A DISSERTATION ON

"COMPARISION BETWEEN TOPICAL GLYCERYL TRINITRATE AND LATERAL ANAL SPHINCTEROTOMY IN TREATMENT OF CHRONIC FISSURE IN ANO "

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CERTIFICATE

This is to certify that the dissertation entitled ""**"COMPARISION BETWEEN TOPICAL GLYCERYL TRINITRATE AND LATERAL ANAL SPHINCTEROTOMY IN TREATMENT OF CHRONIC FISSURE IN ANO "** is a bonafide original work of **Dr. M.M.PRASANTH** 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 APRIL 2016 under my guidance and supervision in 2014-2015

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DECLARATION

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TRODUCTION

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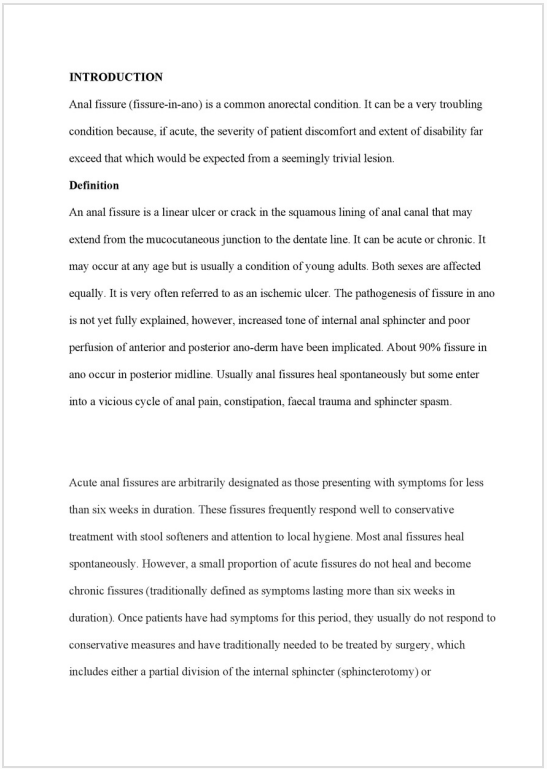

INTRODUCTION

Anal fissure (fissure-in-ano) is a common anorectal condition. It can be a very troubling condition because, if acute, the severity of patient discomfort and extent of disability far exceed that which would be expected from a seemingly trivial lesion.

Definition

An anal fissure is a linear ulcer or crack in the squamous lining of anal canal that may extend from the mucocutaneous junction to the dentate line. It can be acute or chronic. It may occur at any age but is usually a condition of young adults. Both sexes are affected equally. It is very often referred to as an ischemic ulcer. The pathogenesis of fissure in ano is not yet fully explained, however, increased tone of internal anal sphincter and poor perfusion of anterior and posterior ano-derm have been implicated. About 90% fissure in ano occur in posterior midline. Usually anal fissures heal spontaneously but some enter into a vicious cycle of anal pain, constipation, faecal trauma and sphincter spasm.

Acute anal fissures are arbitrarily designated as those presenting with symptoms for less than six weeks in duration. These fissures frequently respond well to conservative treatment with stool softeners and attention to 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 measures and have traditionally needed to be treated by surgery, which includes either a partial division of the internal sphincter (sphincterotomy) or

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CONTENTS

INTRODUCTION

Anal fissure (fissure-in-ano) is a common anorectal condition. It can be a very troubling condition because, if acute, the severity of patient discomfort and extent of disability far exceed that which would be expected from a seemingly trivial lesion.

Acute anal fissures frequently respond well to conservative treatment with stool softeners and attention to 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 measures and have traditionally needed to be treated by surgery, which includes either a partial division of the internal sphincter (sphincterotomy) or manual dilatation of the anus. Surgical treatment for this condition has been associated with the side-effect 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, glyceryl trinitrate (GTN) ointment is emerging as first line of treatment as it breaks the vicious cycle and relaxes the sphincter and promote the healing of chronic anal fissures. These agents cause transient relaxation of the internal anal sphincter by inducing the release of exogenous nitric oxide to the muscle tissue.

This treatment is sometimes termed a “chemical sphincterotomy,” and it is not accompanied by the risk of irreversible incontinence. The major side effect of topical GTN therapy for anal fissures is that up to 40% of patients using this treatment experience headaches. On the other hand, topical modality takes longer duration for the healing of fissure and causes headache.

Due to our social traditions and taboos, patients especially ladies do not readily accept the surgical treatment and ultimately suffer for a long time. This study was to compare between topical glyceryl trinitrate and lateral anal sphicterotomy in treatment of chronic anal fissure.

AIM OF THE STUDY

Though fissure in ano is a very old entity controversies exist in the management of fissure in ano**.**

The purpose of this study is to

- To study the etiology and predisposing factors
- Age and sex incidence
- Clinical presentation
- Position of fissure
- Associated features
- Comparative study of topical GTN (0.2%) 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 efficacy of GTN was studied. Lund and Scholefield randomized 80 consecutive patients to receive treatments with topical 0.2% GTN ointment or a placebo. There were no significant differences observed in fissure healing among any of the treatment groups, but those who received 0.4% (1.5 mg) GTN ointment had a statistically significant decrease in pain intensity. The primary side effect was headache.

Pitt and colleagues treated 1998 patients with 0.2% GTN ointment. They found that the presence of a sentinel pile adversely affected the outcome. To put it another way, the longer the fissure is present, the less likely GTN will be helpful.

Others have opined that GTN (0.2%), on the basis of their randomized, placebo-controlled, double-blind trial, fails to demonstrate any advantage despite demonstrable increased anal canal blood flow and reduced anal pressures. A similar study was conducted by Haseem Ahmed and Tariq Islam in D.H.Q Allied hospital, Faisalabad from November 2001 to October 2003 whose study also showed that topical GTN ointment for the treatment took longer duration and less effective in the healing of fissure in ano compared with Lateral anal sphincterotomy. Topical GTN produced headache in most of the patients.

Table showing impaired anal continence after lateral anal spincterotomy

S				Impaired Anal Continence, %		
Authors, Year	**No. of Patients**	**Healed, %**	**Recurrence/Persistence, %**	***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 is formed by the rectum and anal canal. Useful components of the food are absorbed and waste material is expelled from the anus, which is the external opening of the anal canal seen in the perineum. Anal canal is heavily guarded by the sphincters and it subjected to many maladies. Balanced food at proper time decreases these maladies.

Upper 15mm develops from the primitive anorectal canal. Lined by simple columnar epithelium.

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

Non continuity of the two parts results in imperforate anus.

Situation:

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

Location and Description

Length, Extent and Direction

The anal canal is 3.8 cm long. It extends from the anorectal junction to the anus. It is directed downwards and backwards. The anal canal is surrounded by inner involuntary and outer voluntary sphincters which keep the lumen closed in the form of an anteroposterior slit.

The anorectal junction is marked by the forward convexity of the perineal flexure of the rectum and lies 2—3 cm in front of and slightly below the tip of the coccyx. Here the ampulla of the rectum suddenly narrows and pierces the pelvic diaphragm. In males it corresponds to the level of the apex of the prostate. The anus is the surface opening of the anal canal, situated about 4 cm below and in front of the tip of the coccyx in the cleft between the two buttocks. The surrounding skin is pigmented and thrown into radiating folds, and contains a ring of large apocrine glands.

RELATIONS OF THE ANAL CANAL

Anteriorly

1 In both sexes: Perineal body.

2 In males: Membranous urethra and bulb of penis.

3 In females: Lower end of the vagina

Posteriorly

1 Anococcygeal ligament.

2 Tip of the coccyx

Laterally: Ischioanal fossae

All-round: Anal canal is surrounded by the sphincter muscles, the tone of which keeps the canal closed.

Anatomical anal canal

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

Surgical anal canal

It is the portion of anal canal from anal verge to the ano rectal ring.

Structure

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

INTERIOR OF THE ANAL CANAL

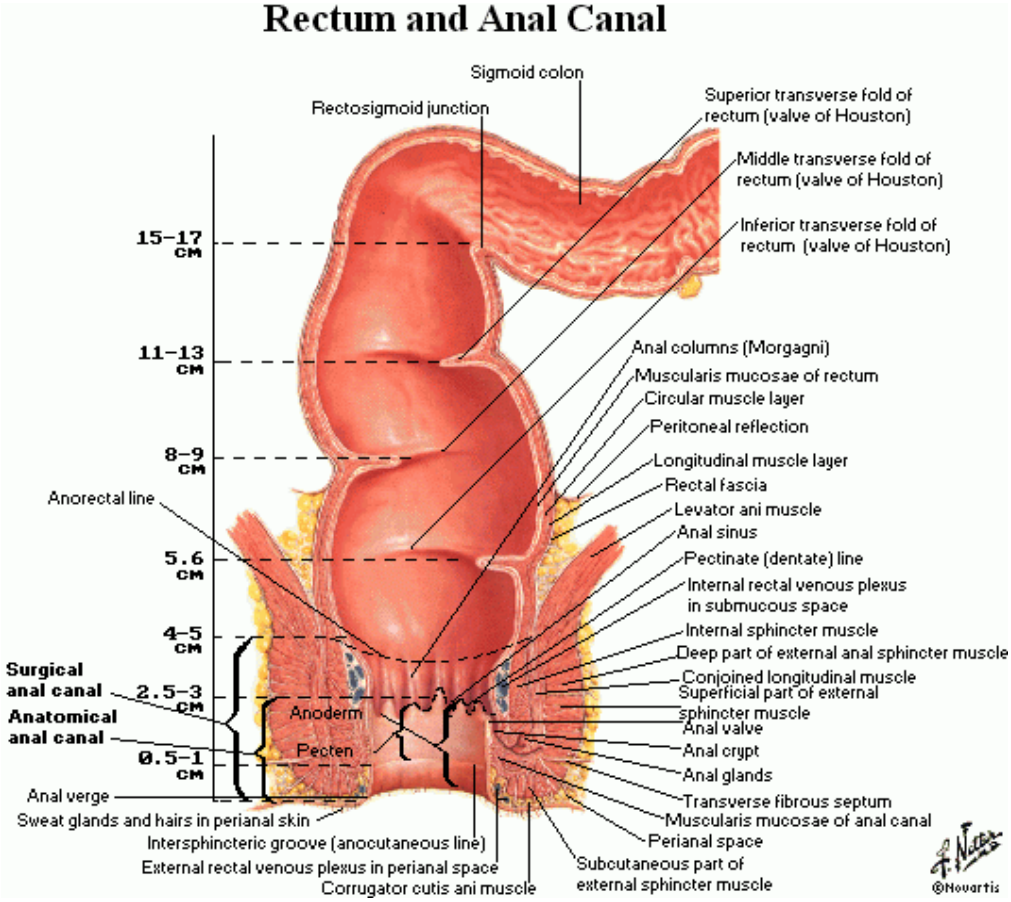


FIG 1. INTERIOR OF THE ANAL CANAL

The interior of the anal canal shows many important features and can be divided into three parts: the upper part about 15 mm long; the middle part about 15 mm long; and the lower part about 8 mm long. Each part is lined by a characteristic epithelium and reacts differently to various diseases of this region .

Upper Mucous Part

1. This part is about 15 mm long. It is lined by mucous membrane, and is of endodermal origin.

2. The mucous membrane shows:

   a. 6 to 10 vertical folds; these folds are called the anal columns of Morgagni.
   b. The lower ends of the anal columns are united to each other by short transverse folds of mucous membrane; these folds are called the anal valves.
   c. Above each valve there is a depression in the mucosa which is called the anal sinus.

The anal valves together form a transverse line that runs all-round the anal canal, This is the pectinate line. It is situated opposite the middle of internal anal sphincter, the junction of ectodermal and endodermal parts. Occasionally the anal valves show epithelial projections called anal papillae. These papillae are remnants of the embryonic anal membrane .

The anal sinus contains anal glands. The secretion of these glands produce peculiar small which is important in lower animals to attract.

Middle Part or Transitional Zone or Pecten

1. The next 15 mm or so of the anal canal is also lined by mucous membrane, but anal columns are not present here. The mucosa has a bluish appearance because of a dense venous plexus that lies between it

and the muscle coat. The mucosa is less mobile than in the upper part of the anal canal. This region is referred to as the pecten or transitional zone. The lower limit of the pecten often has a whitish appearance because of which it is referred to as the white tine of Hilton. Hilton's line is situated at the level of the interval between the subcutaneous part of external anal sphincter and the lower border of internal 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 8 mm long and is lined by true skin containing sebaceous glands. The epithelium of the lowest part resembles that of pigmented skin in which sebaceous glands, sweat glands and hair are present.

a. MUSCULATURE OF THE ANAL CANAL

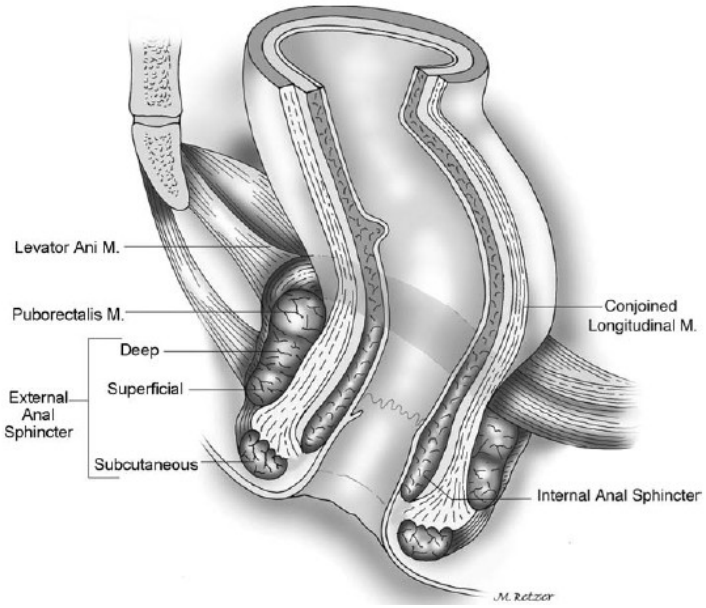


FIG 2. MUSCULATURE OF ANAL CANAL

Anal Sphincters: The internal anal sphincter is involuntary in nature. It is formed by the thickened circular muscle coat of this part of the gut. It surrounds the upper three-fourths, i.e. 30 mm of the anal canal extending from the upper end of the canal to the white line of Hilton.

The external anal sphincter is under voluntary control. It is made up of a striated muscle and is supplied by the inferior rectal nerve and the perineal branch of the fourth sacral nerve. It surrounds the whole length of the anal canal and has three parts, subcutaneous, superficial and deep.

Contrary to earlier view, the external anal sphincter . forms a single functional and anatomic entity. Uppermost fibres blend with fibres of puborectalis. Anteriorly some fibres decussate with superficial transverse perinei muscle and posterior fibres get attached to anococcygeal raphe

Middle fibres surround lower part of internal anal sphincter. These are attached to perineal body anteriorly and to coccyx via anococcygeal ligament posteriorly. Some fibres of each side decussate to form a commissure in the midline,

Lower fibres lie below the level of internal anal sphincter and are separated from anal epithelium by sub mucosa.

In males transverse perinei and bulbospongiosus end in central point of perineum, so that there is a surgical plane of cleavage between urogenital triangle and anal canal.

In females, the puborectalis is separate from external anal sphincter. Its anterior portion is thinner and shorter .

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

Conjoint Longitudinal Coat

It is formed by fusion of the puborectalis with the longitudinal muscle coat of the rectum at the anorectal junction. It lies between the external and internal sphincters. When traced downwards it becomes fibroelastic and at the level of the white line it breaks up into a number of fibroelastic septa which spread out fan wise, pierce the subcutaneous part of the external sphincter, and are attached to the skin around the anus called as corrugator cutis ani. The most lateral of these septa forms the perianal fascia. The most medial septum forms, the anal intermnscular septum, which is attached to the white line. In addition, some strands pass obliquely through the internal sphincter and end in the submucosa below the anal valves

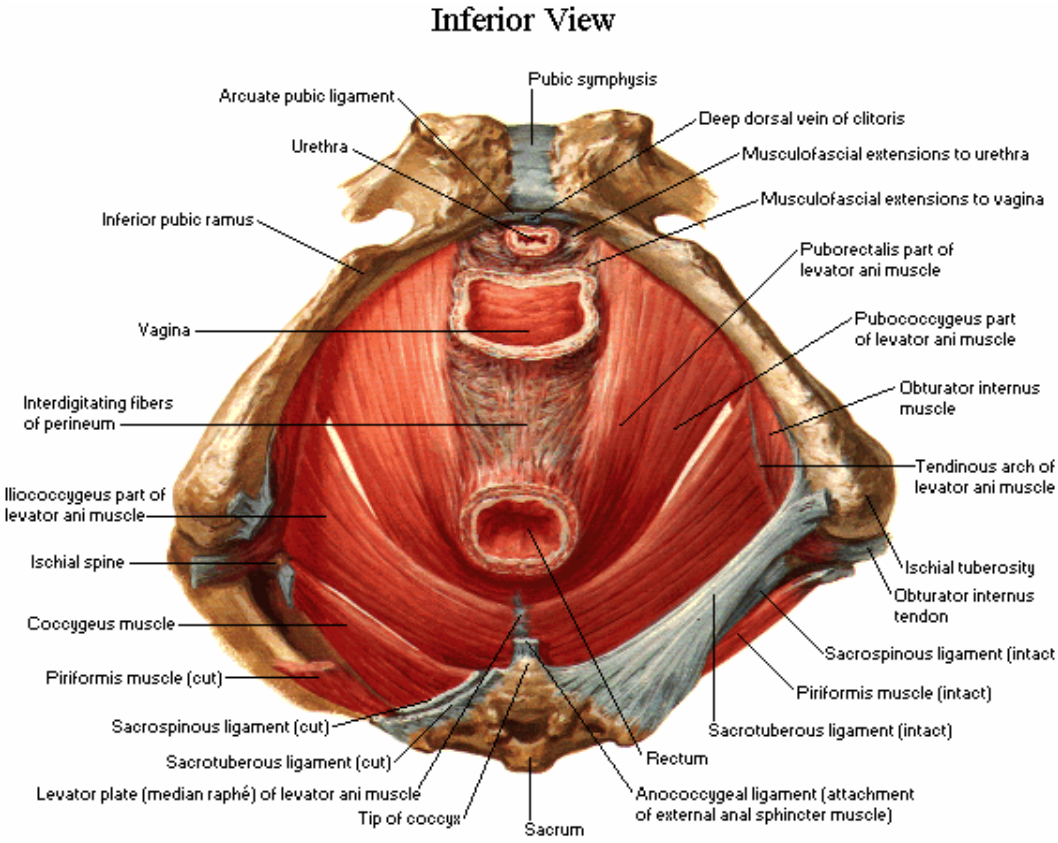


FIG 3. CONJOINT LONGITUDINAL MUSCLE COAT

Anorectal Ring

This is a muscular ring present at the anorectal junction. It is formed by the fusion of the puborectalis, uppermost fibres of external sphincter and the internal sphincter. It is easily felt by a finger in the anal canal. Surgical division of this ring results in rectal incontinence. The ring is less marked anteriorly where the fibres of the puborectalis are absent .

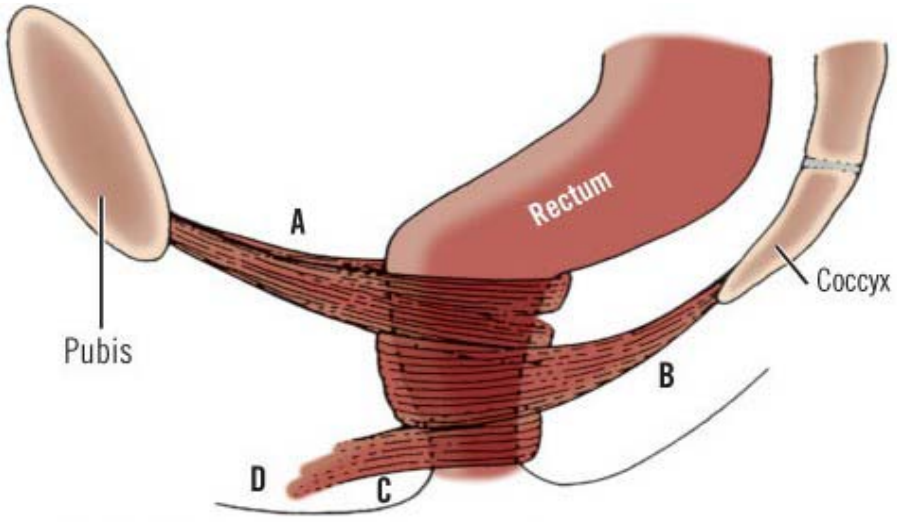


FIG 4- ANORECTAL RING

Surgical Spaces Related to the Anal Canal

1 The ischioanal 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 lower fibres of external sphincter, the external rectal venous plexus, and the terminal branches of the inferior rectal vessels and nerves. Pus in this space tends to spread to the anal canal at the white line or to the surface of the perineal skin rather than to the ischioanal space.

3 The submucous space of the canal lies above the white in line between the mucous membrane and the internal sphincter. It contains the internal rectal venous plexus and lymphatics

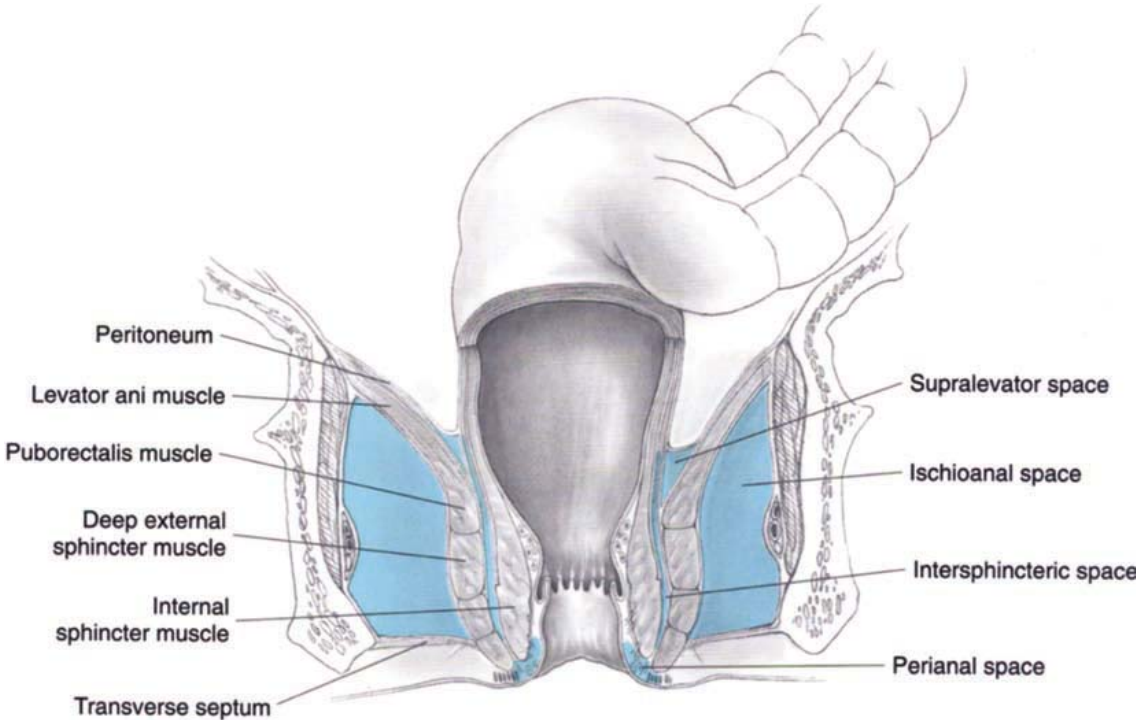


FIG 5 – ANAL CANAL SPACES

Blood Supply

Arteries

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

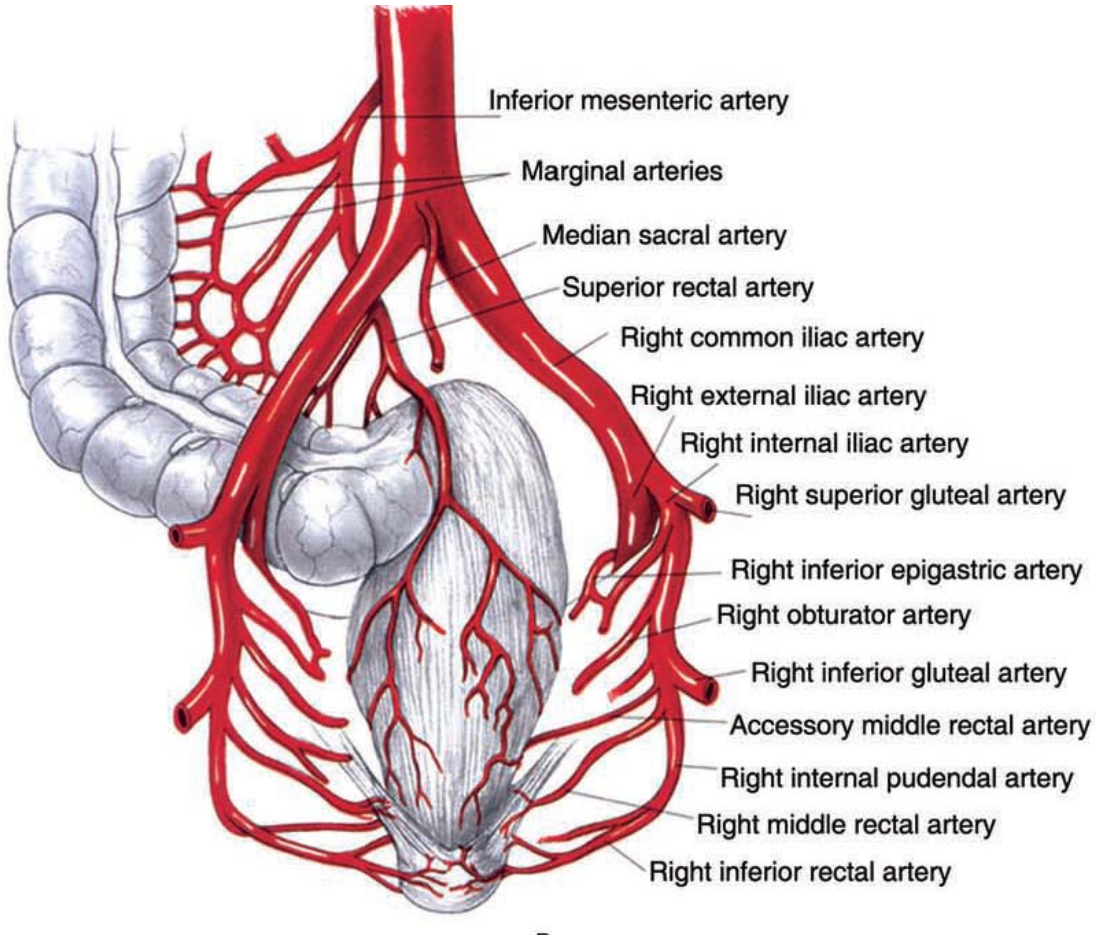


FIG 6. ARTERIAL SUPPLY

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 communication between the portal and systemic veins. The internal plexus is in the form of a series of dilated 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 piles .

2 The external rectal venous plexus lies outside the muscular coat of the rectum and anal canal, and communicates freely with the internal plexus. The lower part of the external plexus is drained by the inferior rectal vein into internal pudendal vein; the middle part by middle rectal vein into internal iliac vein; and the upper part by superior rectal yein which continues as the inferior mesenteric vein. 3 The anal veins are arranged radially around the anal margin. They communicate with the internal rectal plexus and with the inferior rectal veins. Excessive straining during the defaecation may rupture one of these veins, forming a subcutaneous perianal haematoma known as external piles.

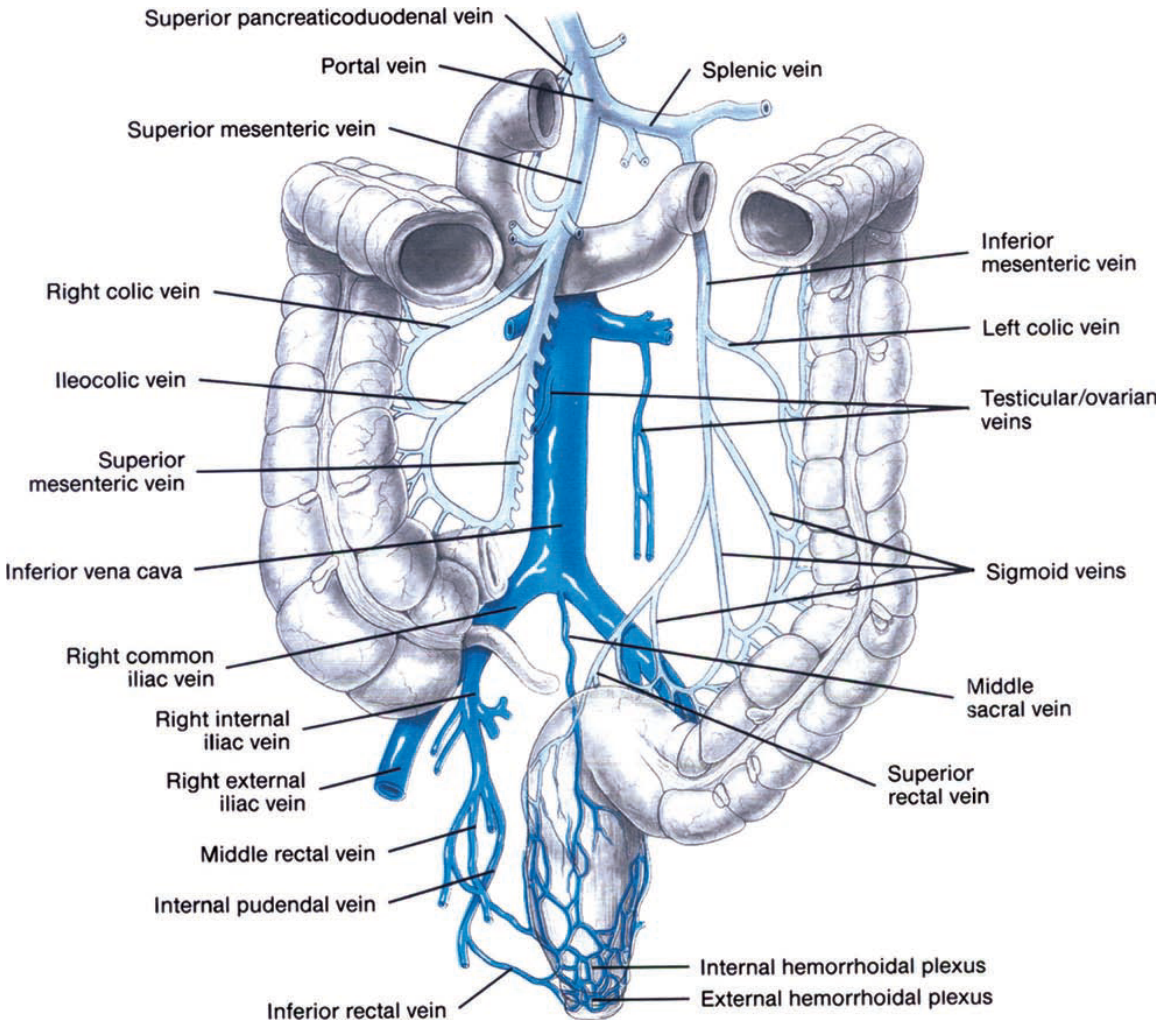


FIG 7. VENOUS SUPPLY

Lymphatic Drainage

Lymph vessels from the part above the pectinate line, drain with those of the rectum into the internal iliac nodes.

Vessels from the part below the pectinate line drain into.the medial group of the superficial inguinal nodes .

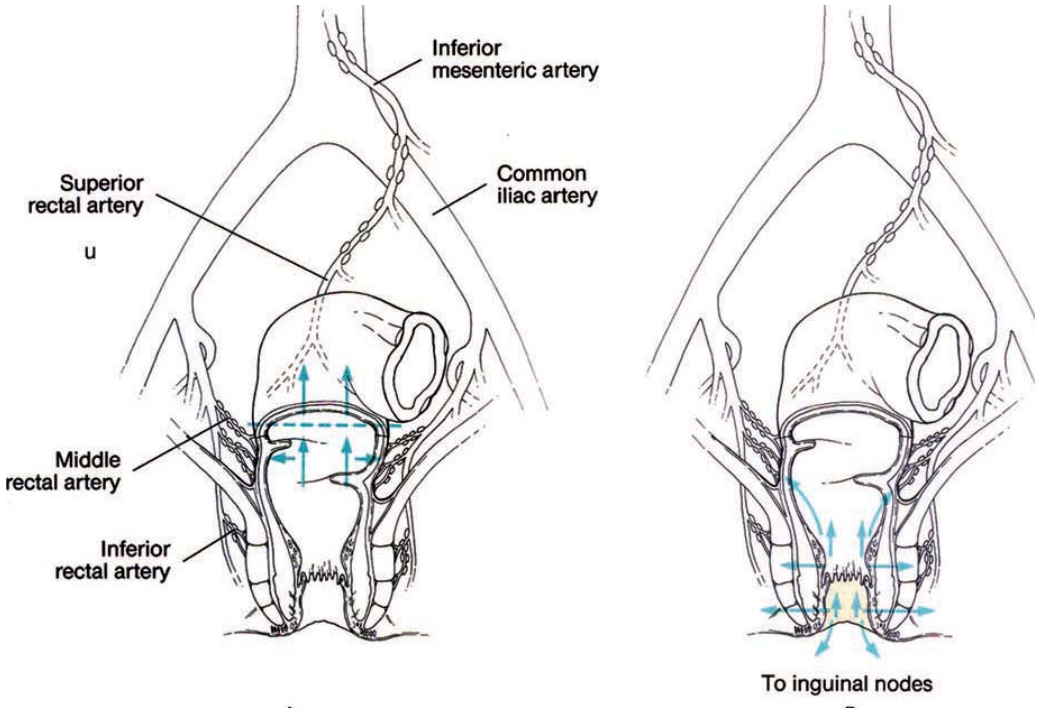


FIG 8. LYMPHATIC DRAINAGE

Nerve Supply

Motor Innervation

The internal anal sphincter is supplied by both sympathetic and parasympathetic nerves that presumably reach the muscle by the same route as that followed to the lower rectum. The parasympathetic nerves are inhibitory to the internal sphincter. The action of sympathetic nerves to the internal sphincter is conflicting. Shepherd and Wright and Lubowski et al. found it to be inhibitory whereas Carlstedt et al. found it to be stimulating.

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

The external sphincter is supplied by the inferior rectal branch of the internal pudendal nerve and the perineal branch of the fourth sacral nerve. The pudendal nerve passes through the greater sciatic foramen and crosses the sacrospinous ligament accompanied by the internal pudendal artery and vein. The pudendal nerve lies on the lateral wall of the ischioanal fossa, where it gives off the inferior rectal nerve, which crosses the ischioanal fossa with the inferior rectal vessels to reach the external sphincter.

Gruber et al. studied the topographic relationship of the pudendal nerve to the accompanying pudendal vessels and the ischial spine. In 58 left and 58 right pelves the course of the pudendal nerve and vessels at the ischial spine were evaluated. Multi-trunked pudendal nerves were found in 40.5% with a left-vs-right ratio of 1:1.5. The diameters of the single-trunked nerves ranged from 1.3 to 6.8 mm. In 75.9% the pudendal nerve was found medial to the accompanying

internal pudendal artery. The distance to the artery ranged from 17.2mm medial to 8mm lateral. The distance to the tip of the ischial spine ranged from 13.4mm medial to 7.4mm lateral. Knowledge of the close spatial relationship between the pudendal nerve and the internal pudental artery is important for any infiltration technique and even surgical release. In 31% of cases, an additional direct branch from the fourth sacral nerve innervates the external sphincter. This is important because it helps to explain why a bilateral pudendal block produces complete paralysis of the external sphincter in only about half the subjects, despite loss of sensation in the area innervated by the pudendal nerves . The puborectalis muscle is supplied not by the pudendal nerves, but by a direct branch of the third and fourth sacral nerves, which lie above the pelvic floor . The levator ani muscles are supplied on their pelvic surface

by twigs from the fourth sacral nerves, and on their perineal aspect by the inferior rectal or perineal branches of the pudendal nerves.

Sensory Innervation

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

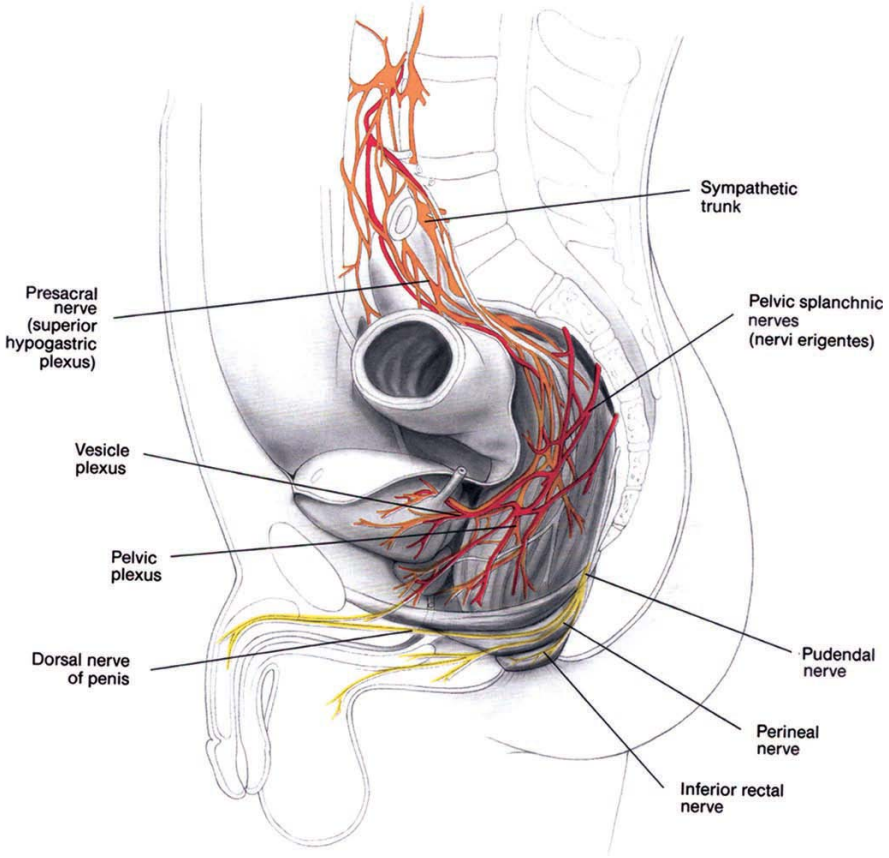


FIG 8. NERVE SUPPLY OF ANAL CANAL

PHYSIOLOGY OF THE ANORECTUM

The mechanism that maintains anorectal continence and facilitate defecation are related and complex. A clear understanding of Anorectal physiology has been made possible by introduction of several newer methodologies like Anorectal manometry and Electromyography designed to quantitate parameters of anorectal

physiology.

Factors Maintaining Fecal Continence :

The factors maintaining fecal continence are

1. Anal canal high pressure zone – (Anal sphincter mechanism)
2. Anorectal angle and co-ordinated activity of the

pelvic floor musculature

3. Anorectal sensory and reflex mechanisms
4. Distensibility, ‘tone’ and capacity of rectum
5. Rectal motility and evacuability
6. Colonic transit
7. Anal Canal motility
8. Stool volume and Consistency

Anal Canal High Pressure Zone :

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

The EAS & IAS envelop the anal canal and are responsible for

maintaining resting and generating squeeze pressures. The highest resting pressure are recorded 1-2 cm proximal to Anal verge. The mean Anal canal resting pressure is approximately 90 cm H2O. IAS contributes about 85% of resting tone of the Anal canal.

Resting anal pressures are found elevated in individuals with fissure in ano, performed with **balloon rectosphincteric manometry**.

SQUEEZE PRESSURE :

It is generated by contraction of the EAS and the puborectalis muscle. The squeeze pressure may also be distributed unequally around the Anal Canal. Maximum squeeze pressure elevation lasts less than 1 minute, as the sphincter fatigues rapidly after that time.

ANORECTAL ANGLE :

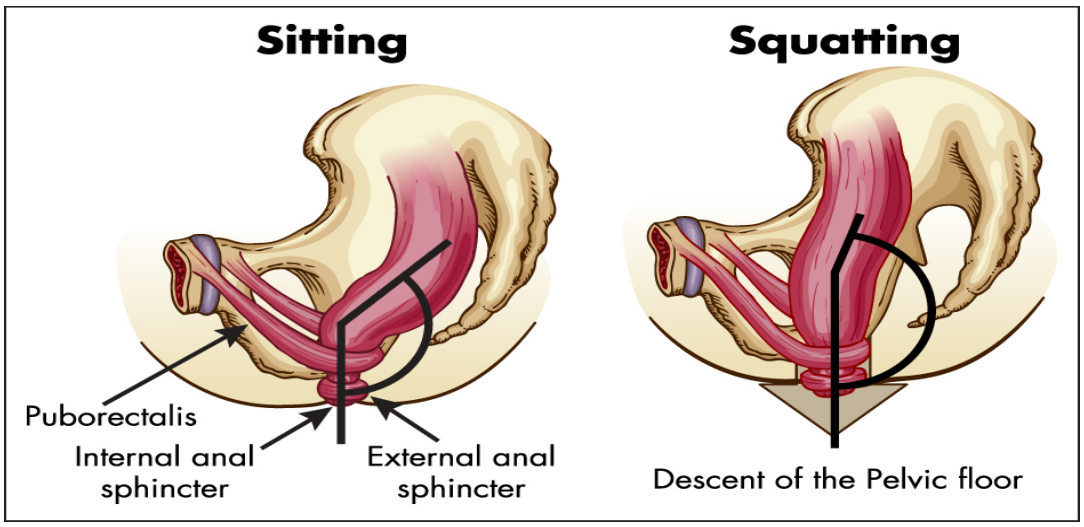


FIG 9. ANORECTAL ANGLE IN SQUATTING POSITION

It maintain hour to hour faecal continence formed predominantly by the anteriorly directed pull of the puborectal muscle as it envelops anorectum at the level of Anorectal ring. The mean angle is 102+13 degree at rest in left lateral position. Standing change the angle slightly, sitting widens the Angle significantly to 119+17. Valsalva maneuver, Sharpen the angle to 81+19.

It enables the Anterior wall of the rectum to act as a 'flap valve' at the Anorectalring. Wherever the abdominal pressure increases, the walls of the Anal canal flatten as they pass through an anteroposterior slit in the pelvic diaphragm to maintain continence.

Finlay and colleague found that, expulsion of air was achieved by a sharpening of Anorectal Angle increase in anal canal pressure and intra rectal pressure. Conversely, expulsion of liquids was achieved by a widening to Anorectal Angle, decreasing anal canal pressure and increasing intra rectal pressure.

Rectal Anal sphincter inhibitory response (RASIR) :

With acute rectal distention, the rectal wall contracts slightly, the proximal portion of the Anal canal releases (IAS) and distal portion contracts (EAS). The role of the Rectal Anal sphincter inhibitory response is not fully understood.

Rectal Distensibility and Capacity :

The Rectum accommodates passively to distention – intra luminal pressure remains low, where as intra luminal volume increases. Maximum tolerable volume in healthy individuals approximates 400 ml.

Motility of Rectum and Anal Canal :

Infrequently small amplitude of contractions have been recorded in the rectum in electroencephalic studies. The mean amplitude of these waves is about 10+3 cms in H2O.

Three types of contractions have been observed.

1. Simple contractions of frequency 5-10 cycles / min

2. Contractions with amplitude of upto 100cm H2O

3. Slow contraction of high amplitude.

In case of fissure in ano, the slow contractions with high amplitude is increased.

It has been demonstrated that patients with anal fissures have abnormal 'over shoot' contraction of their IAS following expected relaxation due to rectal distention.

DEFECATION

The stimulus for initiating defecation is distension of the rectum. This in turn may be related to a critical threshold of sigmoid and possibly descending colon distension. As long as fecal matter is retained in the descending and sigmoid colon, the rectum remains empty and the individual feels no urge to defecate. This reservoir type of incontinence does not depend on sphincter function. Distension of the left colon initiates peristaltic waves, which propel the fecal matter downward into the rectum. Rectal distension induces relaxation of the internal sphincter, which in turn triggers contraction of the external sphincter.Thus sphincter continence is induced. If the individual decides to accede to the urge,a squatting position is assumed.This causes the angulation

between the rectum and the anal canal to straighten.A valsalva maneuver is the second semivoluntary stage.This overcomes the resistance to the external sphincter by voluntarily increasing the intrathoracic and intra abdominal pressure.The pelvic floor descends and the resulting pressure on the fecal mass in the rectum increases intrarectal pressure.Inhibition of the external sphincter permits passage of the fecal bolus.Once evacuation has been completed,the pelvic floor and the anal canal muscles regain their resting activity,and the anal canal is closed.

DEFECATION REFLEXES

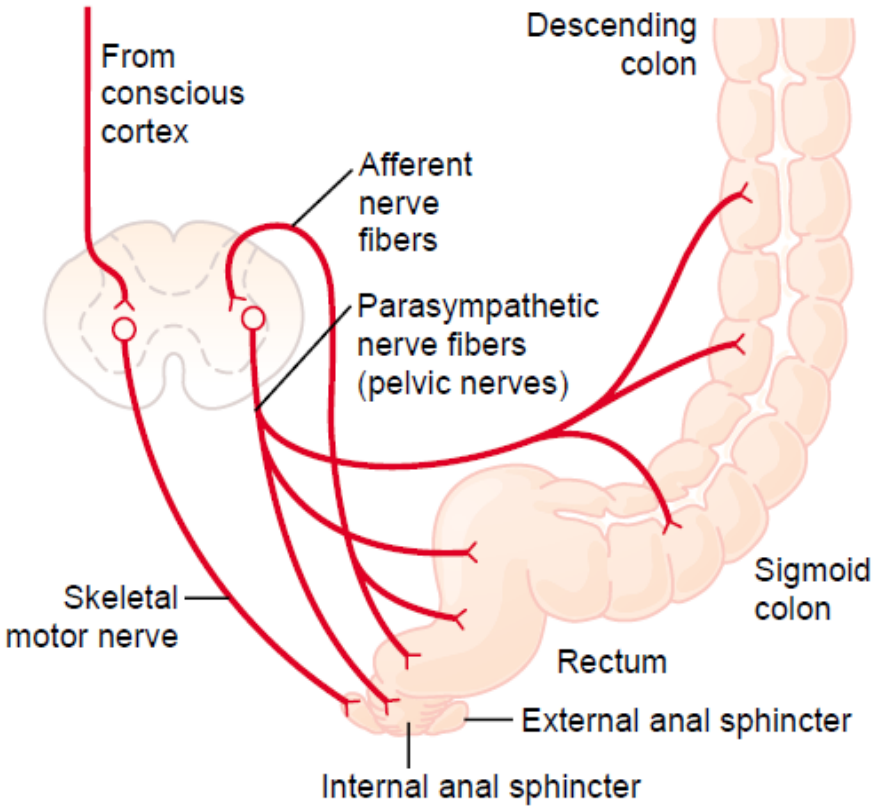


FIG 10. DEFECATION REFLEX

There are two types of defecation reflexes:

1.)One of these reflexes is an intrinsic reflex mediated by the local enteric nervous system in the rectal wall. Functioning by itself this reflex normally is relatively weak. Feces enters the rectum leading to distension of the rectal wall.This initiates afferent signals that spread through the myenteric plexus,initiating peristalsis in the descending colon,sigmoid and rectum forcing feces towards the anus.The peristaltic waves approaches the anus leading to internal sphincter relaxation.At the same time if extrenal sphincter is voluntarily

relaxed, defecation occurs.

2.) Another is the parasympathetic defecation reflex- The intrinsic reflex is fortified by a parasympathetic defecation reflex that involves the sacral segments of the spinal cord. Nerve endings in the rectum gets stimulated and signals get transmitted to the spinal cord. Reflex signals come via pelvic nerves ,in the descendind colon, sigmoid and the rectum. These parasympathetic signals travelling in the pelvic nerves greatly intensify peristalsis and relax the internal anal sphincter. At the same time, if external anal sphincter is voluntarily relaxed, defecation occurs.

Defecation signals entering the spinal cord initiate other effects, such as taking a deep breath, closure of the glottis, and contraction of the abdominal wall muscles to force the fecal contents of the colon downward and at the same time cause the pelvic floor to relax downward and pull outward on the anal ring to evaginate the feces. In the newborns and in some people with transected spinal cord segments, the defecation reflexes causes automatic emptying of the lower bowel at inconvenient times during the day because of lack of conscious control exercised through voluntary contraction or relaxation of the external anal sphincter.

The act of defecation follows either two patterns:
1.) Expulsion of the rectal contents accompanied by mass peristalsis of the distal colon, which clears the bowel in one continuous movement.

2.)Passage of the stool piecemeal with several bouts of straining. The pattern is largely determined by the habit of the individual and the consistency of the

feces.

The high amplitude propagating waves initiated by stimulation of the sacral nerves gets originated in the ascending colon.These giant waves are necessary for an effective expulsion of the stool.The high amplitude propagating contractions arise especially after awaking and after a meal.

ACCOMODATION RESPONSE

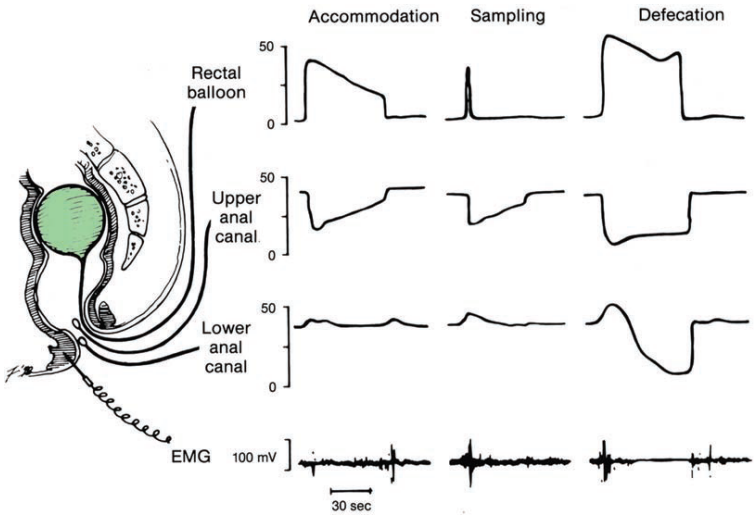


FIG 11. ACCOMODATION RESPONSE

The accomodation response consist of receptive relaxation of the rectal ampulla to accomodate the fecal mass.With increasing volume overload,there is a gradual stepwise increase in rectal pressure,and depending on the age of the patient,an urge to defecate is experienced.This abates in few seconds as the rectum accomodates to the stimulus.When volume increases rapidly over a short period ,the accomodation response fails,leading to urgent emptying of the rectum.The nerve endings for the accomodation reflex is in the rectal ampulla and in the

levator ani muscles.The nerve center for the spinal paet of the reflex is in the lumbosacral cord with higher center control to permit suppression of the urge to defecate.

Anal Incontinence

This socially crippling disorder has been studied via a number of investigative techniques including manometry, electromyography, and nerve stimulation techniques to better define the exact cause of incontinence. For example, anal manometry may distinguish which of the two sphincters is principally responsible for the incontinence. This is important because if symptoms are due to internal sphincter dysfunction alone, a sphincter repair may not benefit the patient. The clinical value of manometry in patients with fecal incontinence has been questioned.

For example, one study found that 43% of incontinent subjects had ‘‘normal’’ values for both MRAP and MSAP. In contrast, a low MSAP was demonstrated in 9% of normal continent individuals. Based on these results, the authors concluded that anal incontinence cannot be assessed by anorectal manometry alone.

Penninckx et al. described the balloon-retaining test, which consists of progressive filling of a compliant intrarectal balloon in a patient in the sitting position. The pressure inside the balloon is monitored, and the patient is asked to retain the balloon as long as possible and to report first, constant, and maximal tolerable sensation levels. The balloon is used to simulate semisolid and solid stool.

The authors believe this test to be a more realistic approach to the evaluation of fecal continence than the rectal saline infusion test and anal manometry. The test evaluates the rectal reservoir function, sensation, and sphincter competence simultaneously and also permits objective evaluation of the effect of different treatments in incontinent patients.

In a sophisticated computer model, Perry et al. developed a manometric technique of anal pressure vectography for the detection of anal sphincter injuries.

Abnormal symmetry indices exposed even occult anal sphincter injuries. Perry et al. believe that the vector symmetry index may be useful in determining which incontinent patients should have sphincter repair.

Endoanal sonography facilitates the detection of occult sphincter defects. Since the introduction of this investigative technique, opinions about the pathogenesis, investigation, and management of fecal incontinence have changed dramatically. It is well known that 0.5–2% of women delivering vaginally will sustain a third-degree tear. Primary repair of such injury is often inadequate.Sultan et al. reported that half the women with a repaired third-degree tear have symptoms of fecal incontinence or urgency and that sphincter defects can be identified with endoanal sonography in 85% of these women. Sonographic investigations have also revealed that one of three primipara who deliver vaginally develop a permanent defect involving one or both sphincters

and that 90% of incontinent women, in whom the only apparent factor is obstetric damage, have a structural abnormality of one or both sphincters . It is

now agreed that childbirth is the most common cause of fecal incontinence in healthy adult women.

In many patients, biofeedback therapy has been effectivein correcting or at least improving anal incontinence.

Definition

An anal fissure is a linear ulcer or crack in the squamous lining of anal canal that may extend from the mucocutaneous junction to the dentate line. It can be acute or chronic. It may occur at any age but is usually a condition of young adults. Both sexes are affected equally. It is very often referred to as an ischemic ulcer. The pathogenesis of fissure in ano is not yet fully explained, however, increased tone of internal anal sphincter and poor perfusion of anterior and posterior ano-derm have been implicated. About 90% fissure in ano occur in posterior midline. Usually anal fissures heal spontaneously but some enter into a vicious cycle of anal pain, constipation, faecal trauma and sphincter spasm.

FIG 12. CHRONIC FISSURE IN ANO

ETIOLOGY AND PATHOGENESIS

Aetiology – Trauma to the anal canal is the most common initiating factors usually in the form of passage of a large hard faecal mass.

Among the predisposing factors are –

- Inflammatory bowel disease.
- Previous anal surgery particularly haemorrhoidectomy.
- Anterior fissure develops in women due to child birth trauma.
- Persons taking laxatives or saline purgatives for a long period develops a degree of anal stenosis which may predispose to fissure formation , such patients have had only liquid motions for months or years and their anal canal has undergone some degree of contraction so that a sudden passage of a hard scybalous mass could be particularly difficult and traumatizing to it.
- Large haemorrhoids and hypertrophied anal papillae may cause fissure due to traction when these prolapse at defecation.
- Enthusiastic use of ointments for variety of anal conditions causes thinning of skin of the anal canal thus predisposing to an easy tear.
- Sometimes trauma to anal canal caused by nozzle of enema, results in fissure .
- Rarely passage of a sharp foreign body in stool may cause a fissure.

Pathophysiology.

The spasm of the internal sphincter may prevent its healing by approximating the edges of the ulcer and preventing adequate drainage. The resulting pressure with the internal sphincter is higher in patients with an anal fissure than normal controls. Normally rectal distension causes a reflex relaxation of the internal sphincter and contraction of the external sphincter. In patients with fissure this relaxation of the internal sphincter is followed by an abnormal contraction. Following successful treatment this abnormal contraction of the internal sphincter disappears.

Physiology of sphincter relaxation

An understanding of the physiology of the IAS sheds some light on the pathophysiology of anal fissures as related to increased IAS tone and response to non-surgical treatment. The basal tone of the IAS is dependent on intracellular calcium. Therefore contraction of the smooth muscle cells within the IAS is mediated by influx of calcium through calcium channels, but it is also affected by neurohormonal stimulation of α1- adrenoreceptors at the smooth muscle cells. Activation of α2-adrenoreceptors in the myenteric inhibitory neurons most likely presynaptically inhibits nonadrenergic, non-cholinergic (NANC) relaxation. Relaxation of these cells is mediated through directly decreasing intracellular calcium concentration as well as increasing cGMP and cAMP. Potassium influx hyperpolarizes the cell membrane and decreases calcium entry.

Activation of β2- adrenoreceptors increases cAMP, returning intracellular calcium to the sarcoplasmic reticulum. In addition, there are inhibitory

neurotransmitters that mediate NANC relaxation, including nitric oxide (NO) and vasoactive intestinal peptide (VIP). NO is the major neurotransmitter mediating NANC relaxation of the IAS by increasing cGMP. VIP, like β2-adrenoreceptors increases cAMP13,14. L-arginine, aprecursor of nitric oxide, has been found to relax IAS smooth muscle perhaps by increasing substrate for nitric oxide synthase (NOS), the enzyme involved in NO synthesis15. A preliminary study has shown reduced NOS in the IAS of patients with anal fissures compared to controls.

Why fissure is more common posteriorly ?

An anal fissure is typically found in the posterior midline just within the anal verge. More than 98% of fissure in males and nearly 85% in females occur in this way.

Various hypothesis are

- The superficial external anal sphincter arise from the tip and side of the coccyx and surrounds the anal canal leaving a weak area on the posterior wall this causes it to tear when it is over stretched during the passage of a hard stool.
- Anal crypts are more marked posteriorly and which tends to harbour subclinical infection, which causes the epithelial lining to be friable.
- The lower portion of this muscle is not truly circular, but rather consists of a band of muscle fibers that pass from posterior to anterior and split

around the anus. The anal mucosa is, therefore, best supported laterally and is weakest posteriorly. The decreased anterior support in women accounts for the greater occurrence in this location than in men.

- Lockhart Mummery believed that the explanation can be found in the structure of the external sphincter. The lower portion of this muscle is not truly circular but rather consists of a band of muscle fibers that pass from posterior to anterior and split around the anus. He postulated that the anal mucosa is, therefore, best supported laterally and is weakest posteriorly. The decreased anterior support in women is believed to account for the greater occurrence in this location than in men. Additional evidence reinforcing the Lockhart-Mummery concept may be apparent when the physician inserts an anal retractor too vigorously at the time of hemorrhoid surgery. The split that may occur is almost invariably located posteriorly. Likewise, if the sphincter is stretched in the cadaver, tearing almost always occurs posteriorly.

- Another theory that has been suggested is related to the blood supply to the area. Klosterhalfen and associates visualized the inferior rectal artery by means of postmortem angiography, by manual preparations, and by histologic study following vascular injection. They determined that in 85% of specimens, the posterior commissure is less well perfused than other areas of the anal canal. Hence, ischemia may be an important etiologic factor in causing anal fissure, especially in the posterior

location. The authors further suggest that the blood supply, which is already tenuous, may be further compromised by compression and contusion as the branch of the inferior rectal artery passes through the internal anal sphincter. Others have confirmed in cadaveric studies that there is a significant trend to an increasing number of arterioles from posterior to anterior in the subanoderrnal space at all levels.

- Schouten and colleagues assessed microvascular perfusion of the anoderm by means of Doppler flowmetry in 27 patients. Anodermal blood flow at the fissure site was significantly lower at the posterior cornmissure of the controls. Reduction of anal pressure by sphincterotomy improved anodermal blood flow, resulting in healing of the fissure, These observations lend further support to the concept that ischemia is the etiologic factor that contributes to the development of fissure disease. A later study by the same authors, this time involving 178 subjects, confirmed that anodermal blood flow was less in the posterior midline than in other segments of the anal canal.
- Anterior fissure in women (15%) is often due to trauma of parturition causing old tear to break down.

Acute and Chronic fissures

An acute fissure is an ulcer, the base of which is formed by longitudinal muscle fibres. When it become chronic , the deeper circular fibres of the internal sphincter are seen to form the floor of the fissure.

The sentinel piles develops due to combination of infection and edema. Infection of the base may lead to an abscess, which may rupture through the base of the fissure or through the skin near by leaving a short subcutaneous fistula. There is no real agreement as to what constitutes a chronic anal fissure. One definition is that a fissure is chronic when it has become a clearly recognized, well-circumscribed ulcer.

A chronic fissure thus has four typical features -

(1) A boat shaped ulcer with indurated edges.

(2) Fibres of internal sphincter forms the floor.

(3) A rounded swelling (hypertrophied anal papilla) at its upper end.

(4) A tag of skin at its lower end (sentinel piles).

Why fissure fails to heal ?

Why some fissures heal spontaneously and others become chronic is an unresolved question.

- Ischemia, infection, or lymphatic obstruction secondary to persistent inflammation may be responsible.
- An anthropomorphic explanation for the occurrence of skin tags and papillae, it is as if healing cannot take place across the defect produced by the fissure, so the body attempts to heal it through overgrowth on the proximal and distal ends of the defect

Atypical fissures

An anal fissure situated away from the midline usually has a cause within the anal canal in the form of a fibrous polyp , large haemorrhoids or a hypertrophied

anal papilla. If a cause is not found , such a fissure should immediately raise suspicion of another pathology (example – tuberculosis, syphilis, leukemia, squamous cell carcinoma ,inflammatory bowel disease especially Crohn's disease and sarcoid)

Fissure in inflammatory bowel disease tends to be multiple, broad and situated away from the midline. The spasm normally associated with a nonspecific fissure is minimal or absent.

HISTOPATHOLOGY

Nothing in particular is histologically diagnostic of an anal fissure. If the lesion is excised and submitted for pathologic examination, usually typical nonspecific inflammatory changes are observed. Brown and colleagues prospectively studied 18 consecutive patients who underwent internal anal sphincterotomy for chronic anal fissure and took a biopsy specimen from the base and also from the muscle before division. Histologic evaluation confirmed the presence of fibrosis throughout the internal sphincter, but no such finding was identified in controls.

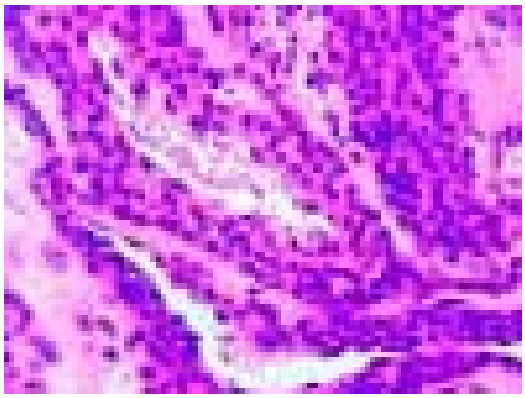


FIG 13. HISTOLOGY IN CHRONIC ANAL FISSURE

CLINICAL FEATURES

SYMPTOMS

ACUTE FISSURE

PAIN

Pain of tearing, cutting or burning type associated with defecation and lasting for a variable period after defecation is the symptom. With the onset of suppuration the pain become throbbing in character and continuous. Each act of defecation become an agony due to fear of pain the act of defecation may be postponed leading to constipation. A vicious cycle of pain, constipation and pain is setup.

The pain of anal fissure can be differentiated from that of proctalgia fugax in that the latter condition produces discomfort, which is usually not related to bowel action. In addition, the patient with a fissure feels the discomfort in the anal area; the pain of proctalgia fugax is higher and more deep-seated. The other anal condition that commonly produces pain is a thrombosed hemorrhoid , but with this complaint, the patient also reports feeling a lump. This will not be present if an acute anal fissure is the cause of the pain.

BLEEDING

Bleeding is seldom more than a few drops and is bright in color. Streaks of blood may be seen on the stool surface.

· Reflex symptom of dysuria or pain radiating down the thighs is common.

CHRONIC FISSURE

Those individuals with a long-standing (i.e., chronic) anal fissure will present with a different symptom complex.

In chronic fissure, irritation, pruritus and discharge which soils

the underclothing are present .

Bleeding may or may not be present .

A swollen skin tag be felt outside the anus (sentinel piles).

Problems with micturition (e.g., retention, urgency, frequency) and dyspareunia occasionally accompany the symptoms of both acute and chronic fissure.

EXAMINATION

ACUTE FISSURE

Gentle traction on the anal margin along with a request to bear the discomfort will show the lower end of the fissure.

Applying a local anaesthetic ointment to the fissure is important before doing a rectal examination.

An acute fissure being a shallow ulcer is impalpable, though the sphincter spasm is marked. Proctoscopy is avoided in these cases. Palpation will usually demonstrate a spastic anal sphincter or tight anal canal and will exacerbate the patient's discomfort. The open wound is often not appreciated by the examining finger in a patient with an acute anal fissure. Because the cut is relatively superficial, there is usually no fibrosis.

POSITIONING:

Although the inverted prone jackknife position on a proctoscopic table is most popular and is extensively used in the United States , the left lateral position with the buttocks projecting slightly beyond the edge of the examining table is as good for examination and is much more acceptable to the patient . It is a myth that the prone jackknife position straightens the rectosigmoid colon andtherefore that the proctosigmoidoscope can be passed higher. Altering the patient's position or inducing general anesthesia does not help in negotiating an acute angle that is impassable in the original position. The inverted jackknife position should not be used in various conditions: acute glaucoma, retinal detachment, severe cardiac arrhythmia, severe debilitation, late pregnancy, and recent abdominal surgery.

ANOSCOPY:

Anoscopy, as the name implies, is the examination of the anal canal. The anoderm, dentate line, internal and external hemorrhoids, and lower part of the rectal mucosa can be seen through the anoscope. Anoscopy should not begin until a digital examination has been completed. For most cases, an enema is not required. Insertion of the anoscope always should be done with the obturator in place. The obturator is removed during examination and reinserted to rotate the instrument to another area. If an inverted jackknife position is used, the examination table should not be tipped down more than 10 to 15_. If a left lateral position is used, an assistant needs to pull up the right cheek of the buttocks for

exposure. During examination the patient is asked to strain, with the anoscope sliding out to detect any prolapse of the rectal mucosa and the anal cushion. Excoriation, metaplastic changes, and friable mucosa indicate a prolapsed hemorrhoid.

CHRONIC FISSURE

· In chronic fissure the presence of a sentinel piles is noted.

A hypertrophid anal papilla may be felt at the upper end of the fissure in a chronic case. Gently proctoscopy will show the presence of associated haemorrhoids,hypertrophied papilla or a fibrous polyp.

Sigmoidoscopy is not essential for the diagnosis but must be done after acute symptoms have subsided or before surgery to rule out inflammatory bowel disease or associated pathology.

MANOMETRY

Anorectal manometry is a means of quantifying the function of the internal and external sphincters.There is no standardised method of performing anorectal manometry.Of the many methods available,there is a closed balloon systems and perfused fluid-filled open-tipped catheters.Recently microtransducers are used to overcome the measurement problems and errors associated with perfused open-tipped catheters and closed balloon systems.These modern recording devices,which consist of a miniature pressure sensor located at the tip of the

catheter,offer many advantages in anorectal manometry.There are no problems of perianal skin irritation caused by continuous perfusion and leakage from the anal canal.Furthermore recordings are not influenced by hydrostatic factors,compliance or perfusion rate.But the microtransducer-tipped catheters are much moreexpensive than conventional recording devices.

For the assessment of an anal pressure profile,the recording probe must be withdrawn from the rectum ,either stepwise or continuously at a constant rate.The continuous pull-through technique allows a more appropriate assessment of the anal pressure profile and functional sphincter length.The highest pressure of a pull-through technique is defined as the maximal resting anal pressure[MRAP].Resting pressure in the anal canal exhibits regular fluctuations that vary from day to night by the presence or absence of fecal material in the rectum and by posture.Most of these fluctuations present as slow waves with a frequency between 10 and 20/min and an amplitude varying between 5 and 25 cm H2O.Although these slow waves can be found in all normal subjects,they are not present continuously.Less frequently observed are the ultraslow waves,with an amplitude varying between 30 and 100 cm H2O and a frequency of < 3/min.These ultra slow waves seem to be associated with high resting anal pressures.

Differential Diagnosis –

An ulcer situated away from the midline should immediately arise suspicion of –

 A **traction fissure**, the cause of which lies within the anal canal is excluded by digital and proctoscopic examination.

 A **tuberculous ulcer** has undermined edges and the discharge is thin and watery. The presence of a lesion in the chest, a raised ESR, sputum examination and a biopsy may be necessary to reach a diagnosis.

 A **primary chancre** has a good deal of induration along with inguinal lymphadenopathy. Secondary syphilis presents as multiple fissure. The Wassermann reaction is strongly positive.

 A **malignant ulcer** has indurated and raised edges and is resistant to the local treatment . Biopsy is needed for the diagnosis.

 Fissure in inflammatory bowel disease are multiple, indolent and resistant to local treatment. Proctoscopy and sigmoidoscopy reveals the pathology within the rectum.

 Multiple acute fissure may occur following sodomy in which a history of **anal intercourse** can be obtained. Possibility of HIV infection being transmitted through this route should be kept in mind.

Idiopathic stenosis of internal sphincter – It occur in certain older patients usually women, who have been accustomed to taking aperients over many years so that the anal canal has for a long time been spared the regular dilation action of a normal solid motion. As a result the internal sphincter undergo contraction and may become fixed in this contracted condition by fibrosis.There may be no symptom or when the contraction become extreme, the patient may find difficulty in passing motions.

TREATMENT

· Conservative

· Medical

· Surgical

CONSERVATIVE LINE OF MANAGEMENT

(Dietary and life style modifications.)

Many fissure heals spontaneously in two or three weeks. These are usually superficial lesion which have been attended by a short history of pain. In contrast a chronic fissure are most resistant to any form of conservative treatment, though there may be temporary relief of symptoms, but the trouble tends to recur frequently.

Treatment of acute anal fissure is nonsurgical unless the fissure is due to traction when excision of fibrous polyp or the anal papilla will remove the chance of its recurrence.

- Adequate fluid intake
- **Fibre rich diet**. A diet should be rich in vegetables, fruits and brown rice.
- **Bulk forming agents** like psyllium husk and bran can be given after meals.
- Repeated anal trauma by passage of hard faeces can be avoided by laxatives such as liquid paraffin and lactulose are especially suitable for they tend to produce soft easily passage motions. Drastic purgation must be avoided since frequent passage of loosestools causes agony.
- Surface anaesthetic ointment (5% Xylocaine) and oral analgesics are helpful to reduce pain.

- Metronidazole and a suitable broad spectrum antibiotics will hasten recovery.
- Frequent Sitz bath are comforting and help to reduce the sphincter spasm.

MEDICAL LINE OF MANAGEMENT

It is usually a combination of conservative treatment along with **chemical sphincterotomy**.

The object of medical management are –

 Relief of pain.

 Complete 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, this process is known as "Chemical Sphincterotomy". Some of the agents used for chemical sphincterotomy are –

 Glyceryl trinitrate .

 Calcium channel blockers- Nifidipine and Diltiazem

 Neurotoxins

· Botulinum toxin

· Gonyautoxin

Newer Agents

These drugs are under trail

· Phosphodiesterse inhibitors -Topical Sildenafil.

· Potassium channel openers-Minoxidil.

· L-Arginine – Precursor of NO.

· Adrenergic antagonist –Indoramin

· Angiotensin converting enzyme inhibitors–Topical Captopril

· Hyperbaric Oxygen.

Some of the obsolete agents and methods are –

· Sclerotherapy.

· Cholinergic Agonist -Bethenecol cream.

· Solcoderm - 5 Fluro uracil and salicylic acid ointment.

Glyceryl trinitrate (GTN) – It is a vasodilator and smooth muscle relaxant. It releases nitric oxide which is an inhibitory neuro -transmitter. The drug is used as 0.2% cream 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 upto two third of patients. In addition glyceryl trinitrate being a vasodilator improves blood flow to the area and this aids healing. Unfortunately glyceryl trinitrate ointment may produce severe head ache.

Isosorbide dinitrate – As 1% ointment has also been used in past to produce chemical sphincterotomy but again it has head ache a prominent side effect.

Calcium Channel Blockers

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

Nifedipine : Nifedipine given 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 proffered as an alternative for the treatment of chronic anal fissure. Diltiazem given 60Mgs BD as oral form or applied as 2% cream BD for 4 to 6 weeks

Botulinum Toxin – It is a striated muscle relaxant and acts by inhibiting acetylcholine release at the neuromuscular junction. 30 units of Botulinum Toxin A injected into the internal sphincter on either side of the fissure once a month. The average healing rates of 47 to 65% has been reported . Local side effects of flatus incontinence, increase in residual urine, muscle weakness, fecal soiling have been seen.

Gonyautoxin : It a phycotoxin produced by shellfish, has also been used in anal fissure management. In a recent report56, 23 patients were injected with 100 units in the IAS every 4 days. Total remission was achieved in all patients within 7-14 days. No relapses were observed during the 10 month follow-up. No side-effects were noted.

SURGICAL LINE OF MANAGEMENT

The choice of operative approach to the treatment of anal fissure depends on the duration of symptoms and on the physical findings. The aim of the surgical treatment is to modify the function of the internal sphincter so that it cannot go into spasm and to increase the diameter of the anal canal outlet so that it would offer less resistance to the passage of stools.

- Sphincter stretch
- Internal anal sphincterotomy - which may be Posterior or Lateral anal sphincterotomy.

- Open method
- Closed method

Stretching of the anal outlet as advocated by Recamier, is used in acute fissure when there is no response to conservative treatment. The procedure should be done under general anaesthesia .It involves gradual stretching of the anal sphincters over several minutes to effect a temporary paralysis of the internal and external sphincter muscles for several days to week thus allowing the ulcer to heal. There is no anal wound and the patient can return to work the next day.

Due the risk of incontinence following the procedure , have now made it unpopular. Stretching should not be done in the presence of a traction fissure or in a fissure associated with large internal haemorrhoids since a prolapse of the haemorrhoids often follows the procedure.

Sphincterotomy

Posterior sphincterotomy

Internal sphincterotomy was first advocated by Eisenhammer. The sphincter is divided in its lower half in the posterior midline through the fissure itself. The posterior wound thus created takes a long time to heal resulting in a **key-hole deformity.**

The classic operation of Gabriel removes the fissure along with a triangular area of skin and adds a sphincterotomy in the posterior midline. The result is a large wound which takes a long time to heal, though the recurrence rate is small (1 to 2%) and the patient needs hospitalization for one week.

LATERAL SPHINCTEROTOMY

Internal Anal Sphincterotomy

In 1839, Brodie was the first person to perform an anal sphincterotomy. He advocated the operation for “preternatural contraction of the anal sphincter.” In 1863, Hilton also suggested that the treatment for anal ulcer should be sphincterotomy. However, Miles is usually credited as the surgeon who gave the operation real credence, although Miles believed that he was dividing what he called “the pecten band.”

In 1951, Eisenhammer was the first person to advocate internal anal sphincterotomy for anal fissure and to truly understand which muscle he was dividing.

The internal anal sphincter is the continuation of the distal portion of the circular muscle of the rectum . Its length is essentially equal to that of the anal canal. Distally, it can usually be felt medial to the intersphincteric groove outside the anal verge. The subcutaneous portion of the external sphincter is lateral to the groove.

The internal sphincter maintains the anal canal in the closed position; action is involuntary. The external sphincter is a striated muscle. The external sphincter and the levator ani are the muscles involved in voluntary control. Complete division of the internal anal sphincter is possible without creating significant impairment of fecal continence.

Technique

The procedure of internal anal sphincterotomy has classically been performed in the posterior midline. Although this approach usually cures the condition, it is associated with the complication of the so-called keyhole deformity. Bennett and Goligher reported a high incidence of impairment for flaws with posterior internal anal sphincterotomy (34%) and a 15% incidence of difficulty controlling feces. After a time, however, further improvement was evident, with a cure rate of 93%, but an appreciable morbidity remained.

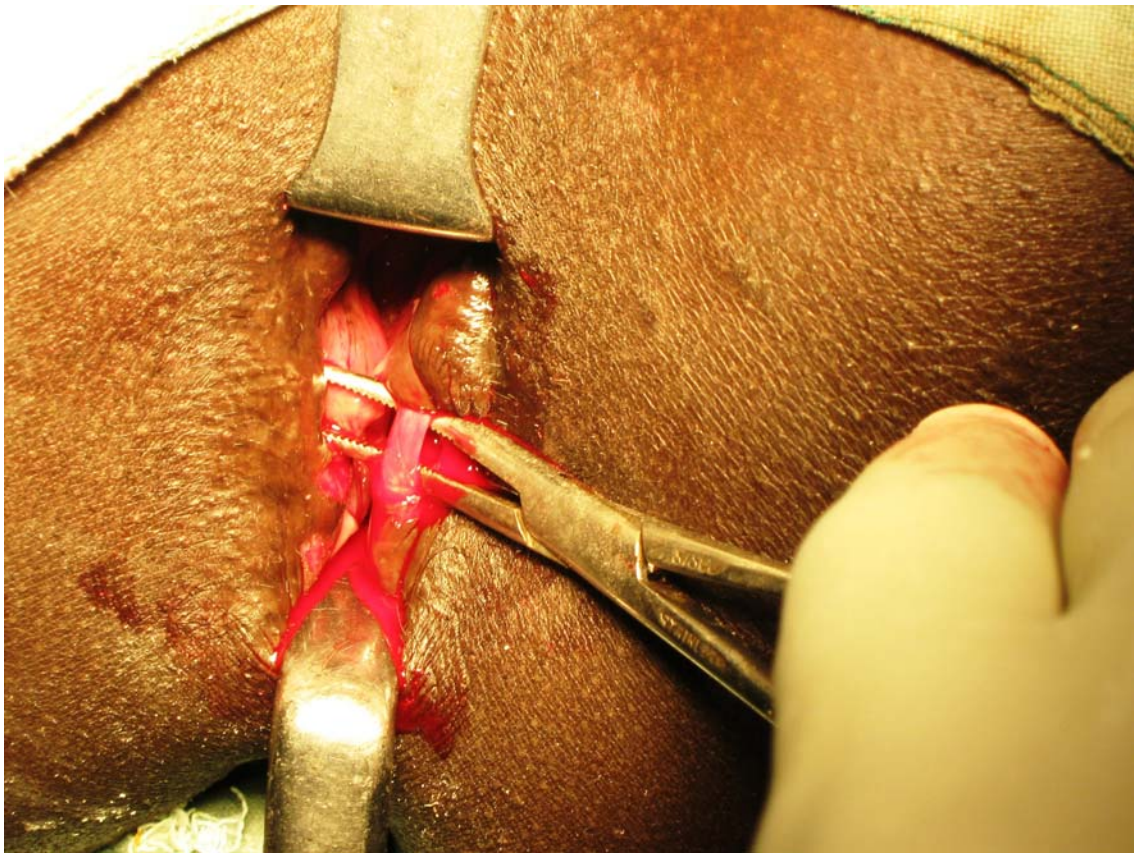


FIG 14. INTERNAL ANAL SPHICTER

Eisenhammer advocated the lateral position for sphincterotomy, dividing one-half of the muscle in an open fashion.In 1969, Notaras reported a technique using a narrow-bladed scalpel to perform an internal anal sphincterotomy in a closed fashion in the lateral position.In 66 patients treated, he reported a 6% incidence of fecal soiling. Notaras subsequently described his procedure in detail by a technique in which he employed a scalpel used for cataract surgery.His method involved submucosal insertion of a knife, followed by an outward incision to the intersphincteric groove. This has the advantage of minimizing the risk of mucosal injury, but it has at least the theoretical disadvantage of one not knowing how deep to cut, risking injury to the external sphincter.

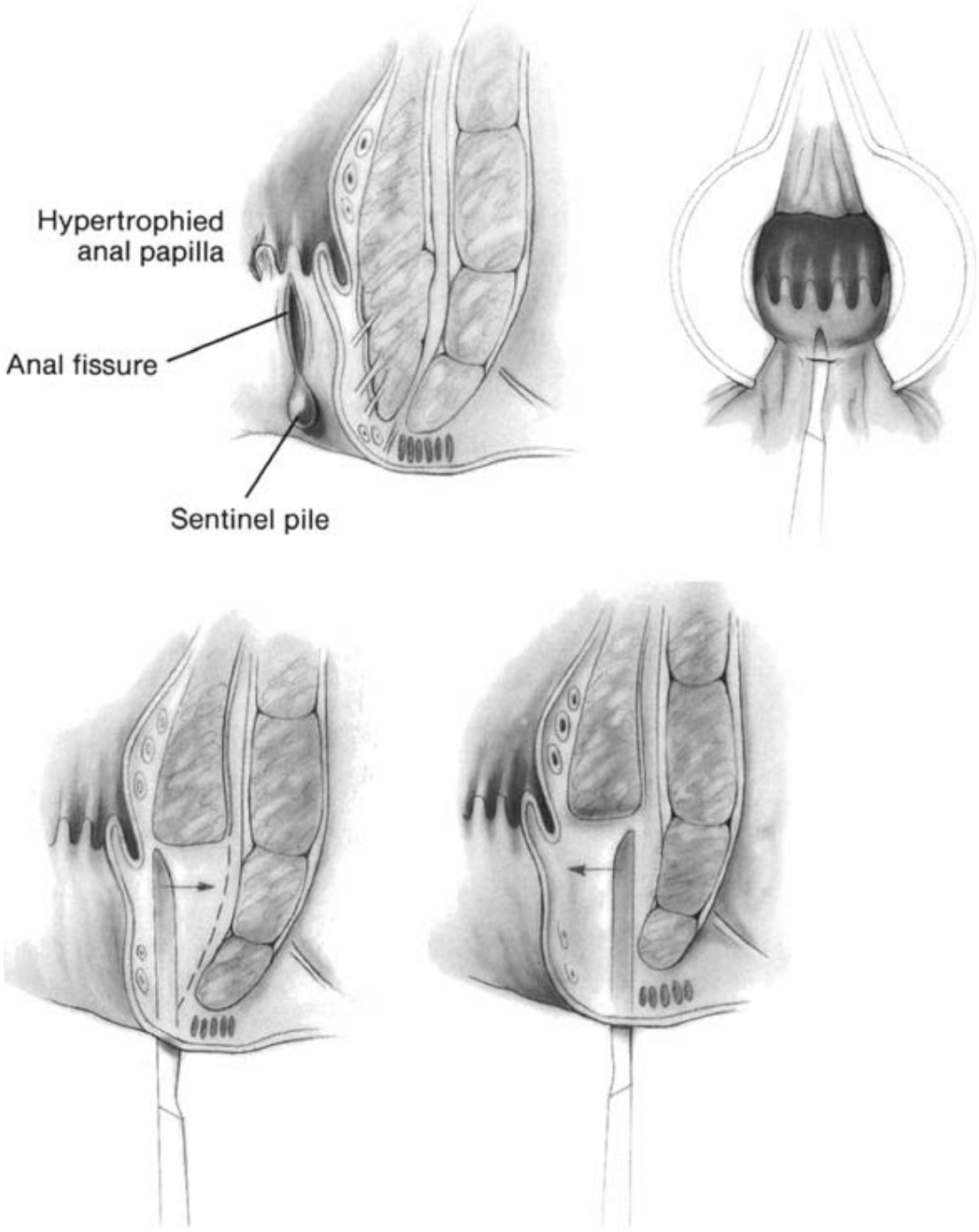


FIG 15. LATERAL INTERNAL ANAL SPHINCTEROTOMY BY NOTARAS

The procedure can be performed in the office using a local ancsthetic (e.g., 0.5% bupivacaine [Marcaine] in 1:200,000 epinephrine) or in an ambulatory surgical

facility, using a short-acting general anesthetic, spinal anesthetic, or local with conscious sedation. If the former method is used, the patient may be placed in stirrups, in the left lateral position, or in the prone jackknife position, depending on the surgeon's preference and the availability of the appropriate table. Women are obviously more accustomed to the lithotomy stirrups and are more tolerant of assuming that position. Men, however, are usually quite self-conscious, if not downright obstreperous, in the lithotomy position. If there is any concern that the patient may not tolerate the procedure in the office, it should be scheduled with the support of anesthesia.

In the office the fissure is infiltrated, as well as the site for insertion of the knife—either the right lateral or left lateral position. A narrow anal retractor (e.g., Hill-Ferguson) is employed. The intersphincteric groove is usually easily felt and the knife blade is inserted into the left lateral aspect . Some surgeons use a No. 11 blade, scissors , or a hooked knife, but a Beaver cataract blade (size 25.5 X 2.2 mm) is preferable. The knife is used as a stiletto and creates a very small wound. For a left-handed surgeon, operating on the right lateral aspect is easier. There is a theoretical advantage in cutting on the right side because the hemorrhoid sites are usually in the anterior and posterior positions, but it requires a right-handed surgeon to operate backhanded, depending on the patient's position, of course. The foregoing admonitions refer to a patient placed in the lithotomy position.

The tip of the blade is angled medially , pointing just above the dentate line, and the lower one-third to one-half of the internal anal sphincter is divided. When the knife is seen beneath the intact anal mucosa, it is withdrawn. The side of the finger is then used to break any residual sphincter fibers . If the physician pushes with the fingertip, there is a tendency to tear the mucosa, which may then lead to bleeding and possibly the subsequent development of a fistula. If bleeding occurs at the wound puncture site, it can be readily controlled by a few moments of direct pressure. If a tag or papilla is present, it can be removed by excision with scissors or electrocautery. No dressings are required, and the patient is discharged when alert.

An alternative approach is to undertake the operation without a retractor in place. The index finger senses the knife blade beneath the anal mucosa, and the residual internal anal sphincter fibers are broken by the side of the finger . Another variation of the lateral sphincterotomy is the open technique. This, too, can be performed either in the office or in the hospital. The disadvantages are that it takes longer to perform and usually requires suturing. Many surgeons prefer this approach in order to visualize the internal and the external sphincter directly for security of anatomy.

A small, radial incision is made laterally, at the lower border of the internal sphincter and continued into the intersphincteric groove . Alternatively, a curvilinear incision outside the anal verge can be used. Because of the open wound and the possibility of bleeding, it is helpful to infiltrate the area with a

local anesthetic containing epinephrine solution. The distal internal sphincter is grasped with forceps and bluntly freed. The lower one-third to one-half is divided with scissors. The wound is closed with absorbable suture material, and a small dressing is applied.

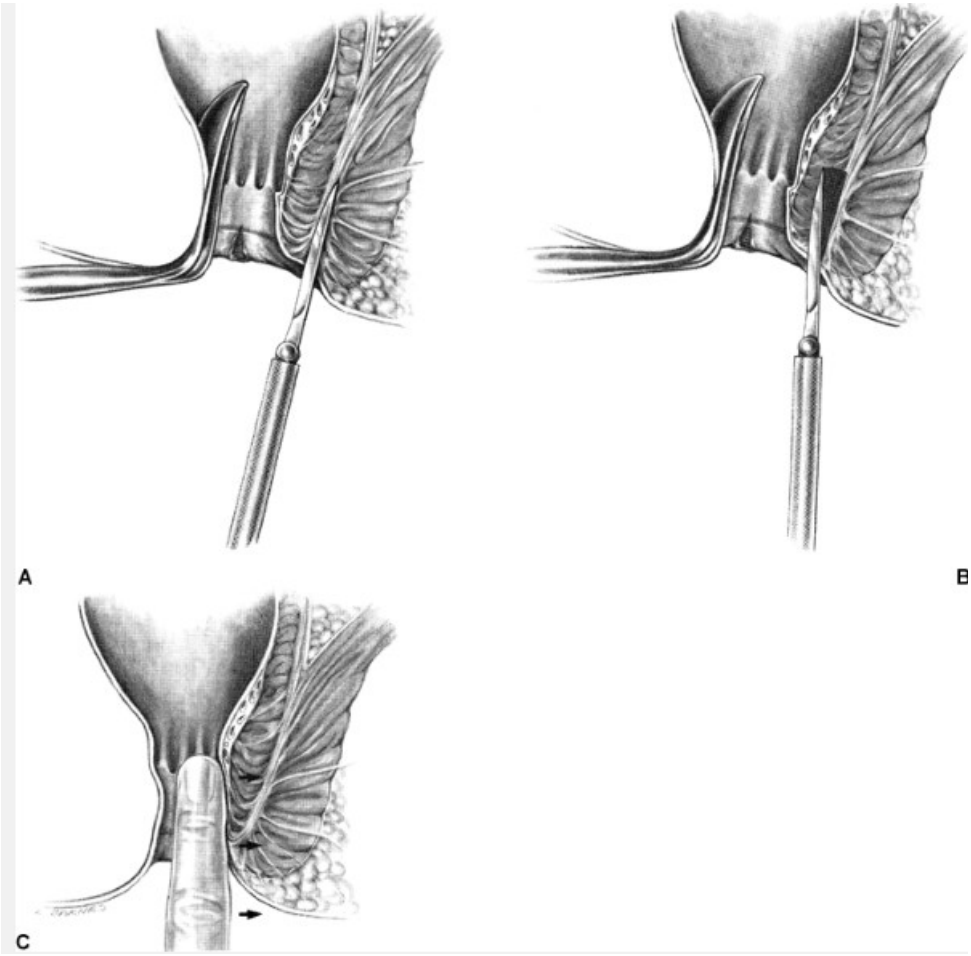


FIG 16. LATERAL INTERNAL ANAL SPHINCTEROTOMY USING THE CLOSED TECHNIQUE WITH RETRACTOR.

A: A knife is inserted into the intersphicteric groove

B: Lower one third to one half of the internal sphincter is divided

C: The residual fibres broken with finger.

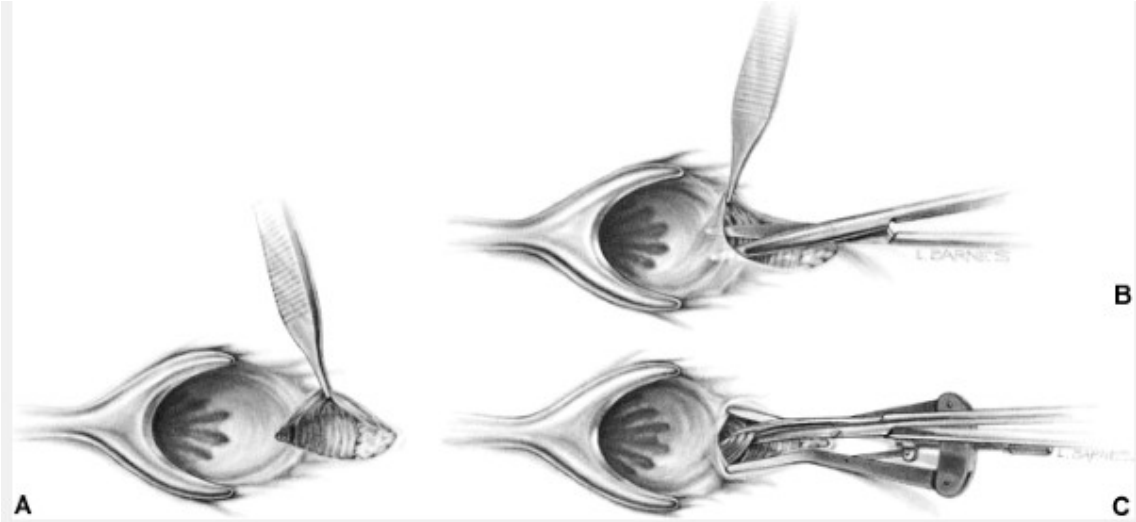


FIG 17. LATERAL INTERNAL ANAL SPHICTEROTOMY USING OPEN TECHNIQUE IN LATERAL OR JACKKNIFE POSITION

A: A radial incision is made across the intersphicteric groove. A narrow Hill-Ferguson retractor is in place.

B: the internal sphincter is separated from the anoderm by blunt dissection.

C: the internal sphincter is divided. The wound may be closed or left open.

Postoperative Care

Warm (sitz) baths and a mild analgesic are the only postoperative measures advised, Pain is often less than that experienced preoperatively, and most patients resume their normal activities within 48 to 72 hours.

Complications

Surgery for anal fissure is associated with numerous complications, most of which are preventable by the application of judicious surgical technique and, of course, by familiarity with anorectal anatomy.

Ecchymosis is frequently noted around the entrance wound if the closed technique is used, but this is of no concern.A hematoma is rare and usually the result of failure to apply adequate pressure to the site.Likewise, hemorrhage is extremely unusual by either the closed or open method, but is much more likely to occur with the open procedure. Suture ligation may be required.

Perianal **abscess** occurs after 1% of closed internal anal sphincterotomies. It is virtually always associated with an anal fistula. This presumably is the result of penetration of the mucosa of the anal canal by the knife blade . It is surprising that this complication is not seen more frequently because the anal canal mucosa must be breached more often than is suspected. Treaunent requires drainage of the abscess, identification of an internal opening if present, and fistulotomy . Fortunately, the fistula is always low and submucosal or intersphincteric, provided the sphincterotomy was carried out by dividing only the internal anal sphincter.

True fecal incontinence following a properly performed internal anal sphincterotomy should be extraordinarily rare. However, it is not that unusual for a patient to experience soiling of underclothes and incontinence for flatus. This is a particular problem in some women. Sultan and colleagues note that the performance of an internal anal sphincterotomy frequently divides more sphincter in women than it does in men. They attribute this to the shorter anal canal of women. Particular caution should be exercised in patients with prior obstetric trauma and in those women with an ectopic anus

Garcia-Aguilar and coworkers studied the anatomic and functional consequences of lateral internal anal sphincterotomy in 13 patients with incontinence and 13 who had no such symptoms. The only significant difference was that incontinent patients had undergone longer sphincterotomies. The fact that the external sphincter was also thinner in the incontinent patients suggests that a preoperative abnormality predisposed some to an increased risk of fecal incontinence, a problem that became unmasked by the addition of internal anal sphincterotomy. Mentes and coworkers undertook a study by using an anal calibrator up to a diameter of 30 mm in a randomized, prospective fashion to "control" the sphincterotomy for a specific distance rather than carrying the incision to the apex of the fissure. They noted a faster relief of pain and a lower rate of incontinence.

A keyhole deformity is a troublesome consequence of fissure excision or internal anal sphincterotomy performed in the posterior midline . The resultant

defect may produce symptoms of mucous discharge, pruritus, and soiling of undergarments. Excision of an uncomplicated acute fissure with a posterior midline sphincterotomy should be avoided; a lateral internal anal sphincterotomy is preferred . With persistent symptoms despite an appropriate bowel management program and cleansing methods, the deformity may be treated by an anoplasty .

Infection - The primary initial concern following sphincterotomy is the risk of infection, one-half of these were associated with a fistula. The two concerning issues with respect to long-term results are incontinence and recurrent or persistent fissure.

Incontinence- Complete fecal incontinence (i.e., the total loss of bowel control) should not occur following sphincterotomy because the internal anal sphincter plays very little role in maintaining anal continence. As mentioned previously, there is not a surprising relationship between the length of the sphincterotomy and the risk of subsequent incontinence problems. Notaras described 73 patients who underwent this procedure and found 4 who experienced soiling of the underclothes,2 who had imperfect control of flatus, and 1 who had occasional fecal soilage.

Recurrence: The incidence of delayed healing or recurrence is the standard of measurement for the success or failure of the operation.

If the fissure persists despite conservative therapy, repeat sphicterotomy, during which a more generous portion of the internal sphincter is divided, is the appropriate treatment. If healing still does not takes place, the patient should undergo gastrointestinal investigations to seek for the possibility of concurrent inflammatory bowel disease, assuming that this had not been accomplished previously.

Open versus Closed

Walker and colleagues reviewed their experience with lateral internal anal sphincterotomy for anal fissure and stenosis in more than 300 patients. Sphincterotomy was performed by several techniques (open, closed, multiple) and under diverse circumstances, so it is difficult to interpret the results.

It is apparent, however, that complications were lowest after the closed procedure (20%) and highest for open sphincterotomy (55%). Anal fistula occurred in three patients (l%). In the entire series, 15% reported various control difficulties, and when very strict criteria for evaluation of morbidity were used, minor complications occurred in 36%.

DERMAL FLAP COVERAGE OF THE FISSURE.

In patients sphicterotomy is done along with exicision of fissure,the defect can be closed with mucosal or dermal advancement flap.

Advancement flaps:

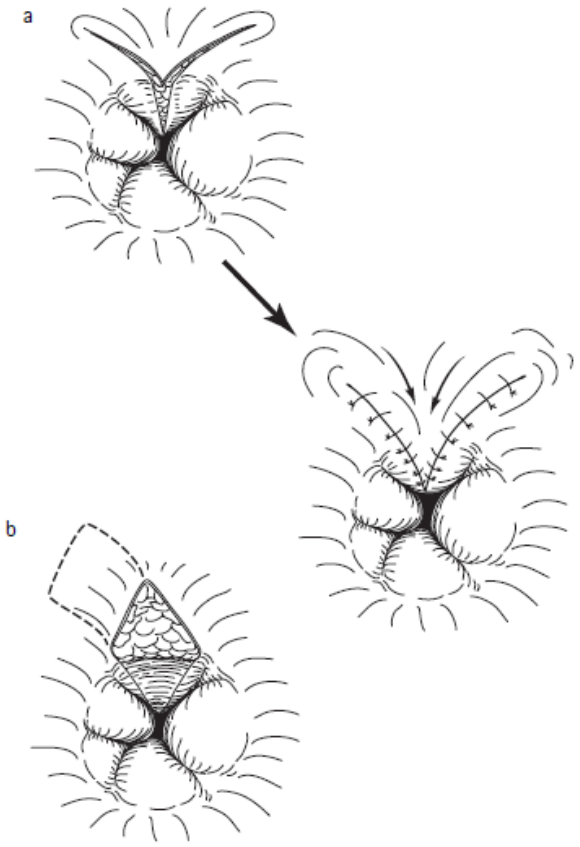


FIG 18. Y-V ANAL ADVANCEMENT FLAP

(a) A **Y-V** *anal advancement flap is a simple procedure for an anal stenosis. The* **Y** *incision at the anterior anal verge has been closed as a* **V**, *bringing extra tissue into the stenosed anus.*

(b) A chronic anal fissure can be excised and a local flap of healthy perianal skin and subcutaneous tissue brought in to fill the defect. The excision of this posterior fissure has left a diamond shaped defect. The flap has been marked. It

will be left attached to the underlying tissue from which it obtains its blood supply. The resultant donor defect can be closed or left to granulate.

A chronic fissure, which has not healed on conservative management, may also be unsuitable for any form of sphincterotomy. For example, the patient may already have some impairment of continence or is known to have had external sphincter damage during a forceps delivery. Excision of the fissure and sentinel pile with preservation of the integrity of the internal sphincter can be followed by a diamond-shaped anal advancement flap to bring healthy, well-vascularized tissue into the fissure bed.

Fissures associated with Crohn's disease are often multiple, atypical, and not in the midline. In general, surgery should be avoided. The surgeon must also be aware of other chronic ulcers in the anus including anal carcinoma, and ulcers secondary to infection with cytomegalovirus (CMV) or syphilis.

If the aetiology is in doubt, the patient should be examined under anaesthesia, the fissure assessed, a swab taken for bacteriological investigations, and a biopsy sent for histology.

Furthermore, a recent meta-analysis showed that anal dilation resulted in significantly greater persistence of disease than sphincterotomy.Retractors and balloon-tipped dilating catheters have been used for dilation in the treatment of chronic anal fissures. These more controlled dilation procedures have been reported to be as efficacious as lateral internal sphincterotomy; however, its use should be discouraged since there is no way to reliably standardize the procedure, and both the internal and external sphincters can be disrupted or

fragmented in an irregular manner, with reported incontinence rates ranging from 12.5% to 24.3%.

MATERIALS AND METHODS

This study is based on analysis of 104 patients with fissure in ano who under went treatment in Govt.Thanjavur Medical College hospital, Thanjavur, from August 2014 to August 2015.

These patients were broadly divided into two groups of 52 patients each who were managed by medical and surgical methods. For all these patients clinical examinations and routine investigations were done, which also include blood for sugar, urea and serum for creatinine and ECG.

Chest X ray was taken for all cases.

Patients who are on medical management are put on 0.2% glyceryl tri nitrate ointment topically over the perianal region twice daily for one month duration . They were also adviced high fibre diet, adequate hydration and antibiotics T.ciprofloxacin 500 mg bd and T.metronidazole 500mg tds for 5 days. All patients were adviced sitz bath twice daily.

Patients who are on surgical management were treated by open lateral anal sphincterotomy. Post operatively they were adviced twice daily sitz bath along with high fibre diet and adequate hydration.T.ciprofloxacin 500mg bd and T.metronidazole 500mg tds were given for 5 days .

Patients were observed for expected complications. Patients were discharged on 5th day. They were asked to follow up in out patient department every weekly for one month.

PREOP INSTRUCTIONS

1. Informed written consent was taken.

2. Basic investigations

3. NPO from 3.00 pm of previous day

4. IV fluids

4. INJ Tetanus toxide 0.5 cc im

5. INJ Xylocaine test dose

6. Pre op antibiotic prophylaxis with inj cefotaxime 1g IV

7. T.Dulcolax 2hs

8. T.Diazepam 5mg hs

9. Preparation of perineum ,abdomen and back.

10. Plain 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 104 patients who were treated for Chronic Fissure in Ano in Govt.Thanjavur Medical College hospital, Thanjavur,from August 2014 to August 2015.

AGE AND SEX DISTRIBUTION

The age and sex distribution of these 104 patients are shown in the table.

Out of these, 69 were male and 35 were female.

Male to female ratio is approximately 2:1.

Lowest age of patients in this study is 16.

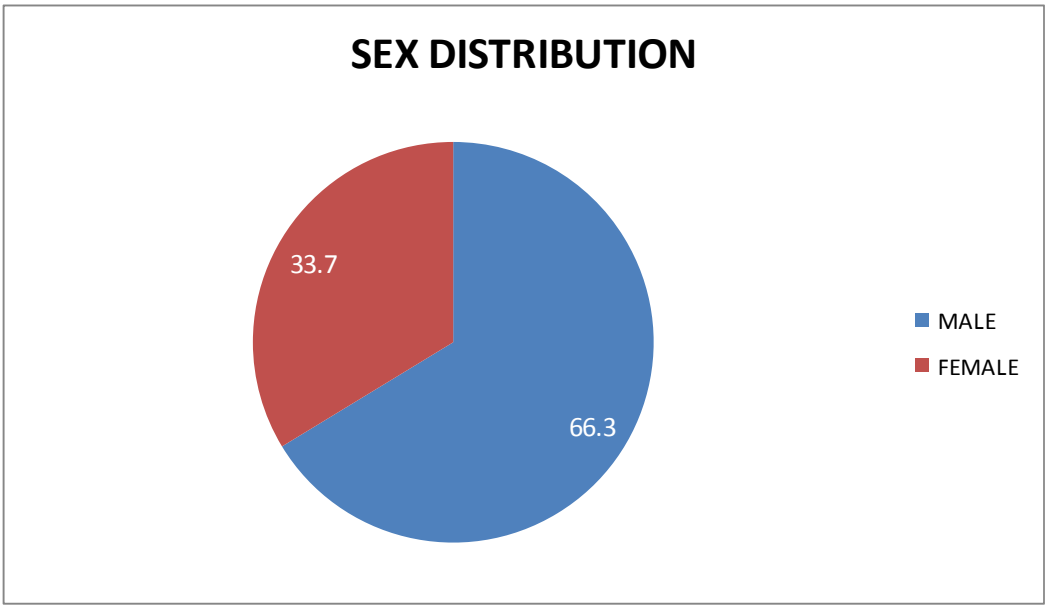
Highest age of patient in this study was 62 years.

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

TABLE 1

AGE AND SEX DISTRIBUTION

AGE GROUP	MALES	FEMALES	TOTAL	%
11-20%	5	4	9	8.7
21-30	13	6	19	18.2
31-40	17	9	26	25
41-50	25	12	37	35.5
51-60	6	3	9	18.7
>60	3	1	4	3.8



SYMPTOMATOLOGY

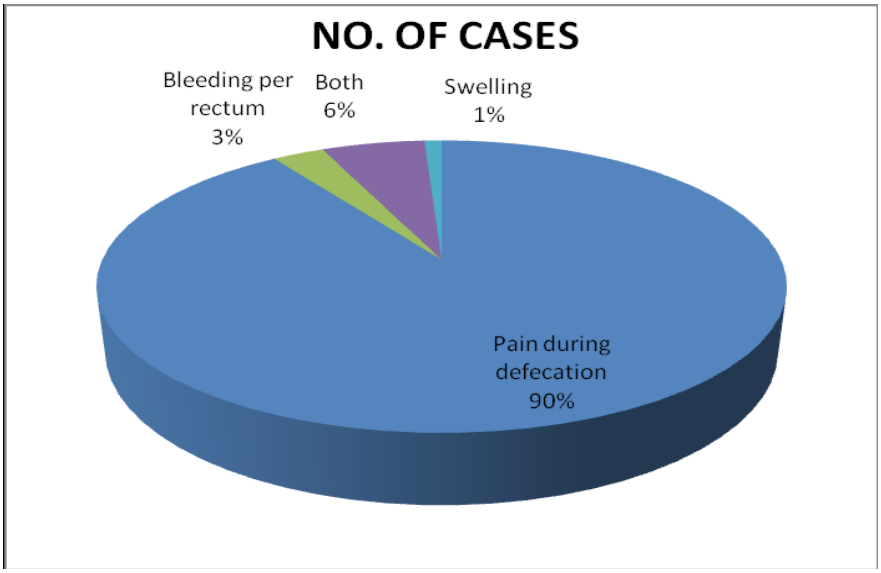
The symptomatology of these patients are shown in the table.

Majority of these patients had history of pain during defecation and bleeding per rectum. Other symptoms were swelling in the perianal region and retention of urine.

TABLE 2

SYMPTOMATOLOGY

SYMPTOM	NO. OF CASES	%
Pain during defecation	94	90.3
Bleeding per rectum	3	2.8
Both	6	5.7
Swelling	1	0.9



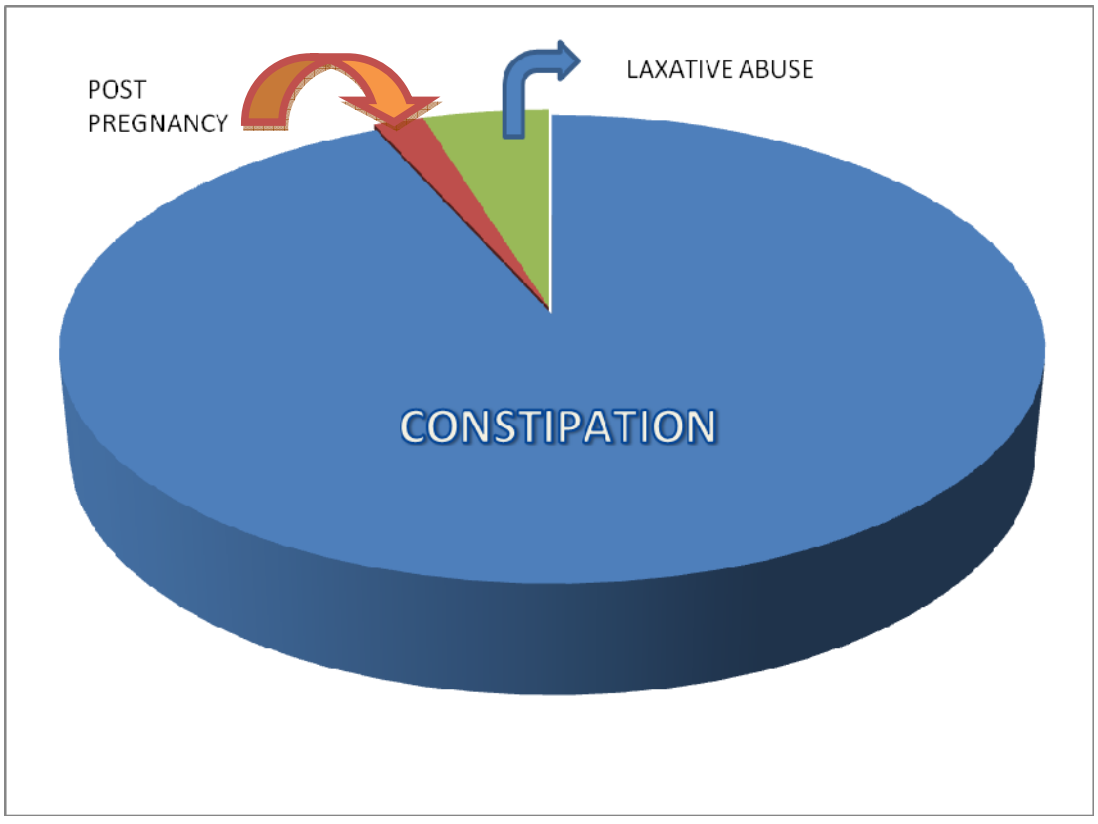
PREDISPOSING FACTORS AND AETIOLOGY

Most of these patients had constipation as the major predisposing factor.

TABLE 3

AETIOLOGY AND PREDISPOSING FACTORS

AETIOLOGY	NO. OF CASES	PERCENTAGE
Constipation	97	93.2
Post pregnancy	2	1.9
Laxative abuse	5	4.8



LOCATION OF FISSURE

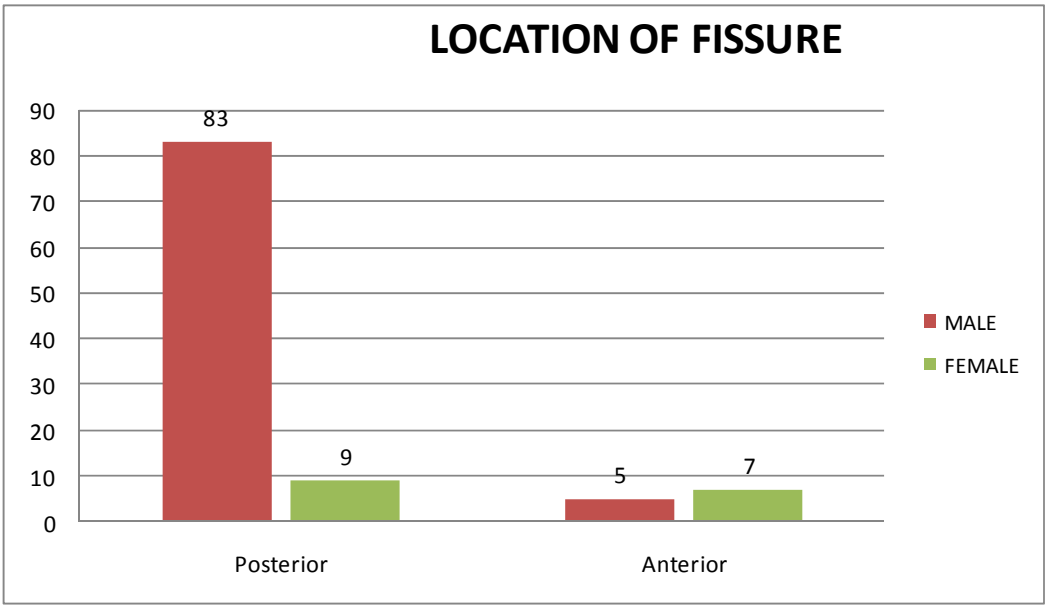
Majority of the patients who were examined by digital rectal examination had posterior fissure in ano.

Minority of patients had anterior fissure which is more common with females.

Lateral fissure was seen in few patients, the details are shown in the table.

TABLE 4
LOCATION OF FISSURE

LOCATION	TOTAL	MALE	FEMALE
Posterior	92	83	9
Anterior	12	5	7



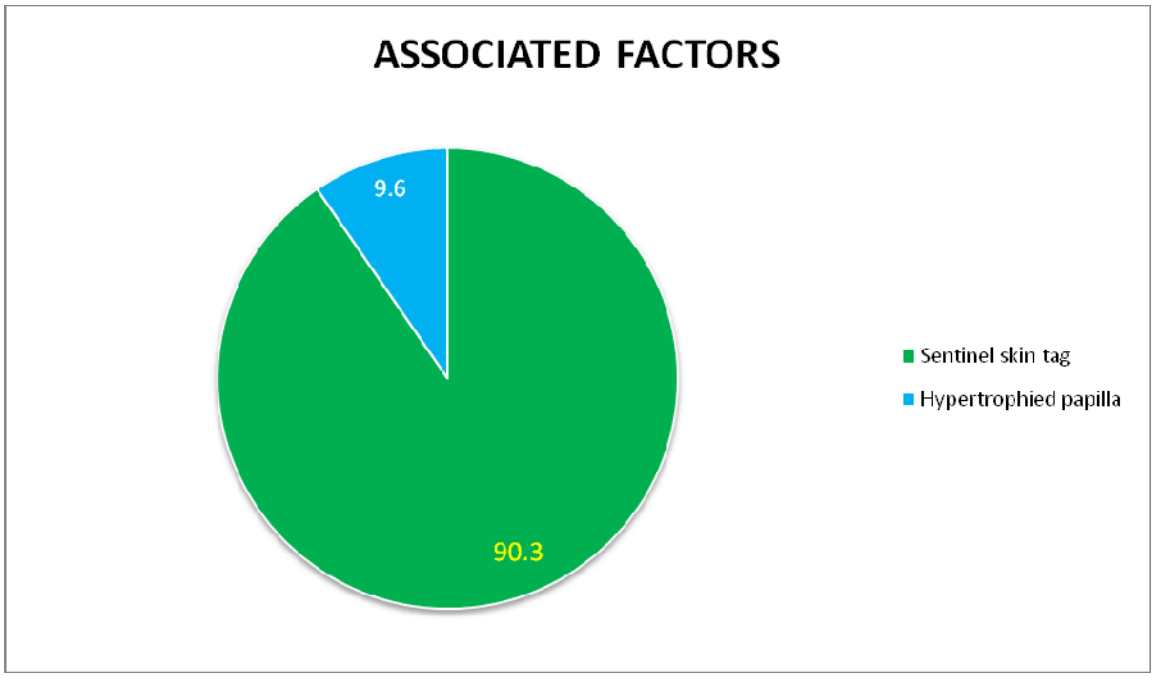
ASSOCIATED FACTORS

Majority of patients who had fissure for longer duration had sentinel skin tag along the lower part of fissure and hypertrophied papilla in the upper part.

TABLE 5

ASSOCIATED FACTORS

ASSOCIATED FACTORS	NO. OF CASES	PERCENTAGE
Sentinel skin tag	94	90.3
Hypertrophied papilla	10	9.6



MANAGEMENT

MEDICAL

52 patients out of 104 were managed by medical and conservative method of treatment. All patients were advised high fibre diet and adequate hydration and oral antibiotics.

All patients were put on 0.2% Glyceryl trinitrate ointment twice daily topically after sitz bath for one month duration.

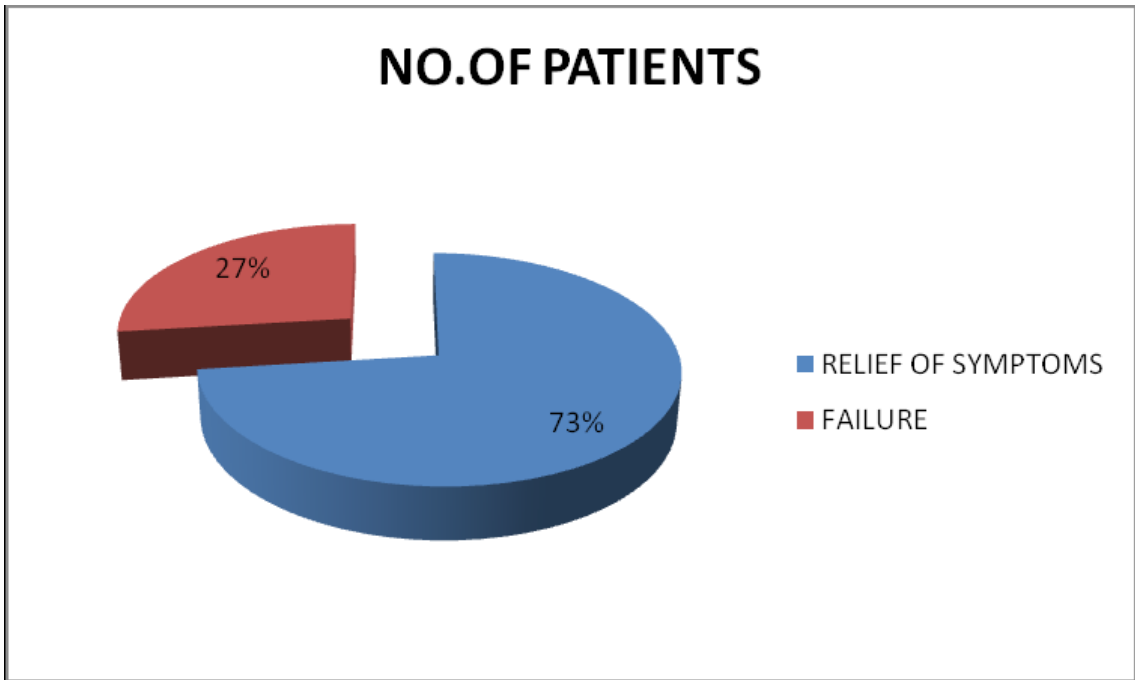
All patients were followed weekly In outpatient department for one month.

Results were inferred by relief of pain and healing of fissure. 38 out of 52 patients had relief of symptoms, which accounts to 73 % of patients who were treated medically.

Other patients had persistent pain and complications like headache.

TABLE 6

	NO. OF PATIENTS	MALE	FEMALE	PERCENTAGE
RELIEF OF SYMPTOMS	38	28	10	73
FAILURE	14	11	3	27



COMPLICATIONS OF MEDICAL MANAGEMENT

14 of the 52 patients has percipient pain and 10 patients had experienced headache as the complication of Glyceryl Trinitrate cream application

These 14 patients required conversion to surgical treatment due to failure of medical management.

SURGICAL MANAGEMENT

52 patients out of 104 were treated by surgical line of management. All patients were treated by open lateral anal sphincterotomy under spinal anaesthesia. Duration of surgery was approximately twenty minutes.

46 out of 52 patients had relief of pain and healing of fissure, which corresponds to 88.5%. Some of the patients had complications as follows.

TABLE 7

	NO. OF PATIENTS	MALE	FFMALE	PERCENTAGE
RELIEF OF SYMPTOMS	46	34	12	88.4
NO RELIEF	6	6	0	11.1

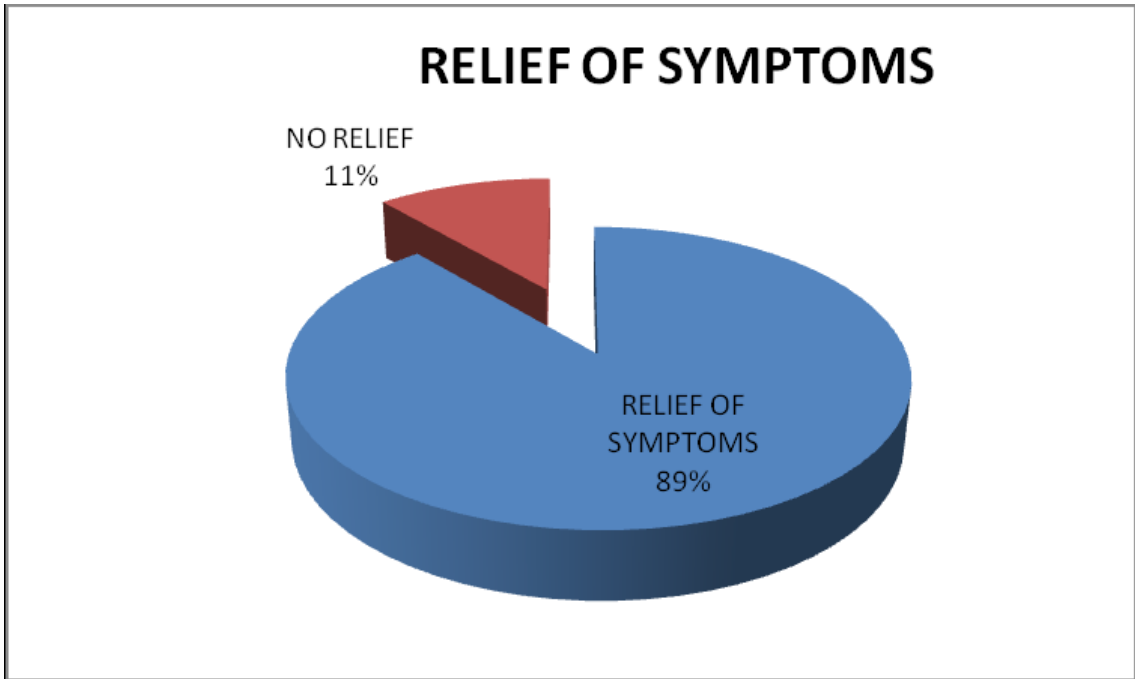


TABLE 8
COMPLICATIONS OF SURGERY

COMPLICATIONS	NO. OF PATIENTS
PAIN	6
SEROMA	3
HEMATOMA	2
INFECTION	2
PERIANAL ABSCESS	1
FISTULA	NIL
INCONTINENCE	NIL

Most of the surgical complications subsided within two weeks and patient had complete relief of symptoms.

SUMMARY

1. During the period of study(AUGUST 2014 – AUGUST 2015), 104 patients were studied .
2. These patients were broadly divided into two groups of 52 each who were treated by medical and surgical methods respectively by non-randomised control study.
3. In this study, males were commonly affected than females.
4. The most common age group were 41-50yrs.
5. Fissure in ano is rare in children and old age
6. Majority of the patients presented with pain during defecation.
7. Constipation was the major predisposing factor among all cases.
8. Most of the fissures were located in the posterior midline.
9. Most of the patients with fissures of long duration had sentinel skin tag and hypertrophied papilla.
10. Anterior fissures were slightly more common in females.
11. No patients studied had inflammatory bowel disease.
12. Patients who were treated surgically by open partial lateral anal sphincterotomy had better relief of symptoms.

13. Around 27% patients managed medically by 0.2% GTN did not have relief of symptoms after one month of treatment, who either discontinued treatment or required conversion to surgery.
14. Complication of Glyceryl trinitrate is headache which occurred in majority of patients.
15. Patients treated surgically had few complications in the preoperative period which subsided after two weeks.
16. pain is the most common post operative complication of lateral anal sphincterotomy. It is experience around 11 percentage of the patients undergoing surgery.

CONCLUSION

This prospective type of study was conducted in the Department of General surgery, Thanjavur Medical College. It can be concluded that most acute anal fissures heal with conservative measures. Those that become chronic may responds to conservative management glyceryl trinitrate 0.2% topical cream application . Persisting fissures and symptomatic patients should be considered for lateral partial internal sphincterotomy. So, in chronic anal fissure 0.2% glyceryl trinitrate application can be considered as an initial line of management.

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PROFORMA

Name:

Address:

Age/sex:

O.PNo:

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. Anemia : Present/ Absent
3. Jaundice/ Cyanosis/ Clubbing/ Edema:

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% Glyceryl trinitrate gel for local application
2. High fiber 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 SPHINCTEROTOMY GROUP

SL NO	NAME	AGE	SEX	PAIN	BLEEDING	BOTH	CONSTIPATION	LAXATIVE ABUSE	FISSURE POSITION	SKIN TAG	HYPERTROPHIED PAPILLA	PAIN RELIEF	POST SURGERY COMPLICATIONS				REMARKS
													PAIN	SEROMA	HEMATOMA	INFECTION	
1	Rajendra	24	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
2	Pitchaiyamma	33	F	YES	NO	NO	YES	NO	ANTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
3	Anukiya	14	F	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	YES	NO	NO	
4	Bharath	16	M	YES	NO	NO	NO	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
5	Saravanan	26	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
6	Mallika	24	F	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
7	Elayaraja	29	M	.	.	YES	YES	NO	POSTERIOR	PRESENT	ABSENT	NO	YES	YES	YES	NO	
8	Karthilk	26	M	YES	NO	NO	YES	NO	POSTERIOR	ABSENT	PRESENT	YES	NO	NO	NO	NO	
9	Rizwana	26	F	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
10	Arokiyaraj	37	M	YES	NO	NO	YES	YES	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
11	Gayathri	35	F	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
12	Nagarathinam	36	M	YES	NO	NO	YES	NO	POSTERIOR	ABSENT	PRESENT	YES	NO	NO	NO	NO	
13	Durairaj	45	M	NO	YES	NO	NO	NO	ANTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
14	Sarala	16	F	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	YES	NO	NO	
15	Sivakumar	18	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	NO	YES	YES	YES	YES	
16	Jegathambal	28	F	YES	NO	NO	YES	YES	ANTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	POST PREGNANCY
17	Rathish	26	M	YES	NO	NO	YES	NO	POSTERIOR	ABSENT	PRESENT	YES	NO	NO	NO	NO	
18	Vasanth	28	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
19	Neelakandan	36	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
20	Sasikala	42	F	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
21	Rajagopal	35	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	YES	NO	NO	NO	
22	Sumathi	37	F	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
23	Velmurugan	56	M	.	.	YES	YES	NO	ANTERIOR	ABSENT	PRESENT	NO	YES	NO	NO	NO	
24	Suryammal	62	F	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	YES	NO	NO	
25	Raja	38	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
26	Sameer	21	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	

LATERAL SPHINCTEROTOMY GROUP

SL NO	NAME	AGE	SEX	PAIN	BLEEDING	BOTH	CONSTIPATION	LAXATIVE ABUSE	FISSURE POSITION	SKIN TAG	HYPERTROPHIED PAPILLA	PAIN RELIEF	POST SURGERY COMPLICATIONS				REMARKS
													PAIN	SEROMA	HEMATOMA	INFECTION	
27	Aanandhi	43	F	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
28	Mananaiyaki	46	F	NO	NO	YES	NO	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
29	Nallaiya	55	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
30	Ramu	34	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
31	Bhuvaneshwar	48	F	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
32	Kavitha	49	F	YES	NO	NO	YES	NO	ANTERIOR	ABSENT	PRESENT	YES	NO	NO	NO	YES	
33	Sangiliammal	46	F	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
34	Ramasamy	45	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
35	Ayyasamy	35	M	YES	NO	NO	NO	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
36	Ranjithammal	60	F	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
37	Dhanapal	44	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	NO	YES	NO	NO	NO	
38	Muthuvel	34	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
39	Manisamy	42	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
40	Jeyakumar	33	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
41	Annadurai	61	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
42	Banumathi	53	F	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
43	Marimuthu	35	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	NO	YES	NO	NO	NO	
44	Karthikeyan	43	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
45	Jeevaraman	34	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	SWELLING
46	Pappathi	61	F	NO	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
47	Kumar	42	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
48	Senthilkumar	44	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
49	Palanisamy	45	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
50	Velmurugan	44	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	NO	YES	NO	NO	NO	
51	Murugesan	46	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	
52	Manivel	47	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	NO	NO	

GTN 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	
31	Balaji	24	M	.	.	YES	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	
32	Arokiamary	60	F	YES	NO	NO	YES	NO	ANTERIOR	PRESENT	ABSENT	YES	NO	NO	
33	Gunasekaran	50	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	
34	Lakshmi	36	F	YES	NO	NO	NO	NO	POSTERIOR	ABSENT	PRESENT	NO	YES	NO	
35	Vadivel	28	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	NO	NO	YES	
36	Aandal	38	F	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	
37	Vishwanathan	36	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	
38	Rangasamy	55	M	YES	NO	NO	YES	NO	ANTERIOR	PRESENT	ABSENT	NO	YES	YES	
39	Mahesh	29	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	
40	Sengamalam	60	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	NO	YES	NO	
41	Vinoth	26	M	YES	NO	NO	YES	NO	POSTERIOR	ABSENT	PRESENT	YES	NO	NO	
42	Rajammal	60	F	YES	NO	NO	YES	NO	ANTERIOR	PRESENT	ABSENT	YES	NO	NO	
43	Sakthivel	43	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	
44	Rajendran	38	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	NO	YES	NO	
45	Rajavel	37	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	YES	
46	Subramanian	52	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	NO	YES	NO	
47	Kathiresan	62	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	
48	Lakshmanan	46	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	YES	
49	Sridhar	45	M	NO	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	
50	Rajayya	43	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	
51	Subbu	42	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	YES	
52	Palaniyappan	44	M	YES	NO	NO	YES	NO	POSTERIOR	PRESENT	ABSENT	YES	NO	NO	