present/ Absent

Hematoma : Present/ Absent

Abscess : Present/ Absent

Incontinence(flatus/feces) : Present/ Absent

Healing of fissure -

LATERAL ANAL SPHINCTEROTOMY GROUP

SL NO	NAME	AGE	SEX	PAIN	BLEEDING	BOTH	CONSTIPATI ON	LAXATIVE ABUSE	FISSURE POSITION	SKIN TAG	HYPERTROP HIED PAPILLA	PAIN RELIEF	POST SURGERY COMPLICATIONS				REMARKS
													PAIN	SEROMA	HEMATOMA	INFECTION	
1	Suryan	24	M	NO	YES	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
2	Preethika	33	F	YES	NO	NO	YES	NO	ANTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
3	Priya	14	F	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
4	Muniyappan	23	M	YES	NO	NO	NO	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
5	Shriram	26	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
6	Shruthi	24	F	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
7	Ilayaraja	29	M			YES	YES	NO	POSTERIOR	PRESENT	ABSENT	NO	YES	YES	YES	NO	
8	Sibi	26	M	YES	NO	NO	YES	NO	POSTERIOR	ABSENT	PRESENT	YES	NO	NO	NO	NO	
9	Jalaludeen	26	F	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
10	Jebbaraj	37	M	YES	NO	NO	YES	YES	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
11	Anitha	35	F	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
12	Nagesh	36	M	YES	NO	NO	YES	NO	POSTERIOR	ABSENT	PRESENT	YES	NO	NO	NO	NO	
13	Dhamotharan	45	M	NO	YES	NO	NO	NO	ANTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
14	Maha	16	F	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	YES	NO	NO	
15	Krishna	18	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	NO	YES	YES	YES	YES	
16	Kalai	28	F	YES	NO	NO	YES	YES	ANTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	POST PREGNANCY
17	Manoj	26	M	YES	NO	NO	YES	NO	POSTERIOR	ABSENT	PRESENT	YES	NO	NO	NO	NO	
18	David	28	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
19	Kuppan	36	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
20	Sabitha	42	F	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
21	Rajakuamr	35	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	YES	NO	NO	NO	
22	Priyanga	37	F	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
23	Ravi	46	M			YES	YES	NO	ANTERIOR	ABSENT	PRESENT	NO	YES	NO	NO	NO	
24	Neelavathi	62	F	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	YES	NO	NO	
25	Teja	38	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
26	Ram	21	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	

DTZ GROUP

SL NO	NAME	AGE	SEX	PAIN	BLEEDING	BOTH	CONSTIPATION	LAXATIVE ABUSE	FISSURE POSITION	SKIN TAG	HYPERTROPHIED PAPILLA	POST SURGERY COMPLICATIONS			REMARKS
												PAIN RELIEF	PERSISTENT PAIN	HEADACHE	
01	Balaji	24	M			YES	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	
02	Arokiamary	60	F	YES	NO	NO	YES	NO	ANTERIOR	PRESENT	ABSENT	YES	NO	NO	
03	Gunasekaran	50	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	
04	Lakshmi	36	F	YES	NO	NO	NO	NO	POSTERIOR	ABSENT	PRESENT	NO	YES	NO	
05	Vadivel	28	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	NO	NO	YES	
06	Aandal	38	F	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	
07	Vishwanathan	36	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	
08	Rangasamy	55	M	YES	NO	NO	YES	NO	ANTERIOR	PRESENT	ABSENT	NO	YES	YES	
09	Mahesh	29	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	
10	Sengamalam	60	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	NO	YES	NO	
11	Vinoth	26	M	YES	NO	NO	YES	NO	POSTERIOR	ABSENT	PRESENT	YES	NO	NO	
12	Rajammal	60	F	YES	NO	NO	YES	NO	ANTERIOR	PRESENT	ABSENT	YES	NO	NO	
13	Sakthivel	43	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	
14	Rajendran	38	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	NO	YES	NO	
15	Rajavel	37	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	YES	
16	Subramanian	52	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	NO	YES	NO	
17	Kathiresan	62	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	
18	Lakshmanan	46	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	YES	
19	Sridhar	45	M	NO	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	
20	Rajayya	43	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	
21	Subbu	42	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	YES	
22	Palaniyappan	44	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	
23	Prasanth	32	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	

