

THE ART OF
Surgical Proctology

MARIO PESCATORI
MD FRCS EBSQ

A PROCEDURAL ATLAS OF PROCTOLOGIC GOLD STANDARDS,
INNOVATIONS AND TRICKS OF THE TRADE



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Dedication

“To my dear friend Andrew Zbar. Surgeon, scientist, educator and publisher”



Acknowledgements

I acknowledge the tireless assistance of my young colorectal colleagues Lorenzo Ascione and Stella M Ayabaca without whose effort in collation of cases and in keeping me focused in my endeavors, this book would not have been possible. I also appreciate the support of the Sapimed Company Italy for the provision of essential disposable proctological equipment used in the management of our cases.



Foreword

In the last decade, there has been a plethora of textbooks published in the English language, dealing solely with Colon and Rectal Surgery. This is a great testimonial to the increasing interest by practicing surgeons, trainees, and medical students in this particular specialty. The latest entry in the field is “The Art of Surgical Proctology: A Procedural Atlas of Proctologic Gold Standards, Innovations, and Tricks of the Trade” by Mario Pescatori, M.D., FRCS, FBSQ. This is a unique text, extensively illustrated by the author himself and organized in an unorthodox fashion. For example the text covers anorectal sepsis (abscess/fistulas), hemorrhoid surgery, obstructed defecation, rectal prolapse and incontinence surgery. After dealing with complications of stapled hemorrhoidopexy (PPH) and stapled transanal rectocele resection (STARR), the book picks up anal stenosis, tumors, TAMIS and PISTA procedures and then returns to the topic of fissure, condyloma, presacral tumors, hidradenitis suppurativa and rectovaginal fistulas.

When dealing with a monogram, the reader has to yield to the preference of the author and this book is no exception. Also because it is presented as an atlas there are no extensive bibliographies to be found at the end of each chapter. The reader must pay attention to the name of the author and the date of the particular publication cited in the text. Then there are the illustrations, which one must get used to, because they are different from the usual line drawings by artists and medical illustrators. They remind us of hand drawings much like what our professors in years past used to draw on blackboards. However, the drawings and the operative photographs accompanying the illustrations complement each other very nicely and help the reader conceptualize and understand the nuances and the steps of each particular surgical procedure.

The Art of Surgical Proctology is a labor of love by a single author who provides the text, the operative photographs and personal line drawings all in an atlas format. This is the difference from other texts. As a monogram it reflects the particular techniques as well as the preference of the author and this needs careful attention and getting used to. But the aficionados of colon and rectal surgery will get to appreciate and love this work and surely it will soon occupy its deserving place in the collections of medical libraries, surgeons, teachers, and students of colon and rectal surgery alike.

Herand Abcarian, M.D., FACS
Professor of Surgery University of Illinois
Chicago, February 2014



Preface

I have created an Atlas of Surgical Proctology designed for general surgeons, colorectal surgeons and colorectal trainees, reporting more than 100 surgical procedures step-by-step and highlighting the crucial parts of each operation. The equipment used in my patients is attached in an *Appendix* and was provided by Sapimed Italy who supplied a range of disposable examining and operating proctoscopes and rectoscopes with readily transportable lighting systems. In this book, there are cautionary notes and “tricks of the trade” inspired by a 40 year experience in the management of anorectal and pelvic floor disorders. Both benign and malignant conditions are described along with some of the newer innovations and high-tech procedures including anal fistula plugs and glues, biologic mesh insertion for rectourethral and rectovaginal fistulas and the TAMIS procedure. Minor office type procedures are outlined for junior surgeons and trainees and are juxtaposed with more complex operations designed to display the full gamut of a tertiary colorectal referral practice. Each operation is illustrated with color drawings and many are supplemented with correlative operative photographs. These are accompanied by detailed captions explaining many “do’s and don’ts” which will often prevent intra- and post-operative complications or which will assist in their management should they occur. The advice offered has come from my practice where nearly half of the patients present with some form of postoperative anorectal or pelvic floor dysfunction and represents the *raison-d’être* for writing this book at this time.

Mario Pescatori MD FRCS EBSQ
Rome, Italy January 2014



Anorectal Sepsis: Abscess and Fistula

To paraphrase Professor John Goligher who produced his enduring book for surgeons which was literally the 'Bible' of coloproctology, [Goligher 1980] "it is more difficult to operate on a complex recurrent fistula than a rectal cancer". Phillips and Lunniss from St. Mark's Hospital who some years later wrote a definitive text on anal fistula management accepted that some degree of fecal incontinence was the price paid by many patients for fistula cure [Phillips and Lunniss 1995]. Against this background, the scenario has dramatically changed over the last 20 years, as shown by Herand Abcarian and his unit from Chicago where in the 1990's they laid open 80% of fistulae but where by 2010 they reported that a sphincter saving procedure was performed in 80% of their cases [Dudukgian and Abcarian 2011]. Patients are generally more afraid of incontinence than they are of recurrence which explains why novel sphincter saving procedures are evolving including the Ligation of the Inter-sphincteric Fistula Track (LIFT), fistula plug insertion, injection treatments of autologous centrifuged fat, adipose-derived stem cells [Herreros et al. 2012] or biocompatible glues, the Video-Assisted Anal Fistula Treatment (VAAFT) and laser fistula ablation, along with other new technologies. Older surgeons, who previously just had to choose between a fistulectomy with a cutting seton and a fistulotomy, may be overwhelmed by the bewildering array of operative choices currently available. Despite these advances, however, with initial successes many of these clever strategies fail over time with durable success rates that settle around 50% over the medium- to longer-term as shown by Altomare et al. reporting results from a prospective multi-center Italian study of fibrin glue (Tissucol) [Altomare 2011].

Fistulotomy and curettage can be performed for low trans- and inter-sphincteric fistulae and fistulectomy can be supplemented by a rectal mucosal flap advancement which is successful in 70-80% of the cases, so that these alternatives should be part of the armamentarium of the modern colorectal surgeon. Even simpler methods, such as the lay-open of high fistulae and the direct closure of the fistula opening following a fistulectomy can be successful and are able to preserve continence in most cases [Athanasiadis et al. 2004; Atkin et al. 2011]. My preference is for a hybrid partial excision of the fistula track and then a straight-forward inner lay-open fistulotomy. This technique permits the recognition of the sphincters where the latter part of the method ensures that minimal muscle is divided. As I learned from Sir Alan Parks, it is also valuable to

divide the lower part of the internal anal sphincter so as to adequately drain the intersphincteric plane which in 70% of the cases is the site of the primordial abscess. What I don't do, however, is to rigorously search for the internal opening if it is not obvious. If I can't find it, it may be obliterated or simply absent, (a hematogenous and not a crypto-glandular infection), so that I don't take the risk of iatrogenically creating a false opening by injudiciously pushing a probe towards the suspected crypt. I routinely perform marsupialization of the surgical wound as it reduces the size of the defect, diminishes the risk of perioperative bleeding and ensures a faster convalescence without increasing the postoperative pain. It is also a technique that is recommended in the guidelines of the Association of Coloproctology of Great Britain and Ireland (ACPGBI) [Williams et al. 2007]. Contrarily to Robin Phillips, I think that preoperative anal ultrasonography using a rotating endoanal probe and selective magnetic resonance (MR) imaging are often useful in assessing the anatomy of the sepsis prior to surgery, even if I dedicate the first phase of the operation to a careful digital assessment.

It is important to tailor the operation to the individual patient and to the position of the fistula. A young male is at much less risk of postoperative incontinence than a multiparous female and the lay-open of an anterior fistula is more likely to cause incontinence than a posterior fistulotomy. There are certain ground rules in the performance of a mucosal advancement anoplasty. Here, the rules of plastic surgery apply so that suture line tension is avoided and so that there is adequate vascularization of the flap. In this regard, the shape of the flap should be like a "lip" and not a "tongue"; namely that the base of the flap should be wider than its length. The flap should comprise rectal mucosa, submucosa and a bit of muscle so as to ensure more strength (and vascularity) to the anoplasty. The flap is better raised using either a knife or scissors rather than diathermy in order to avoid ischemia of the edges and so as to reduce the risk of dehiscence [Kodner et al. 1993]. The rectal flap should not be sutured to the anal skin, (to the anal verge), in order to avoid a mucosal ectropion (the so-called Whitehead deformity) which results in a "wet anus" with some degree of soiling and seepage. Instead, the suture line should be placed inside the anal canal, although not too low where it can be "protected" by the distal end of the internal sphincter to ensure satisfactory continence [Lagares-Garcia et al. 2002].

The construction of a rectal flap following fistulectomy is contraindicated when there is frank pus in the operative field, (i.e. in cases with an associated acute abscess) and also when there is active proctitis as may happen in some cases of Crohn's perianal fistulae. When the above mentioned criteria are strictly followed, one may expect a success rate of 70-80% with mucosal advancement anoplasty. In case of failure however, (i.e. where there is a wide flap dehiscence after fistulectomy), a cutting seton may be inserted under local anesthesia in the office after having divided the skin and dermis below the seton exit point just outside the anus.

Anorectal Sepsis: Abscess and Fistula

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One fistula is almost never exactly identical to another and the presence of deep sepsis may contraindicate the use of most of the exciting innovations. Included in this (and other) chapters is the management of a rectovaginal fistula. In this chapter, simple direct repair is presented. For rectovaginal fistula, there are a myriad of approaches with a moderate (20% or more) expected rate of failure after the first procedure. The outcome for these patients is worse in those with Crohn's disease and also depends on whether the fistula is low or high, or large or small and on the presence or absence of active proctitis. The surgical approach is also dependent upon the underlying fistula etiology and the presence of associated weakened sphincters where an endoanal repair is contraindicated. The range of options include transanal, perineal, transvaginal and even transcoccygeal approaches, as I have listed in my book *Prevention and Treatment of Complications in Proctological Surgery* [Pescatori 2012].

The final area covered in this chapter is that of rectovaginal fistula, a condition with multiple etiologies and occurring in complex fistula, perianal Crohn's disease, as part of a post-obstetric injury and after endorectal stapled surgery. The section shows direct meticulous repair which is often successful but which may need to be supplemented with the interposition of autologous tissue or biologic mesh. Out of the fourteen or so listed procedures for its management (and there might be more), I have personally performed nine. In this regard, Wexner and his group at the Cleveland Clinic Florida, reported their outcomes after a range of different procedures, highlighting those prognostic factors for successful repair [Pinto et al 2010]. The role of the surgical innovations such as the Surgisys (Cook Bloomington, IN) plug [Gonsalves et al 2009; Yaramov et al 2010] or the injection of stem cells [Garcia-Olmo et al 2010], both of which I have never performed, are awaited. In this book, I illustrate the use of a Martius bulbospongiosus graft which I have only performed on one occasion [Cui et al 2009] along with the technique of performance of a graciloplasty as an interposition designed for this purpose [Zmora et al 2006]. Among the innovations, I also like the interposition of biological mesh between the rectum and the vagina, as it is not too costly and is often effective.

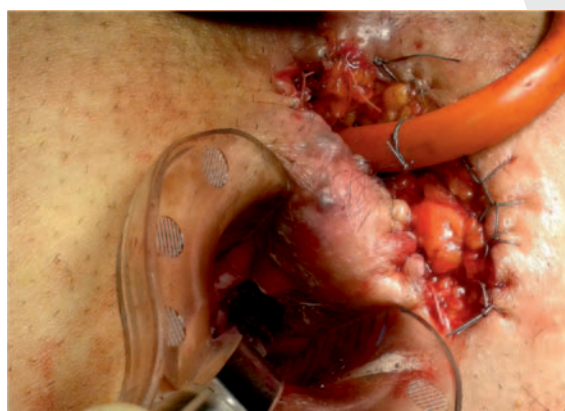
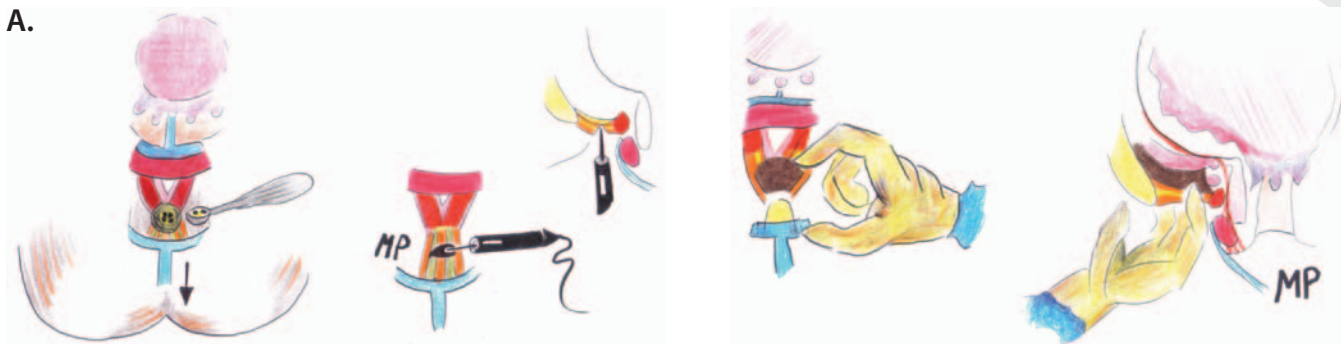
Finally, many studies have reported that an operation for complex fistula is more likely to be successful in the hands of a specialist, where it is advised that a general surgeon may well just position a draining seton and send the patient to an accredited colorectal surgeon with extensive experience of fistula management.

CHAPTER 1 ANORECTAL SEPSIS: ABSCESS AND FISTULA

- 1.1. ANATOMY OF THE PERIANAL AND ISCHIORECTAL SPACES**
- 1.2. FISTULECTOMY, FISTULOTOMY AND MARSUPIALIZATION**
 - 1.2.1. Fistulotomy and Abscess Excision
 - 1.2.2. High Trans-sphincteric Fistula With an Ischiorectal Abscess Managed by Abscess Drainage, Fistulectomy With Primary Suture of the Internal Fistula Opening
 - 1.2.3. Hybrid Fistulectomy plus Fistulotomy
- 1.3. SETON POSITIONING, REPOSITIONING AND FISTULA RE-ROUTING**
 - 1.3.1. Seton Insertion
 - 1.3.2. Seton Railroading and Hybrid Seton Use for a Horse-shoe Fistula
 - 1.3.3. Fistula Re-routing Procedure
- 1.4. MUCOSAL ADVANCEMENT ANOPLASTY**
- 1.5. LIGATION OF THE INTERSPHINCTERIC FISTULA TRACT (LIFT)**
- 1.6. FISTULA ABLATION**
 - 1.6.1. Fibrin Glue Instillation
 - 1.6.2. The Anal Fistula Plug
 - 1.6.3. Autologous Tissue Instillation
 - 1.6.4. Video-Assisted Anal Fistula Treatment (VAAFT)
- 1.7. RECTOVAGINAL FISTULA MANAGEMENT**
 - 1.7.1. Direct Layered Repair
 - 1.7.2. Repair of Post-Obstetric Rectovaginal Fistula
 - 1.7.3. Post-STARR Rectovaginal Fistula

1.1. ANATOMY OF THE PERIANAL AND ISCHIORECTAL SPACES

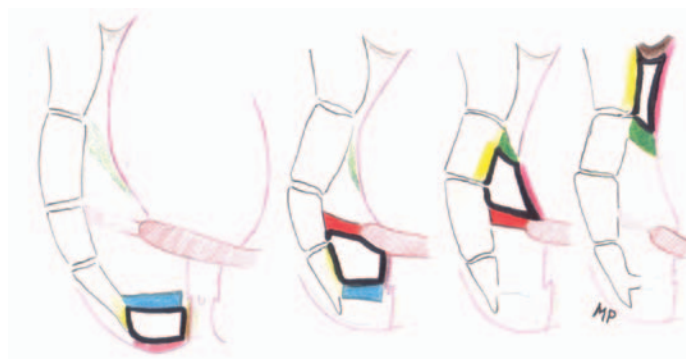
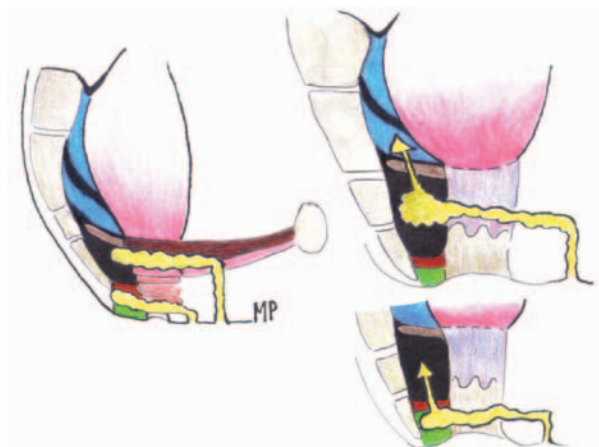
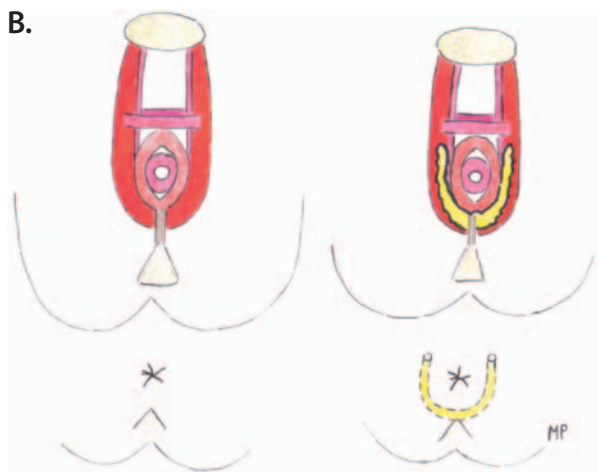
A.



- A. An abscess may extend into the retrorectal space requiring formal drainage through the levator plate with placement of a translevator DePezzer catheter as shown in an operative image. The schematic image shows sectioning of the anococcygeal ligament for entry into this space.

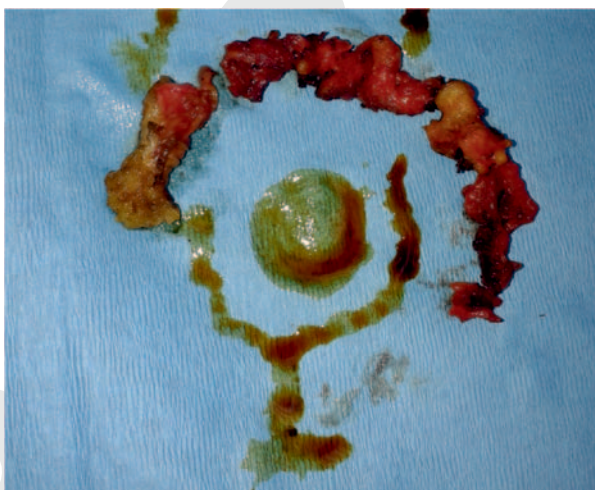
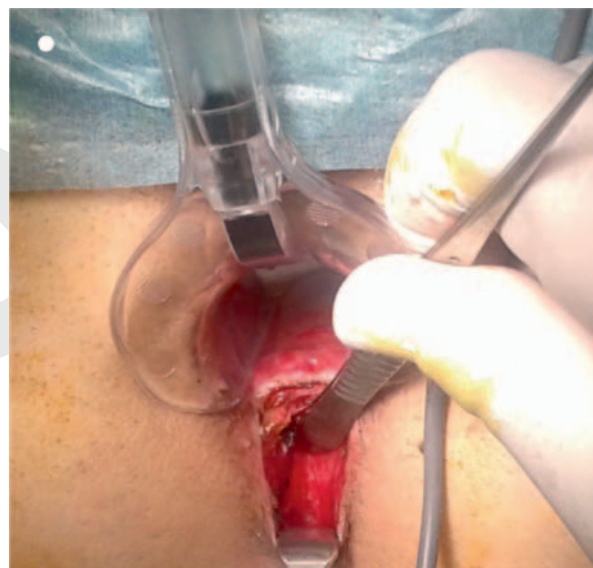
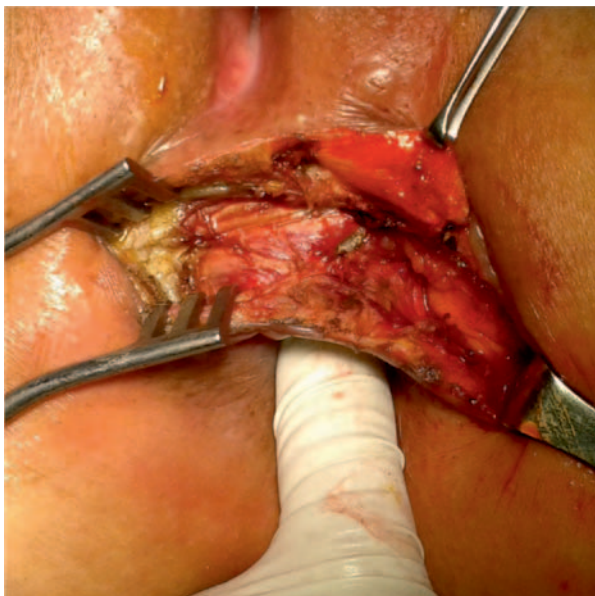
Schematic Legend: (*Top Left Image:* Superficial part of the external sphincter: “V”-shaped red. Deep part of the external sphincter: pink. Ano-coccygeal ligament: dotted yellow-orange. Coccyx: yellow. Retractors: blue. *Top Right Image:* Palpation of a deep abscess - brown).

B.



- B.** The operative images show anterior horse-shoe formation with dissection of the anterior intersphincteric plane which communicates with the ischiorectal space (*Top Left and Top Right*). The technique of opening the retroanal space for sepsis is shown (*Bottom Left and Bottom Right*).

C.



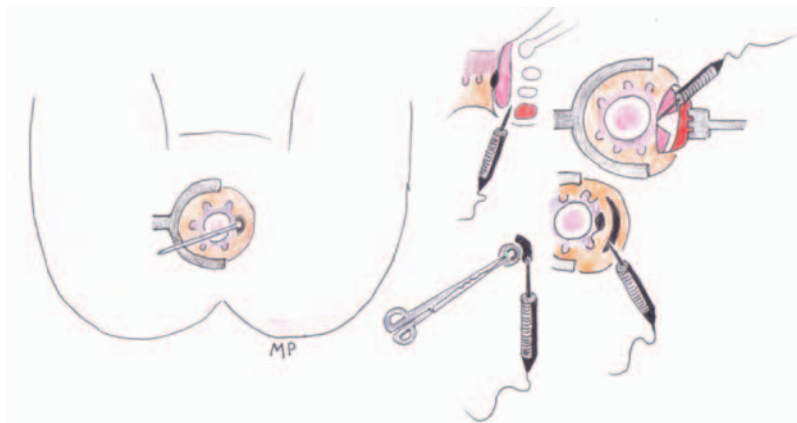
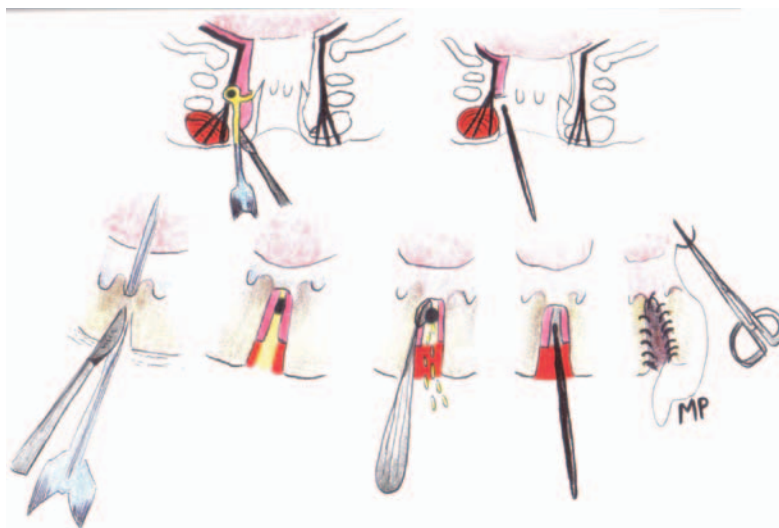
C. Operative images of the anatomy of the antero- and retroanal abscesses is made with specimens of excision sent to the pathologist.

Comment: The surgeon should avoid opening up a communication between a diseased and an intact space as this maneuver is likely to extend the septic process.

1.2. FISTULECTOMY, FISTULOTOMY AND MARSUPIALIZATION

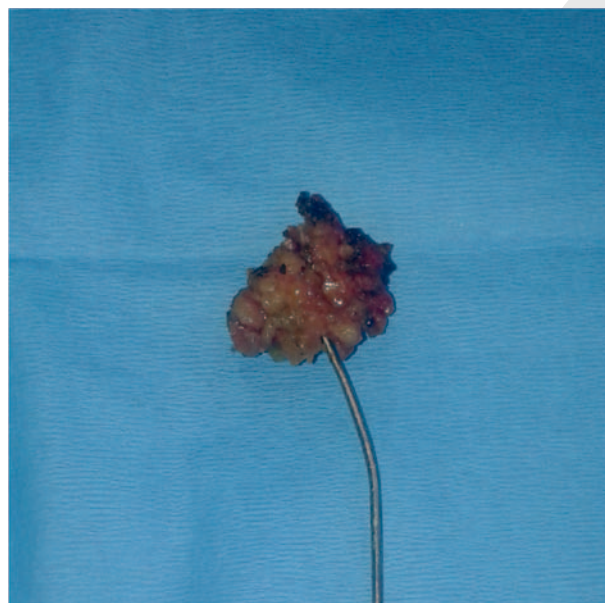
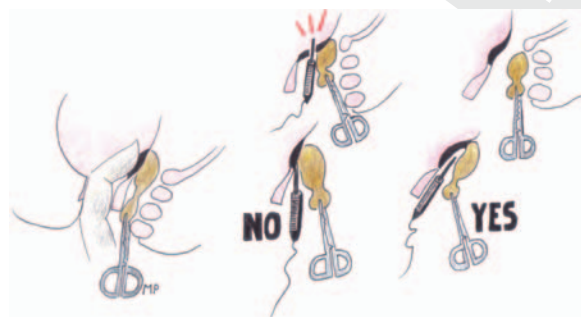
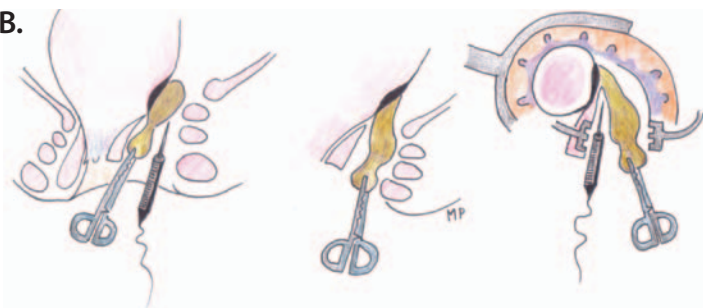
1.2.1. Fistulotomy and Abscess Excision

A.



- A. Intersphincteric dissection is carried out for an intersphincteric collection with partial fistulotomy and fistula curettage. The internal anal sphincter is typically divided in order to provide adequate drainage. The corresponding operative photograph shows entry into the perianal space.

B.



- B. By staying in the plane of the abscess wall, in some cases formal abscess excision can be performed. No attempt is made to excise the abscess at this point as it may lead to inadvertent rectal perforation leaving the rectal fibrosis intact. The photograph confirms formal abscess excision.

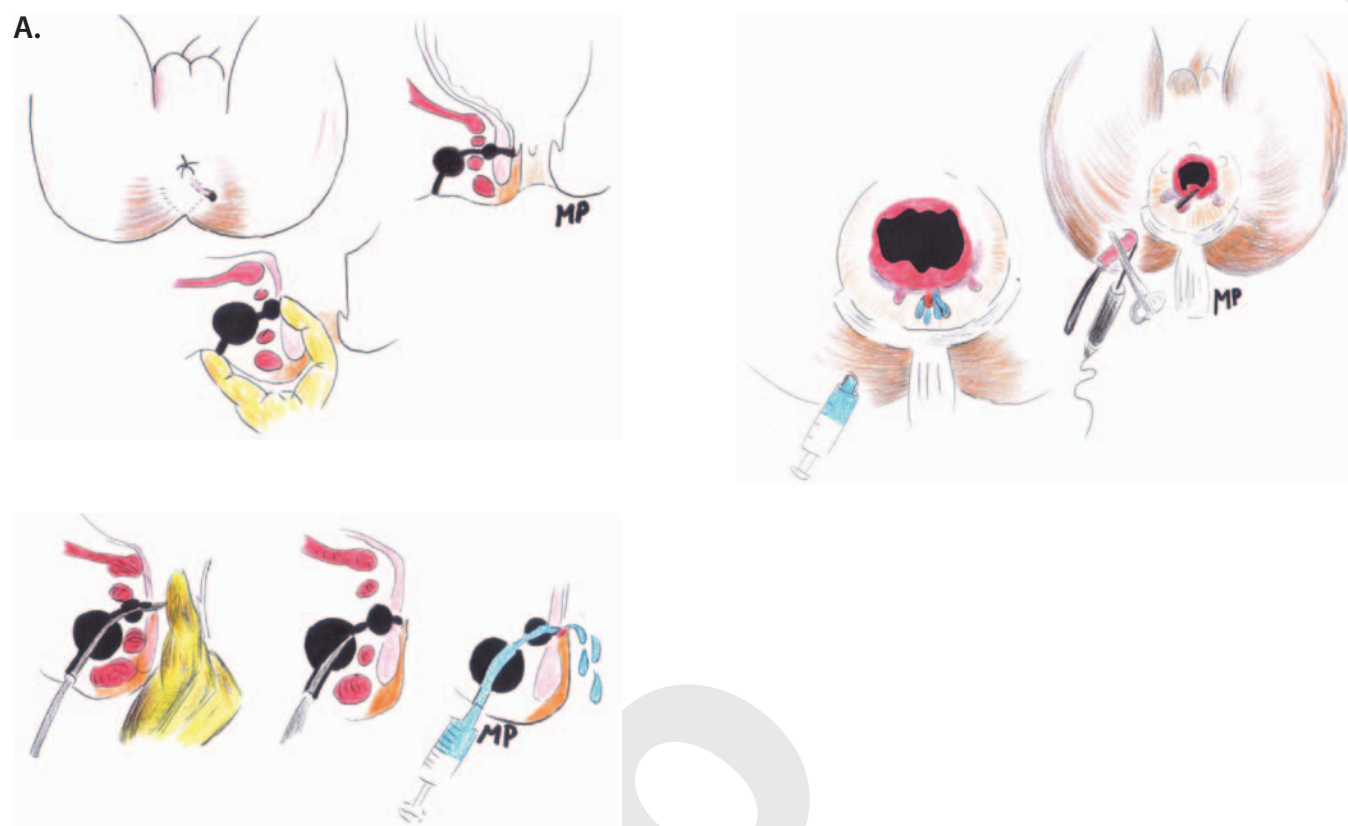
C.



C. In those cases where abscess excision is not feasible the wound may be marsupialized.

Comment: In case of a high intersphincteric fistula without an external opening, I would advise caudal extension for 2-3 cms outside of the anal verge which ensures better drainage and permits easier irrigation of the cavity.

1.2.2. High Trans-sphincteric Fistula With an Ischiorectal Abscess Managed by Abscess Drainage, Fistulectomy With Primary Suture of the Internal Fistula Opening



A. Abscess drainage and commencement of the fistulectomy with irrigation.

B.

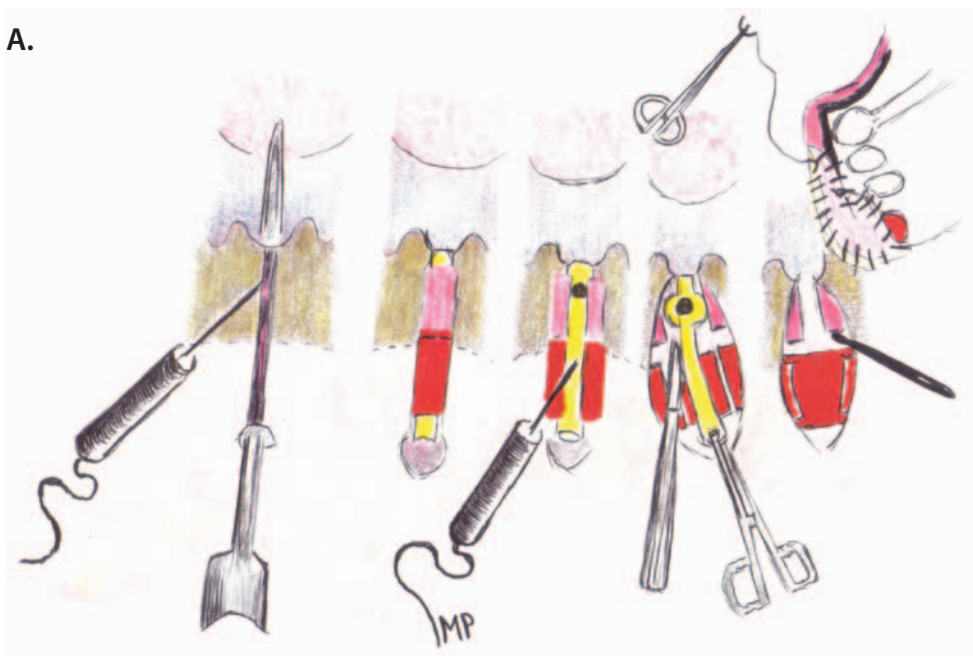


- B.** The internal opening is directly closed. The wound may either be packed or marsupialized depending upon its size. The technique of direct suture of the internal fistula orifice is patterned after that described by Athanasiadis, Greece.

Comment: Suture dehiscence is more likely to occur with a single-layer closure of the internal fistula orifice.

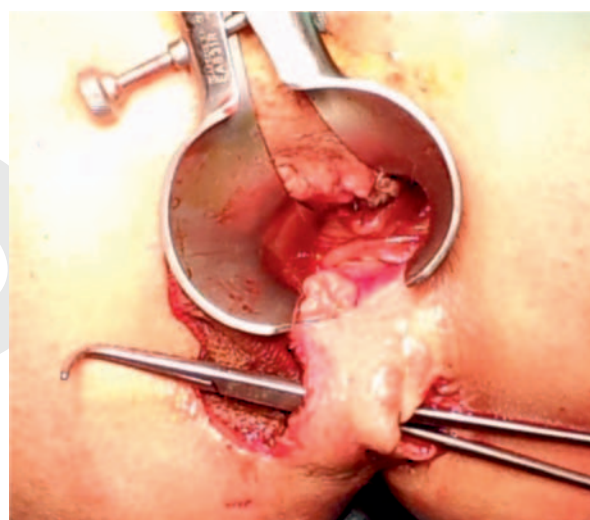
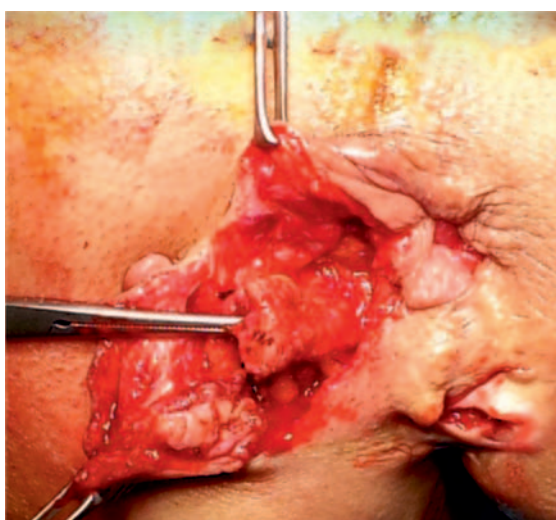
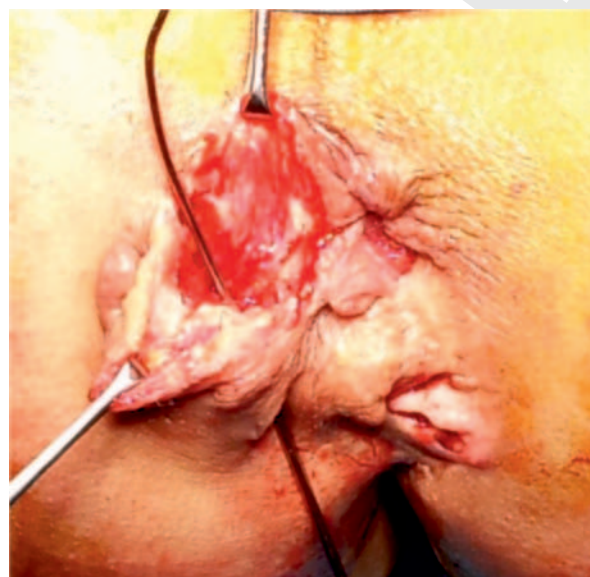
1.2.3. Hybrid Fistulectomy plus Fistulotomy

A.



- A. The distal superficial part of the fistula is treated with a fistulotomy to reduce muscle division and the deep inner portion is precisely excised as a fistulectomy. In the schematic case the wound is marsupialized which speeds healing and reduces the risk of postoperative bleeding.

B.



- B.** Operative images are shown of the technique for a ramifying fistula with multiple external openings and a horse-shoe component. The top left image shows a 36-year old male with a complex horse-shoe fistula. The top right image shows a deep fistulectomy. The bottom left image shows a superficial fistulotomy and the bottom right image shows communication between the ischiorectal and postanal spaces.

Comment: I learned the principles of this approach from Sir Alan Parks. In this setting, the intersphincteric track crosses the subcutaneous part of the external anal sphincter crossed by the distal fibers of the longitudinal muscle (Parks' *corrugators ani*). When dealing with patients with weak sphincters at risk of postoperative incontinence, it is better not to perform a straight-forward fistulotomy as it might completely divide the subcutaneous portion of the external anal sphincter and affect anal continence. A hybrid fistuotomy-fistulectomy is also useful when dealing with low fistulae where the anatomy is unclear, permitting a decision intraoperatively of either completing the fistulotomy or converting it into a fistulectomy where the amount of sphincter to be divided may be visualized and palpated.

1.3. SETON POSITIONING, REPOSITIONING AND FISTULA RE-ROUTING

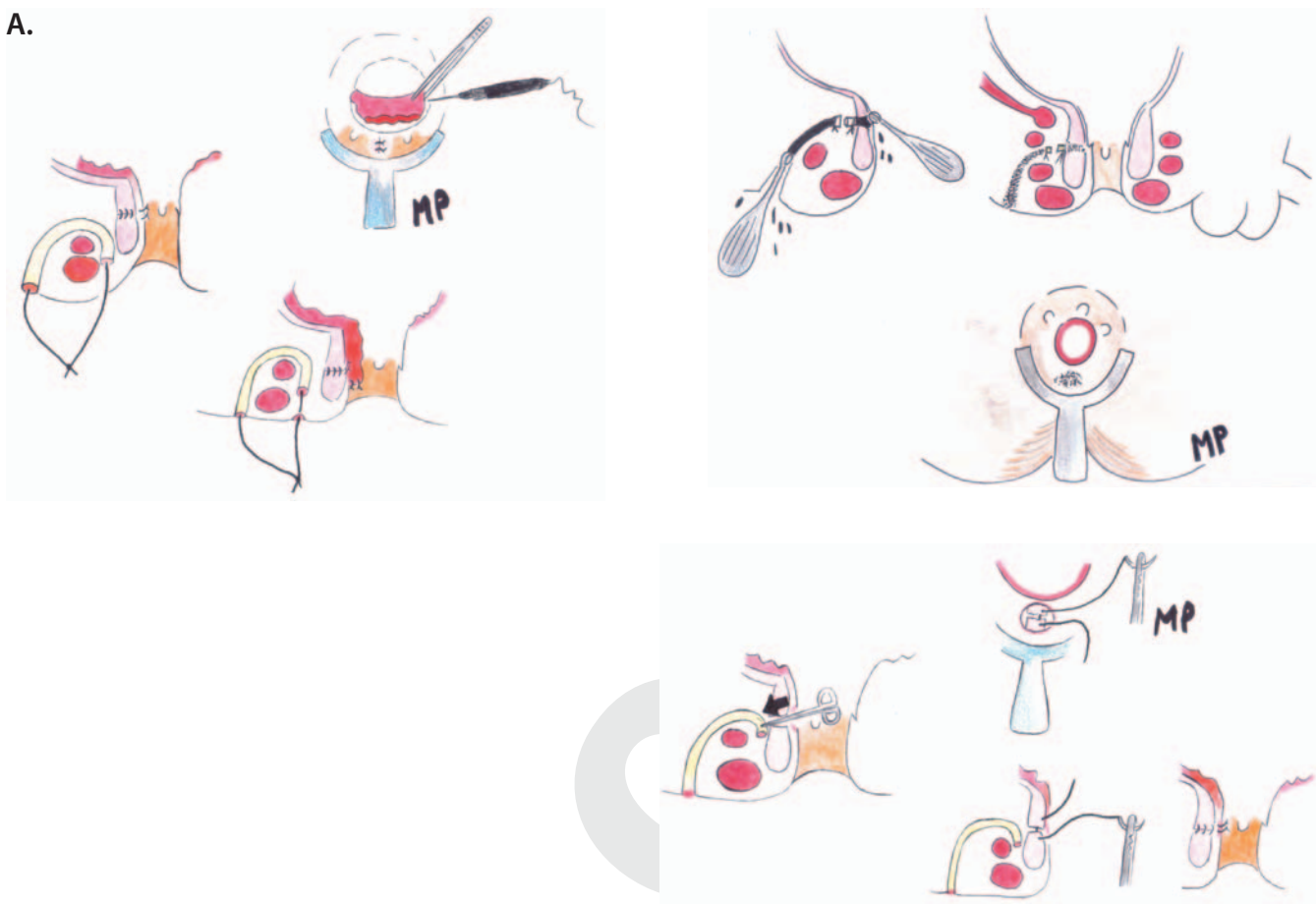
1.3.1. Seton Insertion



After drainage of the abscess (*top left*) a finger in the rectum identifies the induration around an internal fistula opening (*top right*). An eyelet probe is inserted into the fistula (*bottom left*) and a seton is brought through (*bottom right*).

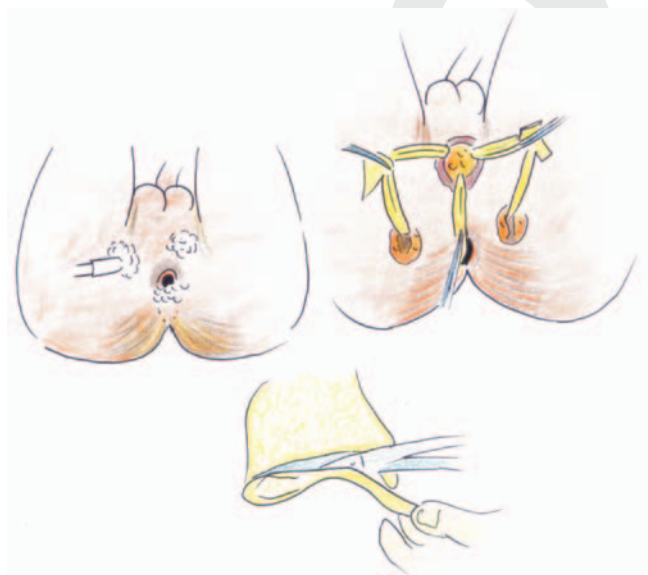
1.3.2. Seton Railroading and Hybrid Seton Use for a Horse-shoe Fistula

A.



- A. A pre-existing seton passed across a high trans-sphincteric fistula is cut and tied to a silk suture (*Top Left*). This is pulled through the fistula using a railroad technique. The fistula is curetted and irrigated (*Top Right*). The suture is tied to a new seton which is positioned across the fistula. This may be supplemented in a second stage procedure by formal closure of the internal opening (*Bottom Right*) and fistulectomy.

- B.** The modified Hanley procedure using a hybrid seton fashioned from a surgical glove as described by Leventoğlu, Turkey in 2013. The operative photograph shows dual seton use for a high complex trans-sphincteric horse-shoe fistula after initial perineal excision for necrotizing fasciitis.



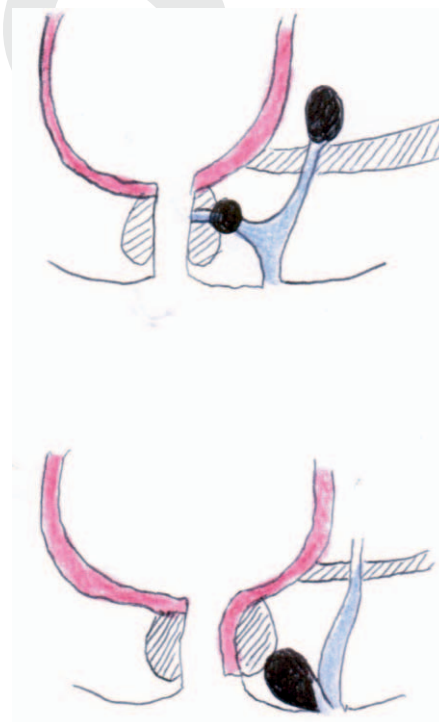
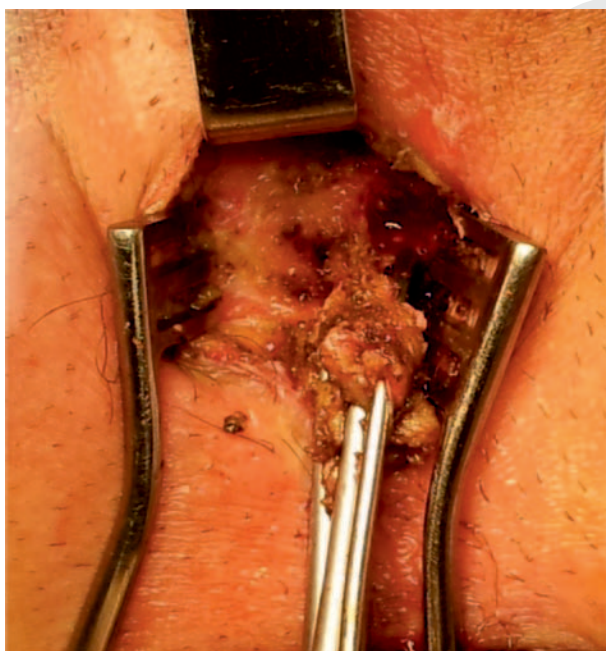
1.3.3. Fistula Re-routing Procedure



The internal opening is isolated and closed with a mucosal advancement flap. The seton is rerouted through the intersphincteric space with formal repair of the internal anal sphincter. If the seton is used as a cutting seton or divided, the healthy internal anal sphincter below the internal opening is left intact in an effort to preserve continence. The technique was described by Zbar.

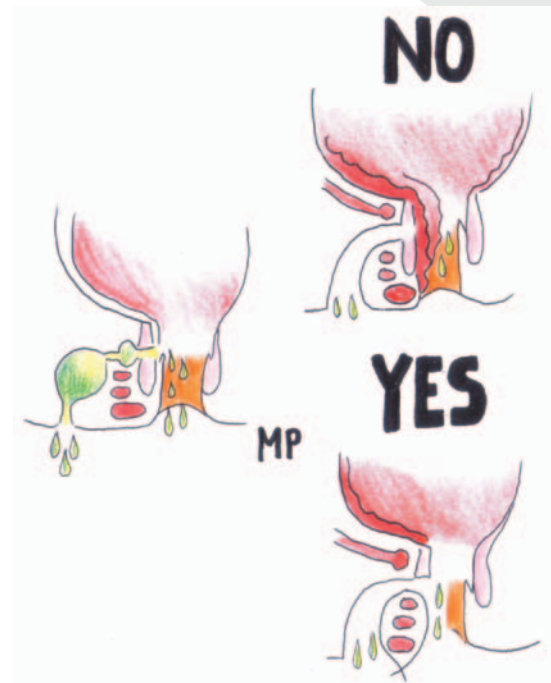
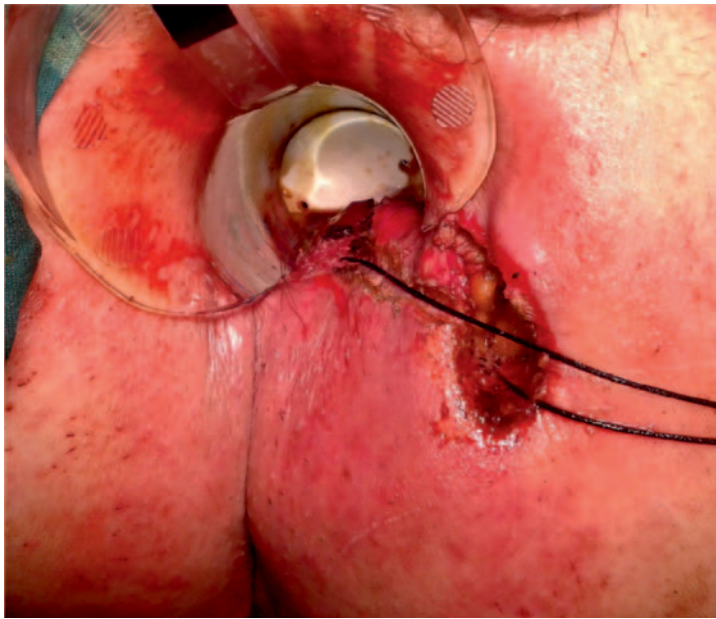
1.4. MUCOSAL ADVANCEMENT ANOPLASTY

A.



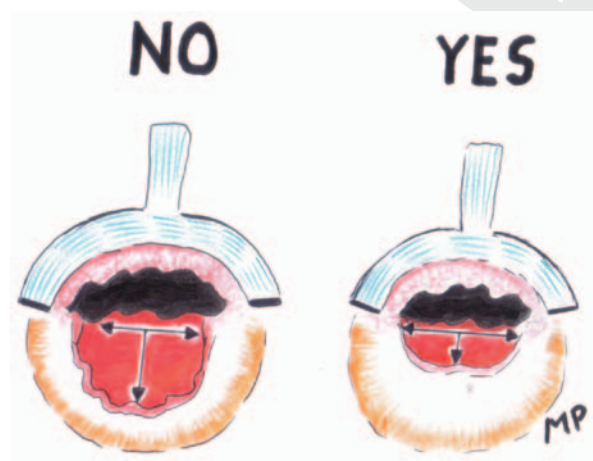
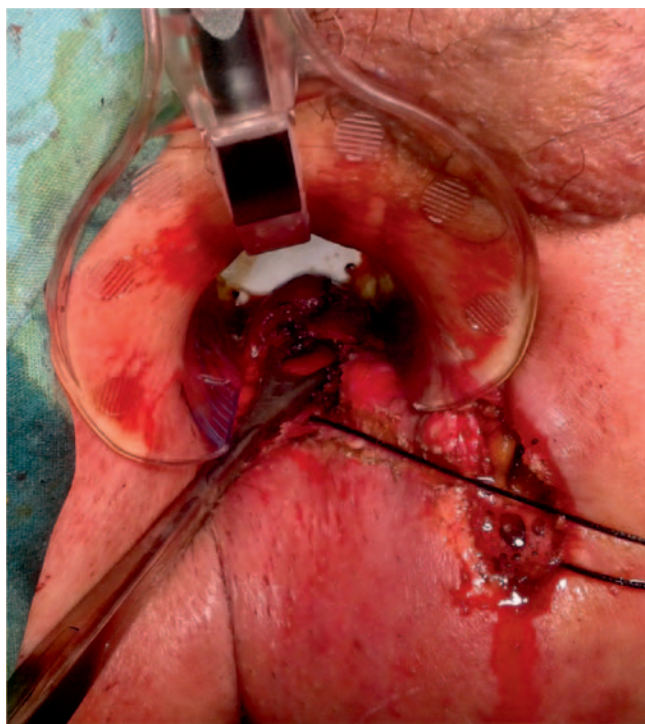
- A. The operative images show commencement of dissection of a high trans-sphincteric fistula. The schematic image shows the relevant anatomy of the fistula with a translevator extension.

B.



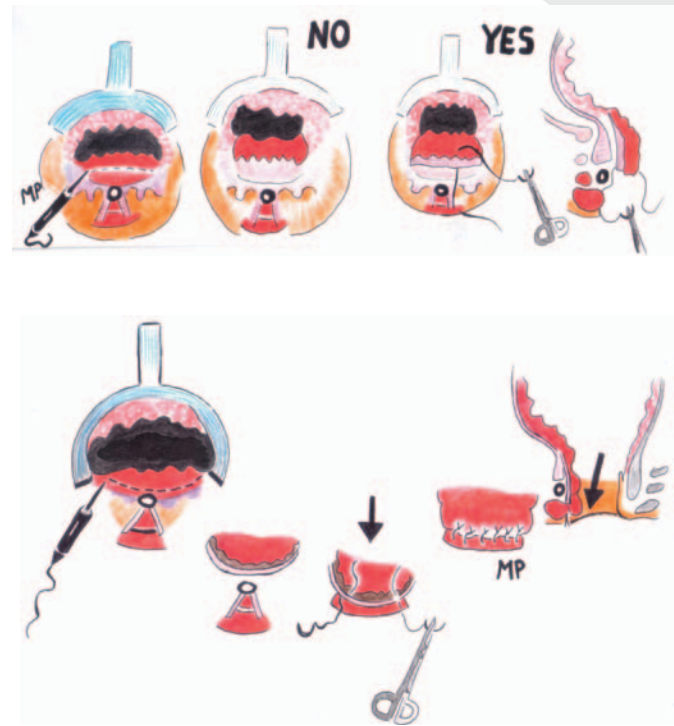
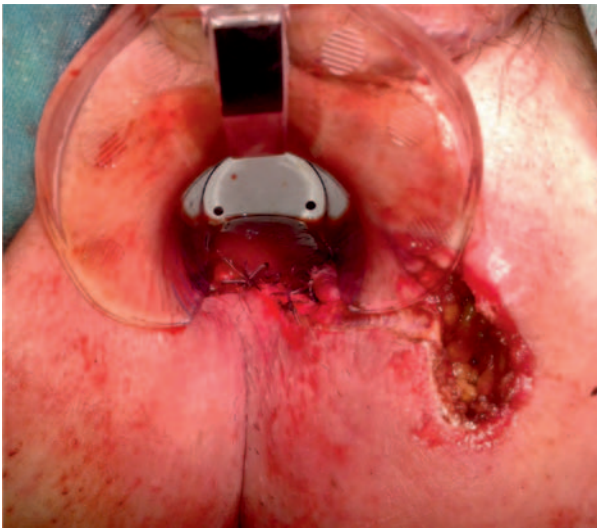
- B.** The operative image shows identification of the internal fistula opening and responsible crypt with seton insertion. The schematic images show the correct approach via an intersphincteric dissection (YES). High dissection may result in a suprasphincteric fistula or an iatrogenic rectal opening (NO).

C.



- C. Commencement of the mucosal flap which should be twice as wide as it is long in order to remain viable and to prevent delayed dehiscence.

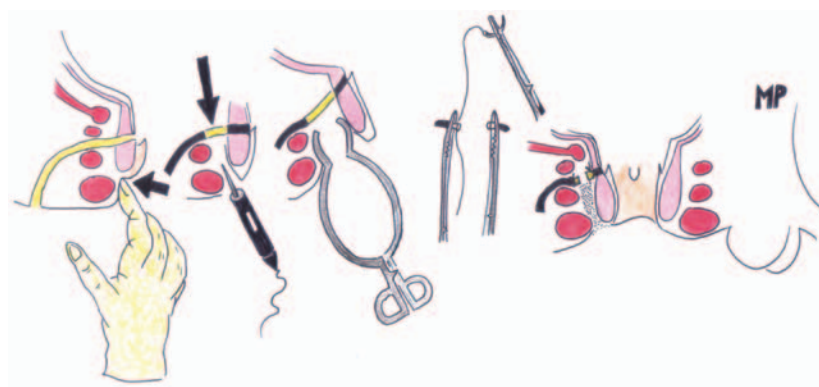
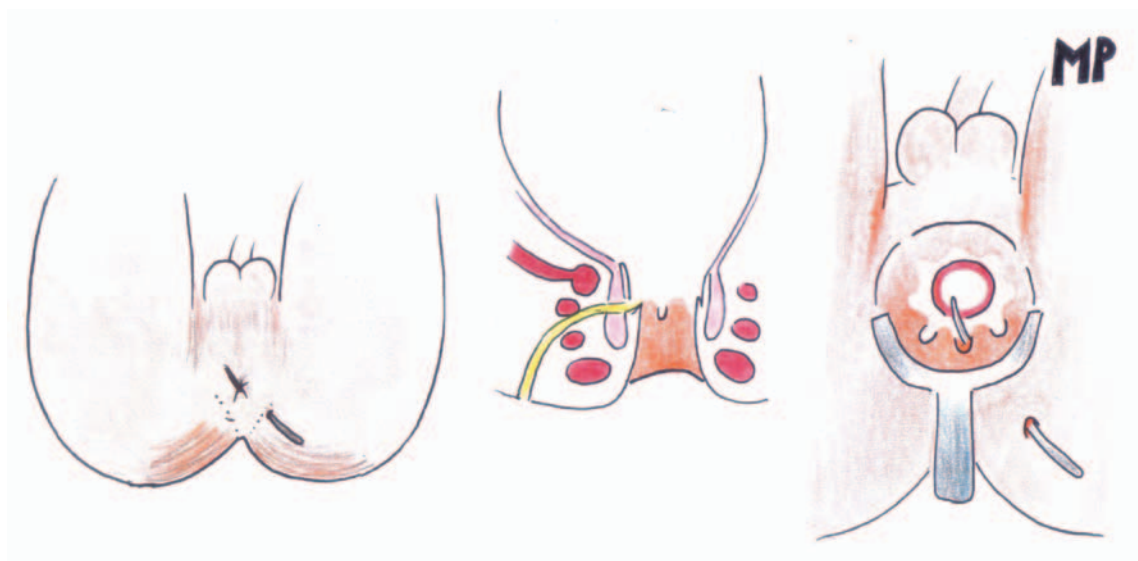
D.



- D. The flap is sutured to the subcutaneous part of the external anal sphincter above the anal verge so as to avoid creation of a mucosal ectropion which results in a persistently wet anus. Although debated, a more durable flap is established with a small amount of rectal muscle.

Comment: A perianal skin flap is also a viable alternative option where there is a diseased and inflamed rectum provided that it is harvested in an area free of anal Crohn's lesions. A mucosal flap is not fashioned if there is a significant concomitant abscess or active proctitis where a seton is initially placed instead.

1.5. LIGATION OF THE INTERSPHINCTERIC FISTULA TRACT (LIFT)




The *Top* image shows probing of a high trans-sphincteric fistula. The *Bottom Left* image shows the intersphincteric approach to the fistula for identification and ligation. The inner aspect of the fistula can drain internally without need for an advancement anoplasty. The external wound is left open for drainage in the immediate postoperative period.

Comment: Although originally invented by Robin Phillips but popularized by the Thai surgeon Arun Rojanasakul, the LIFT procedure is likely to become the "workhorse" of complex anal fistula surgery. Its longer-term results will define its place in complicated fistula management.

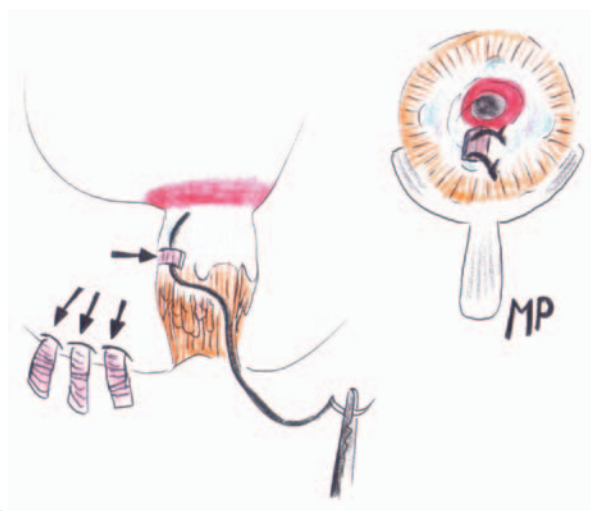
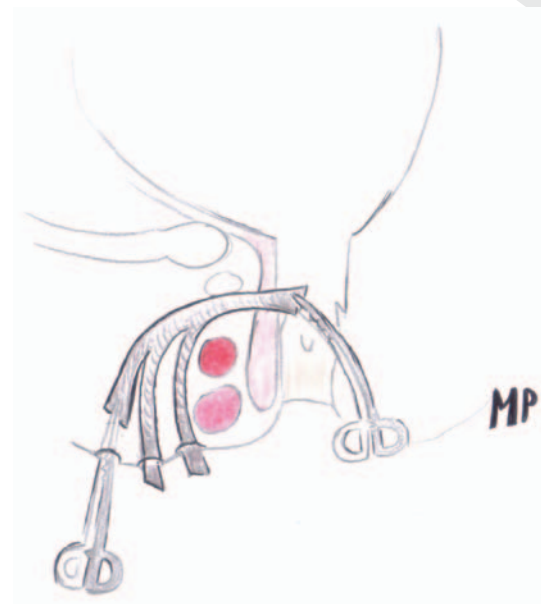
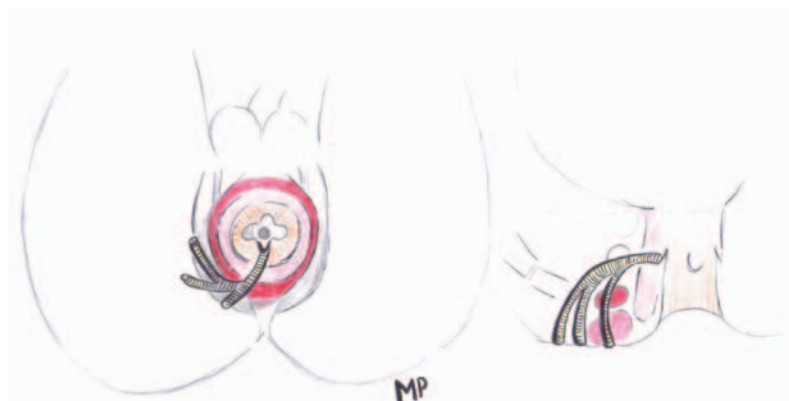
1.6. FISTULA ABLATION

1.6.1. Fibrin Glue Instillation

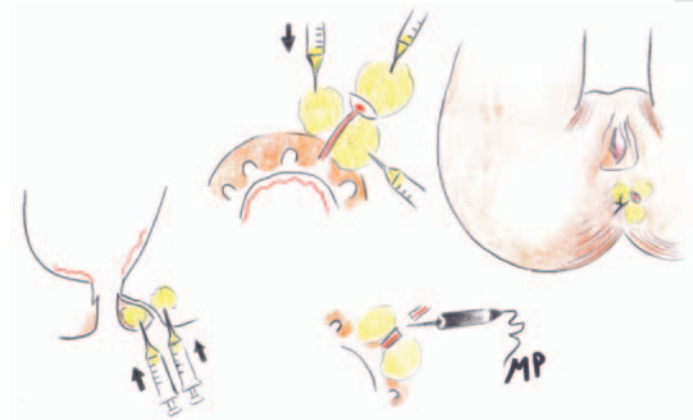
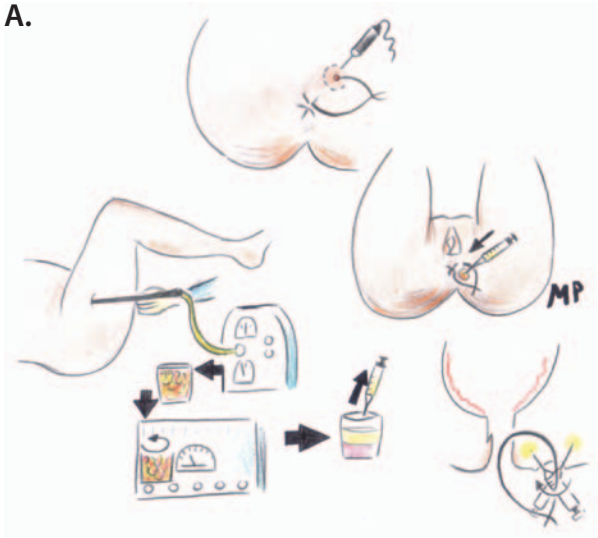


A range of novel alternatives (discussed below) are available for complex fistula management. These include fibrin glue instillation, fistula ligation (the LIFT procedure), video-assisted fistula ablation (the VAAFT procedure) and the laser (FiLac) treatment. The left hand image shows fibrin glue instillation. 

1.6.2. The Anal Fistula Plug



The complex high trans-sphincteric fistula has three external openings. After initial curettage of the fistula tracks individually, the fistula is railroaded so as to pull through the anal fistula plug(s) (CookTM). The plug is secured at the internal opening to prevent migration with 2/0 Vicryl.

1.6.3. Autologous Tissue Instillation**A.**

- A.** This may include fat harvested by liposuction from the buttock which after centrifugation can be instilled around the fistula.

B.



- B. An alternative is direct instillation of platelet-rich derived plasma into a complex fistula with multiple openings after initial seton insertion. This technique has been reported by van der Hagen et al. in 2011.

1.6.4. Video-Assisted Anal Fistula Treatment (VAAFT)

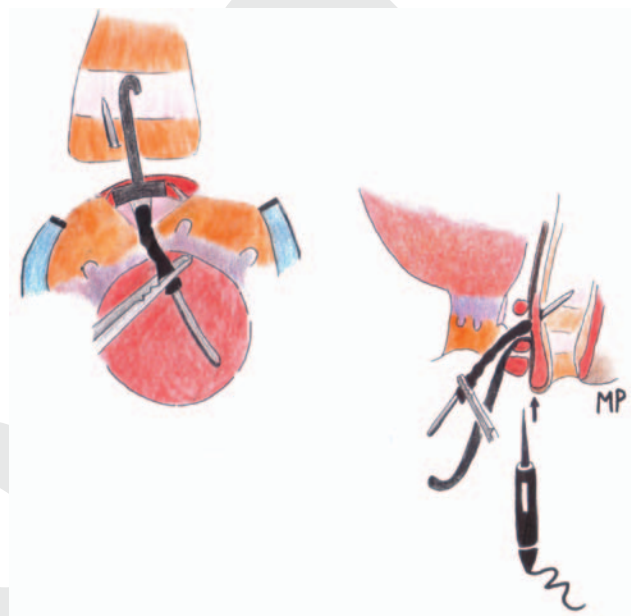


The technique was developed by Meinero of Italy. It consists of insertion of a straight rigid scope which is positioned to straighten the fistula track until it reaches the internal fistula opening. The internal opening is then isolated with sutures and the fistula track is ablated with an endoscopic diathermy electrode. The sutures at the internal opening are then lifted to create a “volcano” effect which can be supplemented by instillation of cyanoacrylate glue and then stapled with a ContourTM 30 mm or a laparoscopic GIA (Ethicon) stapler depending on the fistula position.

1.7. RECTOVAGINAL FISTULA MANAGEMENT

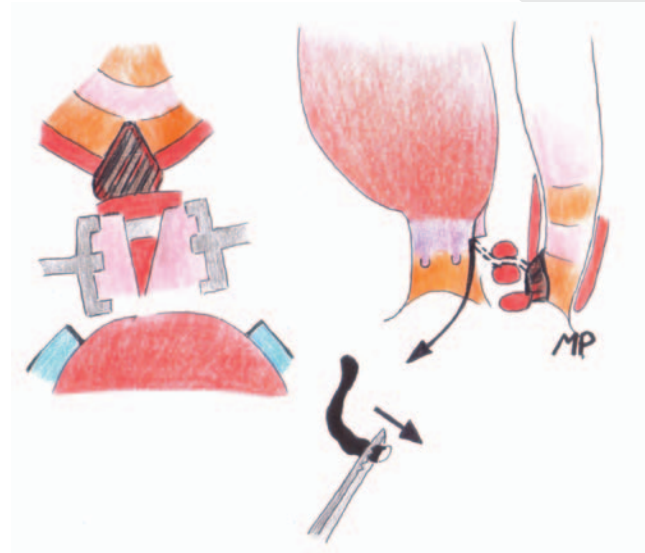
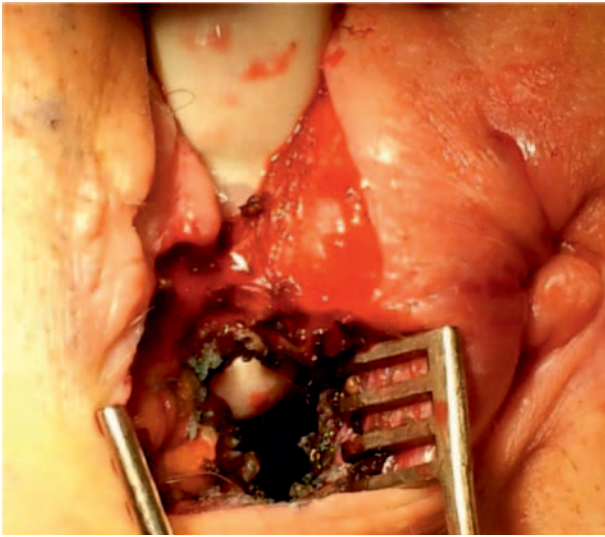
1.7.1 Direct Layered Repair

A.



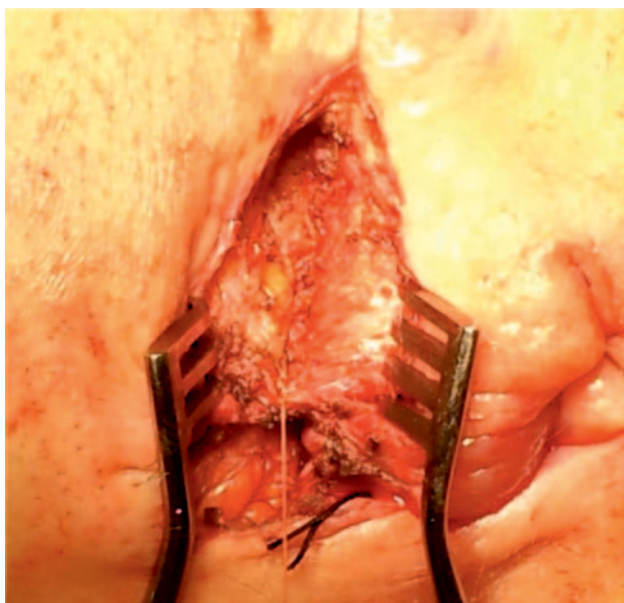
- A. Case of a 63-year old lady presenting with a rectovaginal fistula and connecting external fistulae. The operative images show initial dissection of the main fistula on the vaginal side.

B.

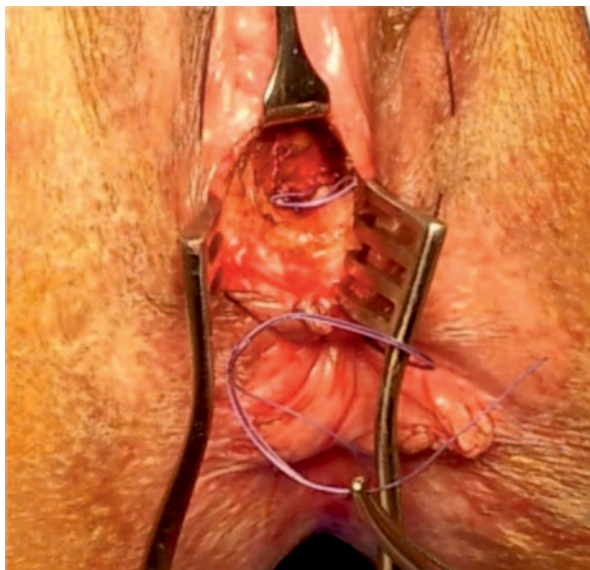
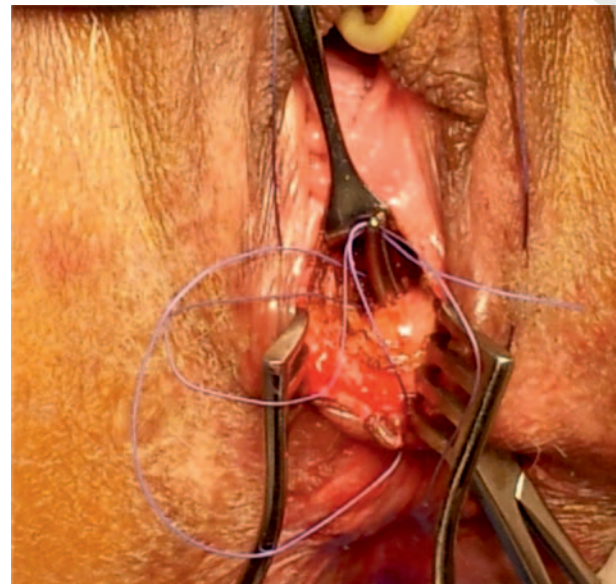
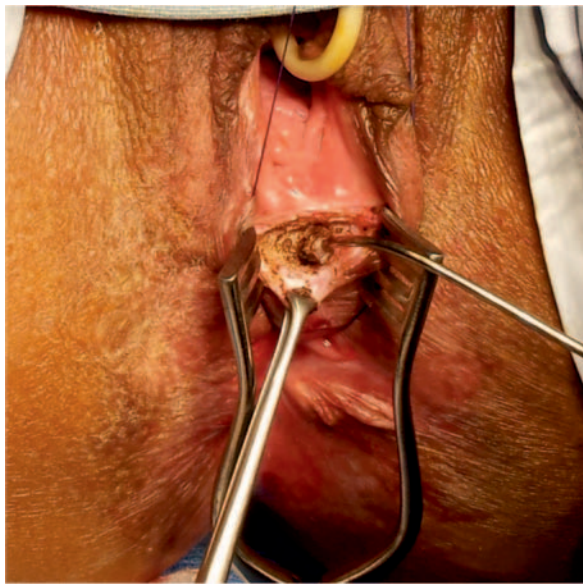


- B.** The operative image shows a finger in the vagina confirming a sizeable rectovaginal fistula which is treated with formal fistula excision. The schematic image shows the anatomy of the fistula excision.

C.



C. The fistula is closed in layers.

1.7.2. Repair of Post-Obstetric Rectovaginal Fistula**A.**

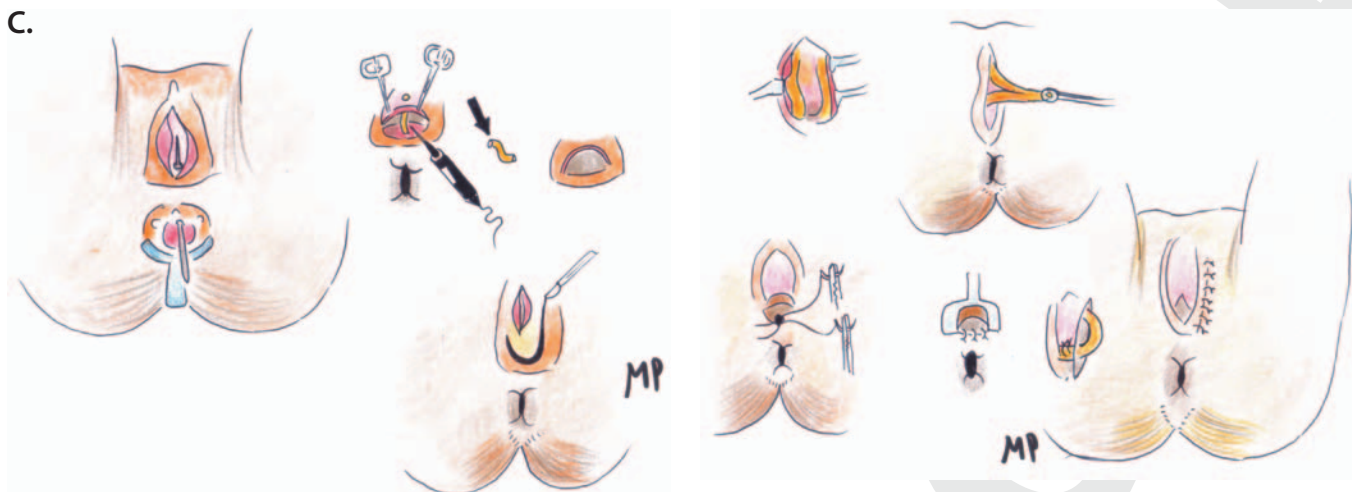
- A.** The patient was a 60-year old lady presenting with an anovulvar fistula and incontinence. The top left image shows the transperineal approach. The top right image shows closure of the fistula with inverting sutures used to minimize the risk of dehiscence or recurrence. The bottom image shows completion of the repair.

B.



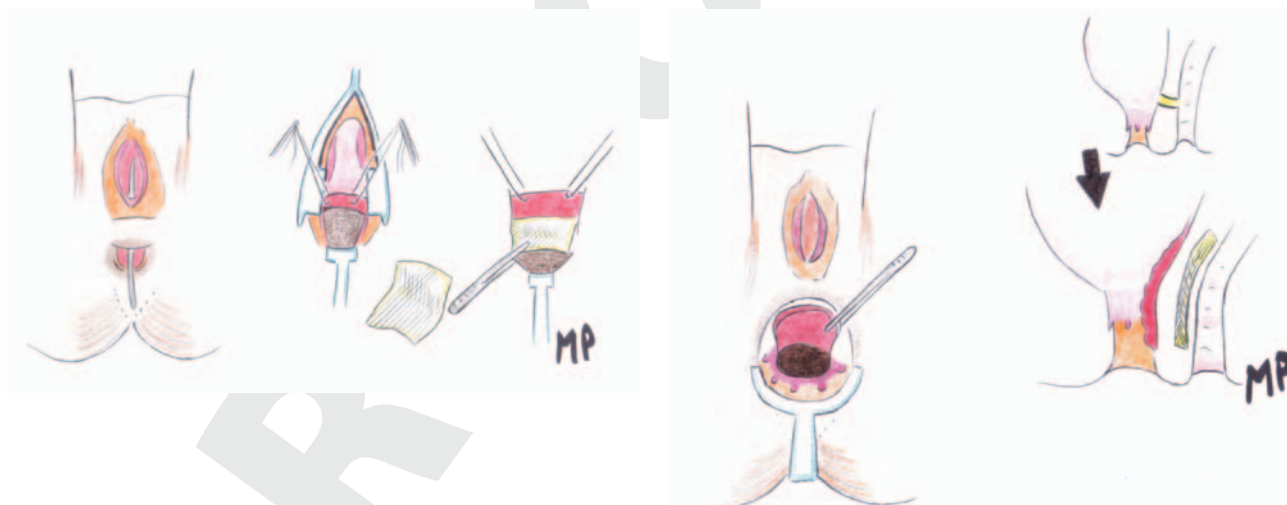
B. The operative images show reconstruction of the vaginal fourchette and completion of the procedure.

C.



- C. To support the repair and augment the perineal body a Martius bulbospongiosus graft is performed. After separation of the fistula, a vascularized labial fat pad is dissected and laid between the rectal and vaginal suture lines. On occasion a Martius graft may require protection with a proximal diverting stoma.

D.

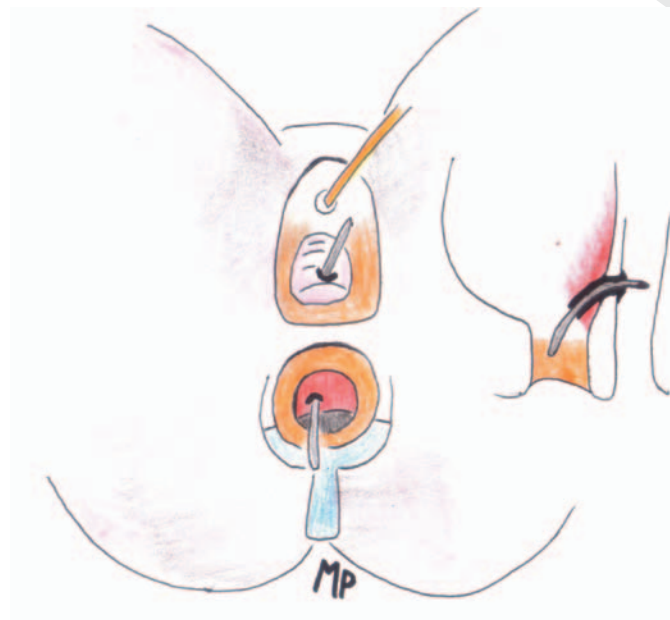


- D. An alternative is the insertion between the vaginal and rectal repairs of biologic prosthetic mesh.

1.7.3. Post-starr Rectovaginal Fistula

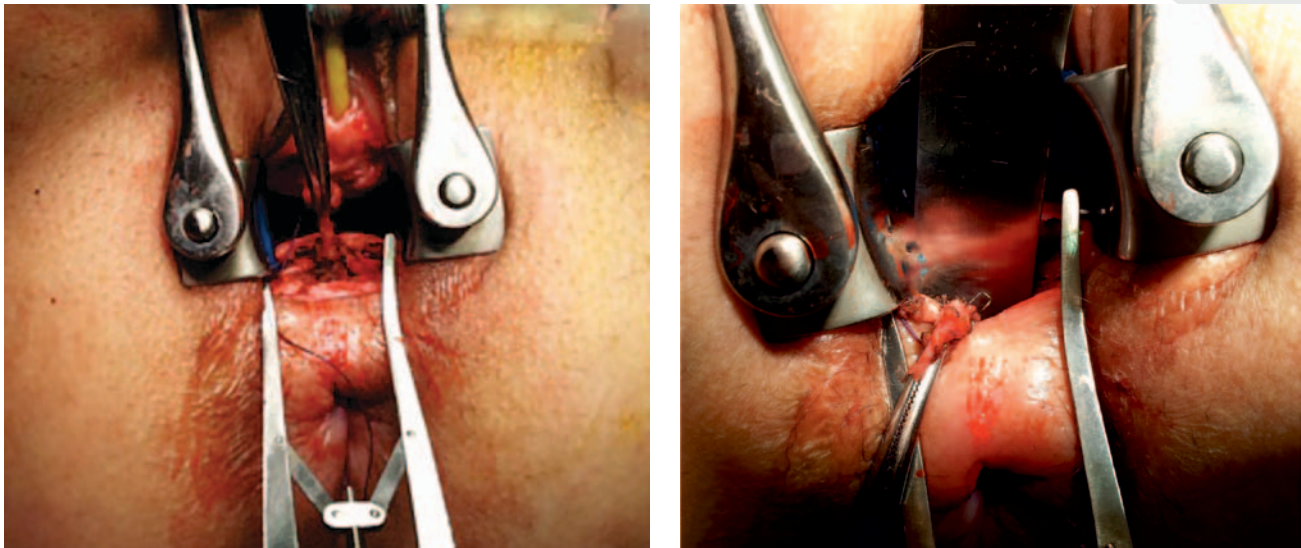


A.



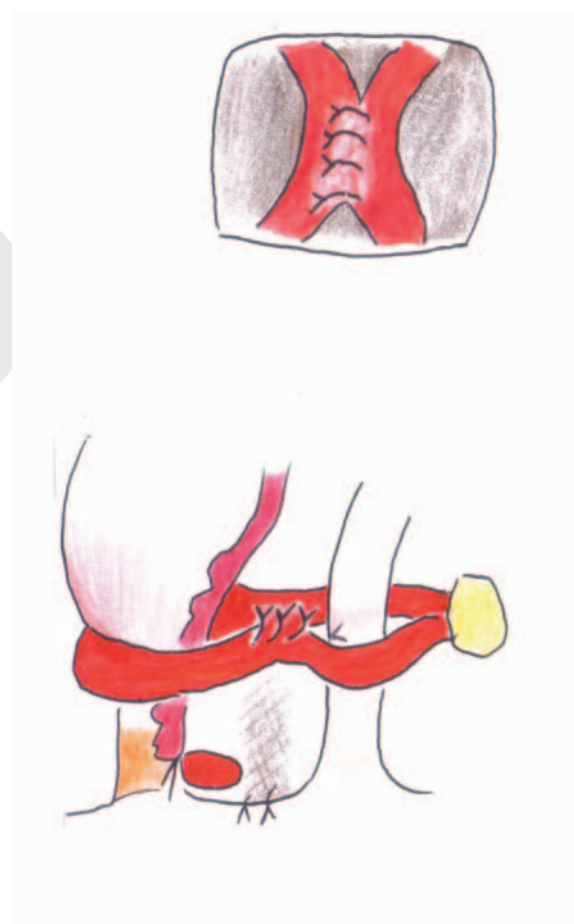
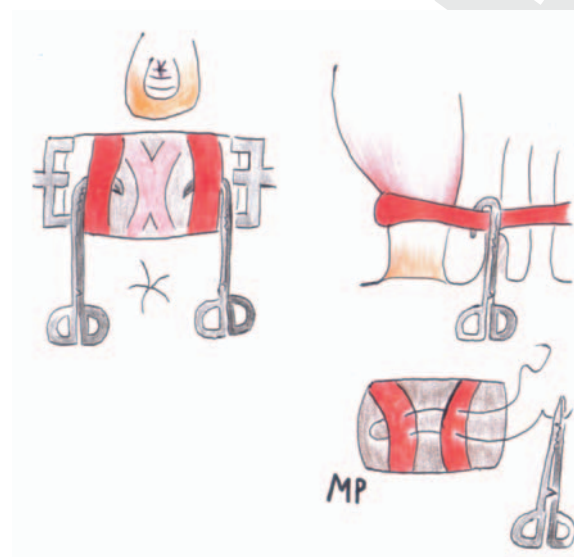
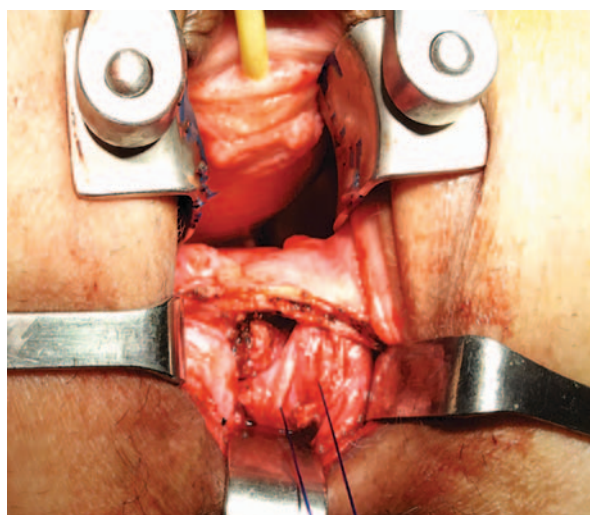
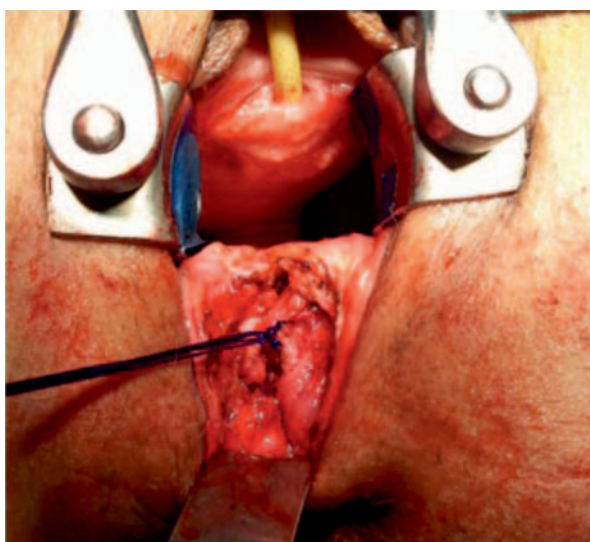
- A. The operative photograph shows a lady presenting with a rectovaginal fistula following a STARR procedure for obstructed defecation. This is represented schematically in axial and sagittal views. A rectovaginal fistula may occur after stapled endoanal surgery by incorporation of the vaginal wall in the anastomosis or with postoperative ischaemia, hematoma or sepsis.

B.



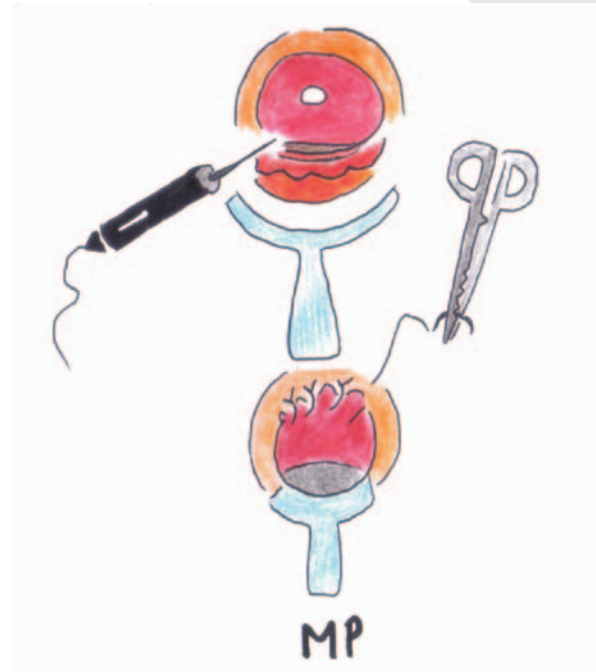
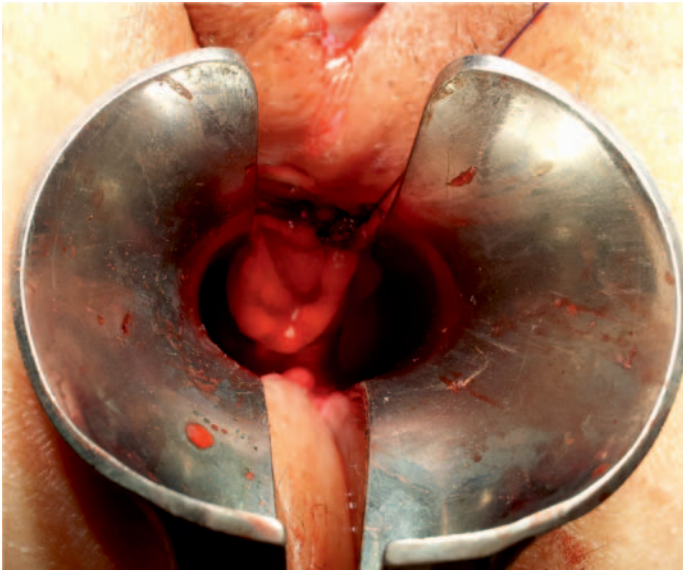
- B.** The operative images show dissection of the fistula from the vaginal side revealing retained staples.

C.



- C. After fistula repair a levatorplasty is performed to separate the rectal and vaginal suture lines.

D.



D. The repair is covered with an advancement anoplasty.

Comment: If a levatorplasty is used, sexually active women should be informed that there is a risk of postoperative dyspareunia.

CHAPTER 2

Hemorrhoids

“To inject, to band or to excise?” These were the alternatives for a colorectal surgeon some 50 years ago, when sclerosant injection, rubber band ligation and hemorrhoidectomy were the sole alternatives. In the last half century the management of hemorrhoids has undergone dramatic changes. Just focusing on surgical procedures shows an array of alternatives including not only the open (Milligan-Morgan), the closed (Ferguson) and the semi-closed (Reis-Neto) manual hemorrhoidectomies but also Laser hemorrhoidectomy, the PPH hemorrhoidopexy, THD dearterialization procedures, Hussein’s ligation-anopexy, Farag’s ischemic suture and the STARR procedure for 4th degree piles and mucosal prolapse.

It is worth remembering a quote from Professor Goligher in an article entitled “Skepticism in surgery” (published in *Perspectives in Colon and Rectal Surgery* in 1990) that “many innovations prove to be in the long-term much less successful than was originally hoped . . . and often turn to be out to be frank failures.” [Pescatori 2011] There is much truth in this as it pertains to some of the novel procedures heralded as hemorrhoidal panaceas. Cryotherapy has disappeared because of pain, mucorrhea and sepsis and even stapled hemorrhoidopexy is declining in use as a result of what was reported in the Guidelines of the American Society of Colon and Rectal Surgery as “potentially devastating complications” [Cataldo et al 2005; Senagore 2012]. As a consequence, the PPH device was withdrawn from the American market because of its high cost, concern about serious and even life-threatening complications and a higher hemorrhoid recurrence rate when compared with other more standard surgical techniques [Nisar et al. 2004; Tjandra and Chan 2007; Giordano et al 2009; Faucheron et al 2012].

After many novel procedures designed to reduce postoperative pain and accelerate healing, manual hemorrhoidectomy still remains the gold standard. Since 2004, THD (Doppler-guided dearterialization) seemed the most promising innovation, being non-invasive with both a low complication and recurrence rate accompanied by a relatively low cost. Larger series and longer follow-up are both needed in order to ensure that it is an effective long-term procedure that matches the recurrence and complication rate of manual hemorrhoidectomy. The alternative is the use of the LigaSure hemorrhoidectomy which has been associated with a low complication

rate and which is the most commonly used surgical procedure for hemorrhoids as reported by the Chairmen of the Italian Coloproctology Units [Bruni and Occelli 2006].

My favorite operation is the Ferguson procedure, which carries a low complication rate, the rare risk of bleeding, a high rate of long-term cure and a reported better functional outcome than the Milligan-Morgan hemorrhoidectomy [Johannsson 2013]. Despite this, I tend to tailor the procedure both to the patient and the degree of hemorrhoids where it would not seem logical to carry out a PPH procedure for one or two-quadrant piles with no internal mucosal prolapse or a Farag suture for external hemorrhoids. In one-quarter of my patients I perform more than one procedure in the same case which is an illustrated feature of this book where such tailoring is a matter of experience and judgment. For example, after the excision of two advanced internal and external piles with the Ferguson technique, I prefer a ligation-anopexy in dealing with a third large but mostly internal pile avoiding the risk of an anal stricture. In hemorrhoids like much of proctology, many complications are technically preventable.

Most patients with hemorrhoids may be treated in a day-care setting even if combined with other anorectal procedures. For example if there is an associated fistula, it is imperative to avoid extensive de-epithelization of the anal canal which, again, would result in a stricture. For these types of cases, closure may be readily provided by a local customized flap as shown in this chapter. Post-hemorrhoidectomy pain may be either prevented or minimized using a combination of glyceryl trinitrate ointment with or without Botulinum toxin injection with each technique chemically reducing internal anal sphincter spasm without incurring significant postoperative fecal leakage [Khubchandani 2002].

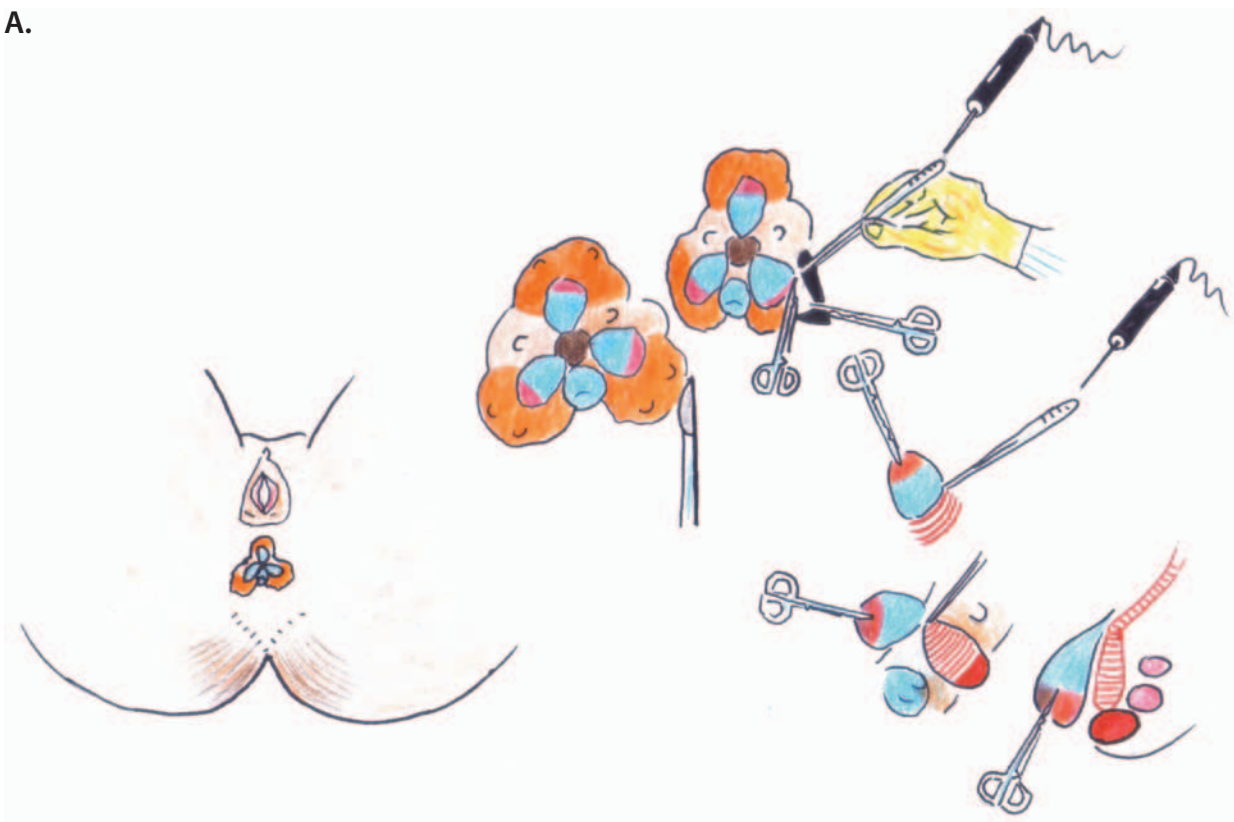
Although postoperative bleeding is a serious problem, it is in my experience rare and preventable. I have had 22 severe bleeds after more than 1,000 hemorrhoidectomies performed over 40 years, where I had to re-operate on the patient only twice. One of these cases was handled in the office and the other in the ward, merely suturing a small superficial bleeding area evident in the lower anal canal and verge in both patients. In the other 20 patients, all cases of bleeding stopped by irrigating the rectum with cold water and leaving an inflated Foley catheter balloon *in situ* for between 3-12 hours. Blood transfusion was required in 7 cases. It is worth iterating these results over a prolonged experience to point out to our younger colleagues and some general surgeons, who may attempt to tamponade the rectum with gauze packs or return the patient to the operating theater.

CHAPTER 2 HEMORRHOIDS

- 2.1. MILLIGAN-MORGAN HEMORRHOIDECTOMY
- 2.2. TAILORED HEMORRHOIDECTOMY
- 2.3. STAPLED HEMORRHOIDOPEXY FOR CIRCUMFERENTIAL MUCOSAL PROLAPSE
- 2.4. FERGUSON HEMORRHOIDECTOMY
- 2.5. DOPPLER-GUIDED HEMORRHOIDAL DEARTERIALIZATION (THD) WITH MUCOPEXY
- 2.6. OFFICE PROCTOLOGY: EVACUATION OF A THROMBOSED EXTERNAL PILE

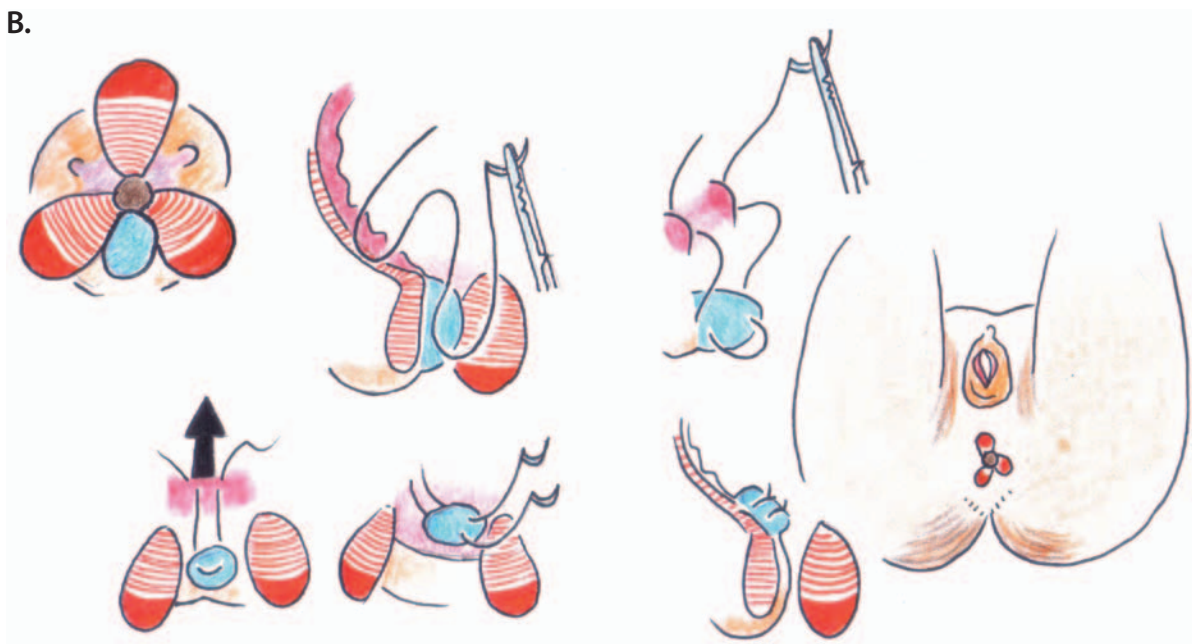
2.1. MILLIGAN-MORGAN HEMORRHOIDECTOMY

A.



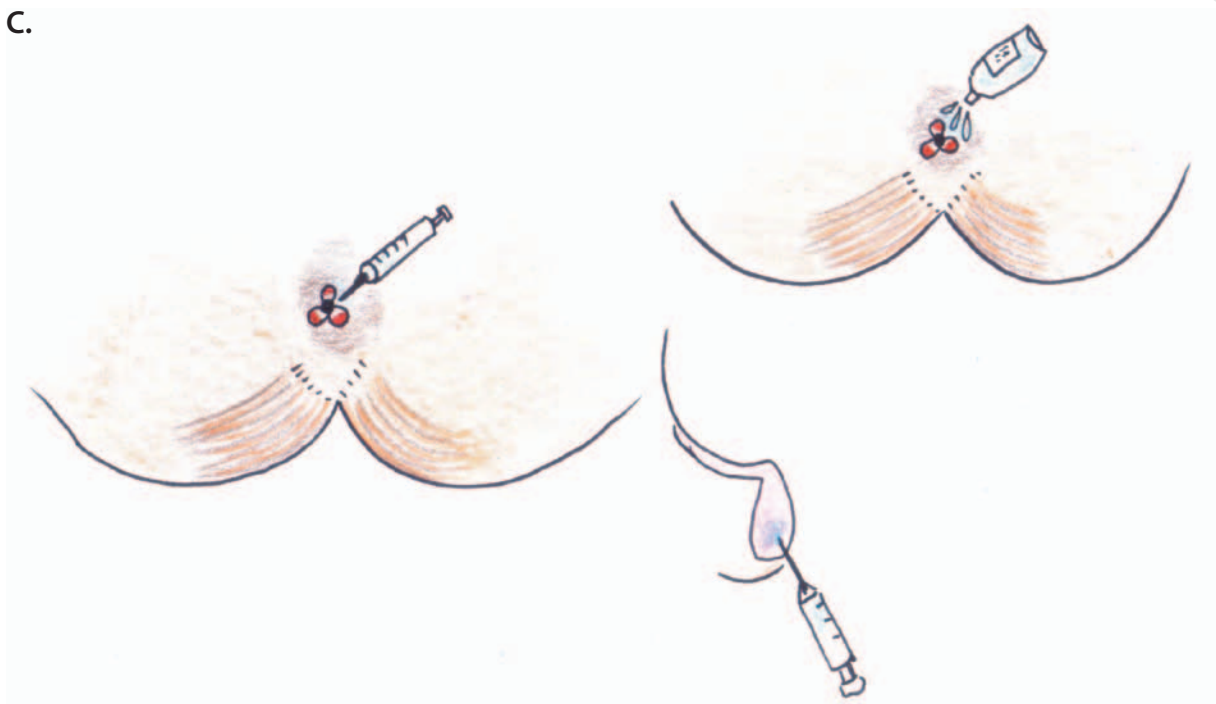
- A. 4th degree hemorrhoids with accessory (secondary) piles. Milligan-Morgan diathermy excisional hemorrhoidectomy with preservation/protection of the internal anal sphincter dissecting the anal cushion from the sphincter musculature.

B.



- B.** After excision of the main pile complexes with preservation of the anodermal skin bridges, the accessory pile is treated without excision by mucopexy to lift the area rostrally and to reduce the likelihood of postoperative anal stenosis.

C.

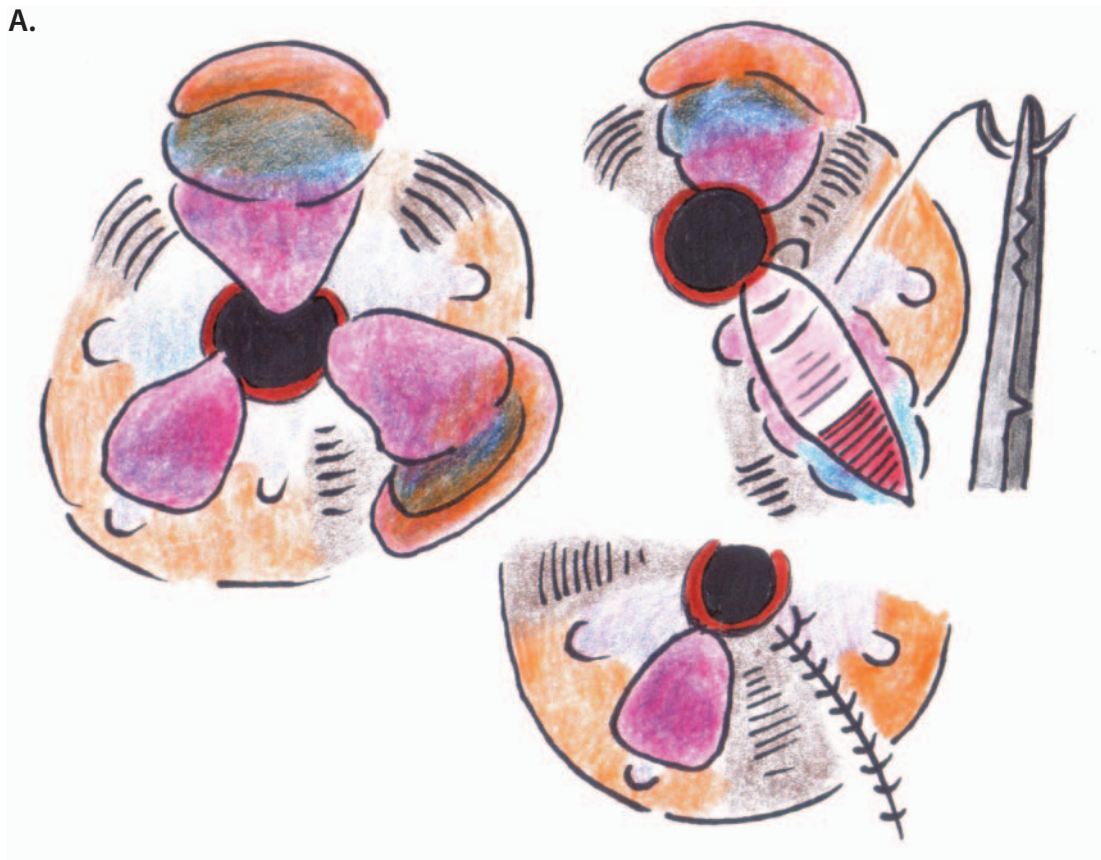


- C. Postoperative pain is controlled by intrasphincteric Botulinum toxin injection plus topical glyceryl trinitrate ointment.

Comment: Indirect contact with the diathermy against the forceps allows dissection with minimal bleeding. When there are secondary hemorrhoids, these may be dealt with by a “U” stitch anchoring the pile to the rectal muscle and re-suturing it with two transverse sutures similar to a Farag procedure. This prevents anal stricture formation and descent of the pile-bearing area, particularly if there is a prior history of straining at stool. Although taught this trick by Sir Alan Parks I have modified the technique by adding the transverse sutures. Hemorrhoidectomy needs to be tailored to the type of pile (internal or external, primary or secondary) as well as to whether there is a risk of anal stricturing or any associated fibrosis of the anal canal, combining open and closed methods based on the prediction of likely outlet problems and supplementing these techniques with hemorrhoidopexy. I will usually perform different procedures in the same anus in about 20% of my patients, most frequently choosing a combination of the Ferguson hemorrhoidectomy with a ligation anopexy.

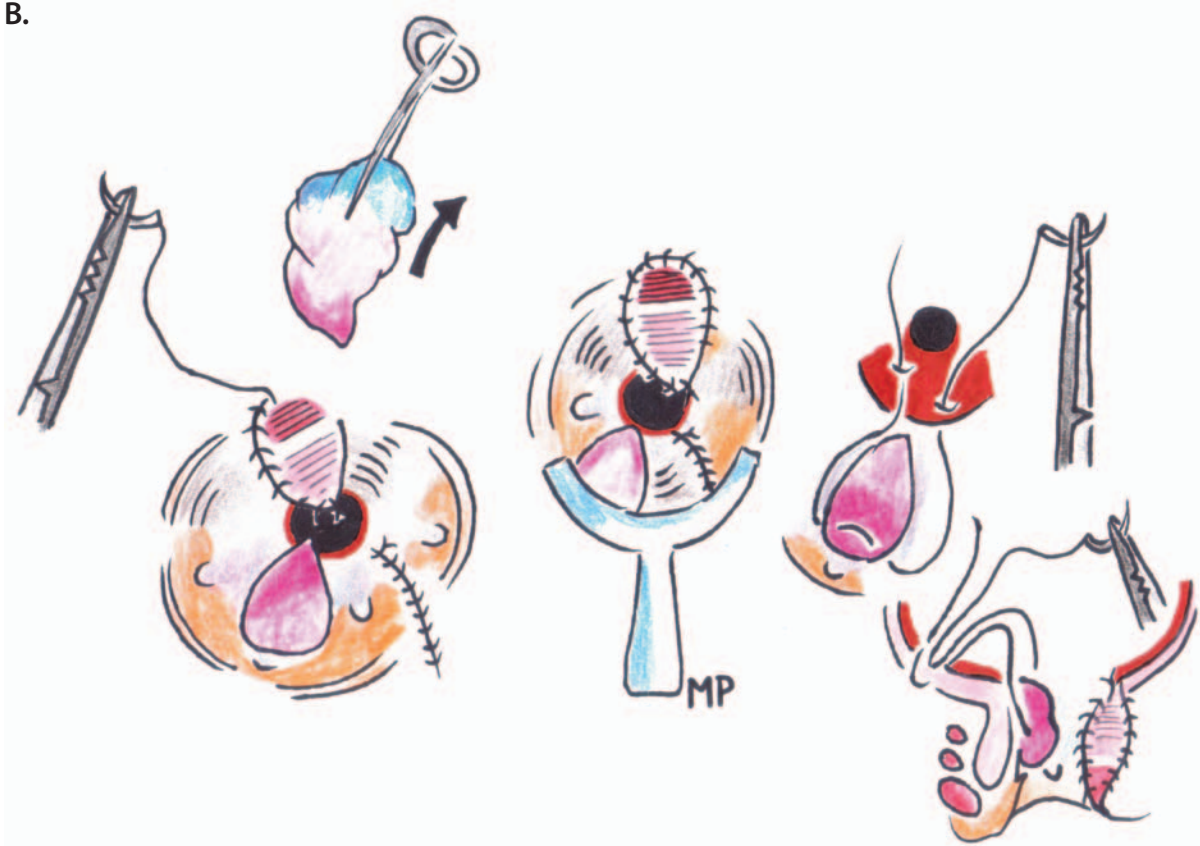
2.2. TAILORED HEMORRHOIDECTOMY

A.



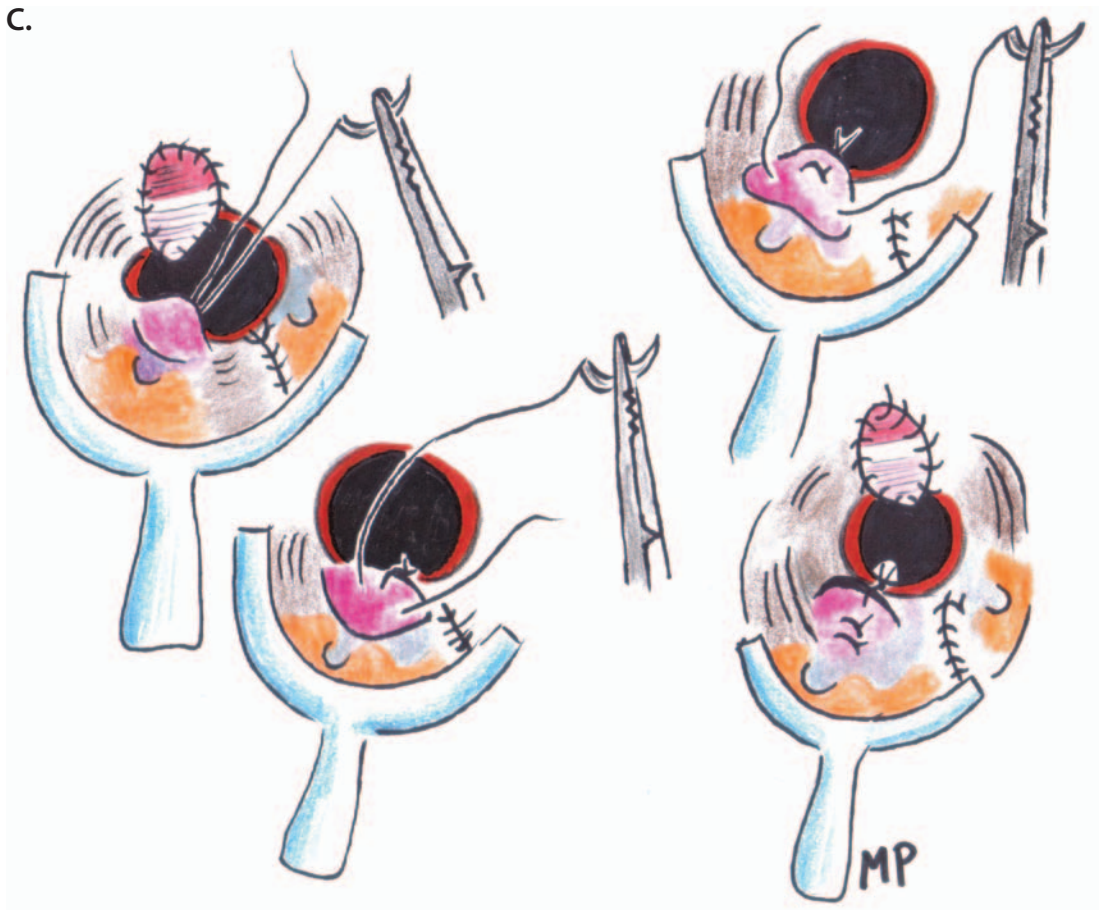
- A. In this technique 3 methods are combined to treat extensive prolapsing hemorrhoids and prevent anal stenosis postoperatively. The first component is by Fergusson closed hemorrhoidectomy to the main pile mass.

B.



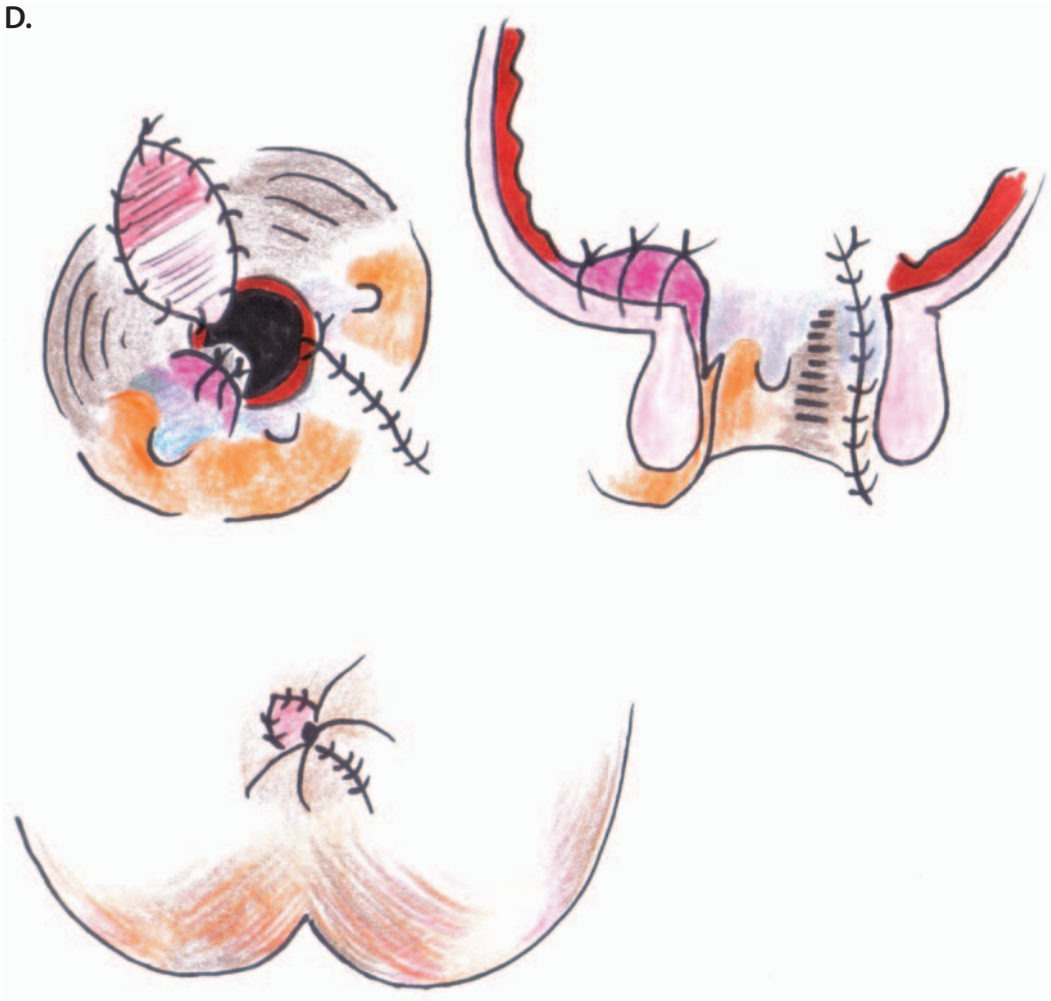
- B. Excision of one main pile mass leaving the wound open plus a mucopexy of an accessory pile mass designed to preserve anoderm.

C.



C. Details of anoderm-preserving mucopexy of the accessory pile.

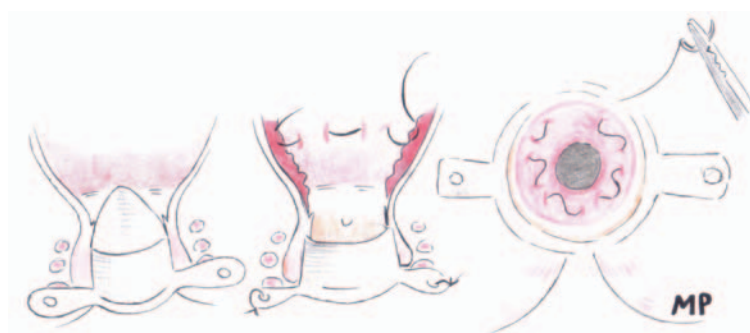
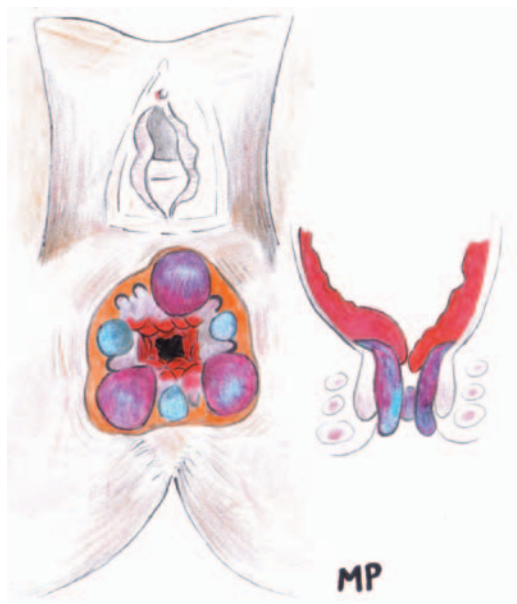
D.



D. Final appearance (internally and externally) of the 3 combined techniques.

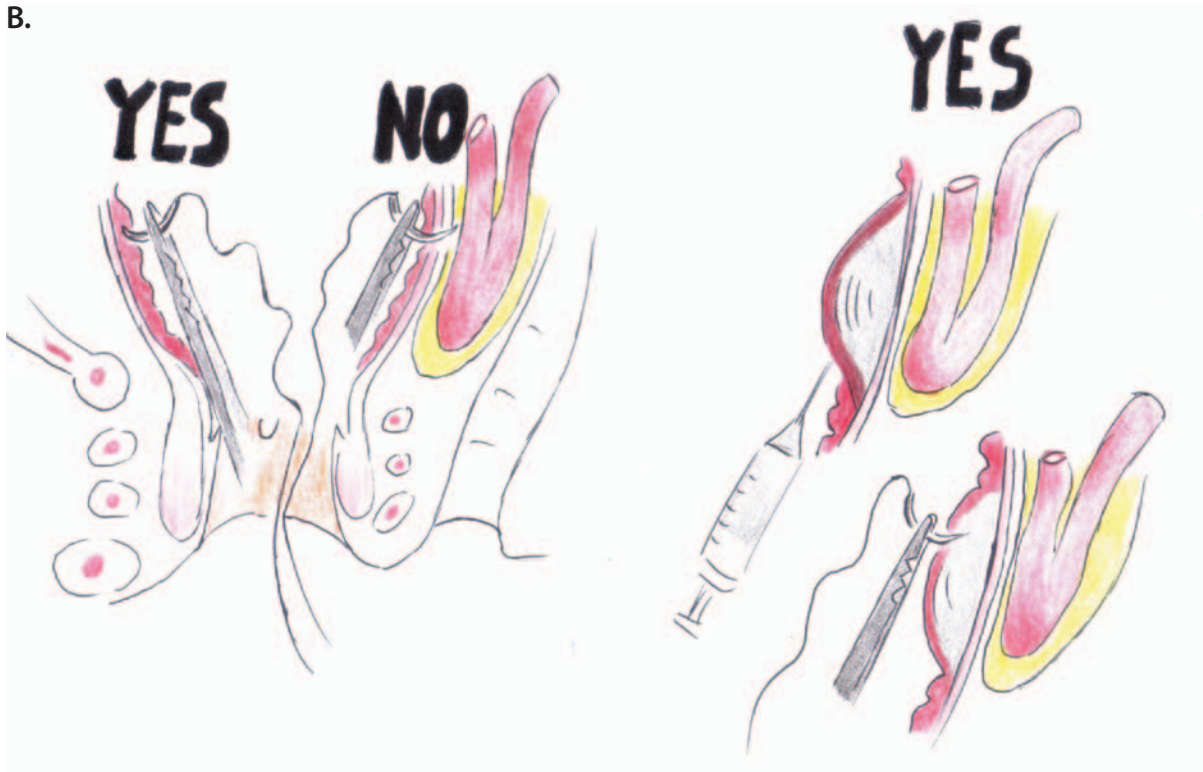
2.3. STAPLED HEMORRHOIDOPEXY FOR CIRCUMFERENTIAL MUCOSAL PROLAPSE

A.

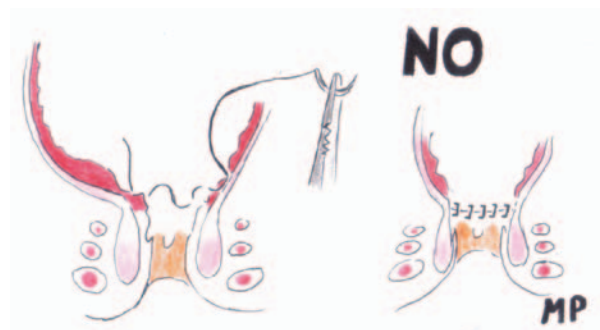
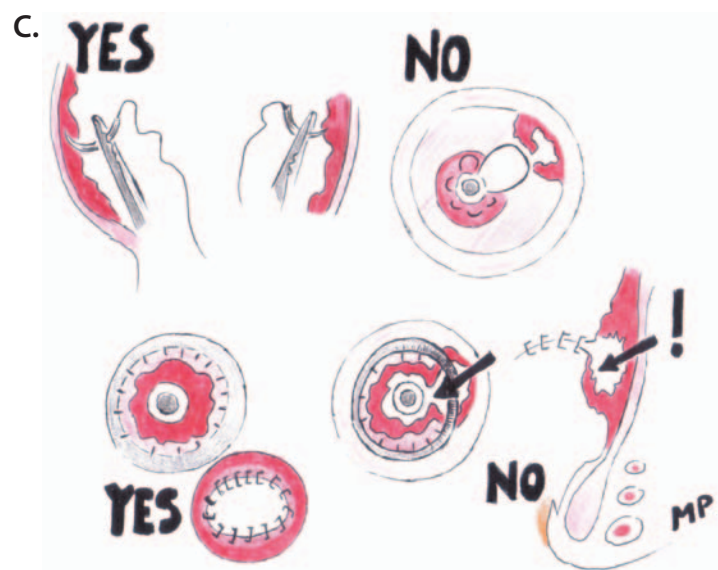


- A. Insertion of PPH kit anal dilator and performance of the purse-string suture about 2 cm above the dentate line.

B.

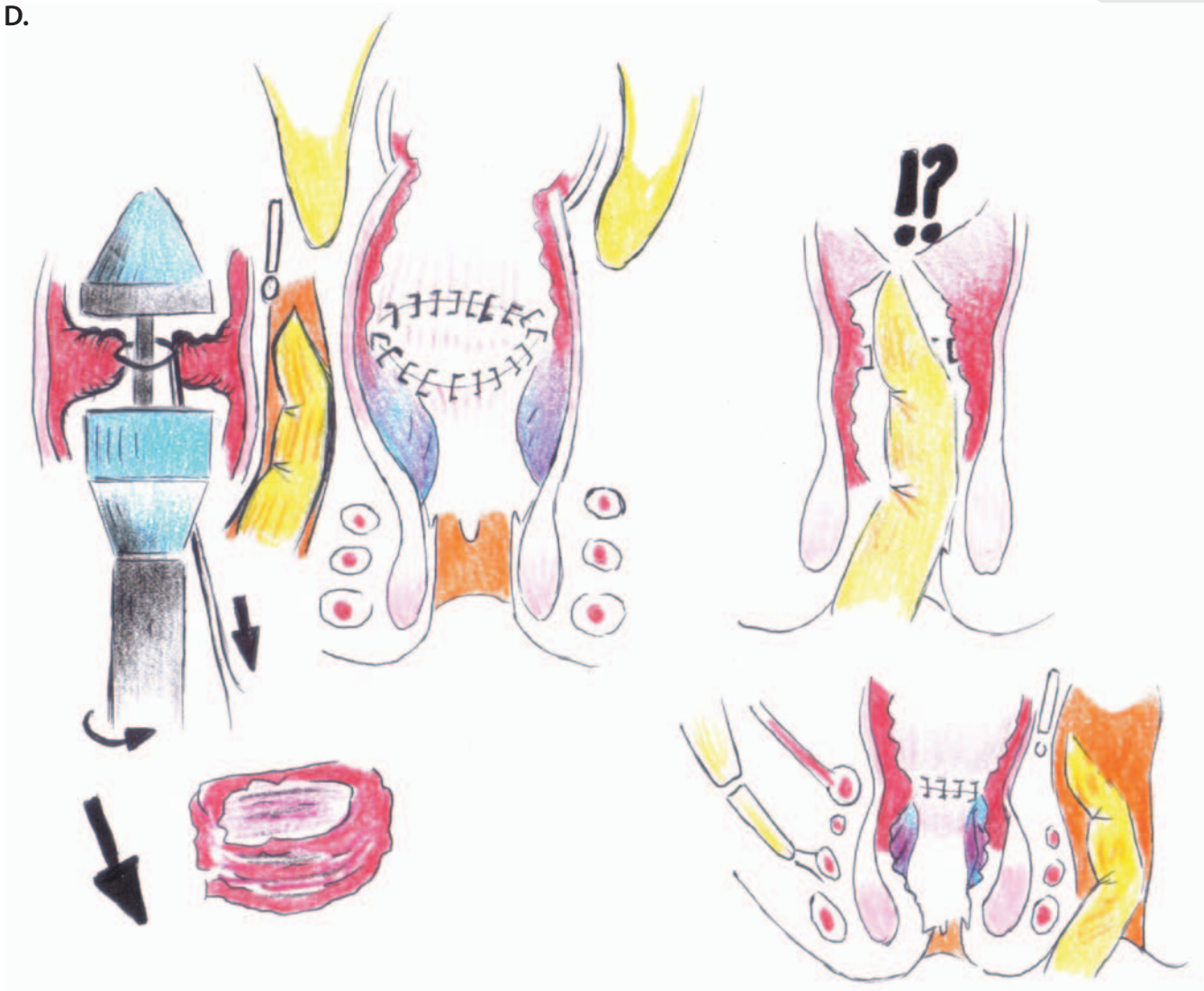


- B.** The mucosa may be infiltrated avoiding a too deep placement of the purse string suture which can be after staple deployment, a source of proctalgia and which may rarely be associated with inadvertent enteric injury.



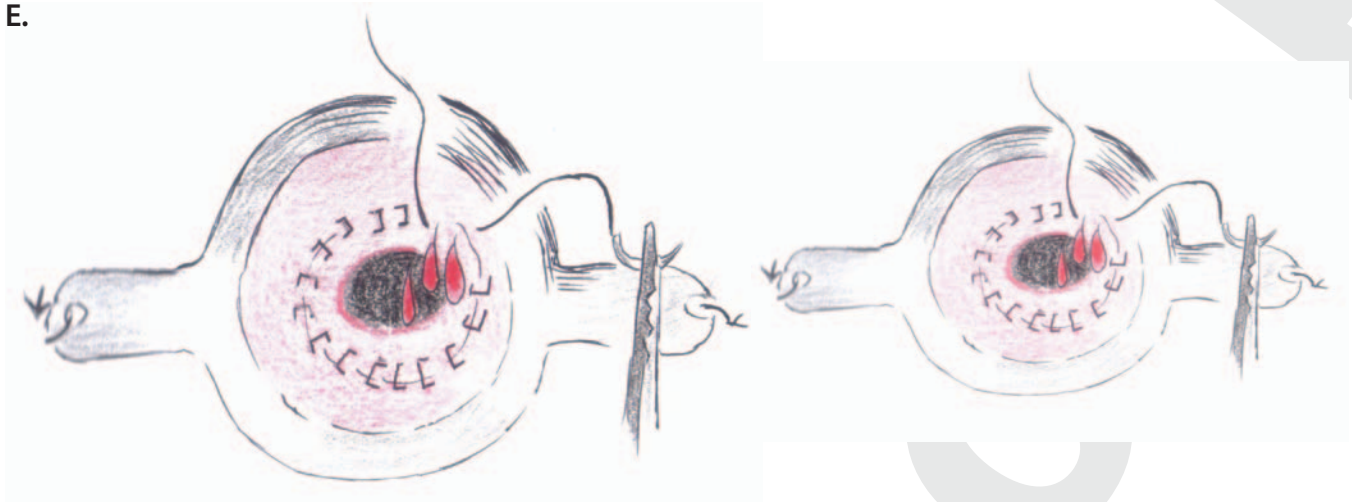
- C. The purse string suture must be complete otherwise it may exclude part of the lumen and lead to a “rectal pocket syndrome” which may be a source of proctalgia, fecal accumulation recurrent sepsis and odoriferous discharge.

D.



- D. The stapled anastomosis is wide and patent with complete doughnut rings. Digital examination confirms rectal patency and excludes the uncommon complication of rectal obliteration.

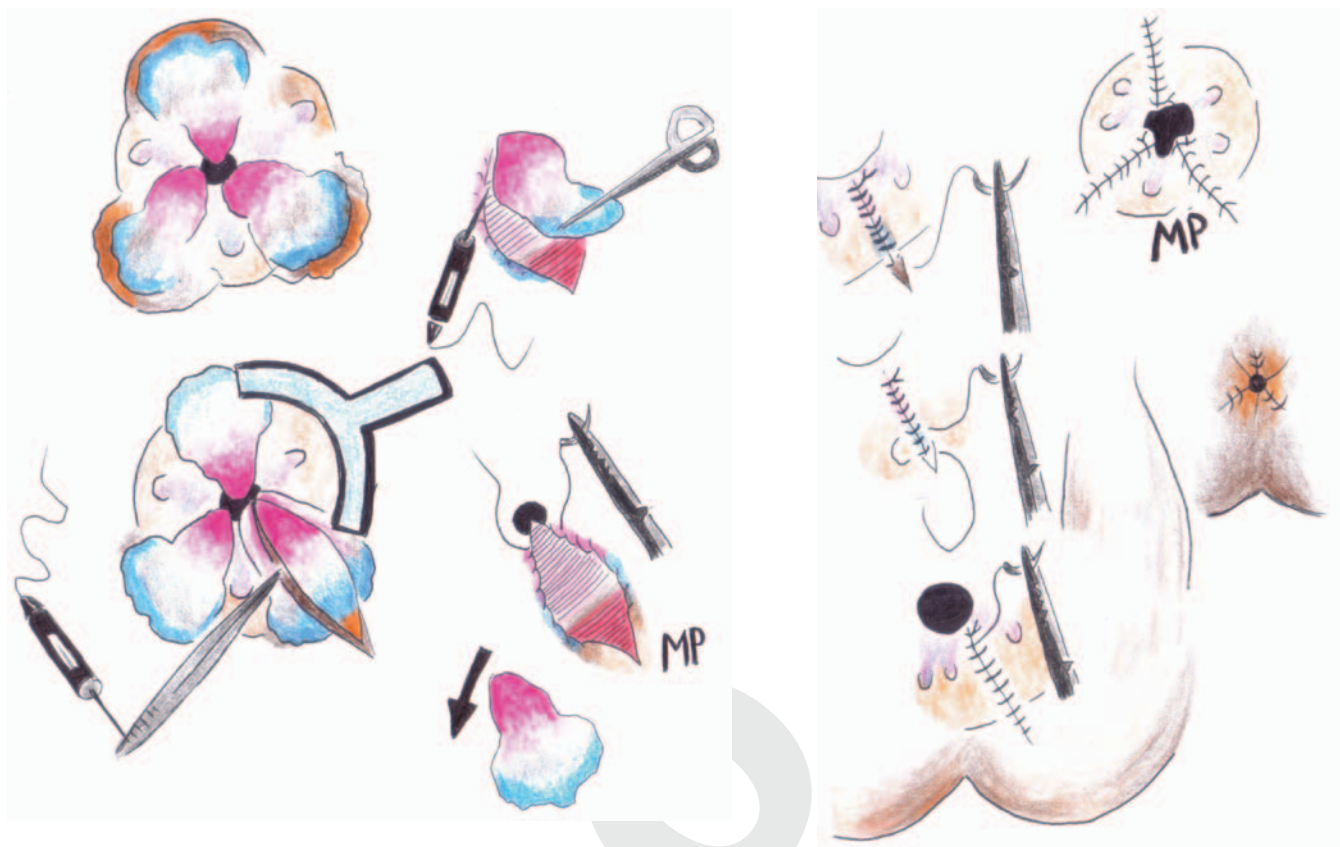
E.



E. The staple line is oversewn with a 3/0 vicryl suture to secure hemostasis.

Comment: About one-third of patients presenting with internal and external hemorrhoids will have associated internal mucosal prolapse and it is this patient with circumferential (principal and accessory) hemorrhoidal prolapse who may benefit from a stapled hemorrhoidopexy, provided that there is no significant history of chronic constipation and straining likely to lead to hemorrhoidal recurrence. If strict criteria are followed, the PPH hemorrhoidopexy is suitable for only about 10% of referred cases where meta-analyses have shown a higher recurrence rate when compared with conventional manual hemorrhoidectomies.

2.4. FERGUSON HEMORRHOIDECTOMY

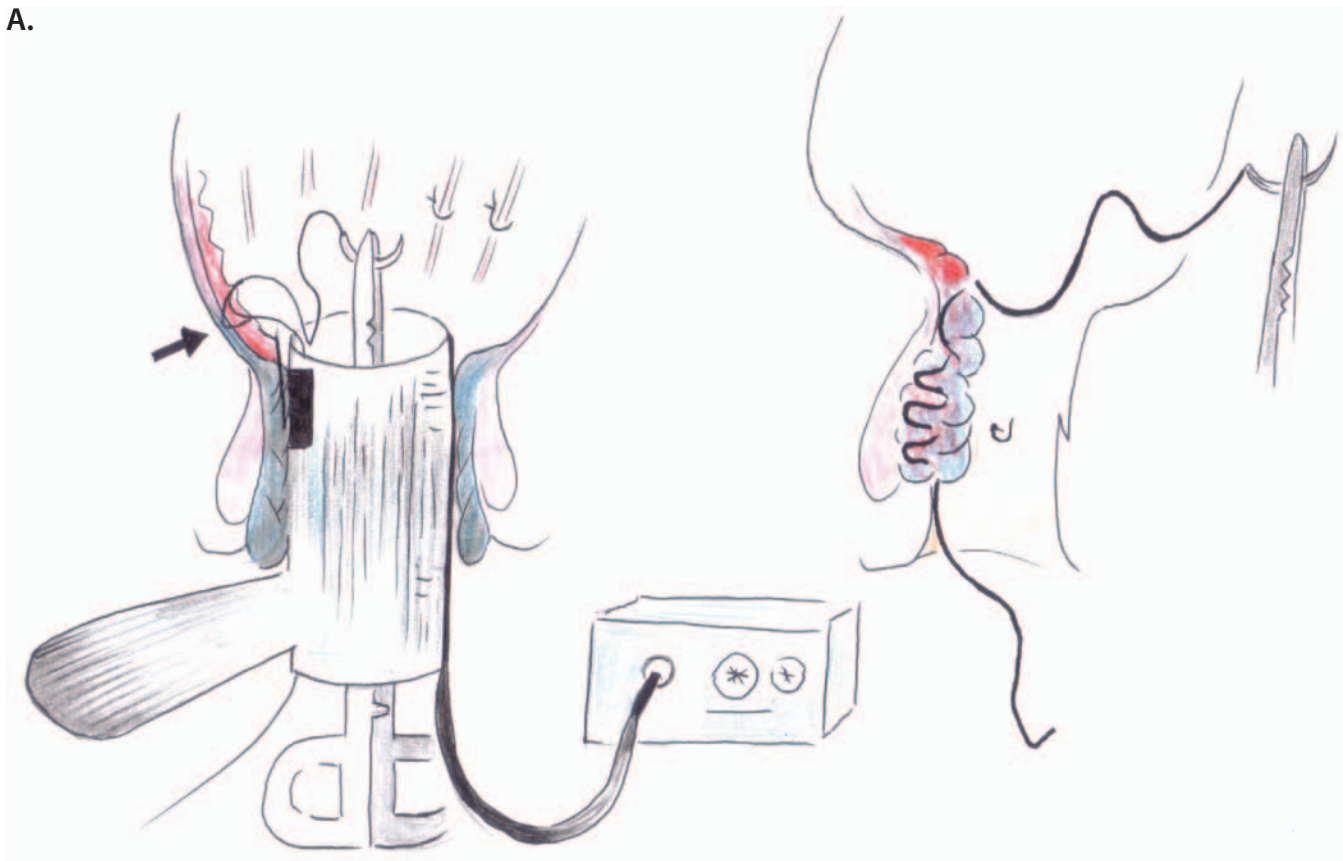


Formal excision of the hemorrhoid is followed by suture from the apex of the excision to the distal peripheral skin with preservation of mucocutaneous bridges and prevention of postoperative anal stenosis.

Comment: Note that the limits of the Ferguson hemorrhoidectomy differ from those of a Milligan-Morgan approach. In the Ferguson technique, the dissection is carried over then around the pile as a narrower excision in order to avoid tension with the mucosal suture and subsequent wound dehiscence. With wider incisions, the tension is likely to cause wound dehiscences. The distal apex of the incision has to be extended well out of the anus in order to avoid a “dog ear” which although not a cosmetic concern is more likely to lead to an annoying skin tag sometimes requiring secondary excision. The running suture may be tied at the anorectal ring providing suture strength although with exposure to higher tension so that I may not use this technique for all 3 piles. I prefer rapid to longer-lasting vicryl as recommended by Santhat Nivatvongs of the Mayo Clinic in case of abscess formation. I find that 3/0 or 4/0 Vicryl is associated with less pain than the heavier sutures and I ensure that all hemorrhoidal tissue is examined by a pathologist to exclude associated dysplasia and intra-epithelial neoplasia. Overall, I prefer the Ferguson technique over the Milligan-Morgan technique where it has been shown to be associated with less bleeding and potentially better continence as it resurfaces the anal canal. It is accepted that the down-side of this approach is a 20% risk of wound dehiscence even in the best of hands.

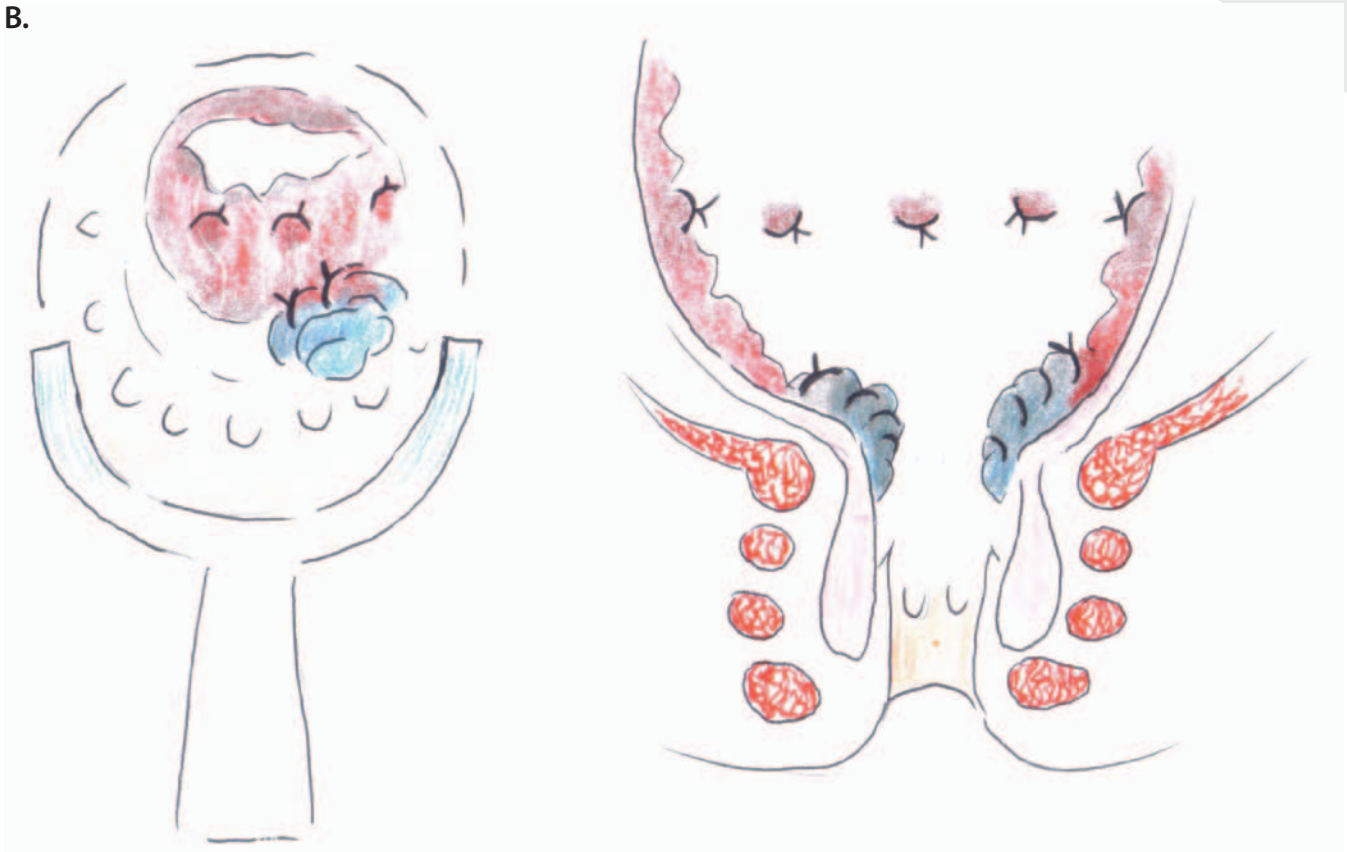
2.5. DOPPLER-GUIDED HEMORRHOIDAL DEARTERIALIZATION (THD) WITH MUCOPEXY

A.



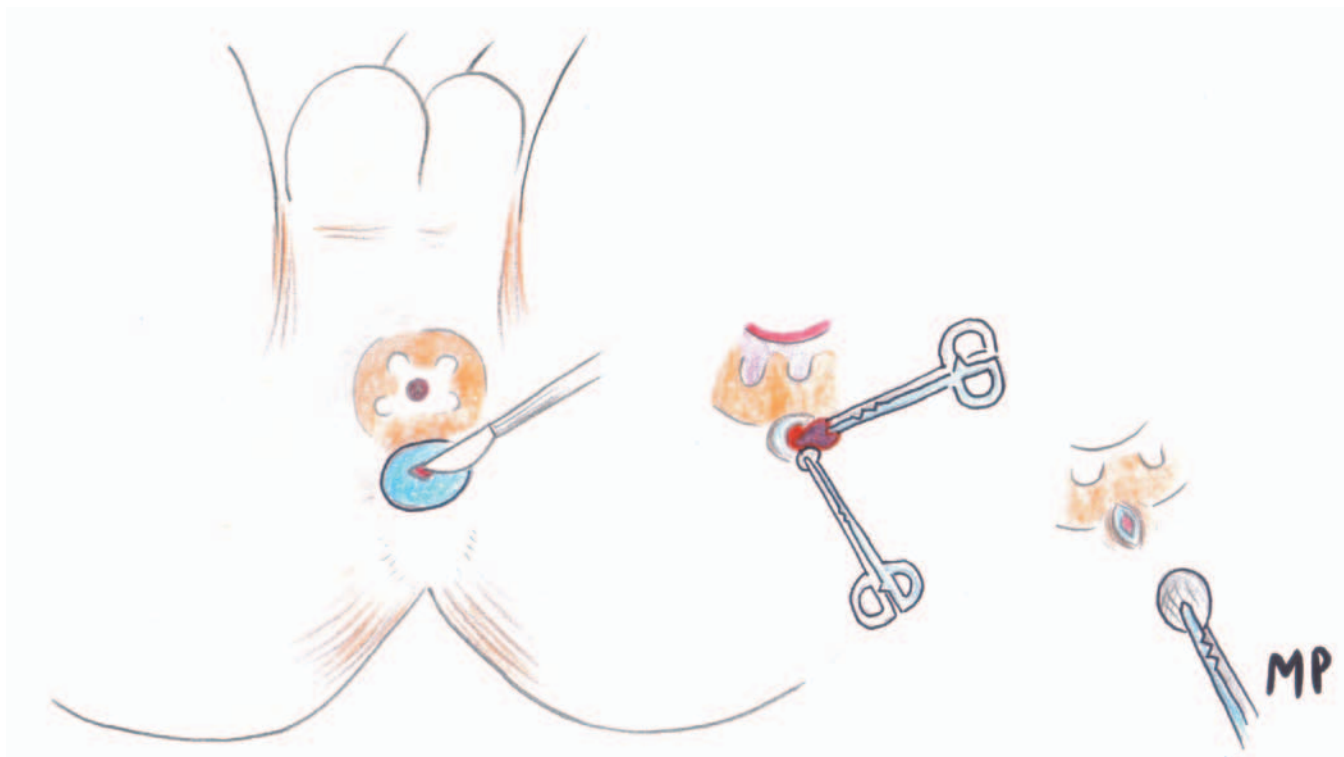
A. Suture transfixion is performed under Doppler guidance to obliterate the vascular signal.

B.



B. Usually 6-8 ligations are performed (final appearance).

2.6. OFFICE PROCTOLOGY : EVACUATION OF A THROMBOSED EXTERNAL PILE



This procedure is performed early after the event under local anesthesia with evacuation and excision of the thrombus.



CHAPTER 3

The Surgery of Obstructed Defecation Syndrome (ODS)

Once termed dyschezia or rectal constipation, obstructed defecation syndrome (ODS) is nowadays one of the most frequent lower gastrointestinal disorders in the Western world, where it is often combined with stress, anxiety and a low fiber diet. It affects nearly 50% of the patients who complain of chronic constipation, and represents a major group of patients in coloproctology referral. It is a complex constellation of disorders with two main related components: functional and organic. Functional problems are the most frequent cause with organic morphological disorders presenting as visible clinical findings. Over time, with repeated ineffective defecation attempts, mostly due to a non-relaxing puborectalis muscle on straining, patients are likely to develop a pelvi-perineal descent with stretching of the pudendal nerves and a pudendal neuropathy. Among the consequences are recto-anal intussusception (or internal rectal mucosal prolapse), recto-rectal intussusception (or rectal invagination), a rectocele, an enterocele and uro-vaginal prolapse (most commonly in hysterectomized women), as well as solitary rectal ulcer syndrome. These morphological abnormalities are often associated with an altered psychological pattern where some patients describe a need to empty their bowel in order to “purify” the body and where in some patients there is a prior history of sexual abuse in adolescence [Leroi et al 1995; Bouchoucha 2004].

At an early stage, patients with ODS may benefit from pelvic floor rehabilitation, but later on some may require surgery. It is unfortunate that many surgeons not well aware of pelvic floor anatomy and function will over-treat their patients, often operating on the effects of these disorders and neglecting the underlying causes. This explains why nearly all the procedures carried out for the treatment of rectoceles and intussusceptions carry good results in the short-term but report high recurrence rates over time. Our “Iceberg diagram” was conceived after a prospective study on 100 patients with ODS, (mostly female) and allows surgeons to achieve a better long-term result for the vast majority of cases [Pescatori et al 2006, 2009]. This approach is aimed not only at management of the “emerging rocks”, (i.e. the evident, easily detectable disorders such as a rectocele and an internal prolapse), but also managing the “underwater rocks”, (i.e. the occult diseases such as a coincident neurosis, anismus, rectal hyposensation, pudendal neuropathy and

irritable bowel syndrome). Most of these latter problems cannot benefit from surgical treatment so that the correct management of ODS should be multimodal and generally conservative more often than surgical, where in my practice no more than 20% of referred cases need an operation. Put simply, the selection for surgery should be very strict, as an altered psychological pattern (which is usually neglected by surgeons) is likely to be a negative outcome predictor; a finding also noted before in those patients presenting with slow-transit constipation [Pinho et al 1989]. For these reasons, Vermeulen et al. [Vermeulen 2005] in a related invited comment on the laparoscopic treatment of rectocele, underlined the fact that correction of disturbed anatomy does not necessarily translate into correction of function. In fact, most patients with an effectively corrected rectocele will still have ODS symptoms where Professor Robin Phillips, commenting on the first STARR paper by Boccasanta et al., [Boccasanta et al 2004] felt that a rectal resection for constipation was like performing a lung resection for asthma [Farouk et al 2009].

When assessing the commoner operations for ODS pathology, rectoceles should only be operated upon if they are wider than 3-4 cms, particularly when the patient evacuates with digital assistance and when there is entrapment of contrast on defecography during straining. As reported by Ayabaca et al., [Ayabaca et al 2002] we use the transanal route when the sphincters are not weakened and when there is an associated large (grade II or III on our grading system) internal prolapse [Pescatori and Quondamcarlo 1999]. The transperineal-transvaginal route is used when there is associated anal incontinence and we prefer to carry out a levatorplasty in this setting. We also have an initially encouraging experience using biological mesh interposed between the rectum and the vagina in these cases where in this regard, I agree with Phillips that the crucial part of an operation for rectocele is the reinforcement the recto-vaginal septum. This too may explain why the STARR procedure is not effective in the cure of large rectoceles [Gagliardi et al 2008]. The STARR procedure may be more effective in dealing with a recto-rectal intussusception, even if as I feel that the more recent Transtar technique offers a better guarantee of treatment with a better safety profile. The STARR operation has a serious litany of complications including recto-vaginal fistula, [Pescatori et al 2005] rectal perforation and up to a 20% incidence of severe proctalgia at one year each of which must be discussed with the patient during the informed consent process.

The internal Delorme procedure, (as illustrated in this book), seems to be a good alternative for recto-rectal intussusception, even if the literature concerning its use is currently insufficient. Anismus, (the non-relaxing pubo-rectalis syndrome), is present in nearly 40% of the patients presenting with ODS. Basically, it is a functional neuromuscular disorder, often affecting patients with major psychological overlay. It can be treated successfully with bio-feedback therapy, however, surgery can be useful in selected cases, as shown by the Egyptian surgeon Farid, who reported satisfactory results by partially dividing the puborectalis muscle on both sides via a

The Surgery of Obstructed Defecation Syndrome (ODS)

5 cm. perianal incision [Farid et al 2009]. The technique Farid published included a closed method for puborectalis division, similar to that described by Notaras for performance of a closed internal anal sphincterotomy [Notaras 1969]. In order to minimize complications for this myotomy (sepsis from the open method, bleeding from the closed technique and incontinence from both procedures), we modified the operation slightly using two minimally invasive incisions of 1 cm each (in effect a semi-closed method) and performed the operation only in cases where the sphincters were intact. Using this procedure, we have reported no incontinence with relief of ODS in 6/8 patients after a median follow-up of one year (*unpublished results*). As most patients are women, the effect of the muscle division and the relief of anismus may be evaluated by vaginal ultrasound which can assess the undisturbed anorectal dynamics.

The last two surgeries for ODS I have included are those for the anterior rectocele and for rectal internal mucosal prolapse, each of which is illustrated in this book. The Block operation, (transanal obliteration) is minimally invasive requiring no excision of tissue with a very low risk of suture breakdown and almost no risk of bleeding. It is indicated in cases of low rectocele and 2nd degree internal prolapse. The Sarles operation, (the anterior hemi-Delorme procedure), may be performed when dealing with a high rectocele and 3rd degree internal prolapse and consists of removing the excess of rectal mucosa, plication of the anterior denuded rectal muscle wall and then suture of the middle rectum to the anal canal above the dentate line. Due to the bulk of the internal “concertina-like” suture and the risk (usually partial, if any) of anastomotic dehiscence of the recto-anal stitch line, it carries a higher complication rate, somewhat like the internal Delorme procedure, at least in my hands.

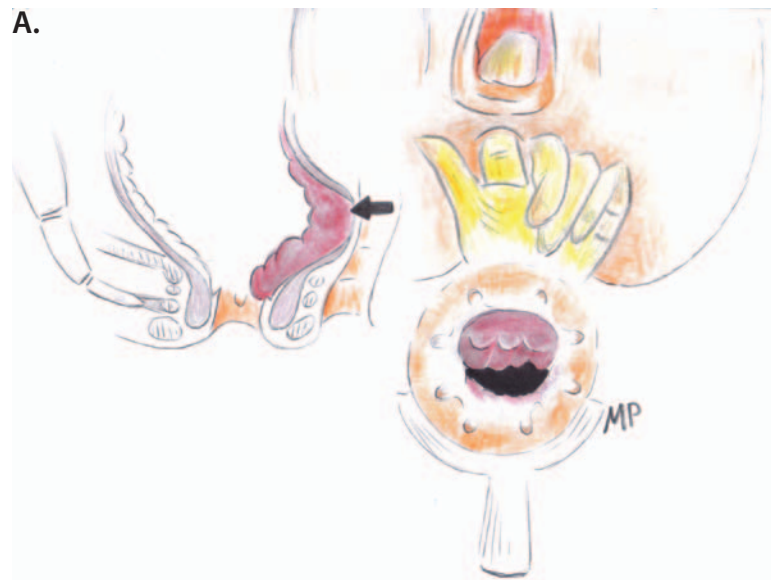
Over many years of treating patients with ODS, I feel that the greatest trick is the selection of patients for surgery and I would agree with Steven Wexner who remarked that “many females have a rectocele, but in only a few cases is it the cause of ODS”.

CHAPTER 3 THE SURGERY OF OBSTRUCTED DEFECATION SYNDROME (ODS)

- 3.1. THE BLOCK OBLITERATIVE SUTURE FOR RECTOCELE**
 - 3.1.1. The Block Obliterative Suture for Rectocele in Obstructed Defecation
- 3.2. PARTIAL PUBORECTALIS MYOTOMY COMBINED WITH A BLOCK OBLITERATIVE RECTOCELE SUTURE**
- 3.3. COMBINED ANTERIOR RECTAL MUCOSECTOMY PLUS LEVATORPLASTY**
- 3.4. SARLES ENDORECTAL RECTOCELE EXCISION**
- 3.5. TRANSVAGINAL REPAIRS IN OBSTRUCTED DEFECATION**
 - 3.5.1. Transvaginal Repair of Rectocele
 - 3.5.2. Perineal Body Repair for Low Rectocele With Mesh

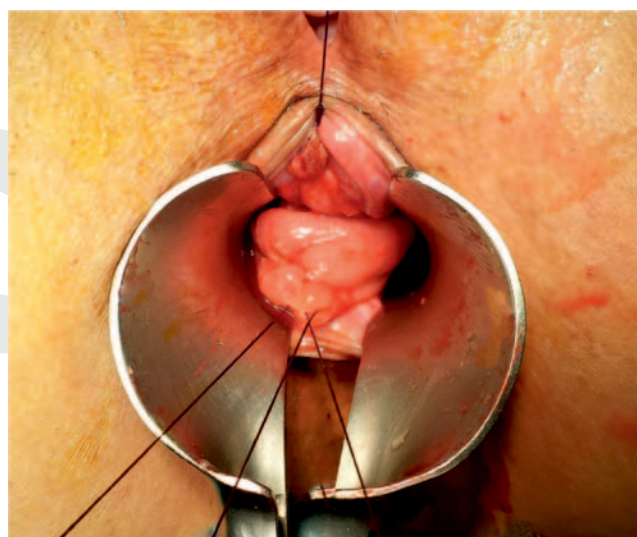
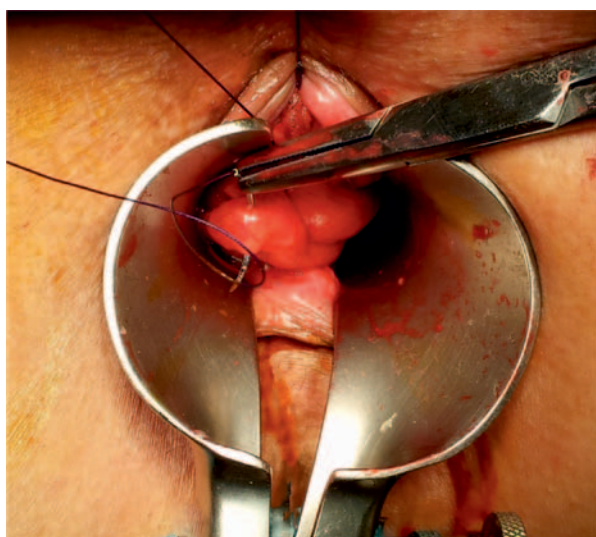
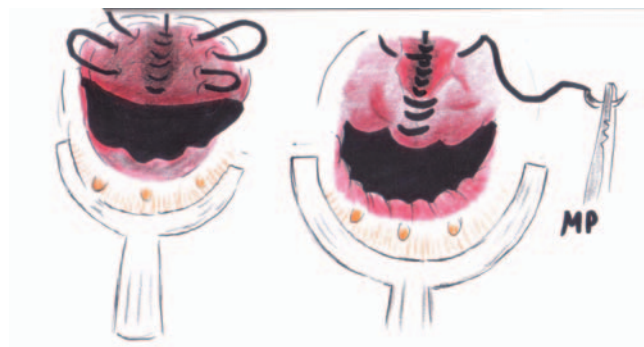
3.1. THE BLOCK OBLITERATIVE SUTURE FOR RECTOCELE

3.1.1. The Block Obliterative Suture for Rectocele in Obstructed Defecation



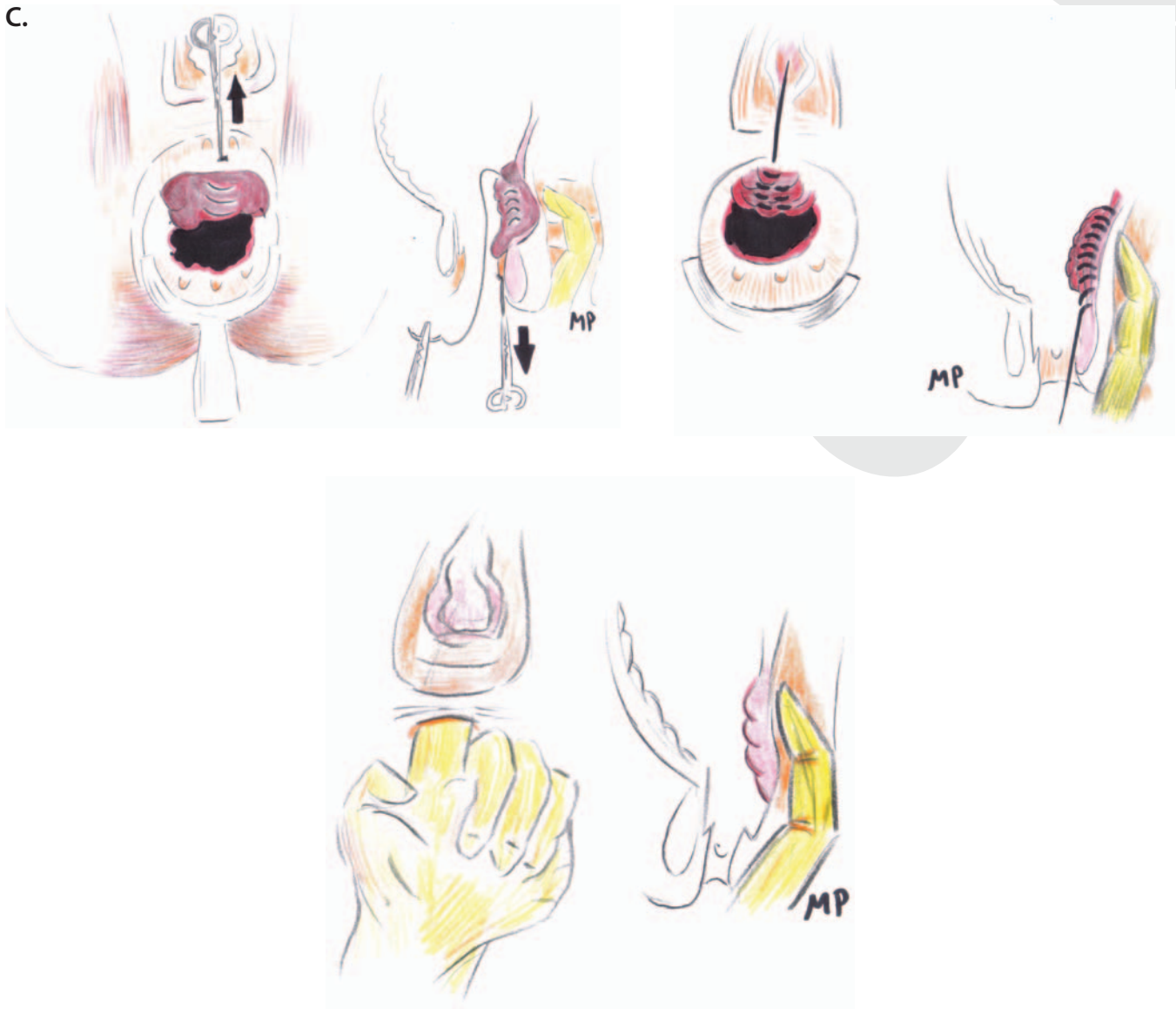
- A. Digital examination confirms the presence of a rectocele by rotation of the examining finger.

B.



- B.** A reefing running suture obliterates the rectocele incorporating the mucosa, submucosa and muscularis. Schematic and operative images of the technique are depicted in an axial lithotomy and a sagittal plane to show the method of obliteration. A finger in the vagina confirms that the rectocele has been repaired and is designed to prevent rectovaginal fistula formation.

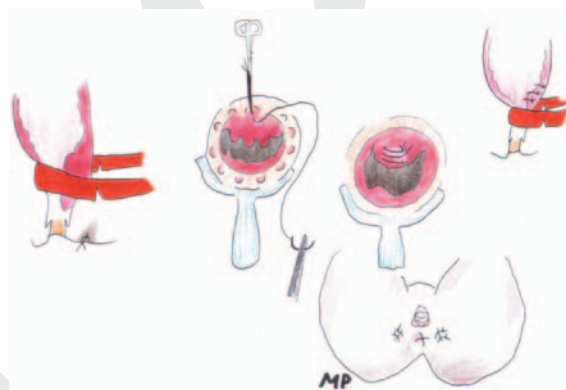
C.



- C. Completion of the cobble-stoned obliterative suture with final digital examination appearance.

Comment: This is the procedure I mostly commonly perform when dealing with a rectocele causing obstructed defecation provided that it is not too high and that the concomitant rectal internal mucosal prolapse is not large. In these latter circumstances, I prefer the Sarles anterior hemi-De-lorme procedure illustrated in this section. The examining digit can assess the rectocele size and depth where in this procedure the vagina must be protected. The obliterating 2/0 vicryl running suture is directed cranially in the midline and starts with the first stitch commencing just above the dentate line anteriorly. The suture should incorporate rectal mucosa and submucosa along with a part of the muscle layer, which is aimed at creating a barrier between the rectum and the vagina.

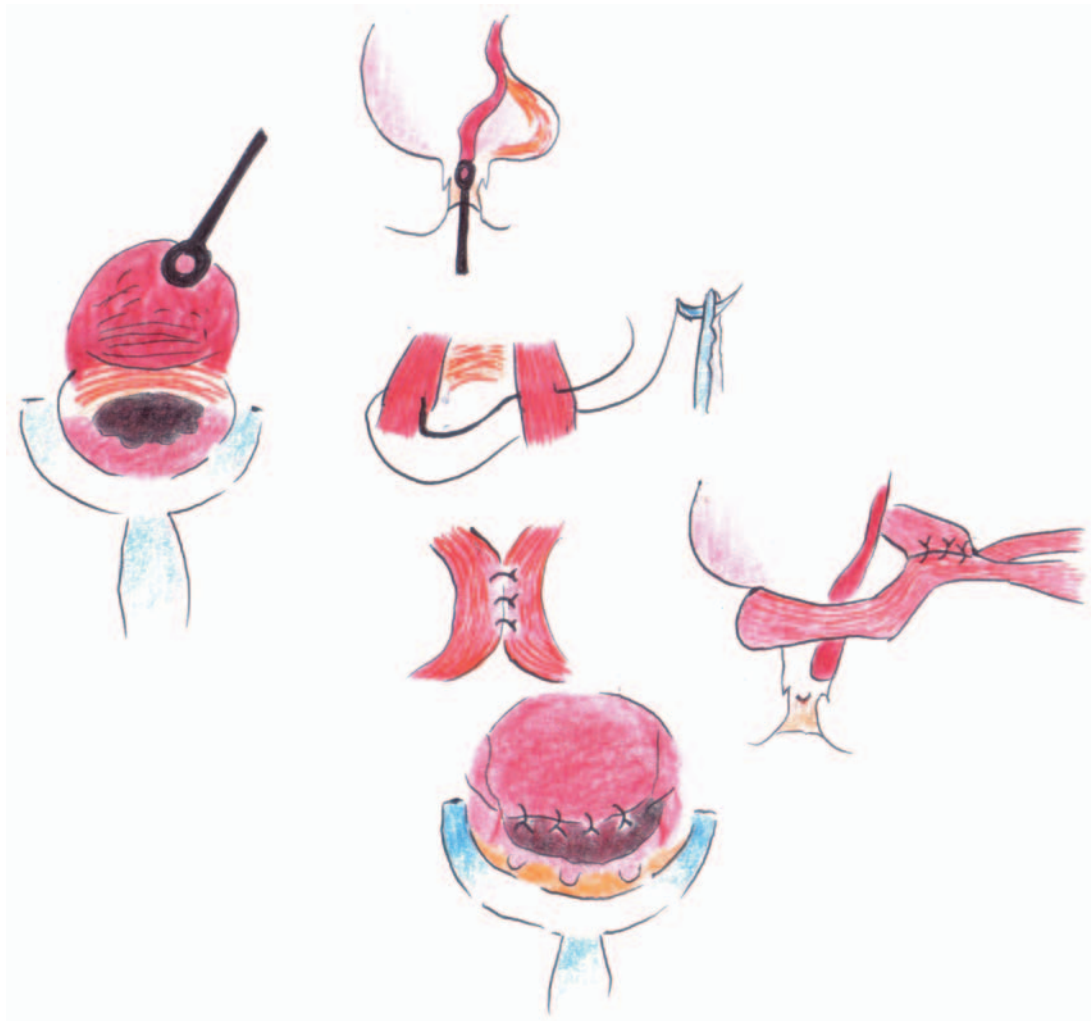
3.2. PARTIAL PUBORECTALIS MYOTOMY COMBINED WITH A BLOCK OBLITERATIVE RECTOCELE SUTURE



The operative photographs show the minimal perineal incisions required. The levator floor on each side is felt against the examining digit and encircled for partial division. Puborectalis myotomy may be performed for a rectocele with coincident anismus (paradoxical puborectalis contraction syndrome). Schematic images of the procedure are shown below which in this case is combined with a Block obliterative suture.

Comment: This rather new operation is a modification of the Wasserman procedure which was devised at St Mark's Hospital in the late 1970's and then abandoned. It consisted of the total division of the puborectalis muscle in its posterior aspect in patients with obstructed defecation due to anismus. Unfortunately the Wasserman operation converted a non-relaxing puborectalis into a non-contracting puborectalis and many patients became incontinent. Modification of this technique was described by Mohamed Farid in 2010 and consisted of bilateral partial division of the muscle, first through a 5 cm wide perianal incision and then with a closed technique, by cutting the muscle blindly after inserting a knife through the perianal skin, with no incision at all. The first technique had a more than 50% incidence of sepsis and in the second approach there was no efficacy in one-third of cases. Incontinence in these patients, however, did not occur. We slightly modified Farid's technique using a semi-closed 1.5 cm perianal bilateral incision which was left open and which was not associated with postoperative sepsis. In this setting, division of the muscle was performed under direct vision where we noted persistence of anismus in one of the 8 patients on whom we performed the procedure. There was just one case of mild incontinence. In the images as shown, the Kelly forceps are gently pushed upwards through the ischio-rectal fossa and inserted between the inner portion of the levator ani and the outer portion of the puborectalis muscle. Care is taken, when separating the inner part of the postero-lateral aspect of the puborectalis muscle from the rectal wall not to enter the rectum with the distal end of the forceps. Once the muscle is brought through the perineal incision the inner half is divided with diathermy.

3.3. COMBINED ANTERIOR RECTAL MUCOSECTOMY PLUS LEVATORPLASTY

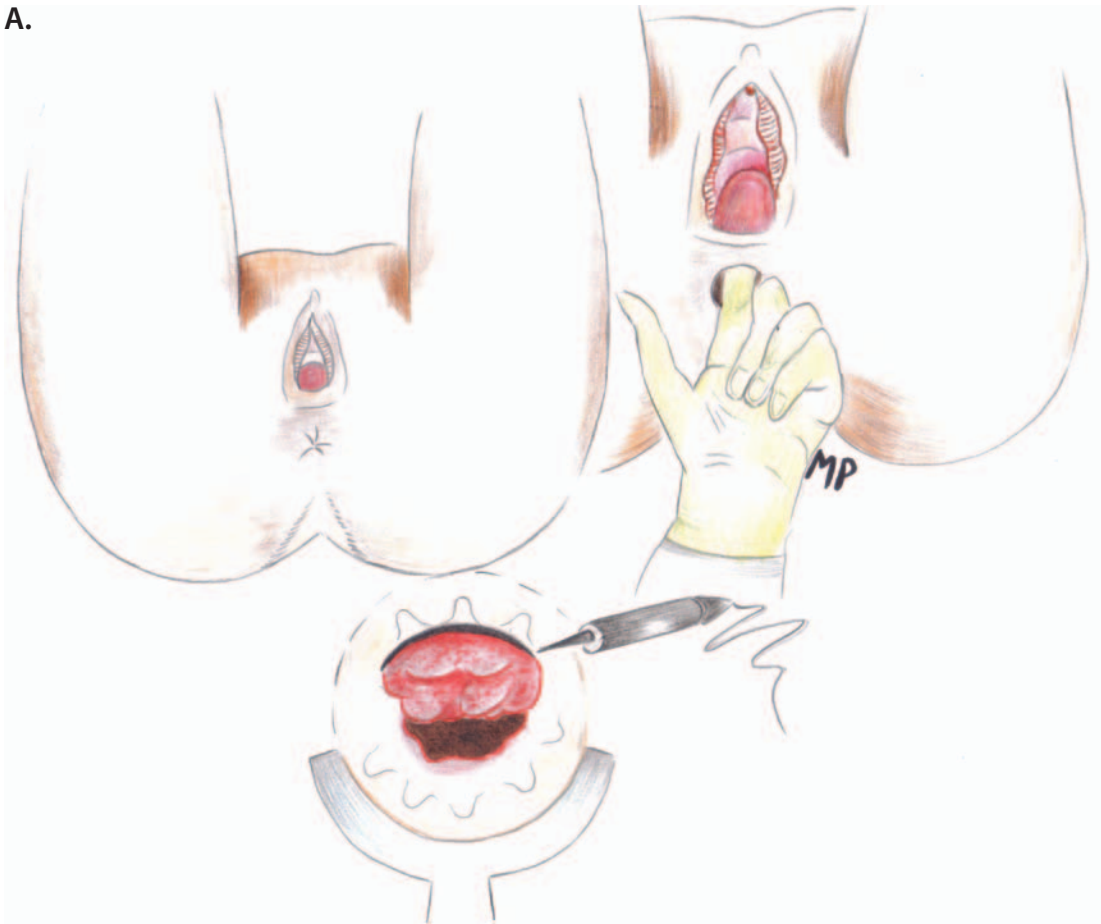


In this case the redundant rectal mucosa is excised with performance of an anterior levatorplasty before closure of the mucosal defect.

Comment: In carrying out the anterior mucosectomy it is necessary to check the diastasis of the rectal muscle which corresponds to the center of the rectocele. At this level the distance between the dissection plane and the vaginal lumen is very short, so that great care should be taken so as not to inadvertently injure the posterior vaginal wall which would result in a recto-vaginal fistula. A sagittal view at the completion of the rectal mucosectomy shows the weak point where the rectal muscle is absent. A peritoneocele (i.e. a prolapsed pouch of Douglas) lies close to the top-end of the dissection and is detectable between the rectum and the uterus. In hysterectomized patients the distal end of the peritoneocele may be even closer to the plane of the mucosectomy and great care should be taken not to injure both the peritoneum and the small bowel where there is a concomitant enterocele. The “concertina-like” plication of the anterior rectal muscle is then carried out and is designed to reduce the distance between the rectal mucosa above the mucosectomy and the epithelium of the anal canal so that there is a tension-free recto-anal anastomosis less prone to dehiscence.

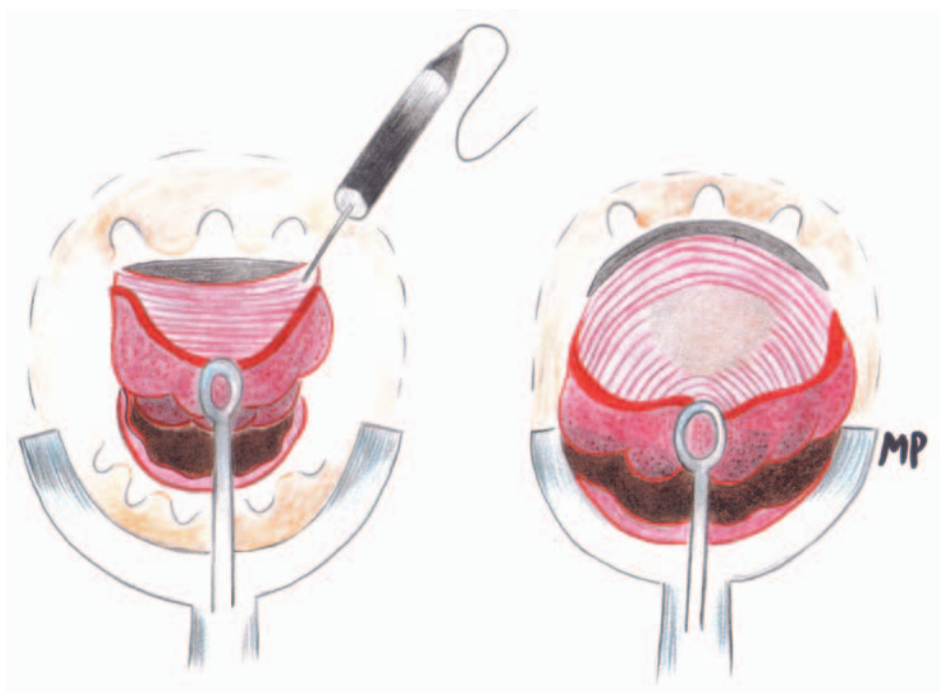
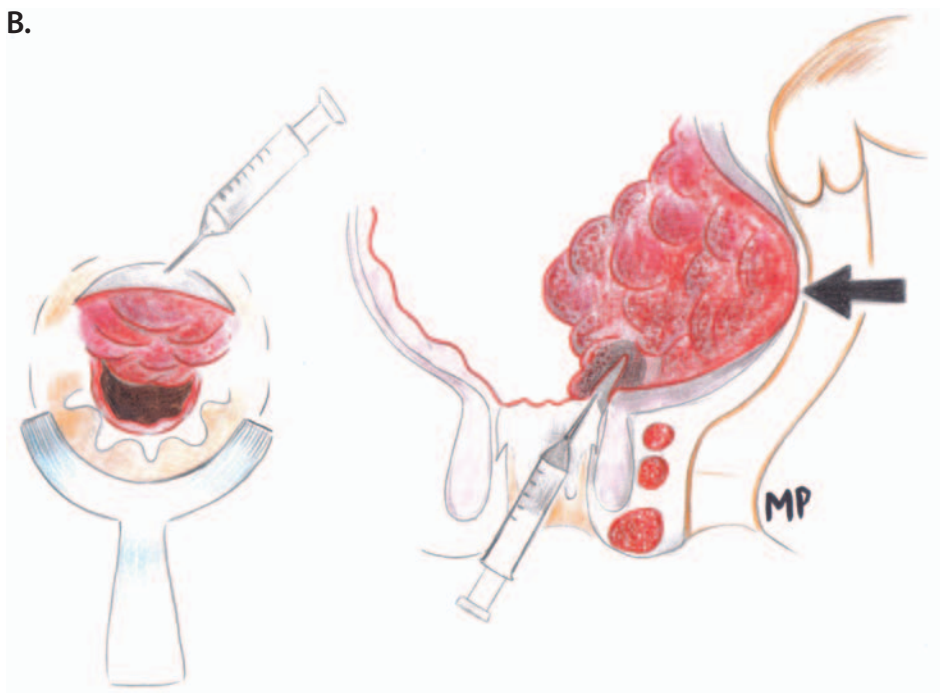
3.4. SARLES ENDORECTAL RECTOCELE EXCISION

A.



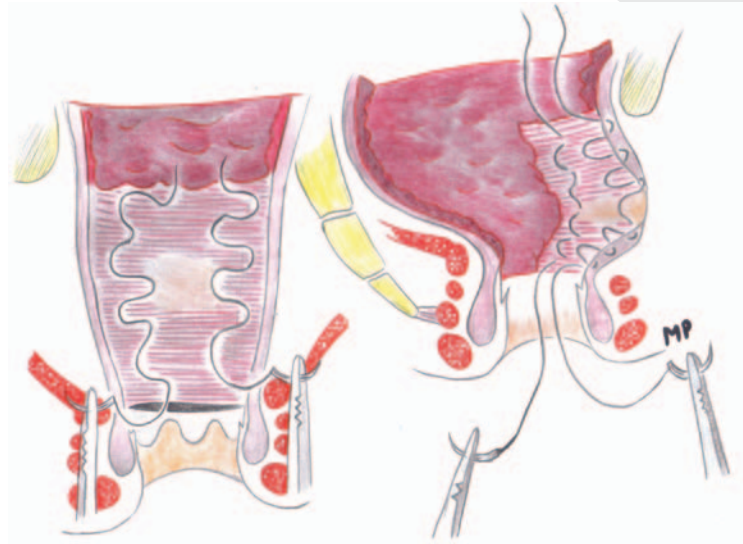
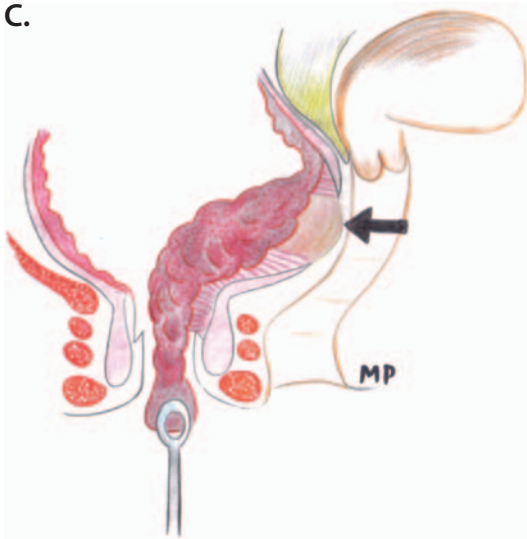
A. After demonstration of the rectocele the initial anterior rectal mucosal incision is made.

B.

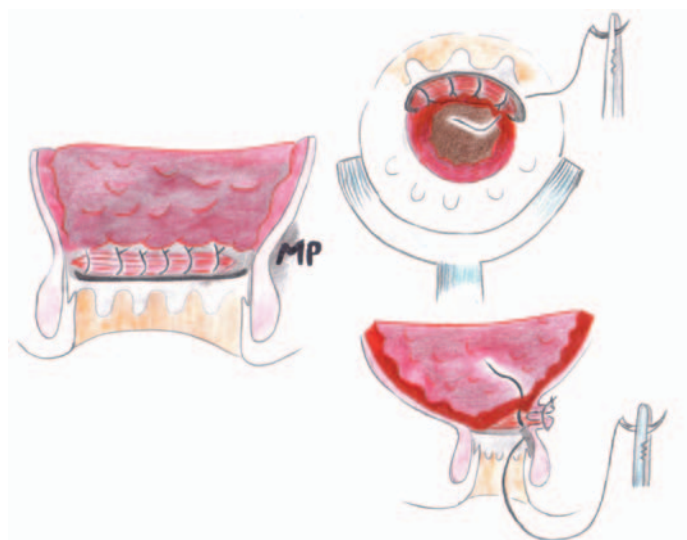


- B. Following submucosal infiltration with a saline and adrenaline solution, the redundant mucosa is stripped off to expose the muscularis propria.

C.



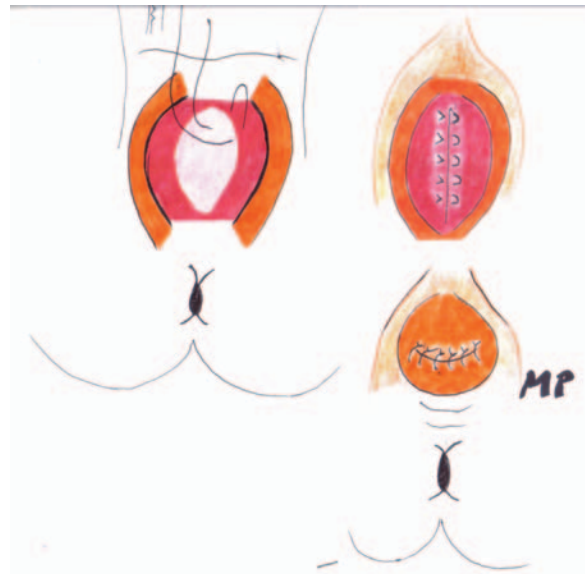
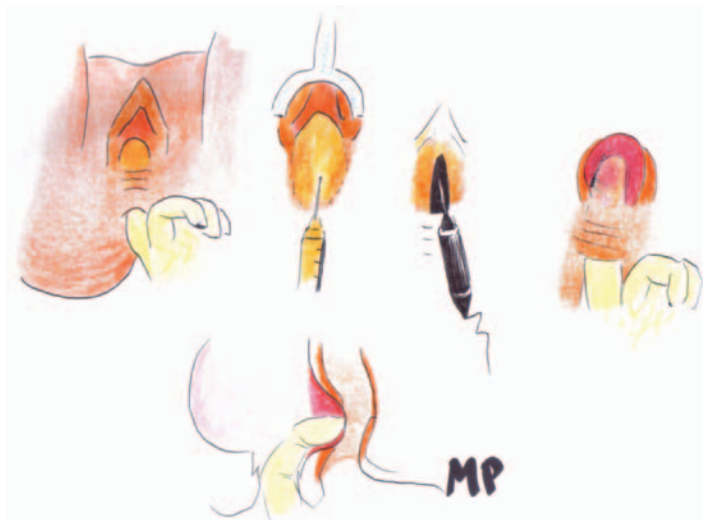
- C. The excess rectal mucosa is resected and the muscularis is reefed internally by performing and anterior hemi-Delorme procedure.



- D. The trimmed mucosal defect is closed after securing the suture line to the underlying muscularis as a mucopexy.

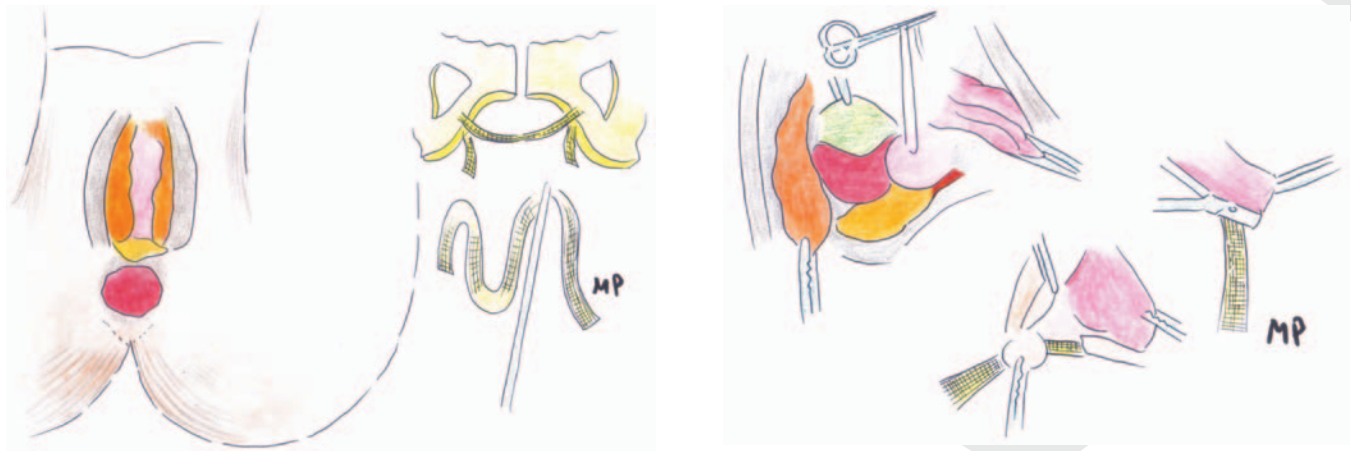
3.5. TRANSVAGINAL REPAIRS IN OBSTRUCTED DEFECATION

3.5.1. Transvaginal Repair of Rectocele



After demonstration of the rectocele, a transvaginal incision is made to excise the redundant mucosa with repair of the rectovaginal septum, excision of redundant vaginal skin and mucosal closure. The procedure is patterned after Schwandner.

3.5.2. Perineal Body Repair for Low Rectocele With Mesh



After dissection of the vagina and rectum off the laterally displaced perineal body, the deep transverse perineal muscle is displayed and is anchored by a strip of mesh using a Tissue Fixation System to the descending pubic ramus which draws the displaced perineal bodies into a more medial position. The procedure is modified from Petros and Inouie.

Comment: This procedure is based on the novel concept of the integrated “pole-flag” proposed by Australian urogynecologists designed for pelvi-perineal prolapses and “celes”. Instead of trying to repair and suture organs and structures such as the vagina, the rectum or the anal sphincters, (which represent “the flags”), the surgeon needs to reinforce “the flagpole”, (i.e. the connective tissue between the sacral promontory or any surrounding bone and the perineal body). In doing so, one avoids suturing and repairing weakened and denervated structures which, most of the time are irreversibly damaged. Rather, one reinforces the more consistent support of these damaged structures. Identification of the deep transverse perineal muscles requires formal dissection of the rectum off the vagina and towards the laterally placed perineal bodies on each side which are repositioned medially with the tissue fixating tape using a finger in the rectum to identify their attachments to the ischial tuberosities and their adherence to the rectum.



CHAPTER 4

Rectal Prolapse

Monsieur Delorme, surgeon of the French Army more than one century ago would likely be very proud to know that his operation, (even if modified by Rehn), is still used worldwide in the management of rectal prolapse (RP). The operation is illustrated in this book step-by-step and is indicated in patients with a small sized RP (up to 7 cm in length) where it may be used most predominantly in mucosal but also in full-thickness RP. Like the Altemeier procedure, (the trans-perineal rectosigmoidectomy), it has the advantage in that it may be carried out under spinal anesthesia in frail patients. It is also, however, a good operation for young patients as it avoids an abdominal incision and presacral dissection with the potential of autonomic nerve injury. Many surgeons will use it for full-thickness RP up to 10-12 cm in length.

Nearly 20 years ago, I was sitting at a nice restaurant in Cesarea in the north of Israel, eating seafood in front of the Mediterranean, when Mike Keighley and his Israeli ex-alumnus Joel Sayfan tried to convince me that a sacral mesh rectopexy was better than a Delorme-Rehn procedure for RP. Despite their eloquent arguments for an operation that has fallen away, it remains so now as it was then that there is no *best operation* for this disease, where the surgical procedure needs to be tailored to the patients' age and comorbidity, their bowel habit (if constipated or not), their sphincter function and integrity and even their profession and lifestyle. Perineal surgery in this regard, may better suit young women where even a laparoscopic or robotic procedure can promote unwarranted intra-abdominal adhesions that can impair future fertility.

By contrast, a Delorme-Rehn procedure is not the ideal operation for a patient with weak sphincters, as function is likely to deteriorate postoperatively. Here, unless the surgeon takes care to avoid prolonged anal dilatation with either a Fansler or an Eisenhammer anal speculum and uses the Lone-StarTM retractor or simply stitches the skin of the lower anal canal to the skin of the glutei, despite a nice operative result, there will be patients whose postoperative incontinence impairs their quality of life. This can also be true for the so-called "internal Delorme" procedure, performed for some patients with obstructed defecation and rectoanal intussusception. Following a Delorme-Rehn operation, the rectal reservoir, at the end of the procedure is reduced due to the "concertina"-like plication of the rectal muscle and the accompanying mucosal prolapsectomy; both of which may impair continence even when the prolapse has been cured.

These remarks also apply to the Altemeier procedure where some patients with severe pre-operative incontinence can be worsened after a neo-rectoanal anastomosis. It is worth remembering that the sigmoid colon used in the Altemeier anastomosis has a narrower caliber and lacks the rectal neural network necessary for adaptation, rectoanal inhibition and flatus/feces discrimination. If we are to do this procedure, we may need to consider supplementing it with construction of a colonic reservoir above the anal canal as proposed by Mike Keighley and Norman Williams [Keighley and Williams 2008]. The point here, is that the coloproctologist must have a considerable armamentarium for the treatment of RP and not just rely on one favored operation. When we do the latter, even if performed with minimally invasive techniques, we are likely to see recurrences and functional disturbances so that our tailored choice of surgery becomes pre-eminent rather than the actual operative approach designed for performance of the selected procedure.

Both the Delorme-Rehn and the Altemeier procedures offer the surgeon the chance to reach and to resect a peritoneocele, (when present), bearing in mind that a loop of small bowel may lie in the deepened pouch of Douglas where it may be inadvertently injured in the process. This point has made me skeptical about the new Stapled Prolapse Resection technique using repeated firings of the Countour Transtar™ stapler championed by Giovanni Romano from Naples [Romano et al 2009]. This danger is real and considerable in the hysterectomized multiparous female where the pouch of Douglas may be just a couple of centimeters above skin level and where despite the use of a deep Trendelenburg tilt there is still the risk of peritoneal entry and enteric injury with this technique. It would seem wise, if the stapling technique is favored, to supplement this with a manual anterior rectal resection aimed at identifying and either sparing or safely resecting the prolapsed pouch of Douglas. An alternative here would be to perform the totally stapled prolapse resection with laparoscopic guidance as has been suggested by Shmuel Avital from Israel.

“An operation for all ages” is the definition provided by Cirocco referring to the Altemeier procedure [Cirocco 2010] as the procedure may be performed both in the young and in the elderly patient under spinal or even local anesthesia. Steven Wexner’s group suggested that the addition of an anterior levatorplasty will reduce the risk of prolapse recurrence, [Chun et al 2004] whereas Atallah preferred to use biological mesh to reinforce the pelvic floor for this purpose [Atallah et al 2012]. Both techniques are included in this Atlas patterned on their descriptions in the literature along with the “classical” Altemeier procedure, the good results of which have been reported by Altomare and colleagues [Altomare et al 2009].

Although the Altemeier and the Delorme-Rehn procedures are the most commonly used surgeries for RP, many other operations have been described including the transperineal mesh sacro-rectopexy reported by Kosba et al., [Kosba et al 2010] a method which is not too difficult to perform for those familiar with the planes of dissection normally seen during a Parks’ post-anal repair. A recent clever alternative (albeit more expensive) is the trans-vaginal sacrospinous

Rectal Prolapse

rectopexy with biologic mesh, first reported by Gurland and colleagues; a variant of the NOTES (natural orifice trans-endoscopic surgery) technique [Gurland et al 2010].

A much simpler but effective technique for use only in cases of small external mucosal RP, is the circular stapled prolapsectomy, which we first described in 1997 [Pescatori et al 1997] ahead of its description as the PPH procedure for hemorrhoids in 1998; a technique which has in meta-analysis been shown to be associated with a higher incidence of hemorrhoidal recurrence when compared with conventional manual hemorrhoidectomy [Giordano et al 2009]. Even simpler (and much cheaper) techniques include that of manual excision or stripping of the external mucosal RP which I first saw performed at St Mark's Hospital in London in the 1980's for small mucosal RP cases. Finally, I would add just a few words on the low-cost El Sibai-Shafik procedure, which is a sort of minimally invasive Delorme-Rehn operation and which is illustrated in the book patterned on its architects [El-Sibai and Shafik 2002]. This Egyptian approach consists of a cauterization-plication of the rectal wall. I have only performed a few of these El-Sibai-Shafik operations for small, predominantly mucosal external RP cases with encouraging results which I published together with my friend Andrew Zbar [Pescatori and Zbar 2009]. This operation cannot be complicated by any form of suture dehiscence as there is no suturing of the rectum to the anal canal, but rather a simple plication of the rectal muscle once the vertical lines of mucosal cauterization have been performed.

In conclusion, several techniques are at the disposal of the experienced colorectal surgeon, each of which may be tailored both to the patient and to the prolapse. Perineal and transanal procedures may be easily carried out under spinal anesthesia in the elderly or in more frail patients, but it is accepted that they are more likely to be followed by recurrence and persistent or neo-incontinence when compared with standard abdominal procedures [Riansuwan et al 2010].

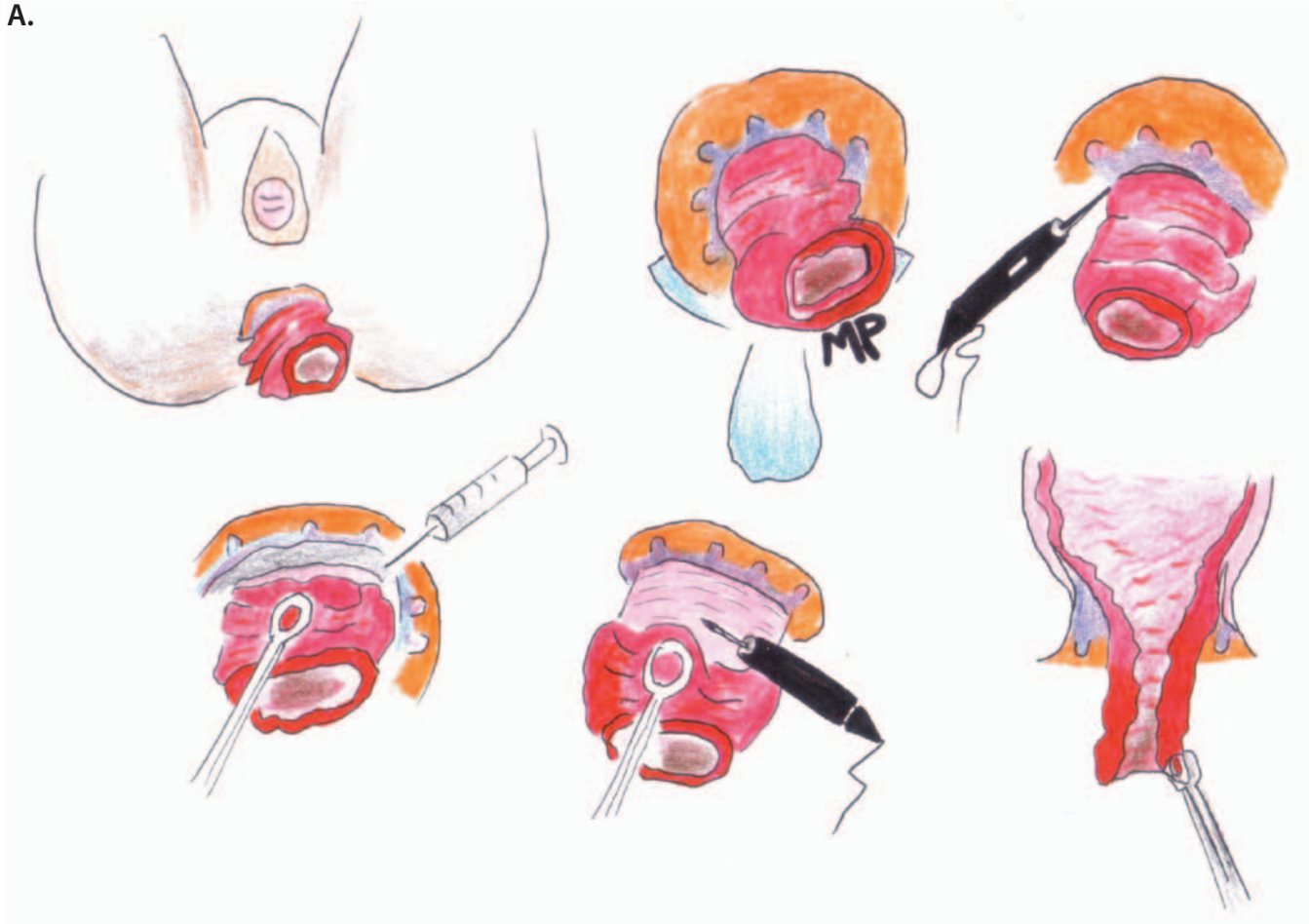
CHAPTER 4 RECTAL PROLAPSE

- 4.1. THE DELORME-REHN PROCEDURE**
 - 4.1.1. Standard Delorme Mucosectomy and Muscularis Plication
 - 4.1.2. The Delorme Procedure With Peritoneocele Repair and Levatorplasty
- 4.2. THE ALTEMEIER PROCEDURE (WITH ANTERIOR LEVATORPLASTY, TOTAL PELVIC FLOOR REPAIR OR BIOLOGIC MESH INSERTION)**
- 4.3. THE EL-SIBAI-SHAFIK CAUTERIZATION/PLICATION PROCEDURE**
- 4.4. POSTERIOR TRANSPERINEAL MESH SACRO-RECTOPEXY**

4.1. THE DELORME-REHN PROCEDURE

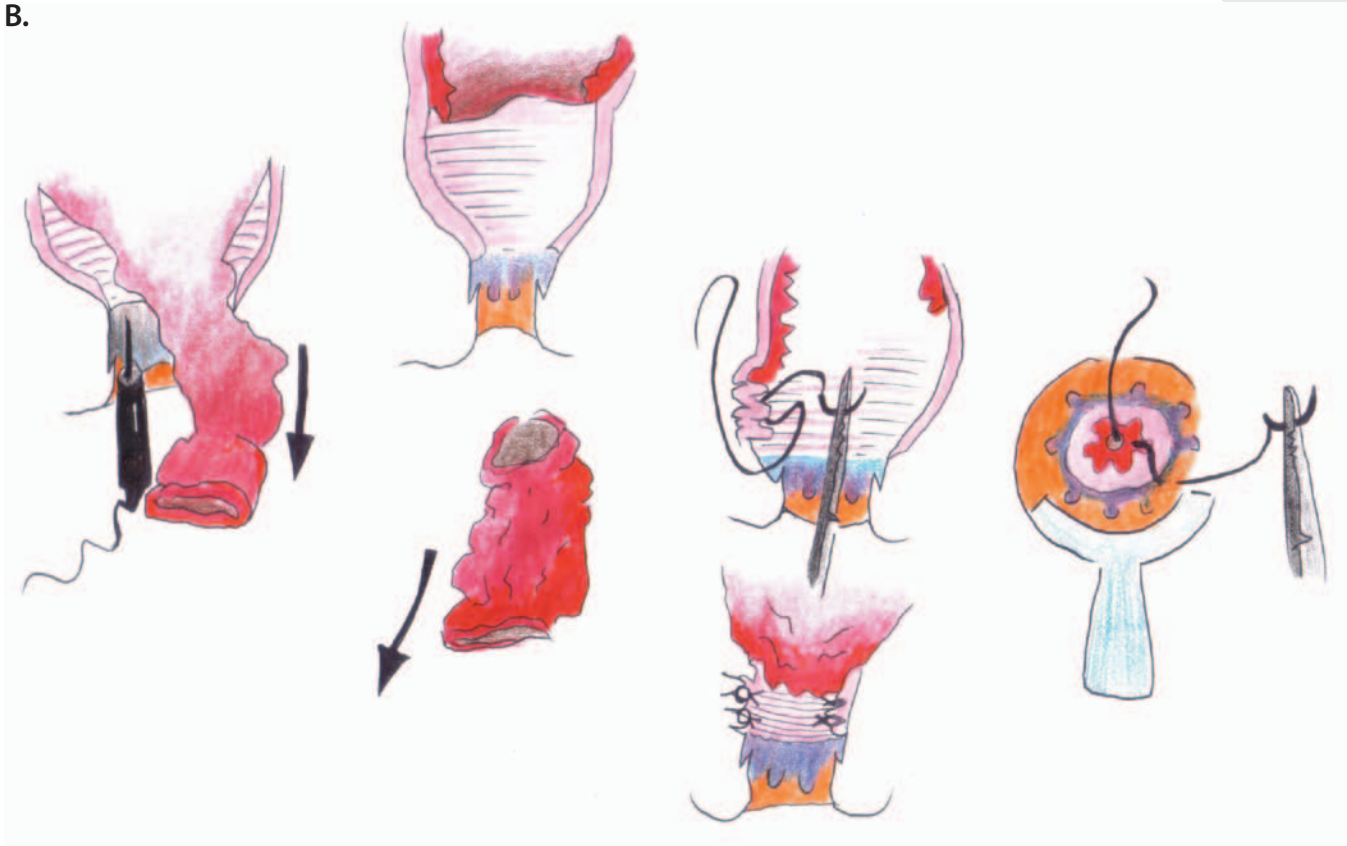
4.1.1. Standard Delorme Mucosectomy and Muscularis Plication

A.



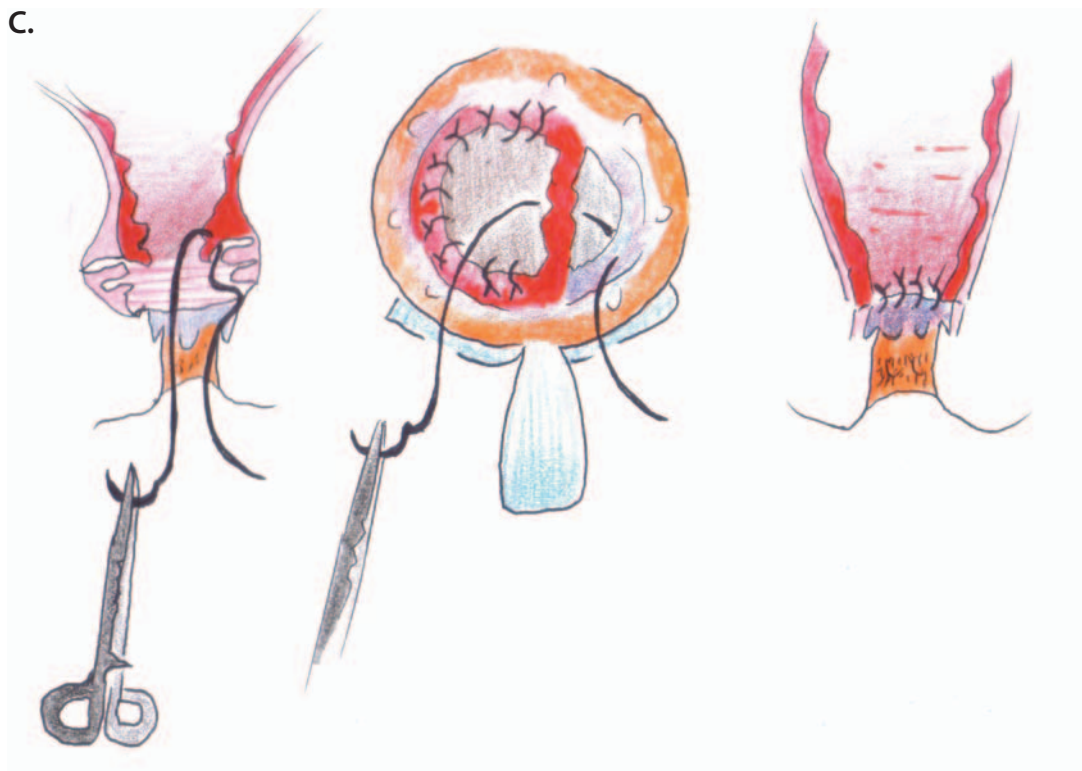
- A. The prolapse is fully extracted. The submucosal plane is infiltrated with a saline/adrenaline solution and the mucosectomy is performed with diathermy in a relatively bloodless plane. The dissection is extended into the lumen as far as possible to obtain the greatest length possible of mucosectomy and if carried out in the wrong plane will lead to excessive bleeding from the small arteries running within the muscular layer of the rectum.

B.

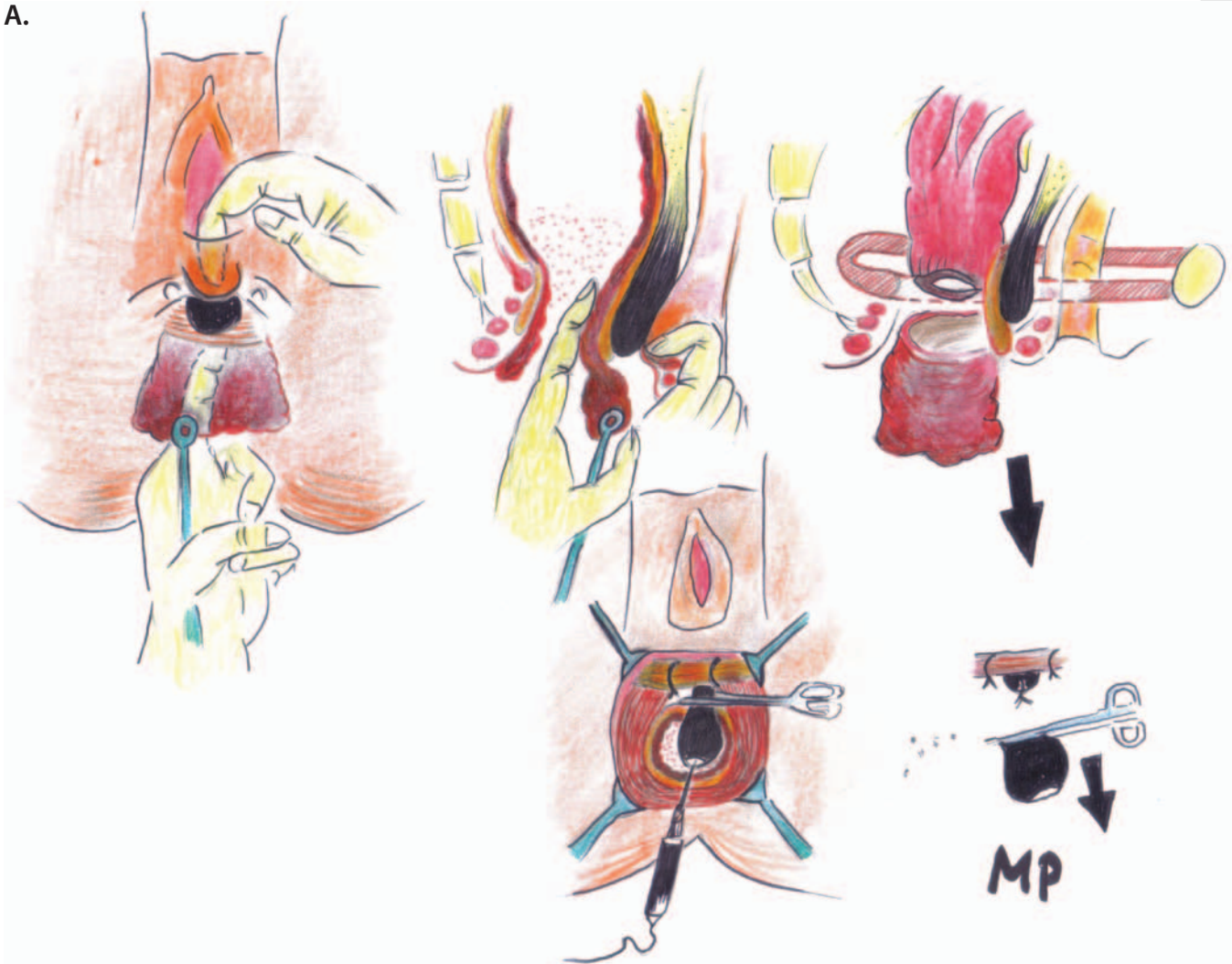


- B.** After the mucosal excision the muscularis is reefed with 2/0 Vicryl sutures around the circumference of the rectal prolapse so as to form a concertina-effect. This has to be carried out symmetrically otherwise the mucosal suture line has a greater tendency to dehisce.

C.

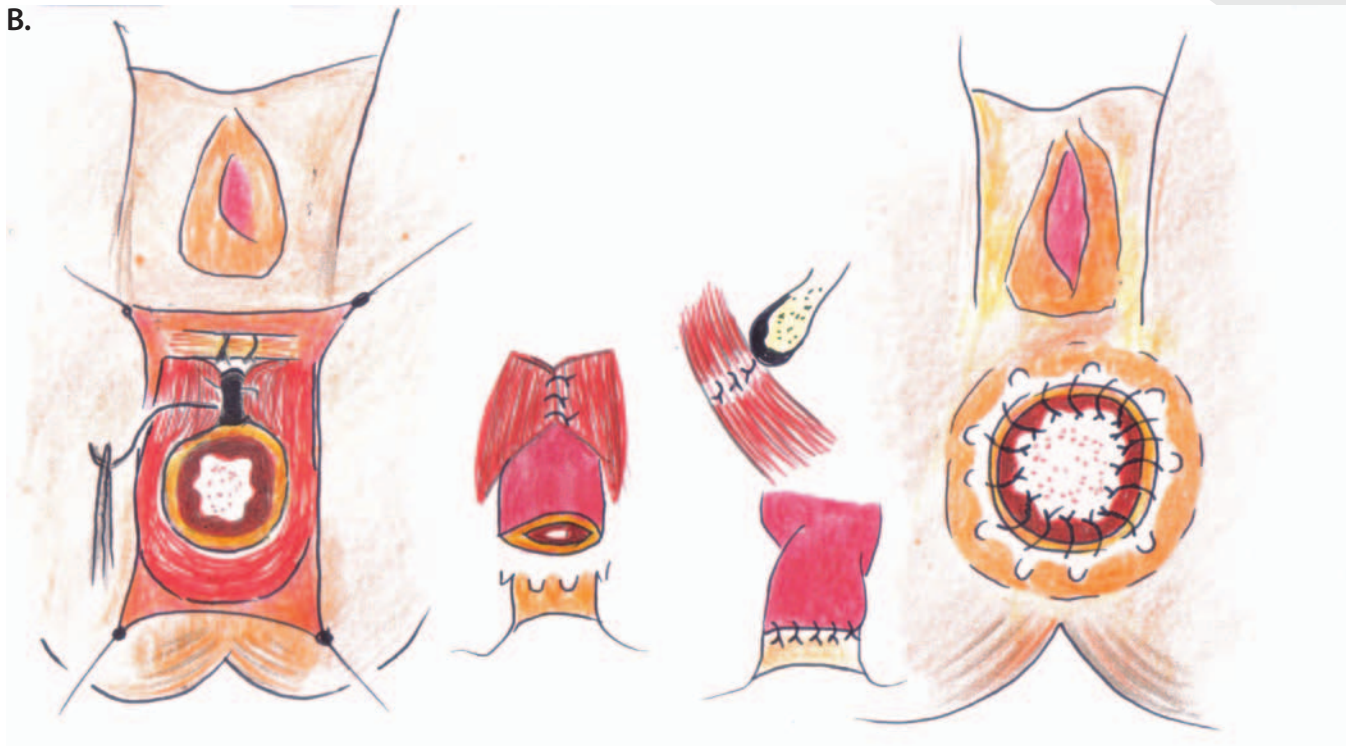


C. The prolapse is reduced and a mucosal anastomosis completes the procedure.

4.1.2. The Delorme Procedure With Peritoneocele Repair and Levatorplasty**A.**

- A.** Following a mucosectomy (as in 4.1.1.) the peritoneal cul-de-sac is excised and ligated. An anterior levatorplasty is also performed.

B.

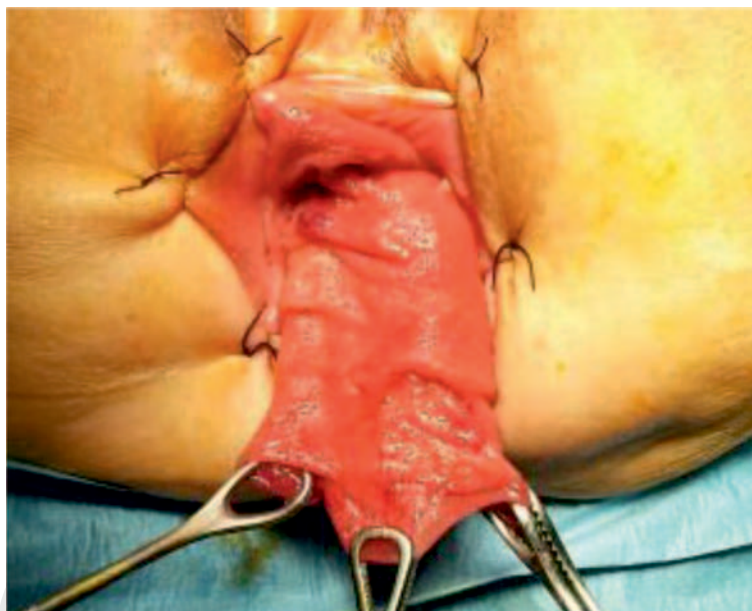
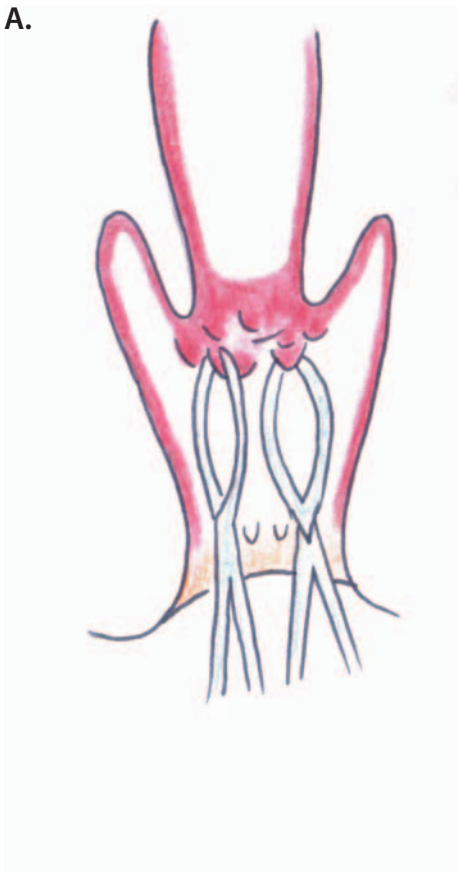


B. Completion anterior levatorplasty and mucosal anastomosis.

Comment: I have concerns regarding the anterior dissection and the risk of peritoneal and potentially small bowel injury with wholly stapled prolapse resection techniques. These approaches using a split of the prolapse and completing the anastomosis with a Transtar™ instrument strike me as comparatively blind. In this respect, the PPH device has been reported to have caused small bowel injury and hemoperitoneum following inadvertent injury of an enterocele.

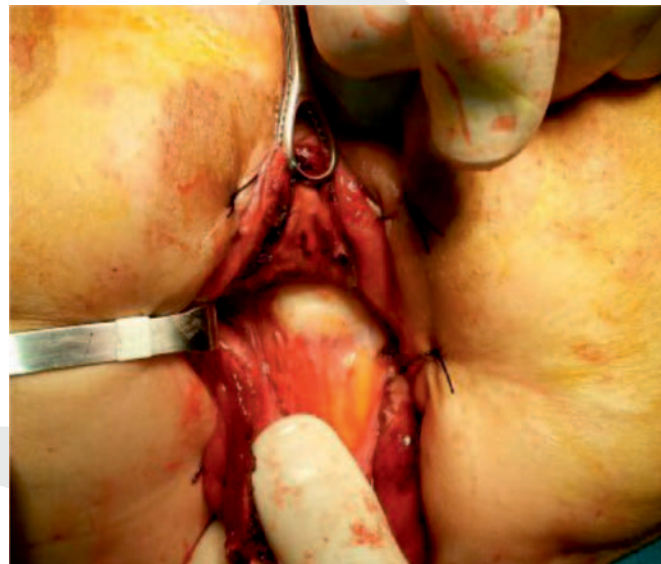
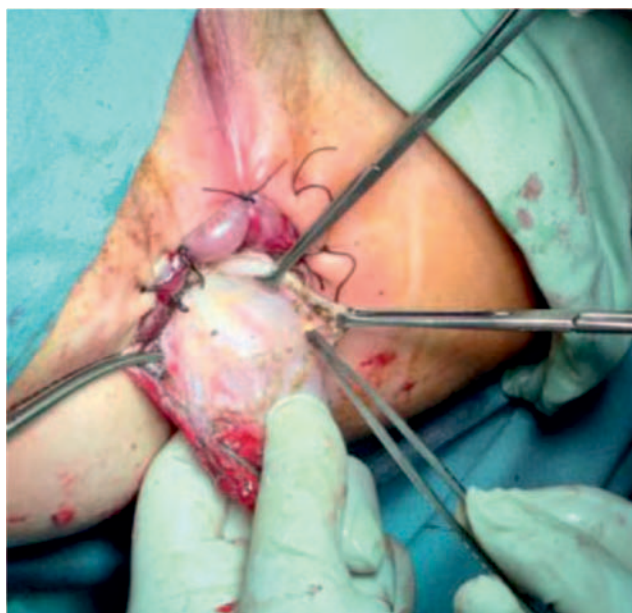
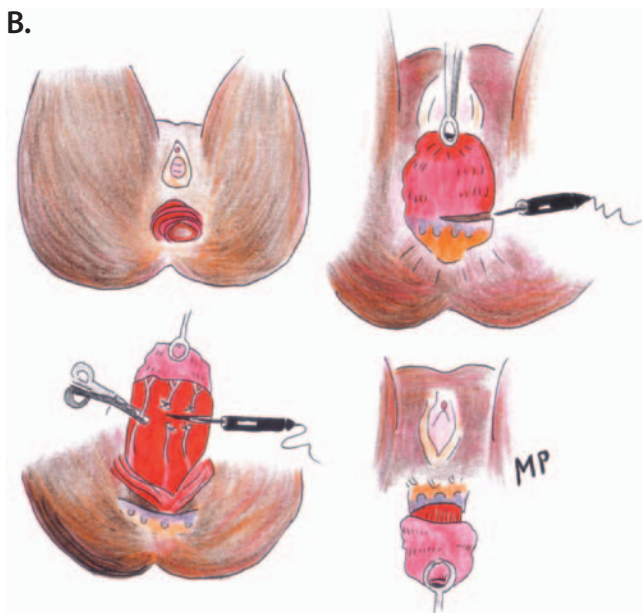
4.2. THE ALTEMEIER PROCEDURE (WITH ANTERIOR LEVATORPLASTY, TOTAL PELVIC FLOOR REPAIR OR BIOLOGIC MESH INSERTION)

A.



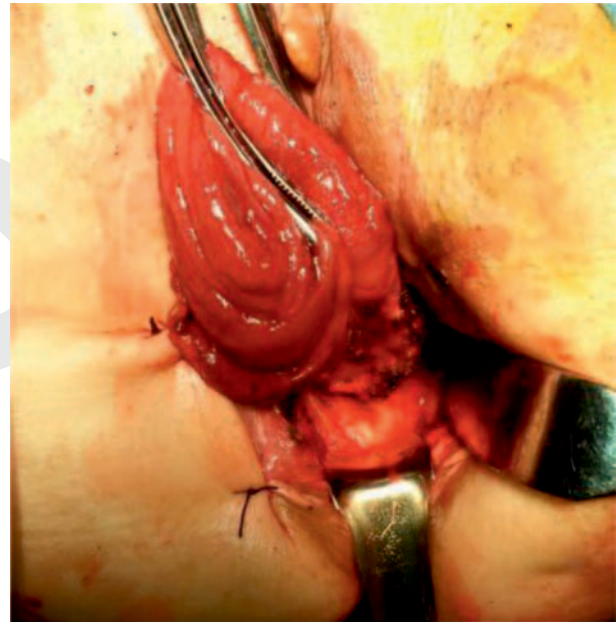
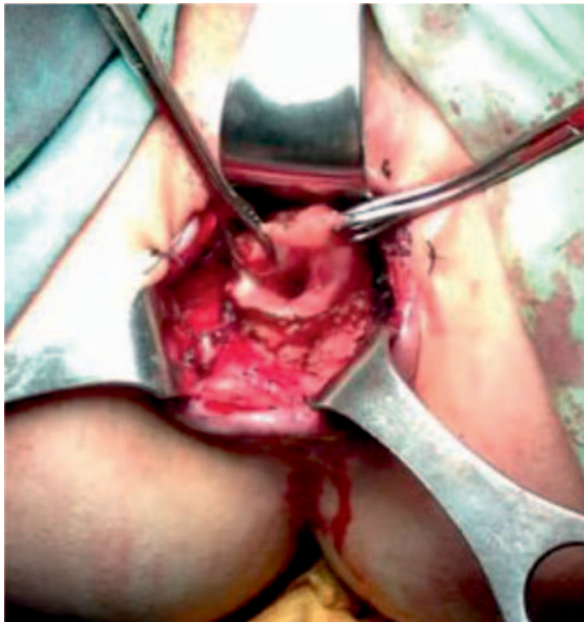
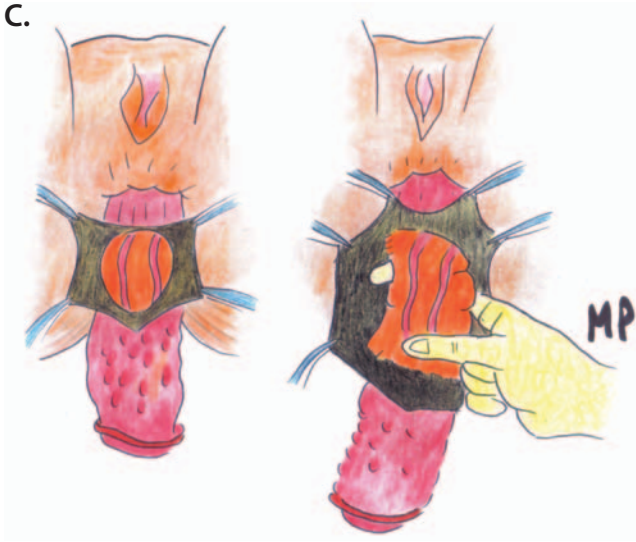
- A. The diagram on the left shows extraction of the rectal prolapse in an 80-year old lady (operative photography right).

B.



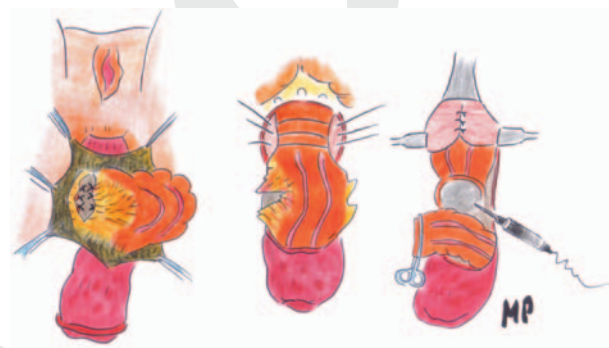
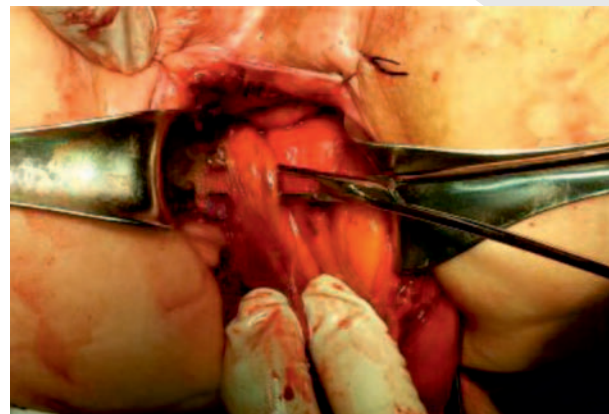
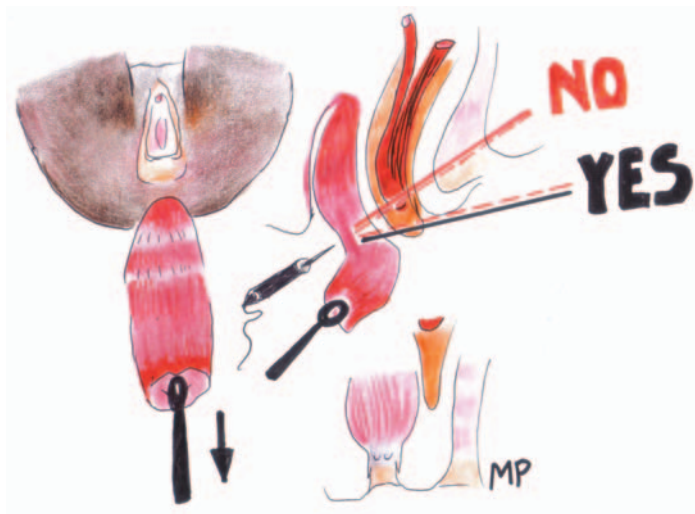
- B.** The schematic and left-hand operative photograph shows commencement of a full-thickness rectal dissection and ligation of the superficial submucosal vessels which are often engorged in prolapse cases. The operative photograph on the right shows the prolapse distracted to its fullest extent. A finger in the vagina demarcates the anterior wall of the prolapse.

C.

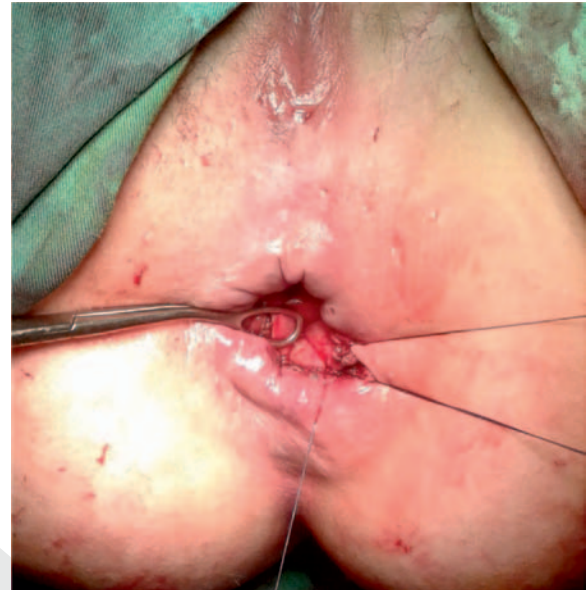


- C. The rectum is transected and the sigmoid is pulled through (schematic and left hand operative photograph). In the operative photographs, lateral rectal dissection is performed with separation from the deep part of the external sphincter and posterior dissection separates the rectum from the puborectalis muscle.

D.



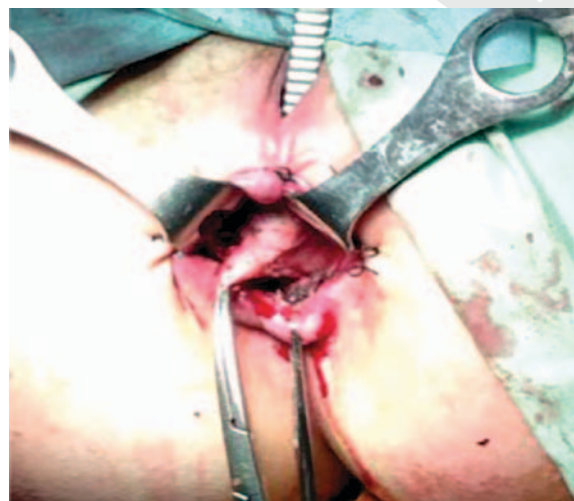
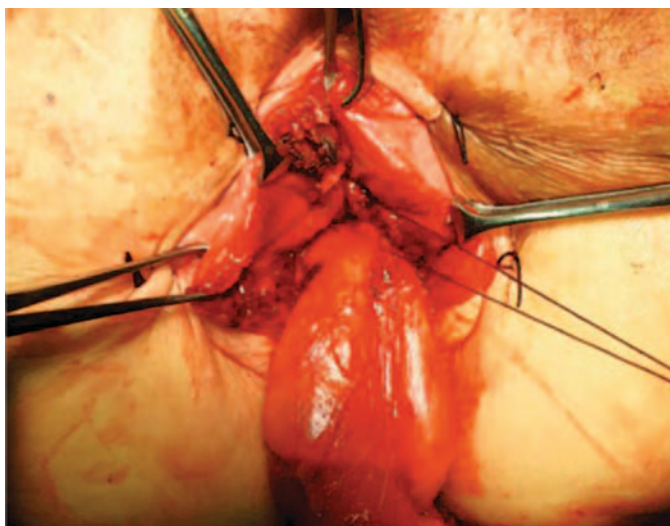
- D. Dissection is continued anteriorly to expose the peritoneum which should be retracted in order to avoid injury. Dissection needs to continue anteriorly in the correct plane so as to avoid inadvertent vaginal injury (defined by the initial vaginal examination defining the anterior extent of the prolapse). The operative photograph shows the division of the mesorectum. The schematic below the operative photograph shows the mesorectal division and transection of the colon.



- E. The schematic and operative images show the hand-sutured sigmoidorectal anastomosis as a pull-through type procedure.

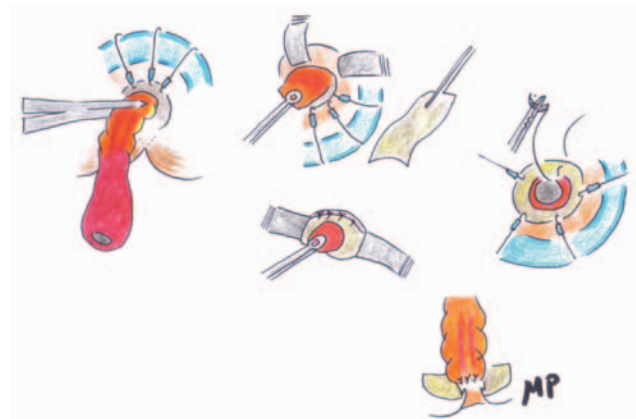
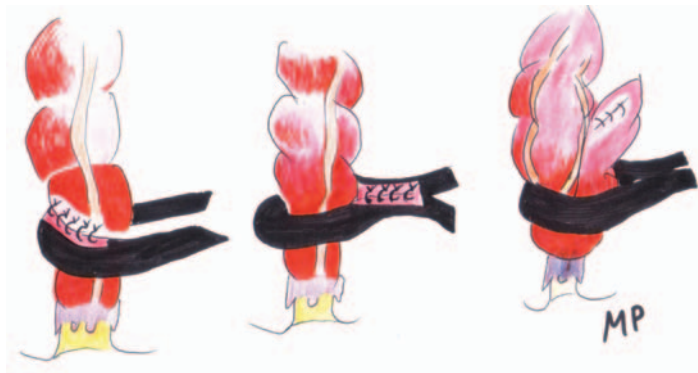
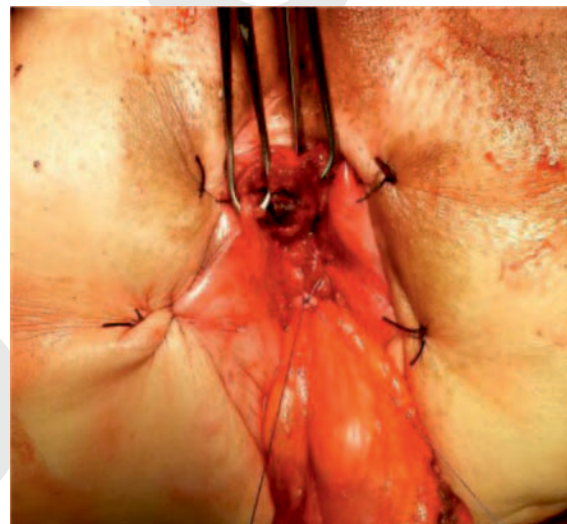
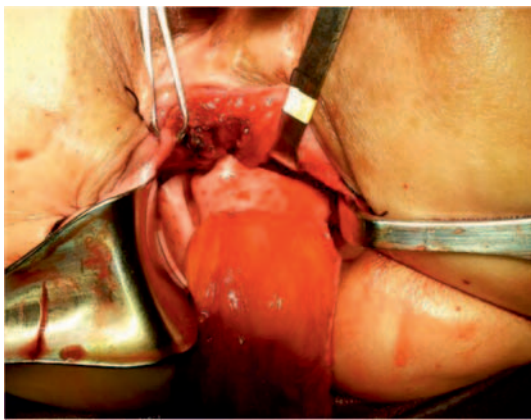
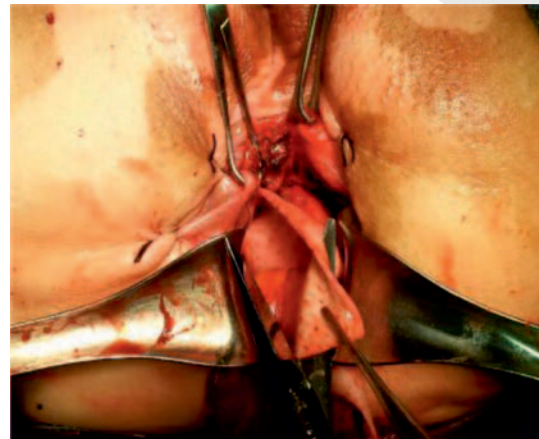
Several methods may be used to support the Altemeier's procedure in an effort to reduce prolapse recurrence (by narrowing the genital hiatus and raising the pouch of Douglas) and to assist preoperative fecal incontinence. These include:

F.



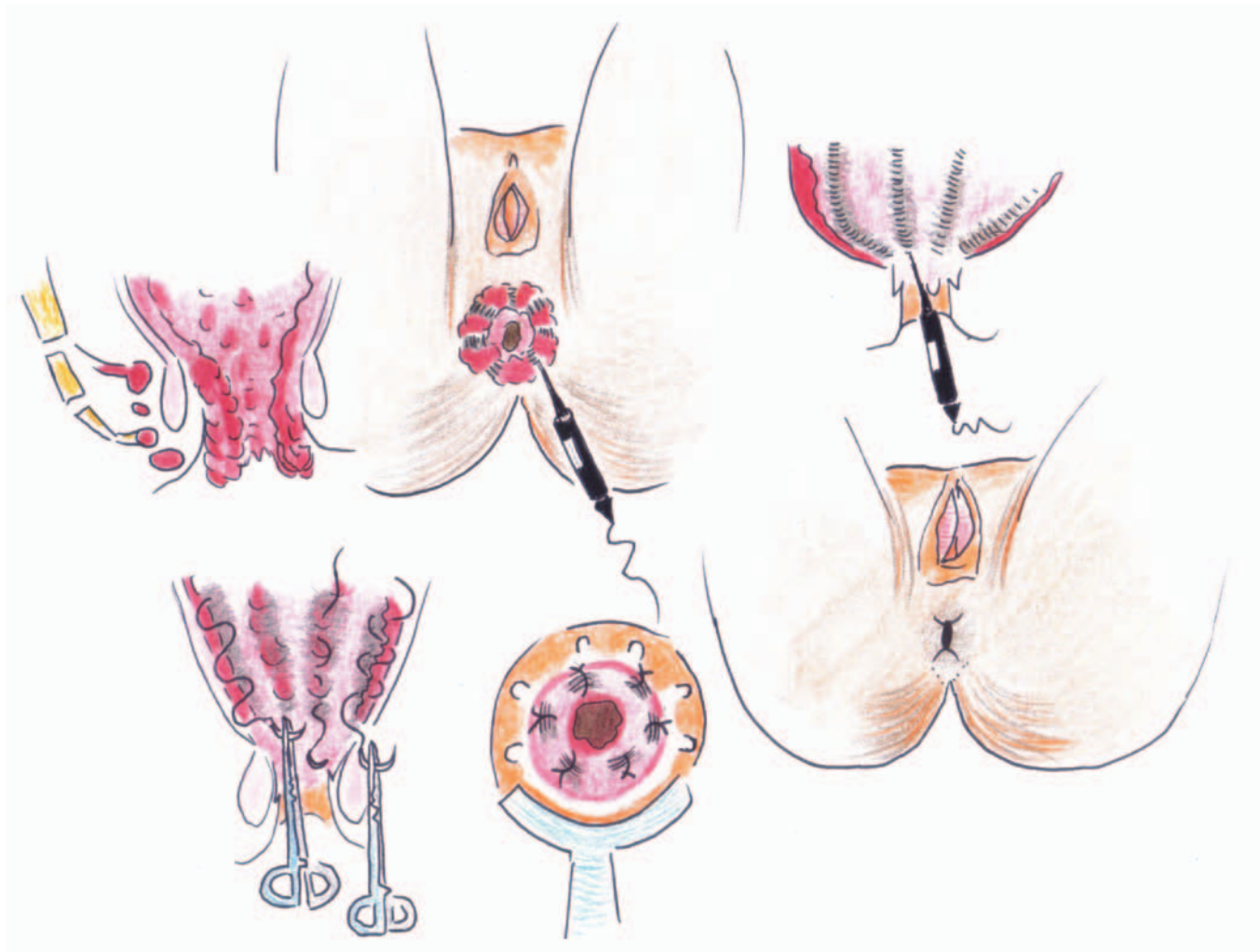
- F. An anterior levatorplasty. The bottom left operative photograph shows a forcep pushing down the vagina to detect its location. A Kelly forcep is grasping the peritoneal cul-de-sac for identification.

G.



- G.** In this case, a supportive biological (Porcine collagen) mesh is inserted and after fashioning, is positioned around the colon like a collar. It is sutured to the pelvic floor as shown in both the operative photographs and in the schematic images. (The technique of mesh insertion has been patterned after Atallah et al.)

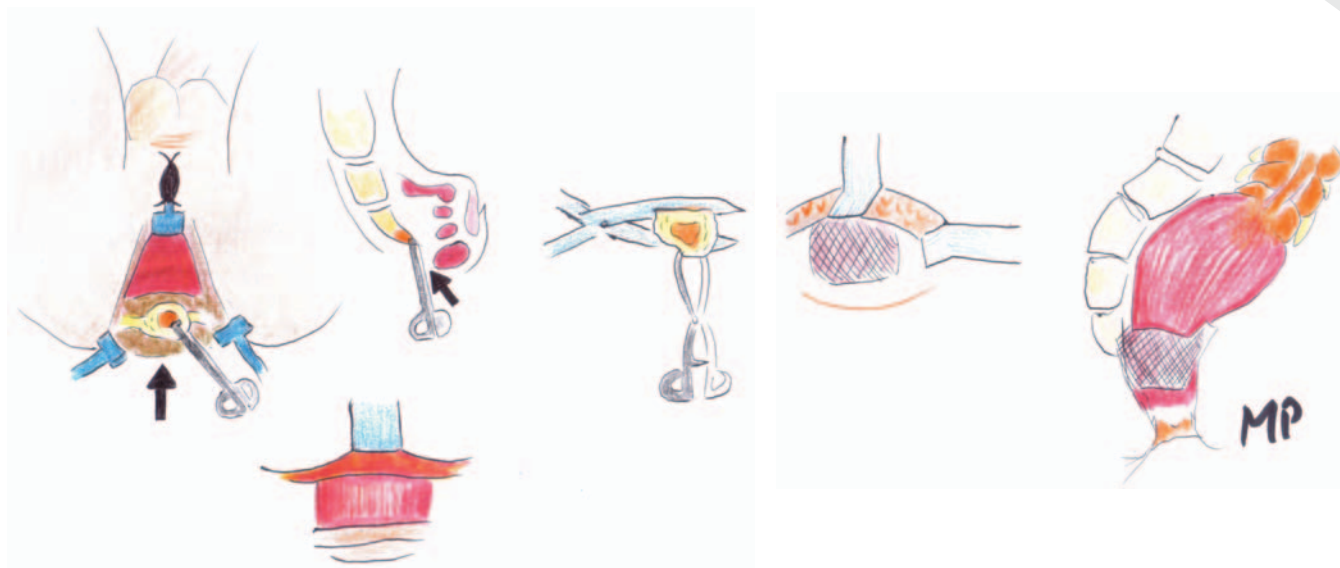
4.3. THE EL-SIBAI-SHAFIK CAUTERIZATION/PLICATION PROCEDURE



After cautery of the mucosa in vertical strips, the muscularis beneath is plicated with 2/0 Vicryl sutures. The procedure may be supplemented with a levatorplasty.

Comment: I have only performed 5 of these procedures with one severe postoperative bleed. I would not advise this procedure for patients with an external mucosal prolapse > 4 cms in size despite the broader indications described by its inventors.

4.4. POSTERIOR TRANSPERINEAL MESH SACRO-RECTOPEXY



Post-anal dissection is carried out into the presacral plane with fashioning of mesh for posterior sacro-rectal fixation. The procedure is patterned after Kosba et al.

Incontinence Surgery

The increasing use of bulking agents and pelvic floor rehabilitation has reduced the number of incontinent patients who require a surgical procedure. Various types of bulking agents are available on the market, each of which is expensive and which are more effective than the low-cost injection of autologous centrifuged fat first described by Shafik in 1993 [Shafik 1995]. After this procedure, a large part of the injected fat migrates, losing its therapeutic role. Shafik, an archetypal example of the surgeon-inventor, was also the first to report on the advantages of another innovation, the electrostimulation of the posterior tibial nerve, which other surgeons, among them Leroi and Faucheron, have proven to be effective [Leroi et al 2012]. Amongst the range of bulking agents, Coaptite, Solesta, Durasphere and PTQ silicon spherules are the main ones in use, the latter showing some worrisome migration far from the site of injection. The “new kid on the block” is the Gatekeeper, manufactured by THD Correggio in Italy which although more costly than the others, acts differently by being more of an implant and swelling to more than 720% of its original size after deployment. Preliminary encouraging results have been reported with its use by Carlo Ratto, however, larger series with longer follow-up are still needed [Ratto et al 2011]. The literature agrees that the injection of bulking agents as illustrated in this book, are indicated in cases of partial incontinence due to a localized defect of the internal anal sphincter and that they improve symptoms without significantly impacting on the quality of life [Altomare et al 2008].

An innovation which has proven to be very effective, (despite being very costly), is that of sacral neuromodulation. This technique, first reported by Klaus Matzel in 1995, has been used worldwide in the last decade and has resulted in an overall cure rate of 70% in the long-term across different etiologic types of fecal incontinence [Matzel et al 1995]. These results are superior to other procedures, with an effect that may be predicted by the temporary implant of a provisional external electrostimulator. Moreover, it is minimally invasive as the pacemaker may be implanted under local anesthesia. Lead displacement appears to be one of the weak points of this novel procedure, a complication which has been minimized with the new generation electrodes.

Among the innovations the use of which has declined after initial enthusiasm, are the electrostimulated graciloplasty and the artificial bowel sphincter (ABS). These procedures have all but disappeared because of their high complication rate, mostly due to their septic complications

which required frequent revision and ultimately device explantation [Edden and Wexner 2009]. Amongst the outstanding colorectal institutions in the United States (the Cleveland Clinics in Ohio and Florida, the Mayo Clinic, the Lahey Clinic and the Colorectal division of the University of Minnesota), only one is still implanting the ABS device and none continue to use the dynamic graciloplasty. Gluteoplasty as an alternative muscle transposition to the gracilis muscle also carries a high postoperative morbidity and is now rarely used [Devesa et al 1997].

Considering the “classic” low-cost manual interventions, anterior levatorplasty, the Parks’ postanal repair and Keighley’s total pelvic floor repair, each of which are illustrated in this book, are procedures I continue to perform on my patients. They seem to work well in the short-term in selected patients. Their main merit is to lengthen the anal canal and to narrow the anorectal angle, both important factors in the maintenance of continence. When carried out in elderly or multiparous patients with dystrophic, neuropathic and pale sphincters, they are, however, in my experience, almost useless. As happens with a non-electro-stimulated (adynamic) gracilis muscle, the muscle fibers of the “anatomical” sphincters of such patients have almost no elastic and dynamic properties and do not restore anal continence in the long-term if locally repaired.

Sphincter reconstruction is still a viable option in cases of sphincter trauma, either obstetric or iatrogenic, (such as following a high fistulotomy), but again as demonstrated by Zoran Krivokapic and his group in Belgrade, its positive effect declines with time [Barisic et al 2006]. Zutshi and colleagues, [Zutshi et al 2012] tried to prolong the positive effect of sphincter reconstruction by adding a biological prosthesis, but their series is small and the results are still short-term. Equally, Wexner’s group compared direct suture of the two ends of the divided sphincter with the overlapping reconstruction, but were unable to find any significant differences in the functional outcome [Oberwalder et al 2008]. As far as the need to protect the sphincter reconstruction with a diverting stoma, Richard and colleagues could not find any significant advantage over cases treated without a covering sigmoidostomy [Richard et al 1994].

Finally, the minor encirclement procedures, using either Marlex, Dacron or Teflon rings are set to make somewhat of a come-back. Manuel Devesa from Spain, [Devesa et al 2011] who abandoned the gluteoplasty because of frequent septic complications, has proposed a novel device using a silicone prosthesis (the so-called IncoStop), reporting an encouraging outcome with a much lower complication rate than the more complex techniques. All of those modern variants of the old-fashioned Thiersch wire may well be used with extended indications for partial incontinence and in elderly fragile patients.

In a recent book I wrote entitled: “Prevention and Treatment of Complications in Surgical Proctology” published by Springer-Verlag in 2012, the chapter on anal incontinence listed 20 different procedures, (8 manual and 12 using devices) for incontinence management [Pescatori 2012]. Those I have not mentioned yet include the radiofrequency or Secca procedure, [Takahashi

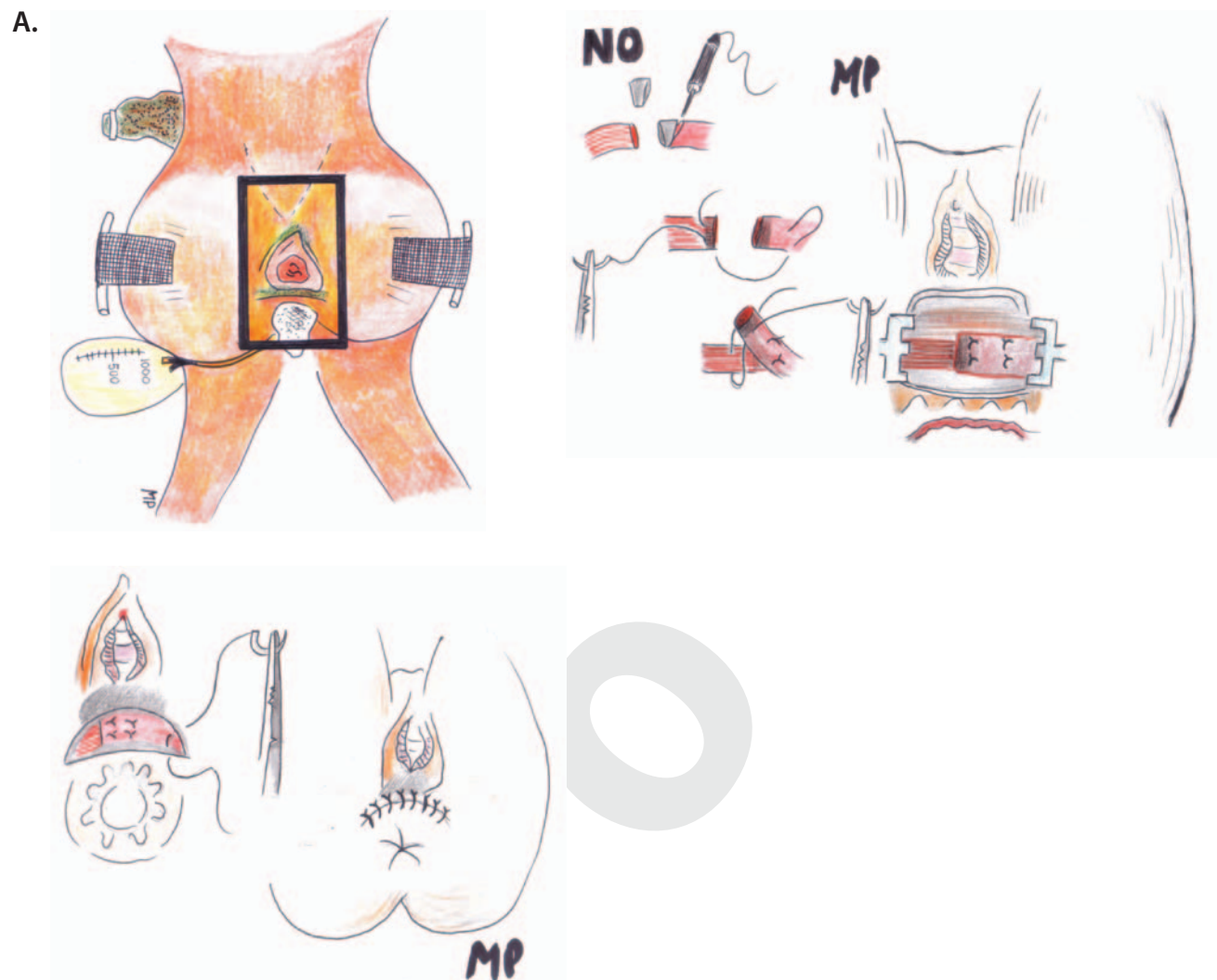
et al 2003] the polyester puborectal sling, [Yamana et al 2004] simple acupuncture treatment [Hultén et al 2013] and the magnetic ring [Mantoo et al 2012]. I have no personal experience with these procedures and they are not illustrated in this book.

In conclusion, after decades of experience treating over 1,100 patients with anal incontinence, let me say that, as the disorder is partly neurological, none of the reported procedures may be considered the “gold standard” and therefore they do not result in a very high cure rate. The specialist has to be able to offer the patient several options, bearing in mind that an holistic approach is preferable and that minimally invasive techniques should be proposed as the first step so that surgical recovery can be made if there is initial or subsequent treatment failure. It should be noted that low cost and safe physiokinesitherapy combined with rectal irrigation, (as suggested independently by Bartolo, Baeten, Taffinder, Laurberg and many others over the last twenty years), may cure more than half of the patients treated without the risk of some of the complications attached to other more complex and advanced techniques.

CHAPTER 5 INCONTINENCE SURGERY

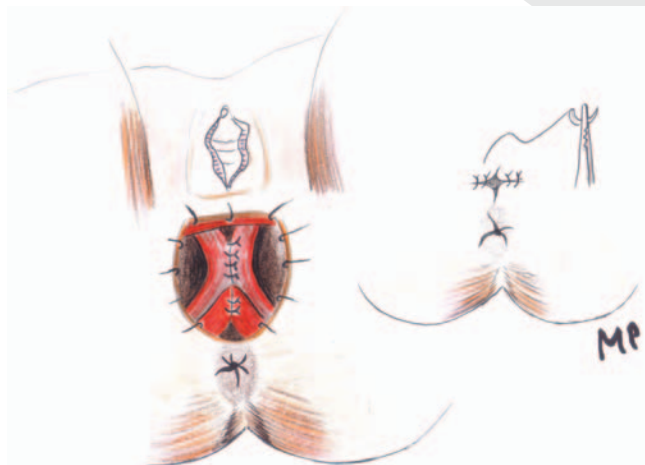
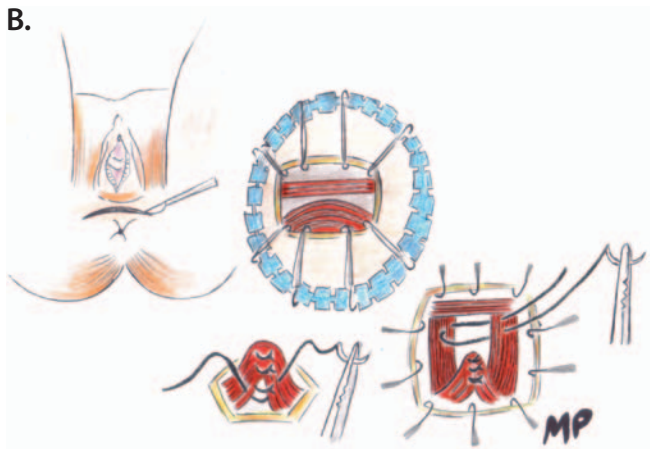
- 5.1. SPHINCTEROPLASTY + LEVATORPLASTY – POST-OBSTETRIC EXTERNAL ANAL SPHINCTER INJURY
- 5.2. PARKS' POST-ANAL REPAIR
- 5.3. DEPLOYMENT OF A BULKING AGENT

5.1. SPHINCTEROPLASTY + LEVATORPLASTY – POST-OBSTETRIC EXTERNAL ANAL SPHINCTER INJURY



- A. The left hand schematic image shows the positioning of the patient. In the right hand image, the external anal sphincter is dissected with diathermy but not excessively so as to avoid denervation and devascularization. The sphincter is divided but the scarred ends are **not** excised as they hold sutures well. An overlapping (waist-coat) repair is performed with the tightness of the outlet judged by a finger in the rectum as the point of the overlap.

B.

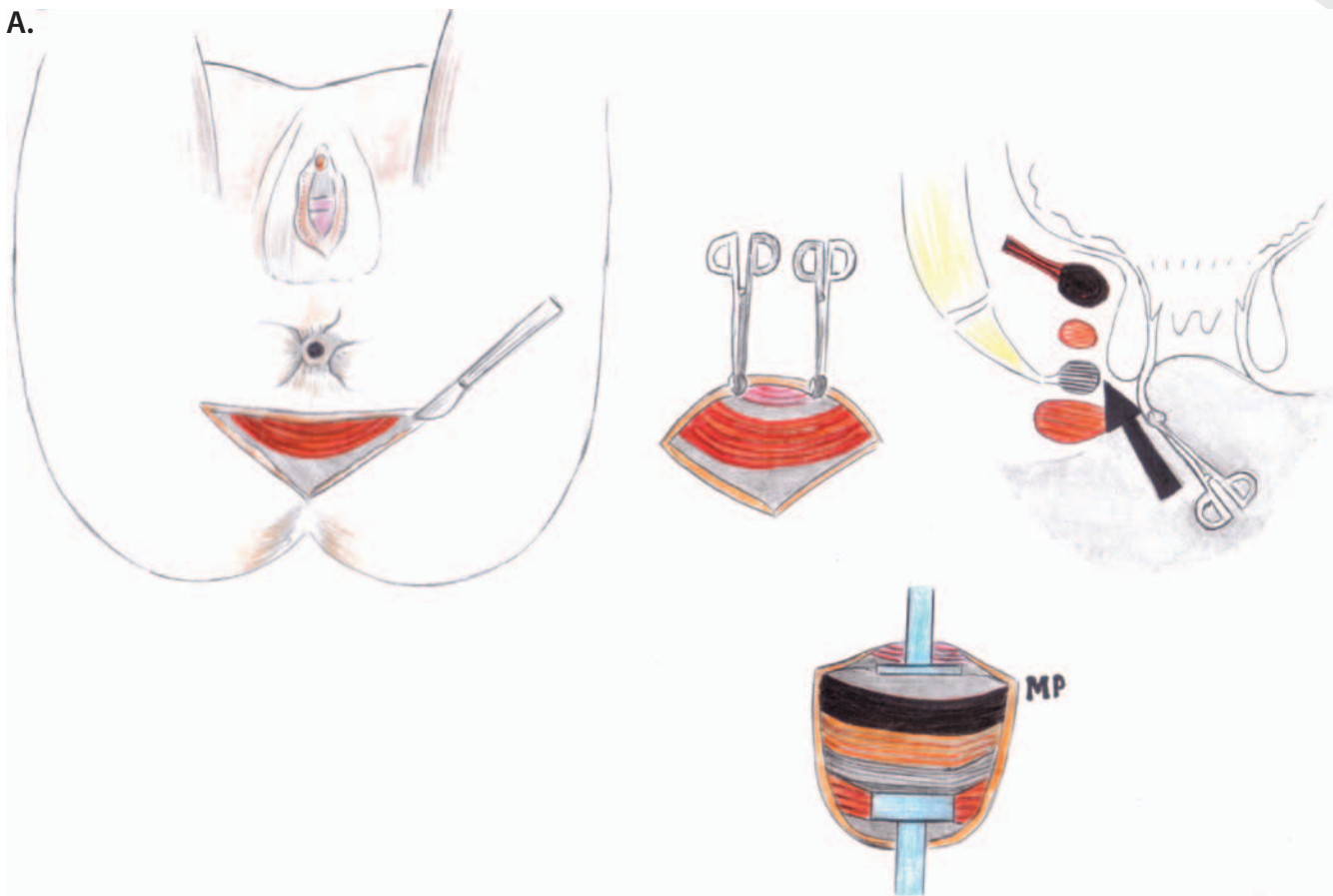


- B.** This repair may be accompanied by a short anterior levatorplasty. The procedure is performed with an anterior transperineal incision and the use of a LoneStar™ retractor to prevent anal distraction. The final appearance of the transperineal wound is shown with a tighter visible disposition of the anus compared to the start of the operation.

Comment: Despite the fact that overlapping repair has not been shown to be superior to a direct repair, I traditionally perform an overlap. The initial results are good although there is often a delayed deterioration of function over the years. The procedure may, however, be repeated with further success. I routinely supplement this operation with postoperative biofeedback despite the limited data attesting to its value.

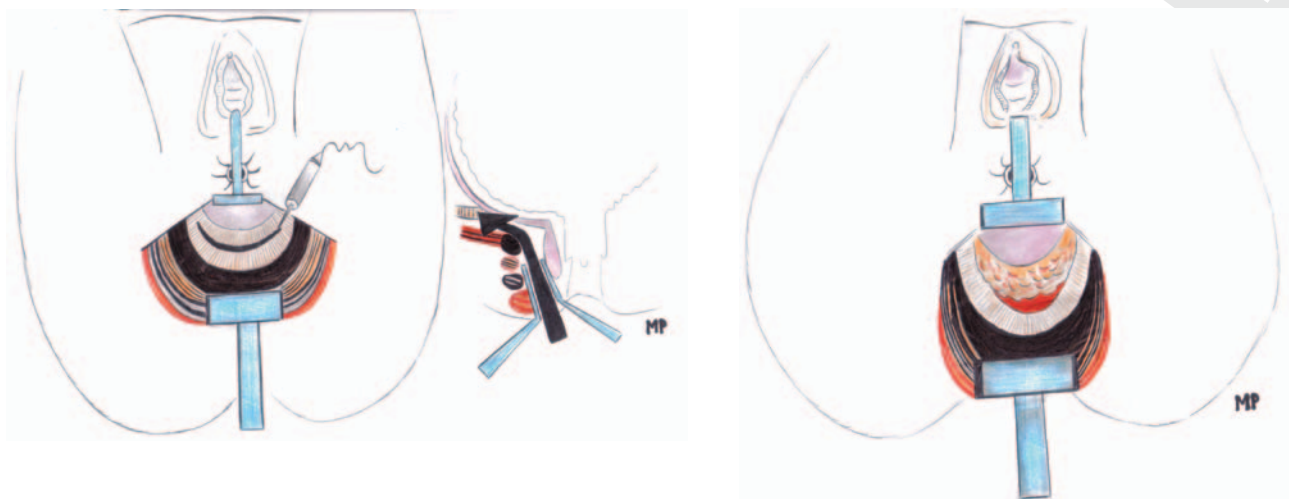
5.2. PARKS' POST-ANAL REPAIR

A.



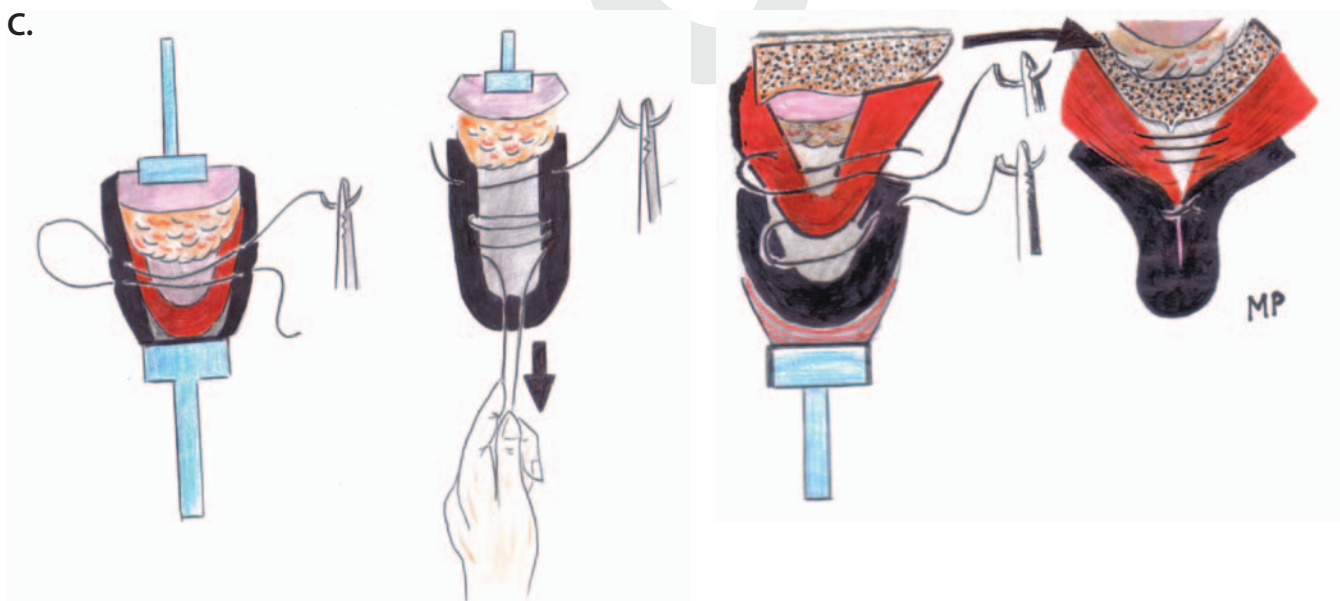
- A. A postanal incision is made with dissection in the intersphincteric space as far as the levator floor.

B.



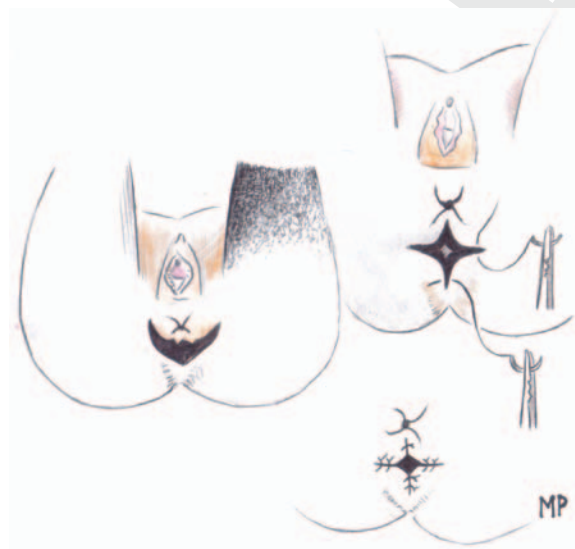
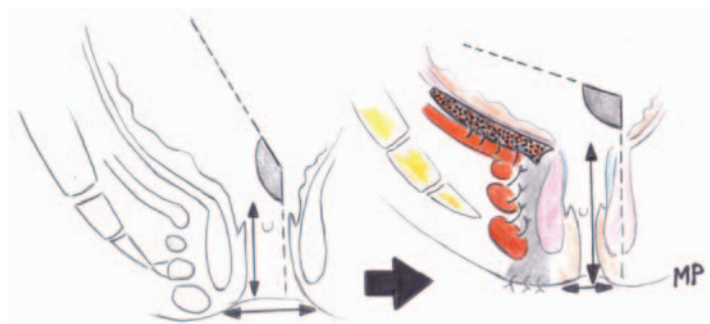
B. Dissection is carried above the puborectalis muscle as shown (*arrow*).

C.



C. Approximation sutures are placed in the anterior levator muscles which are drawn together as a scaffold.

D.



- D.** The levatorplasty narrows and lengthens the anal canal and renders the anorectal angle more acute. The anal disposition after completion normalizes so that the postanal curvilinear incision becomes stellate.

Comment: Although this approach has largely been abandoned, it may have a very selected place in patients without a sphincter defect and with extensive bilateral neuropathy.

5.3. DEPLOYMENT OF A BULKING AGENT



The bulking agent can be inserted to support the internal anal sphincter and anal cushions either submucosally or in the intersphincteric plane by feel or with ultrasound control. This material may be deployed for intrinsic internal anal sphincter damage in between 4-6 sites.

CHAPTER 6

Revisional Surgery Following the STARR and PPH Procedures

Once, in the 1980's, I was talking about pouchitis after restorative proctocolectomy with Basil Morson, the famous pathologist and he told me that "We must be grateful to the surgeons, as they create new diseases for us to investigate." To some extent, things have come full circle and we are seeing a similar effect now with the PPH, STARR and stapled low anterior resections of the rectum. We read about a real "post-PPH syndrome," [Khubchandani et al 2009] a constellation of symptoms including severe chronic proctalgia or painful defecation and of a low "anterior resection syndrome - LARS [Ziv et al 2013]. As far the latter is concerned, it is unlikely that it may be managed with a re-intervention but instead may benefit from pelvic floor rehabilitation in most cases.

My views have been influenced by two memorable patients who both required repeat surgery for this LARS which developed after a low anterior resection performed elsewhere. One was a 56 year-old primiparous woman who underwent a stapled low anterior resection and total mesorectal excision carried out by a skilled British surgeon. She experienced a dehiscence of the colorectal anastomosis and then developed a very low rectal stricture. This was accompanied by prolapse of the sigmoid mucosa to the anal canal which reached the anal verge on straining where she complained of mild fecal incontinence, occasional loss of liquid stool, obstructed defecation and proctalgia. She was also markedly depressed. Prior to commencement of pelvic floor rehabilitation and psychological support, I decided to excise the anorectal fibrotic ring and the prolapsed mucosa via a transanal route. Fortunately, the lady did well with this relatively simple approach. The second patient is (I say "is" because he is still under treatment) a 70 year-old male who also had an anastomotic dehiscence following a low anterior resection with total mesorectal excision, resulting in a long tight stricture. There was no possibility of dilating this endoscopically so I was forced to re-operate on him resecting the narrowed bowel and re-fashioning a coloanal anastomosis. The stricture recurred, but it was fortunately relatively localized and sufficiently low that it has been able to be successfully dilated by intermittent dilatation with Hegar's dilators over the last 10 years.

Whereas an anterior resection is the only option to treat a rectal cancer not suitable for a local excision, there are other less costly and more effective procedures than the PPH and the STARR operations to manage hemorrhoidal disease and obstructed defecation syndrome (ODS), respectively. These other procedures for hemorrhoids and for ODS are illustrated in this book. Both PPH and STARR are the leading procedures in the causative list of adverse events after new technologies as recently reported by Basso et al. on behalf of the Italian Society of Colorectal Surgery [Basso et al 2013] and many of the complications after PPH and STARR are reported in a definitive review article by Pescatori and Gagliardi [Pescatori and Gagliardi 2008].

There are a range of re-interventional options following PPH and STARR including the release of an anorectal stricture, an agrapphectomy designed to excise retained staples in cases of severe proctalgia or bleeding, the lay-open of a rectal diverticulum in a case of “rectal pocket syndrome,” the excision of a granulomatous anastomotic rectal polyp, drainage of a perirectal hematoma and even a Hartmann’s procedure in the event of a rectal perforation and severe pelvic sepsis. The specialist colorectal surgeon must include in his/her armamentarium the performance of either a hemorrhoidectomy or a rectal prolapsectomy in cases of recurrence, the release of the puborectalis muscle incorporated with staples and even the creation of a stoma in selected cases presenting with a retro-pneumoperitoneum and pneumo-mediastinum which have not responded to conservative treatment. One may need to also repair a recto-vaginal fistula which can be performed with a meticulous layered inversion closure as originally described by Given [Given et al 1970] and as illustrated in this chapter. Rarely, it has even been necessary to carry out extensive retroperitoneal debridement in severe retroperitoneal sepsis following endorectal stapled surgery and the list goes on for its more severe postoperative complications. One of the devastating complications following endorectal stapled surgery is a rectovaginal fistula. This may occur because of inadvertent incorporation of the vaginal wall in the purse-string suture or during staple firing or as a result of hematoma and/or sepsis and ischemia developing within the rectovaginal septum [Pescatori et al 2005]. Rectovaginal fistula repair appears elsewhere throughout this book given its different etiologies and surgical management approaches. In the case presented in this chapter, meticulous layered repair was successful, although on more than one occasion I have regretted not supporting the vaginal suture line repair with a proximal diverting sigmoidostomy.

The Transtar Contour device, (an evolution of the STARR stapler), is less likely to cause rectal pseudodiverticulæ or pockets and proctalgia, as recently pointed out by Lenisa et al., [Lenisa et al 2009] but it still may cause life-threatening complications such as an expanding perirectal hematoma, as reported by Faucheron’s group from France [Oughriess et al 2005]. The catalog of complications after these novel stapled procedures has been extensively reported and I have had to deal with some of these over the last decade. Most of them are preventable by using a correct technique or by utilizing some experiential tricks of the trade that have come as part of

Revisional Surgery Following the STARR and PPH Procedures

the learning curve with their use. It is of interest to consider on this background the underlying psychological component which in many cases seems to play a pivotal role, where our group has found that re-interventions after either a failed or complicated STARR procedure will have a negative outcome in those patients with a coincident alteration in their psychological pattern [Pescatori and Zbar 2009]. It seems a pity that the faster convalescence and the reduced postoperative pain incurred as advantages of novel anorectal stapling procedures are offset by such “potentially devastating complications” as reported by Cataldo et al. on behalf of the ASCRS [Cataldo et al 2005]. The manufacturing company has to be commended, however, for sponsoring two consensus meetings on PPH and STARR, chaired by Marvin Corman whose aim was to better define the indications and contraindications for these procedures as well as their operative accreditation and mentoring criteria [Corman et al 2003, 2006]. Despite these valiant efforts, the PPH device has been withdrawn from the market in the United States and the STARR procedure has not been approved by the American FDA. A good initiative of the manufacturing company was the creation of the European STARR Registry, run by Jayne and Stuto which was aimed at recording and discussing postoperative complications. This group was, however, supported by direct funding per procedure which brought into question the procedural indications for the operation and the independence of the team. The initial Registry data was reported in 2009 where unfortunately a high percentage of patients were lost to follow-up [Jayne et al 2009].

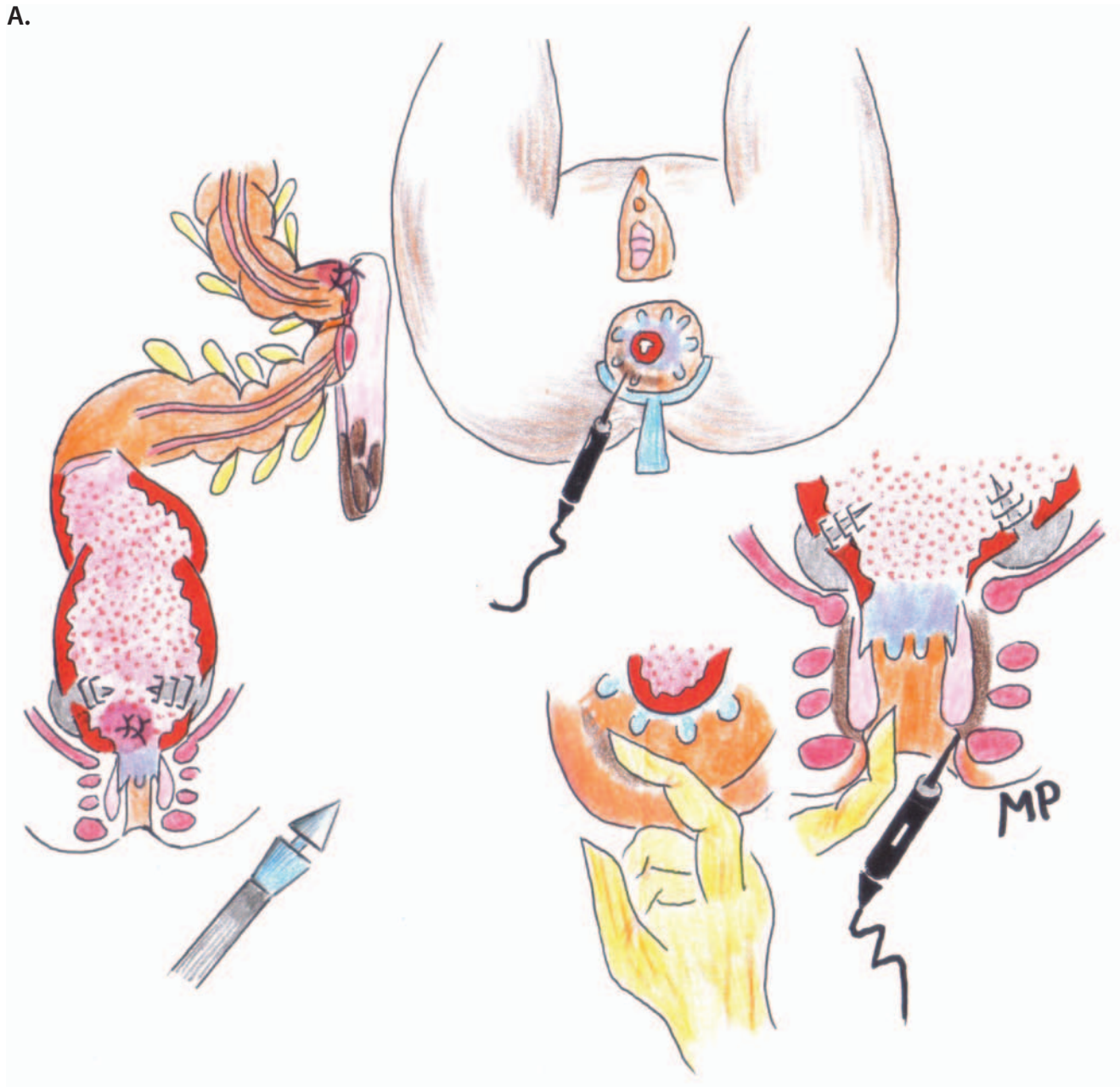
It is also unfortunate that some misleading messages about these two interesting novel procedures are still spread by the media and even by the inventor himself, as recently pointed out by Ira Kodner, former president of the ASCRS, an expert in surgical ethics [Kodner 2009]. He expressed his concerns at the end of a series of correspondences entitled “Sutureless PPH and STARR,” which was published in *Techniques in Coloproctology*.

CHAPTER 6 REVISIONAL SURGERY FOLLOWING THE STARR AND PPH PROCEDURES

- 6.1. MANAGING PROCTALGIA
- 6.2. AGRAPPHECTOMY
- 6.3. RECTAL POCKET SYNDROME
- 6.4. RECTAL OBLITERATION FOLLOWING A PPH PROCEDURE FOR HEMORRHOIDS IN A PATIENT WITH COINCIDENT RECTORECTAL INTUSSUSCEPTION

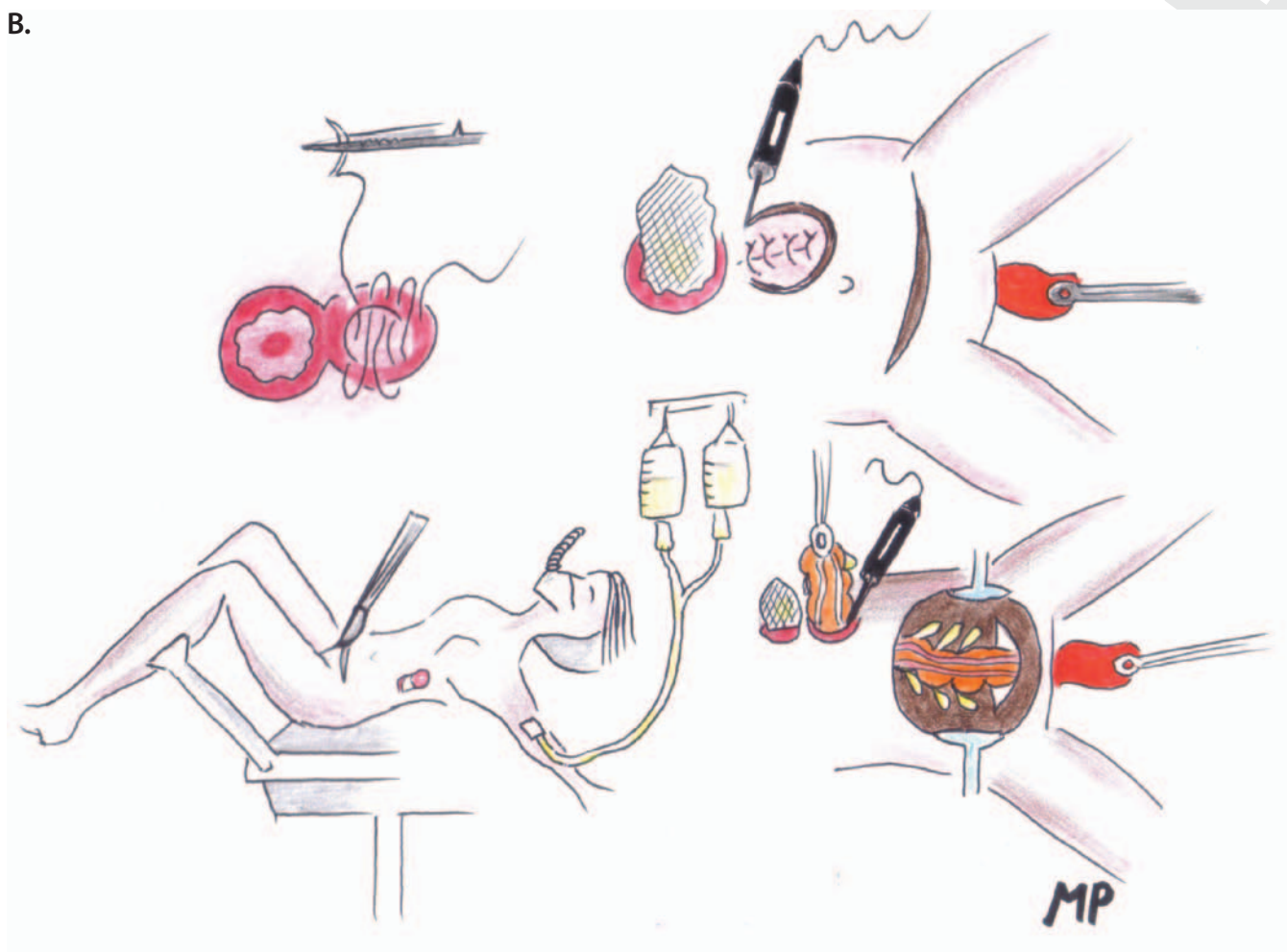
6.1. MANAGING PROCTALGIA

A.



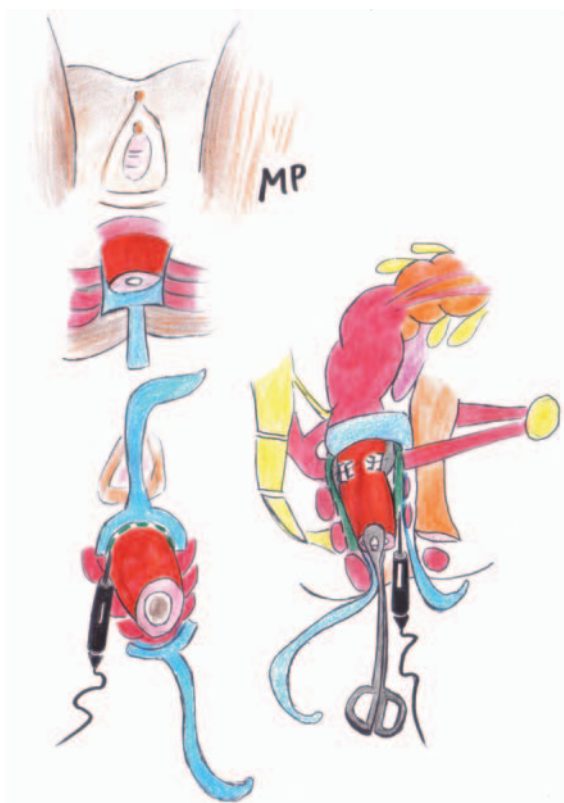
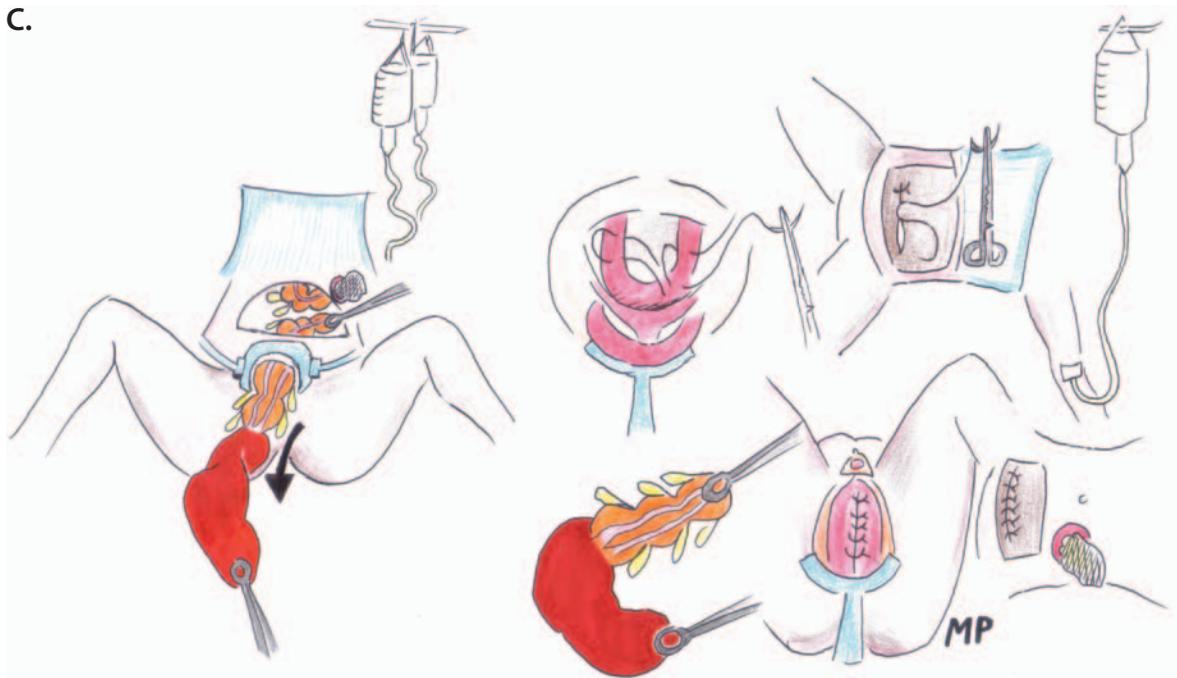
- A. A case of severe constipation in a rather anxious patient following a failed STARR procedure treated initially with a diverting sigmoidostomy complicated by a large parastomal hernia. The patient complained of tenesmus and severe chronic proctalgia with peristaple fibrosis and diversion proctitis. Clinical examination revealed painful palpable staples and proctoscopy showed marked proctitis. A restorative Duhamel procedure was refused. An intersphincteric excision of the rectum was scheduled with an agrapphectomy and parastomal repair.

B.



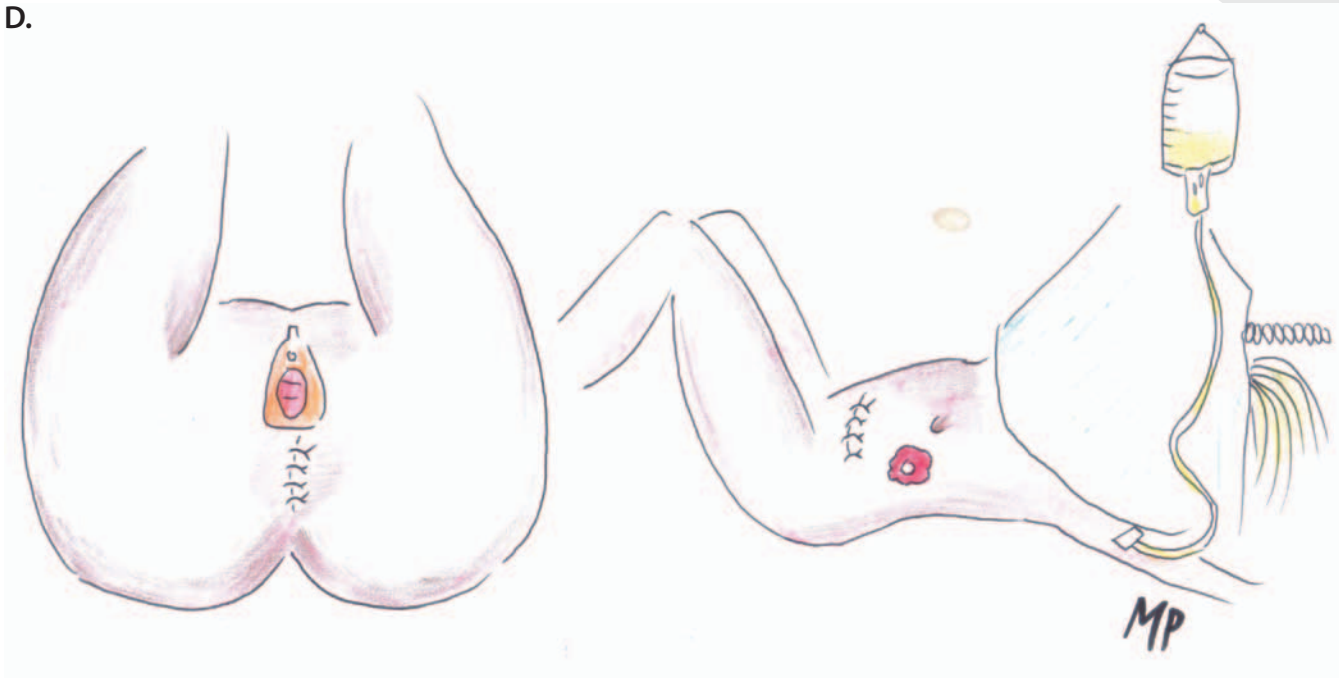
- B.** A sigmoidectomy is performed with separation of the loop colostomy and distal stomal closure. The proximal limb is shown being matured as an end colostomy.

C.



C. The rectosigmoid is excised with pelvic floor closure.

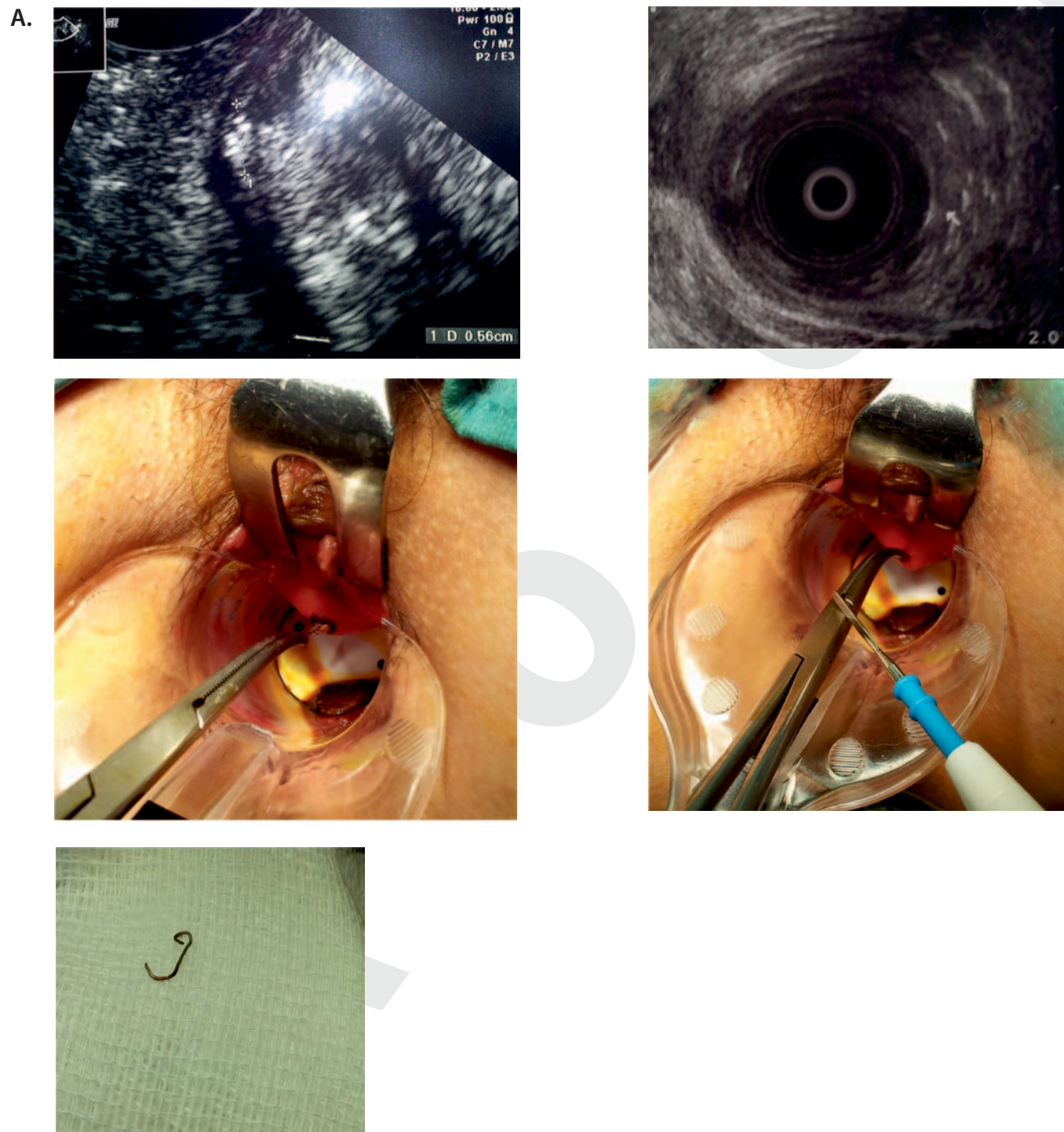
D.



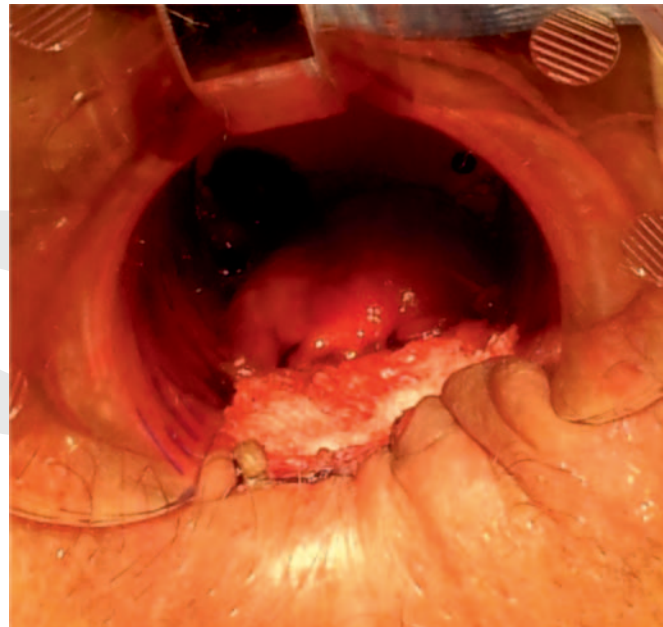
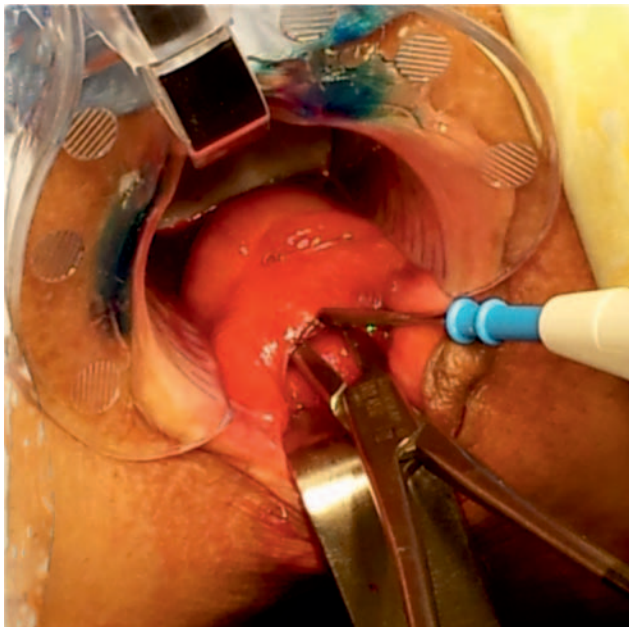
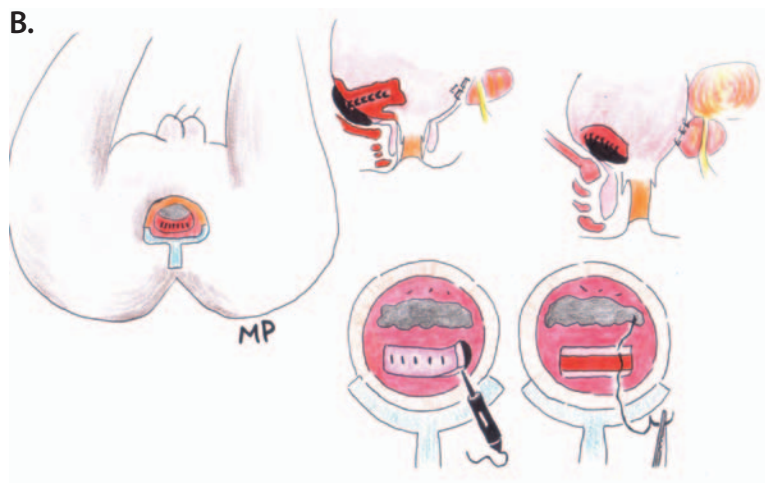
D. The perineum is primarily closed.

Comment: It is essential that the surgeon excludes other organic causes of severe constipation including Hirschprung's disease where an inadvertent STARR procedure may lead to severe chronic postoperative proctalgia.

6.2. AGRAPPHECTOMY



- A. In some cases, severe proctalgia after a STARR procedure is thought to be due to retained staples, peristaple fibrosis and coincident sepsis. Initial ultrasonography (either transvaginal or endoanal) shows staple echoes (*arrows*). The operative images shows an anterior staple being removed. To reduce bleeding it is suggested to hold the staple with a Kelly forcep and to directly apply diathermy to the forcep. The removed staple is shown.



B. A schematic image of agrapphectomy is shown (with correlative operative photographs) where a large strip of rectal mucosa and muscle is excised posteriorly together with staples and peristaple fibrosis. The rectal continuity is then restored. Some anterior staples near the prostate may be left *in situ* in order to avoid prostatic injury.

Comment: The response in my hands to agrapphectomy is variable and some patients have clearly not improved. This may be due to peristaple fibrosis exerting a persistent stimulus to nerve endings located in the levator floor musculature.

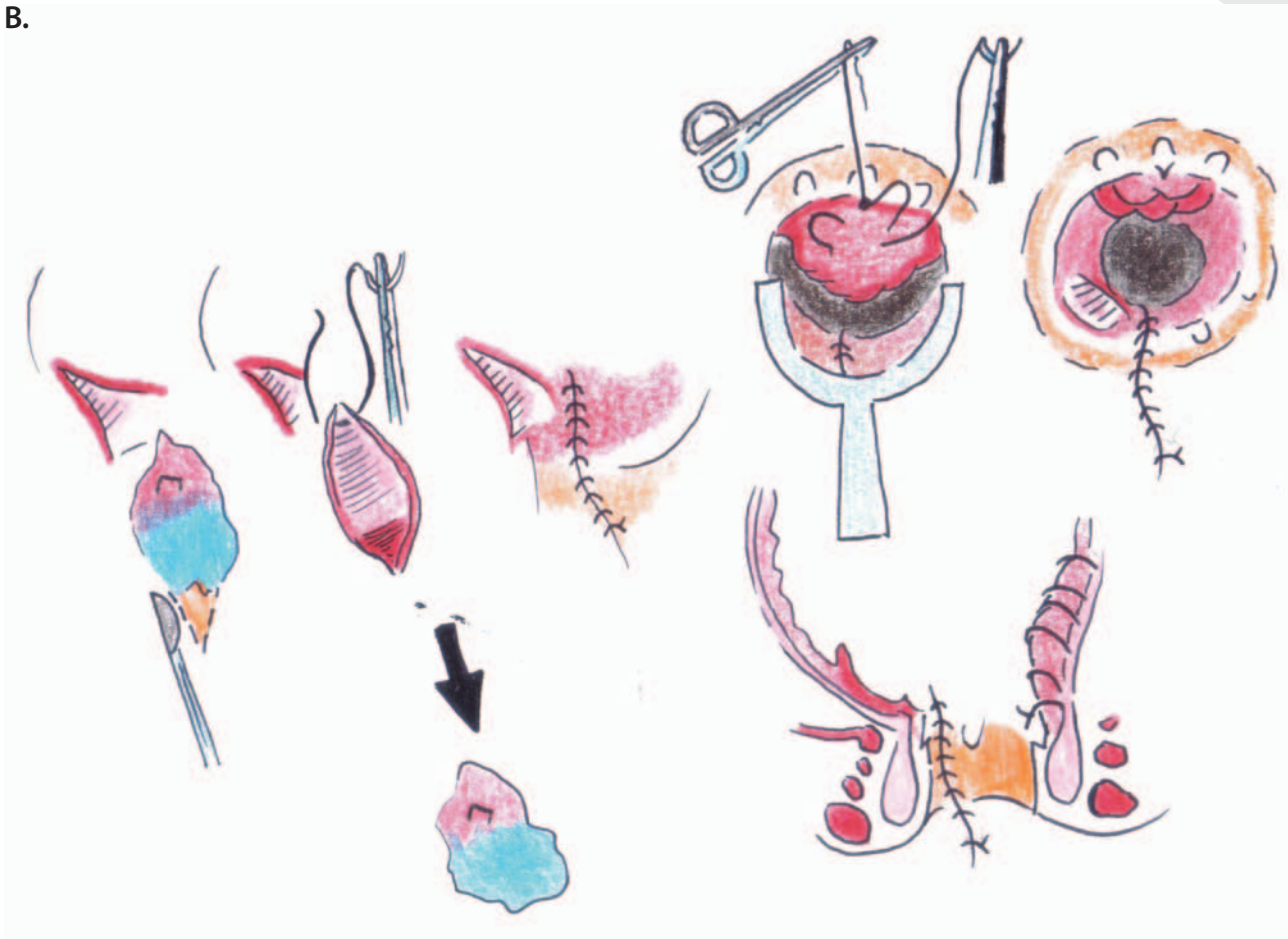
6.3. RECTAL POCKET SYNDROME

A.



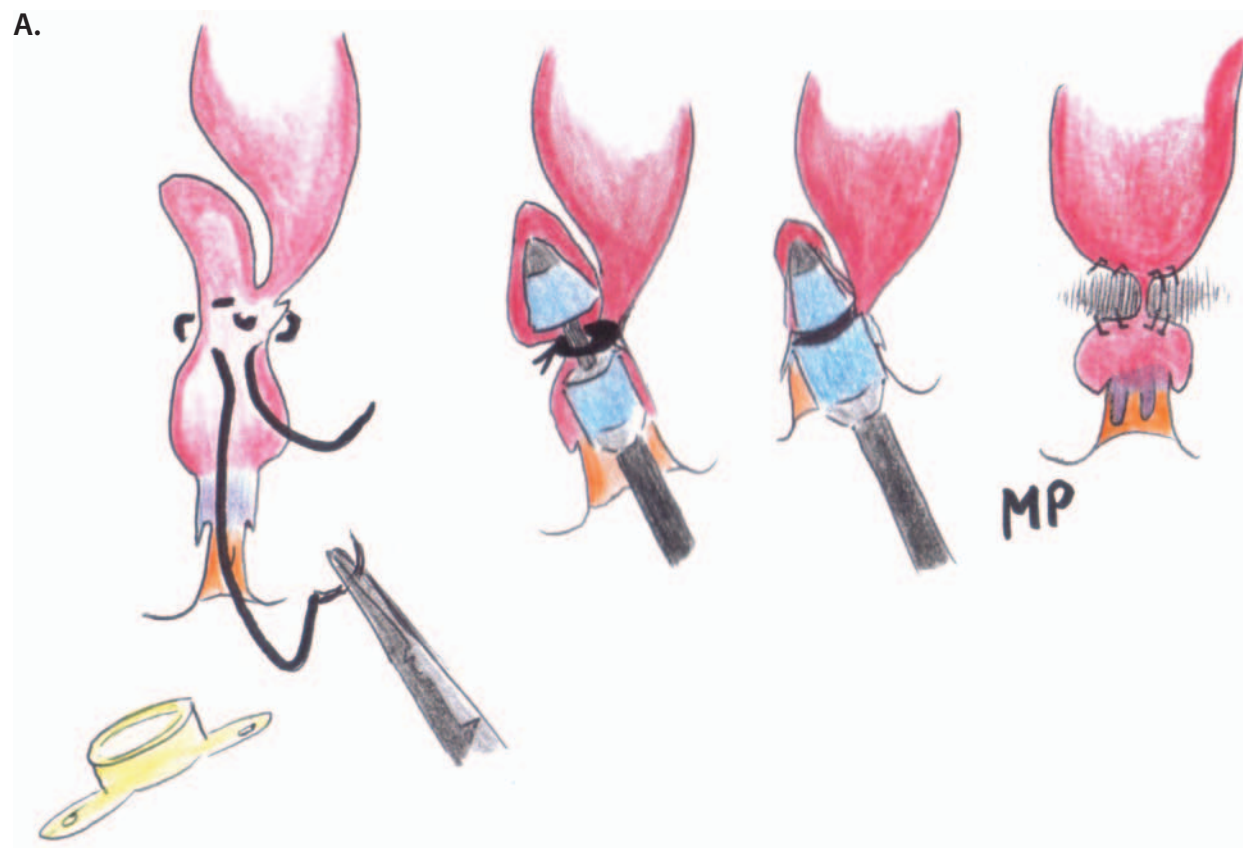
- A. Proctalgia, rectal bleeding, intermittent fever and anal discharge in a patient who underwent a PPH procedure for hemorrhoids and a coincident rectocele. The patient presented with persistent rectocele and hemorrhoids and had a rectal diverticulum (rectal pocket syndrome) with an entrapped fecolith. The rectal pocket was laid open endoanally (procedure patterned after Boffi and Podzemny 2011).

B.



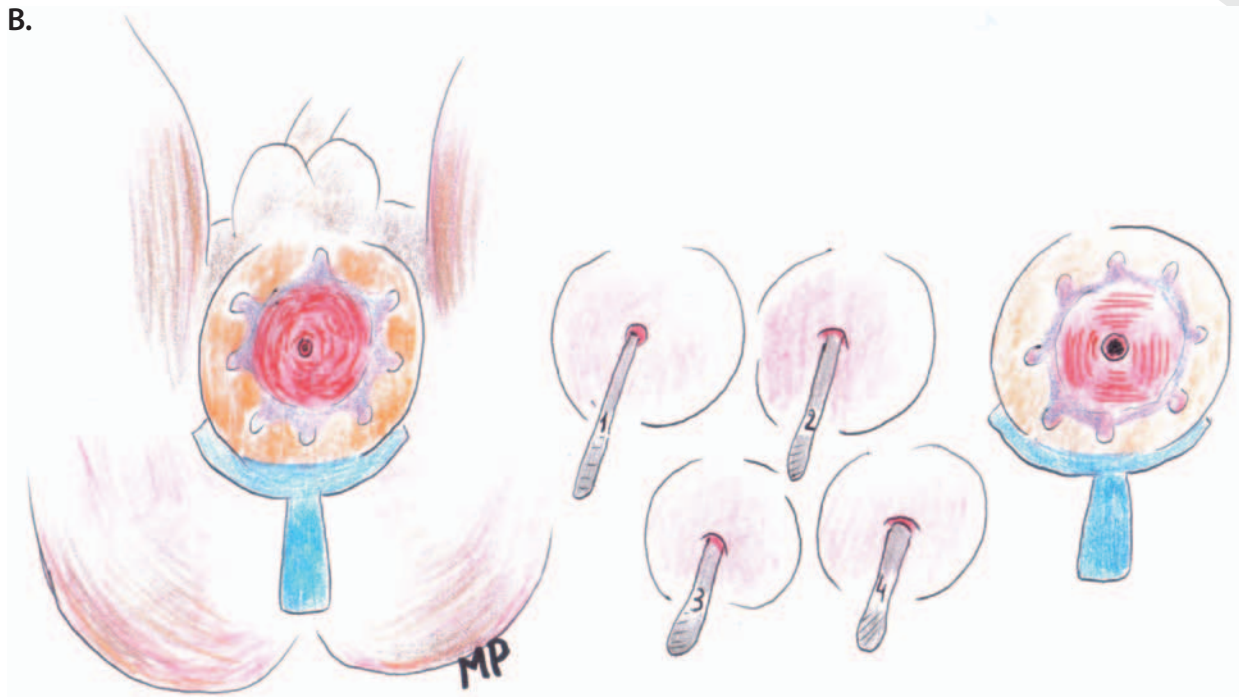
- B.** An obliterative suture (the Block procedure) is also performed for the persistent rectocele as well as an agrapphectomy.

6.4. RECTAL OBLITERATION FOLLOWING A PPH PROCEDURE FOR HEMORRHOIDS IN A PATIENT WITH COINCIDENT RECTORECTAL INTUSSUSCEPTION



- A. Rectal luminal obliteration occurs when the stapler is inserted outside an aberrantly placed purse string suture, into a fold of intussuscepted rectum which mimics the rectal lumen.

B.



- B.** A Foley's catheter and then a small Hegar's dilator were able to be inserted through a narrow hole into the obliterated rectum. The Foley's catheter was flushed and permitted restoration of rectal continuity temporarily relieving the patient's symptoms.

C.



- C. A Foley catheter defined the nature of luminal obstruction when placed above the stricture with the leakage of saline through the rectum. The catheter is then pulled downwards so that the area can be reached by the examining finger. The stricture was resected as a disc of rectal wall with performance of an endoanal recto-rectal anastomosis.



CHAPTER 7

Managing and Preventing Anal Stricture

The definition of anal stricture is “when a normal caliber proctoscope (23 mm) cannot be introduced into the anal canal”. The most frequent cause of an anal stricture, at least in my experience (of about 120 cases out of more than 200 I have treated), is that following a complicated hemorrhoidectomy. This is usually a Milligan-Morgan style operation where the surgeon has left insufficient skin-mucosa bridges between the primary hemorrhoid excision points. Most of these cases can adequately be managed in the office, anesthetizing the anal canal with EMLA paste and dilating it either with the finger or with customized anal dilators. Home-dilatations using anal dilators of three different calibers which are manufactured by Sapimed (Vercelli, Italy) are required afterwards variably for 3 to 6 months. The dehiscence of a recto-anal, colo-anal or an ileo-anal anastomosis may also cause an anal stricture due to subsequent fibrosis although here, the stricture is in the anal canal. Equally, an overly zealous excision of anal and endo-anal condylomata can result in a significant stricture both at the anal verge and into the anal canal.

Advancement anoplasty is the most commonly used procedure for treating an anal stricture, but it also a widely adopted technique designed to cover the internal orifice of either a recto-vaginal or a high trans-sphincteric anal fistula after fistulectomy as discussed elsewhere in this book. One may use an advancement anoplasty after a fissurectomy rather than a conventional sphincterotomy in order to prevent anal narrowing particularly in a patient without anal hypertension or in a multiparous older woman [Duieb et al 2010].

The construction of these types of flaps can be performed in two basic ways. The first is as a rectal mucosal advancement which is shown in Chapter 1. The second way is as a perianal skin advancement upwards with suture to the rectal mucosa just above the anorectal ring. A double rectal and anal flap, sutured one to the other at the level of the dentate line (or better still where the dentate line used to be) may also be raised when the length of the stricture exceeds 4 cms. Concerning the use of a cutaneous advancement anoplasty, a portion of skin and dermis can be advanced into the anal canal and this technique may be indicated when proctitis precludes the use of a rectal flap, as suggested by Rick Nelson and others [Nelson et al 2000]. In this case, it is

better, if possible, not to harvest the skin from the posterior midline outside the anus as it is less well vascularized than the postero-lateral skin. This has been confirmed using Doppler cutaneous flowmetry by Schouten and his group from Rotterdam [Schouten et al 1996]. In the event of a long fibrotic anal stricture, the skin flap has to be wide, as the defect to be covered is large and also because the flap will slightly retract after mobilization. The skin should be sharply dissected without the use of diathermy and care should be taken not to excessively manipulate it or grasp its edges. A bleeding flap is a good sign where small bleeders can be controlled by gentle gauze compression.

Further technical minutiae are important in this operative approach. Knots should not be tied too tightly so as not to compromise the blood supply. Moreover, the stability of the flap should be based more on a dermal rather than a cutaneous suture where superficially placed suture lines have a greater risk of breakdown after contact with the stool. In this respect, suture line dehiscence is more likely to occur following a “diamond” flap, a “house” flap or an “S” anoplasty than it is with the smaller bilateral V-Y type anoplasties. Postoperatively, gentle anal dilatations can be used at the discretion of the surgeon with instruction that the patient should avoid early anal enema insertions or receptive anal intercourse in those with such a proclivity.

An anoplasty may be performed not only to manage but also to prevent an anal stricture, such as after the combined excision of hemorrhoids and fistula tracks in the same patient, when a de-epithelialized anal canal is at risk for the development of a stricture [Pescatori et al 1995]. The same maneuver may be performed at the end of excision of anal condylomata in the anal canal to minimize the risk of a postoperative anal stricture. As a final alternative for unhealed fistulotomy wounds, one may use a full-thickness skin graft as described by Binda and Trizi [Binda and Trizi 2007].

In conclusion, I feel that “the art of surgical proctology” should be applied, more than in other cases, when constructing a flap and resurfacing either the anal canal or the perineum. In this regard, it is pleasing to recently see an entire outstanding text which has been devoted to just this purpose [Zbar, Madoff and Wexner 2013].

CHAPTER 7 MANAGING AND PREVENTING ANAL STRICTURE

7.1. CUTANEOUS ADVANCEMENT ANOPLASTY

7.1.1. V-Y Advancement Anoplasty

7.1.2. Diamond Flap Anoplasty

7.1.3. The “S” Plasty

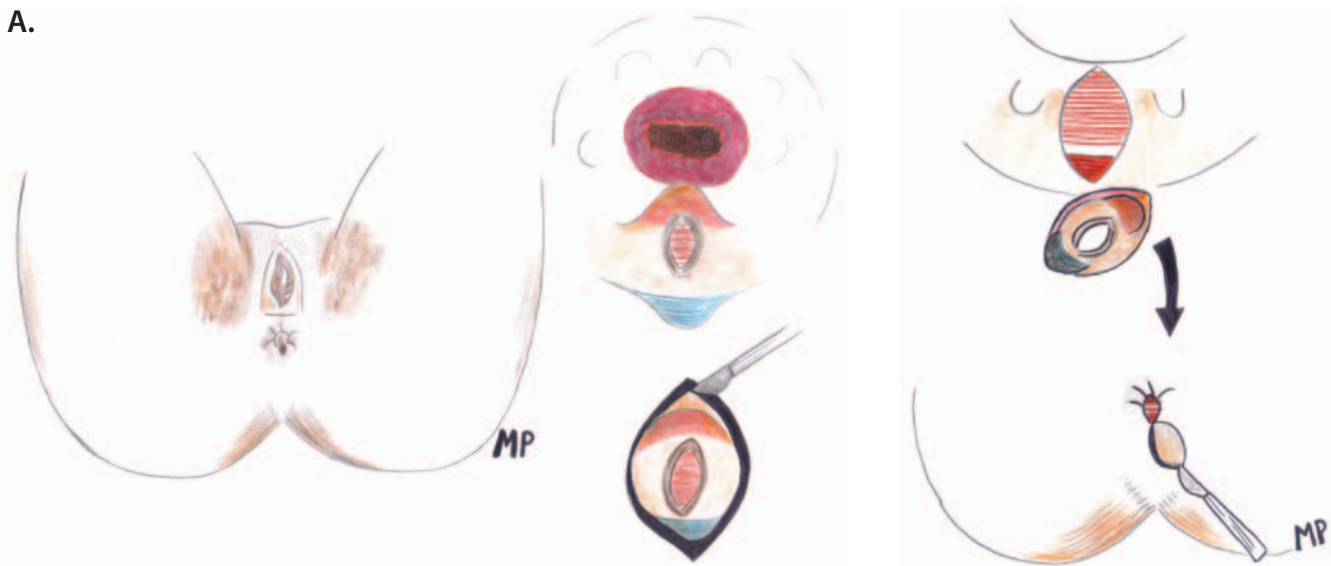
7.1.4. Double Flap Anal Reconstruction to Prevent Anal Stricture in a Case of Combined 4th Degree Hemorrhoids and a High Trans-sphincteric Fistula

7.2. ANAL SKIN GRAFTING

7.1. CUTANEOUS ADVANCEMENT ANOPLASTY

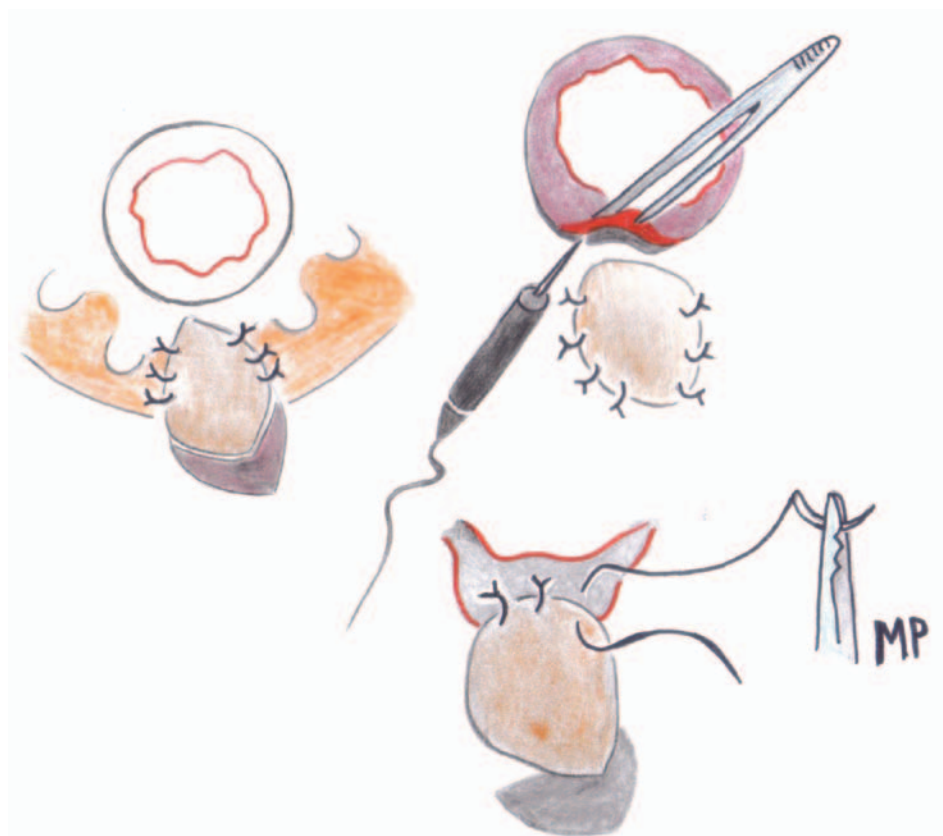
7.1.1. V-Y Advancement Anoplasty

A.



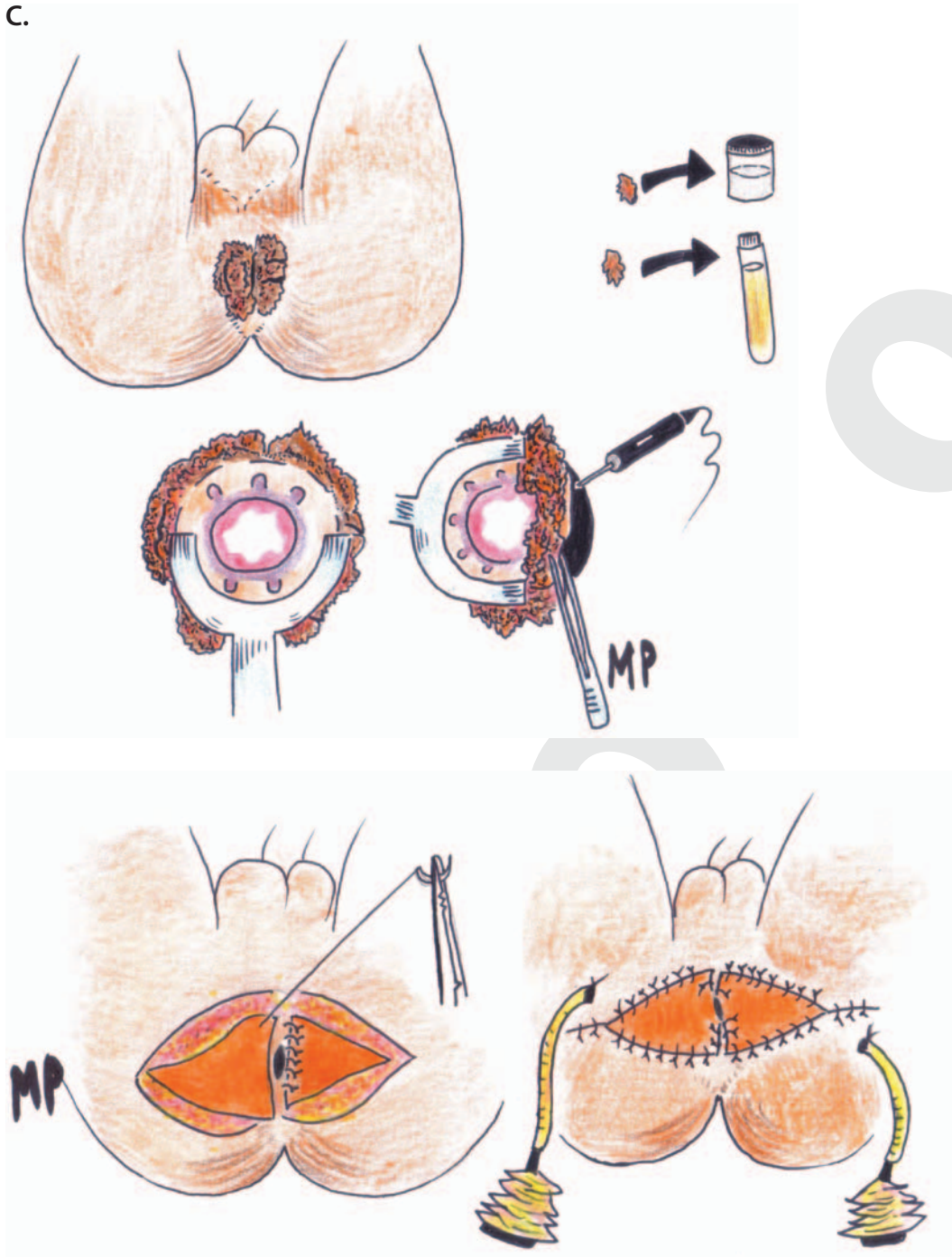
- A. Selective use is made in patients with a chronic anal fissure to perform a fissurectomy and simple advancement cutaneous anoplasty.

B.



- B.** Low, short anal stricture following a Milligan-Morgan hemorrhoidectomy. The technique of a bilateral V-Y advancement anoplasty is shown. Out of 21 of these procedures I have performed, 3 had partial wound dehiscence without any functional consequence.

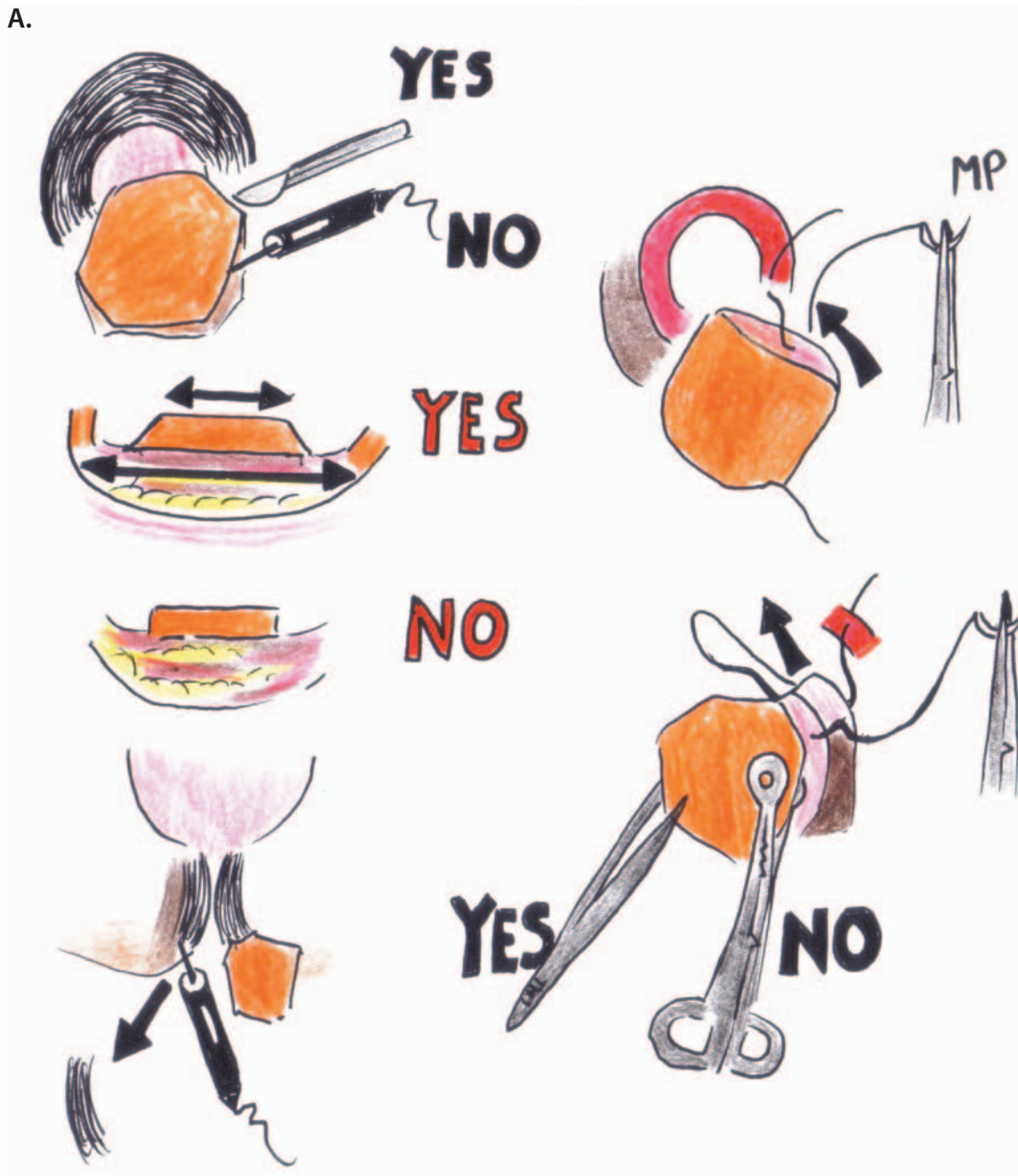
C.



- C. V-Y advancement flap used to prevent anal stricture after formal excision of extensive condylomatosis of the anal verge and anoderm (sent for histopathology and human papillomavirus –HPV RT-PCR subtype analysis). The bilateral V-Y advancement flap reconstructions are performed with Jackson-Pratt drainage. Although there is no scientific basis for their use, I routinely administer metronidazole and a 2nd generation cephalosporin to these patients postoperatively. The technique I have shown is modified from that described by Zinicola et al. in 2012.

7.1.2. Diamond Flap Anoplasty

A.



- A. After excision of a large surface area of the anal verge for extensive anal papillomata, a diamond flap is fashioned. This should be performed by sharp dissection and not by diathermy so as to avoid flap ischemia. Adequate mobilization prevents flap tension.

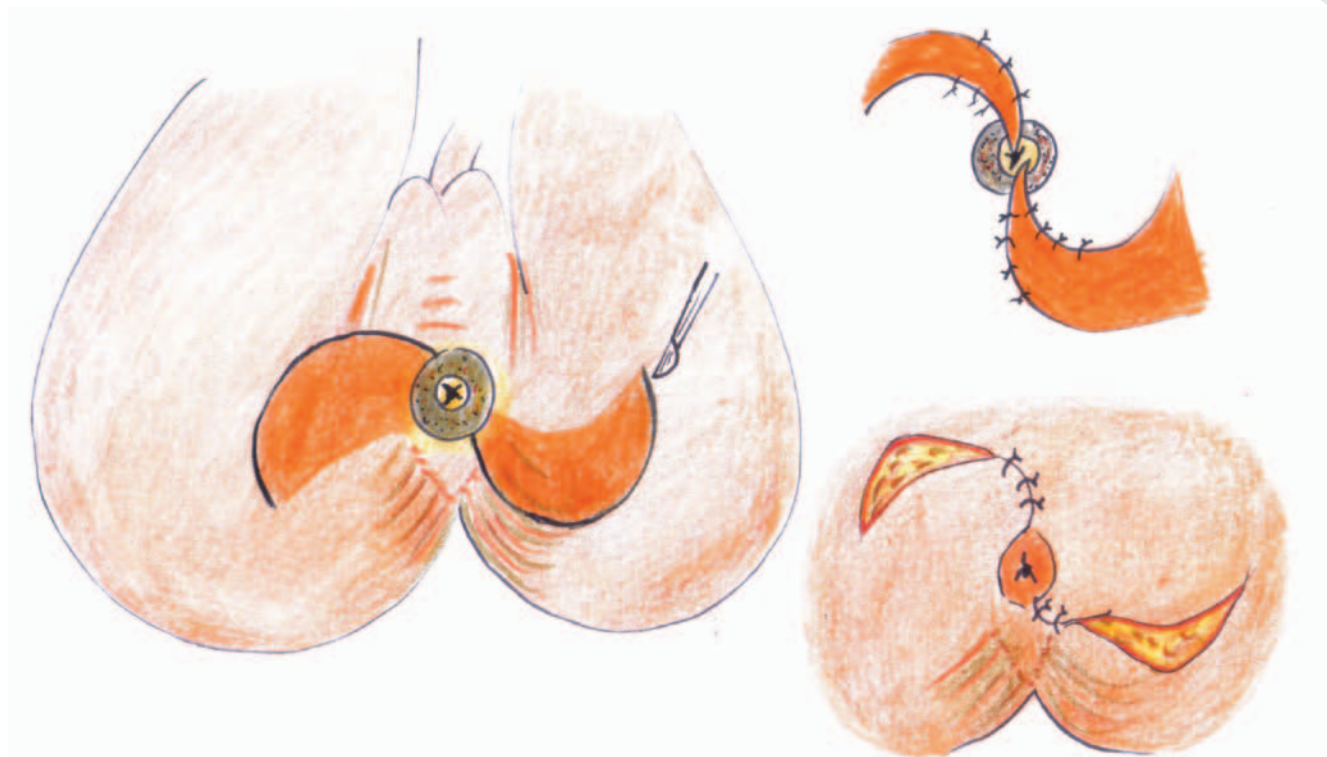
C.



- B.** The flap may be used either as an advancement or as a transposition to cover defects around the anal verge and inside the anal canal.

Comment: The cranial advancement of the flap, (i.e. its main point of strength) should be kept inside the anal canal with advancement of the subcutaneous suture so that pressure is taken off the suture line in the postoperative phase. With this approach a partial dehiscence if it occurs, is less likely to result in complete wound breakdown. The flap needs to be handled with great care avoiding grasping it with forceps and risking ischemic damage.

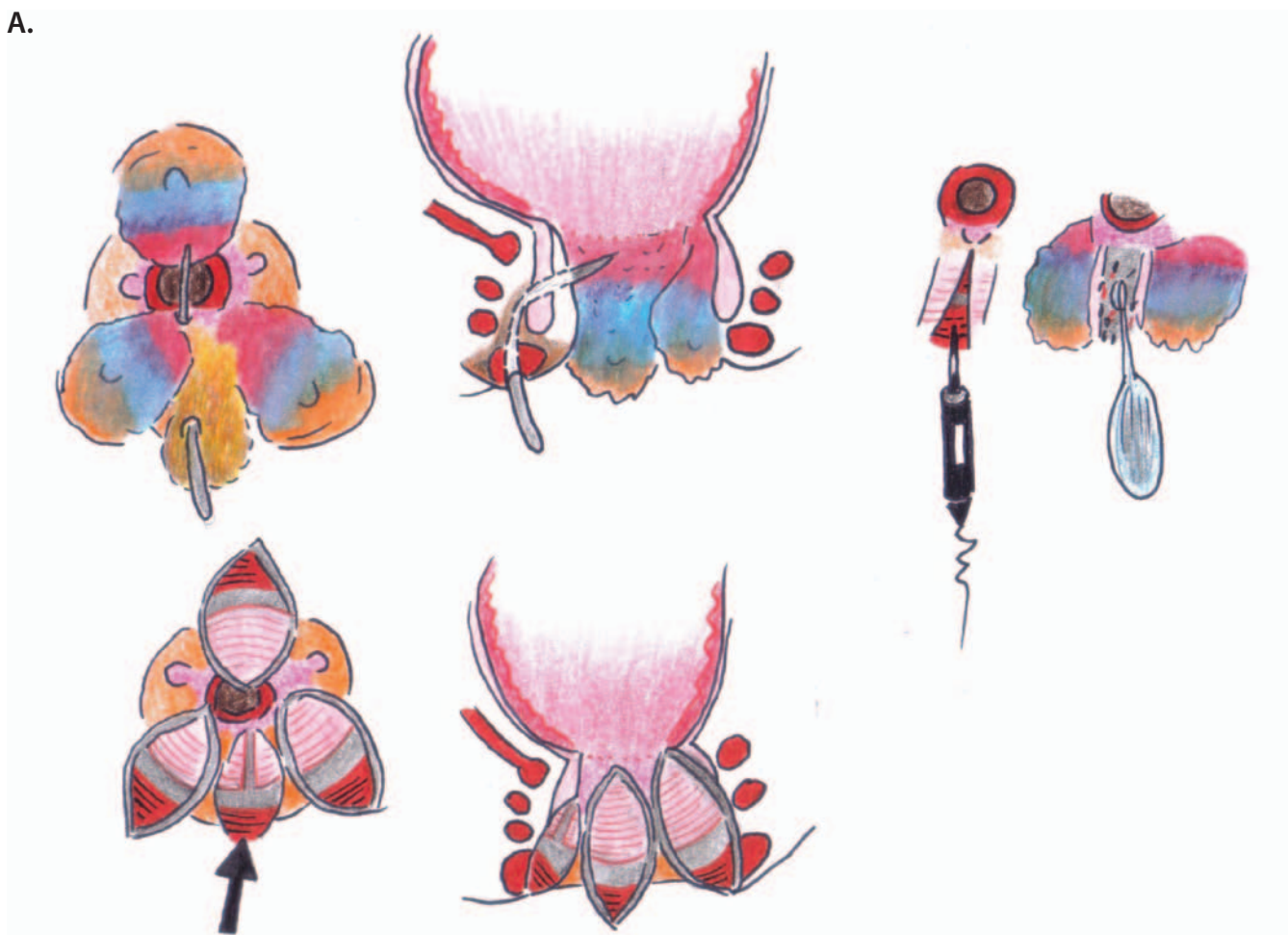
7.1.3. The "S" Plasty



A bilateral 'S'-plasty is performed for a severe post-hemorrhoidectomy anal stenosis. This may be performed as a staged procedure and the lateral wounds are deliberately partially left open.

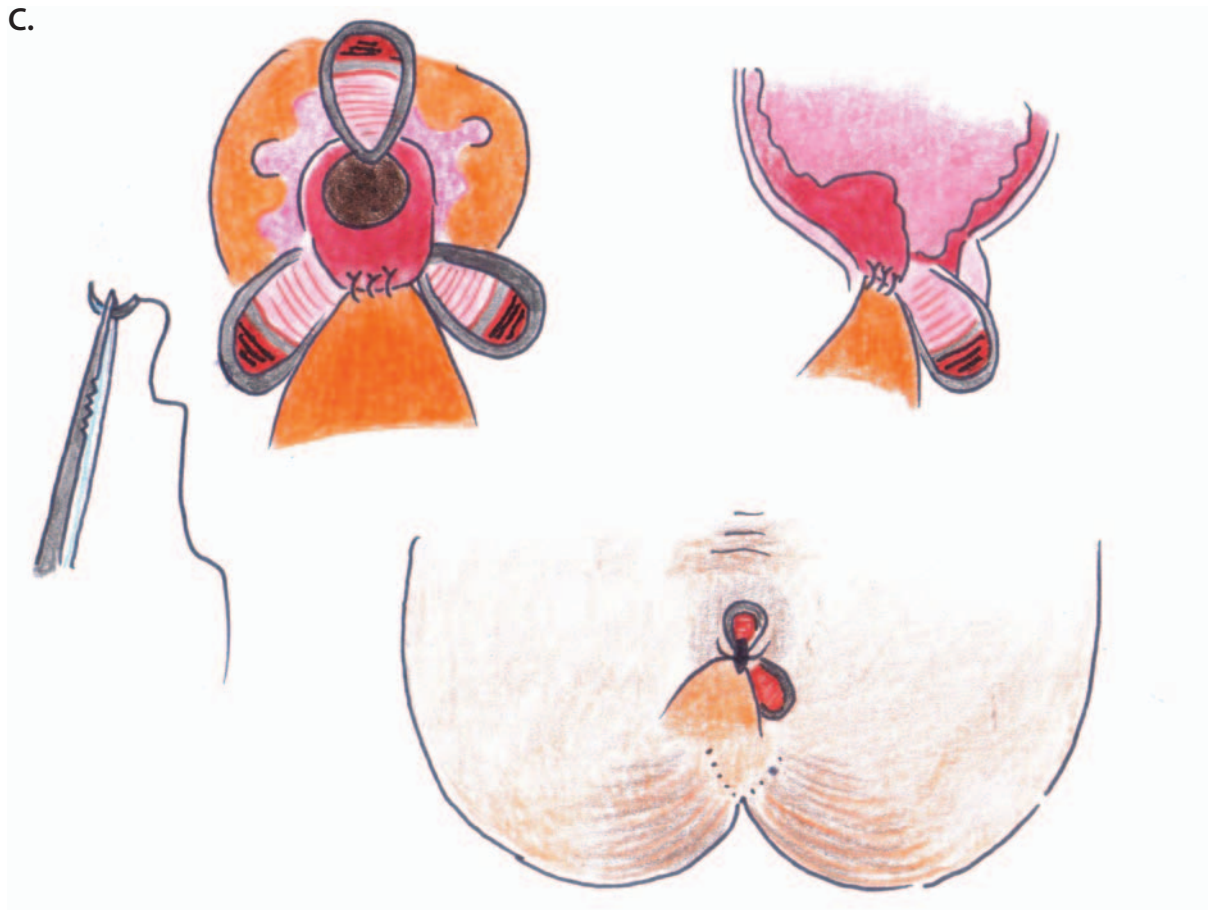
7.1.4. Double Flap Anal Reconstruction to Prevent Anal Stricture in a Case of Combined 4th Degree Hemorrhoids and a High Trans-sphincteric Fistula

A.



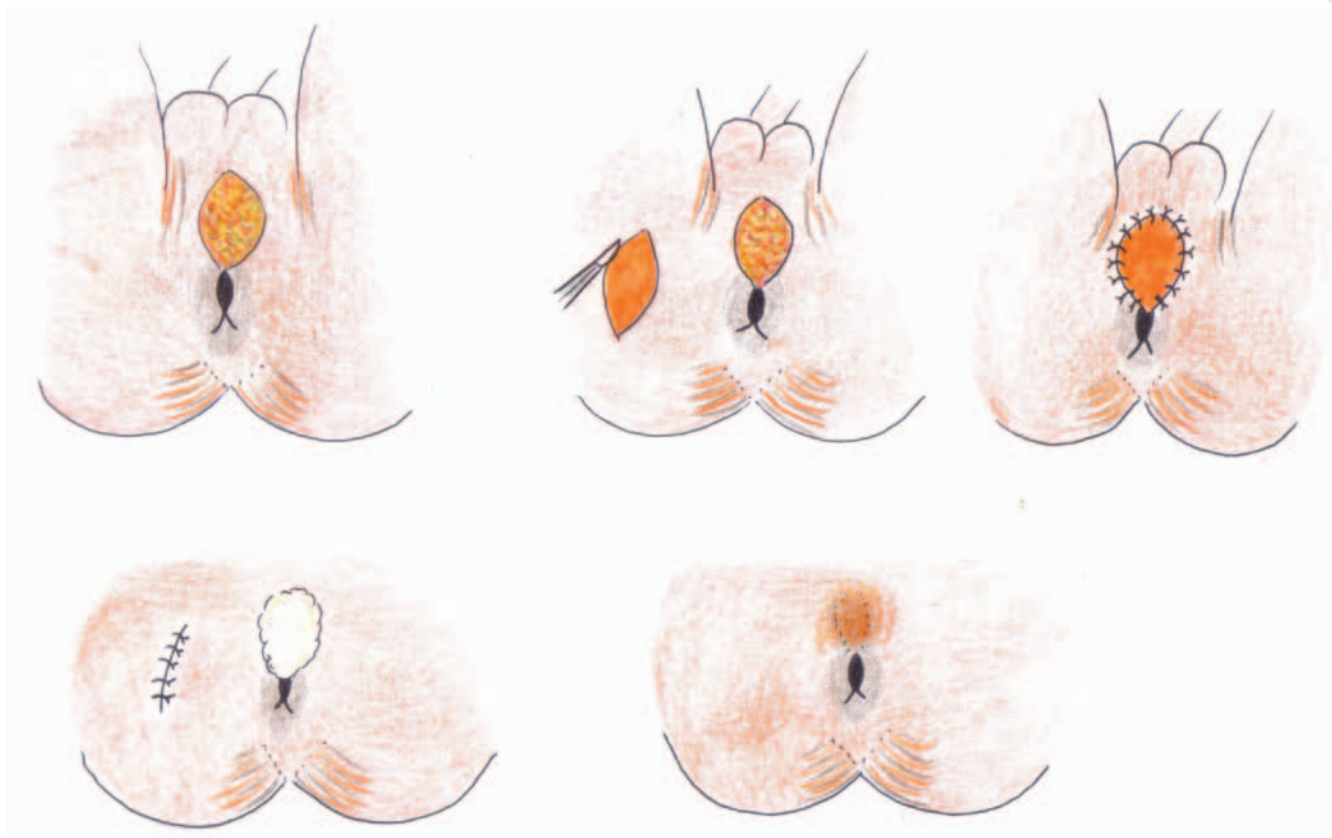
- A. Milligan-Morgan style hemorrhoidectomy with fistulotomy. Double cutaneous flap advancement designed to prevent anal stricture formation.

C.



B. Final appearance of cutaneous advancement anoplasties.

7.2. ANAL SKIN GRAFTING



Unhealed wounds following an anal fistulotomy may be treated with a full-thickness skin graft. (Patterned after Binda and Trizi 2007.)

CHAPTER 8

Rectal Tumors

As I have written in a previous book, “Prevention and Treatment of Complications in Surgical Proctology,” [Pescatori 2012] I regret that I never learned to perform trans-endoscopic microsurgery (TEM) for the management of small rectal tumors, as it is a superior technique for dealing with tumors located in the middle third of the rectum. In addition, it is probably the “gold standard” when the mass to be excised is located high in the rectum. In most cases, however, a combination of a favorable anatomy, such as the more lax and intussuscepted rectosigmoid of an elderly male or a multiparous woman with pelvi-perineal descensus, combined with the surgeon’s skill and expertise in the performance of transanal procedures, makes it possible to reach those tumors that the average surgeon in the standard patient would not consider eligible for manual submucosal excision.

Therefore in this chapter I have illustrated to the readers how to perform the Faivre procedure, explaining how to pull a tumor situated in the middle-high rectum downwards sufficiently to perform a transanal excision. This procedure may be carried out manually without the cost of the new TEM and single-port devices, to assist in Trans-Anal Minimally Invasive Surgery (TAMIS). Total mesorectal excision (TME) by TEM is a favorite topic of my friend Professor Lezoche from the University of Rome who has proposed this intriguing title for a lecture on the modern devices required to treat these small tumors. Today, TAMIS is the “new kid on the block” developed from both TEM and TME, whose technology stems from natural orifice (NOTES) treatments and from the developments in laparoscopic surgical equipment. This chapter illustrates how a rectal cancer may be radically operated upon through the anus, provided that dedicated equipment is available, with an ability in selected cases to resect the rectosigmoid and to completely excise the mesorectum. A minimal skin incision, or even no incision at all, means less immunocompromise consequent upon much less invasive surgical trauma. Moreover, the better cosmesis, appreciated by the patient, does not impair his/her psychological pattern and body image, again potentially improving the overall immunological state; the most important defense against cancer recurrence. These modern techniques also carry less risk of wound hernias and of cancer cell implantation. That is perhaps why Professor Heald commended both Larach and Atallah for independently having been the pioneers of the novel TAMIS technique [Heald 2013]. This book also describes the

combined single-port rectal excision with a laparoscopic pull-through and trans-anal anastomosis (the PISTA) procedure as described by Fu et al [Fu et al 2013].

The technique of TEM, invented by Gerhard Buess in the 1980's, has stood the test of time. When dealing with a large adenoma of the mid-rectum, or better still, at the level of the rectosigmoid junction, where the growth is unreachable by a Parks' submucosal excision, TEM can achieve excellent oncologic results, as reported by Bignell and colleagues in 2010 [Bignell et al 2010]. Should there be concern about the risk of incontinence due to the insertion of a large device into the anus, the data suggest that we can be reassured, where only 4% of 269 patients who underwent TEM at the University of Minnesota complained of anal incontinence [Tsai et al 2010].

I personally still like to perform Parks' submucosal excision of a large sessile benign adenoma when it lies within 8-9 cms from the anal verge. In the case of a T1sm1 adenocarcinoma which has been staged using trans-rectal ultrasound, I prefer to excise the tumor with some underlying muscle for optimal oncologic outcome. By doing this, however, I have certainly had a case of retro-pneumoperitoneum, pneumomediastinum and neck air infiltration, where the patient fortunately recovered with conservative treatment. When dealing with tumors higher than 6-7 cms from the anal verge, I will pull down the site of the growth using various tricks of the trade and I do not necessarily close the defect after the excision, especially when there was a large semi-circumferential growth and where there is concern that such closure might result in a rectal stricture.

It must be conceded that suture of the surgical wound after a non-invasive T1 excision might result in the entrapment of cancer cells under the mucosal closure where even skilled surgeons like Ian Lavery from the Cleveland Clinic Ohio actually recommend to leave the rectal wound open. Attention should be paid also to the choice of anal retractor in cases of Parks' excision. For example, if we use a Parks' anal retractor, it has been demonstrated by Ruud Schouten and his group that its prolonged use contributes to incontinence in one-third of the cases [Zimmerman et al 2003]. In this respect, even the LoneStar™ retractor, with its anal hooks should be used with due care in cancer cases, as even a small laceration of the anal canal by the hooks can enable the implantation of exfoliated malignant cells. In this regard, the Fansler or the Eisenhammer retractors or the Beak manufactured by the Sapimed Company (Alessandria, Italy) allow a less traumatizing stretch of the anal sphincters with less inherent risk of tumor implantation.

Finally, a few words regarding the creation of a neo-sphincter following an abdomino-perineal excision of the rectum. I learned how to transpose a flap of gracilis muscle around the colon pulled through to the perineum in Pisa, from Enrico Cavina and from Norman Williams in London how to keep the muscle "alive" and render it dynamic by implanting a stimulating electrode which changes the muscle's phasic contraction into a tonic pattern. Unfortunately, this fascinating innovation has been almost abandoned due to its high morbidity, its high cost and its frequent

Rectal Tumors

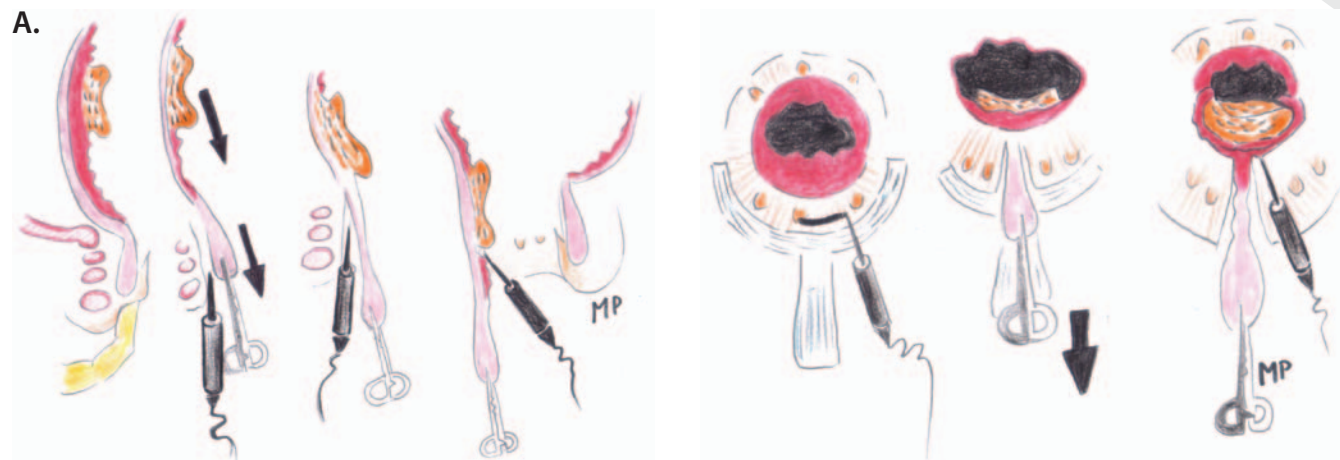
malfunction. A much simpler technique, as illustrated in this chapter, is the encirclement of the distal colon which has to be sutured to the anal canal in a case of a very low rectal tumor, using a smooth muscle neo-sphincter. The graft may be helicoidal in type, as proposed by the Russian surgeon Vyoborov decades ago and which has been adopted more recently by the French. Equally, it may be cylindrical, as first proposed by Schmidt in an attempt to render a terminal colostomy continent [Schmidt 1982]. Some have proposed the cylindrical smooth muscle neo-sphincter graft to reinforce a graciloplasty after a Miles' operation as part of a total anorectal reconstruction [Pescatori et al 1991] or to support a coloanal anastomosis following an inter-sphincteric resection of the rectum [Belyaev et al 2006]. This technique may be useful in selected cases to restore a partially removed internal sphincter for very low non-invasive rectal cancers and may be associated with a transverse coloplasty aimed at restoring a neo-rectal reservoir and improving bowel function and anal continence. The smooth muscle neo-sphincter operation is illustrated in this book. The use of a gracilis muscle transposition to fill a defect after resection of a recurrent rectal cancer is also illustrated [Hill and Wilson 2013] and finally there is a demonstration of an intersphincteric dissection of a benign extramucosal rectal leiomyoma.

In conclusion, as part of the art of surgical proctology, there may be no *best* procedure available for each patient. Here, of all the operations potentially available, old and new, low- and high-cost, simple and complex, manual and robotic, all may be successfully used as reconstructive options provided that they are selected based upon tumor location, remaining (if any) sphincter function and surgical expertise and experience. Each option too it must be stated is dependent upon local hospital resources.

CHAPTER 8 RECTAL TUMORS

- 8.1.** FAIVRE RESECTION OF A RECTAL TUMOR
- 8.2.** THE TAMIS (TRANSANAL MINIMALLY INVASIVE) PROCEDURE
- 8.3.** PISTA PROCEDURE
- 8.4.** PARKS' TRANSANAL EXCISION
- 8.5.** FLAP RECONSTRUCTION IN RECURRENT RECTAL CANCER
- 8.6.** THE ULTRA-LOW ANTERIOR RESECTION WITH INTERSPHINCTERIC PROCTECTOMY AND COLOPLASTY
- 8.7.** INTERSPHINCTERIC RESECTION OF A RECTAL LEIOMYOMA

8.1. FAIVRE RESECTION OF A RECTAL TUMOR



- A. Coronal and axial view of a Faivre advancement. Dissection begins in the intersphincteric plane and permits a downward displacement of the upper reaches of the tumor. This technique is an alternative to a TEM or an endoscopic mucosal resection.

B.

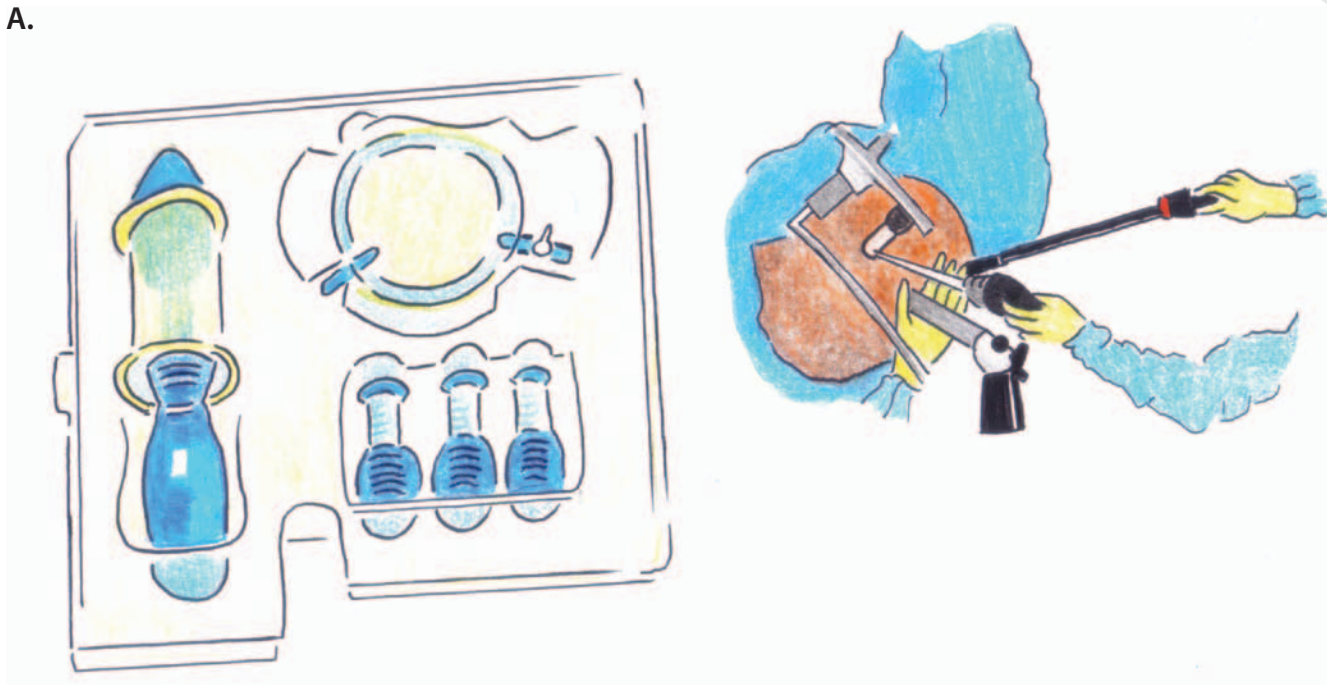


B. The defect is closed following an oncologic local resection.

Comment: This is a low-cost pre-TEM procedure, which may be still be valid when dealing with a rectal cancer or large sessile adenoma located in the middle-third of the rectum which is suitable for local excision. This is particularly the case when the sphincters are not weakened since an internal sphincterotomy is part of the operation. The inter-sphincteric groove at the site of the tumor is identified by finger palpation and the distal end of a 1.5 cm-wide strip of the internal anal sphincter is gently pulled downwards so as to render the tumor more approachable from below.

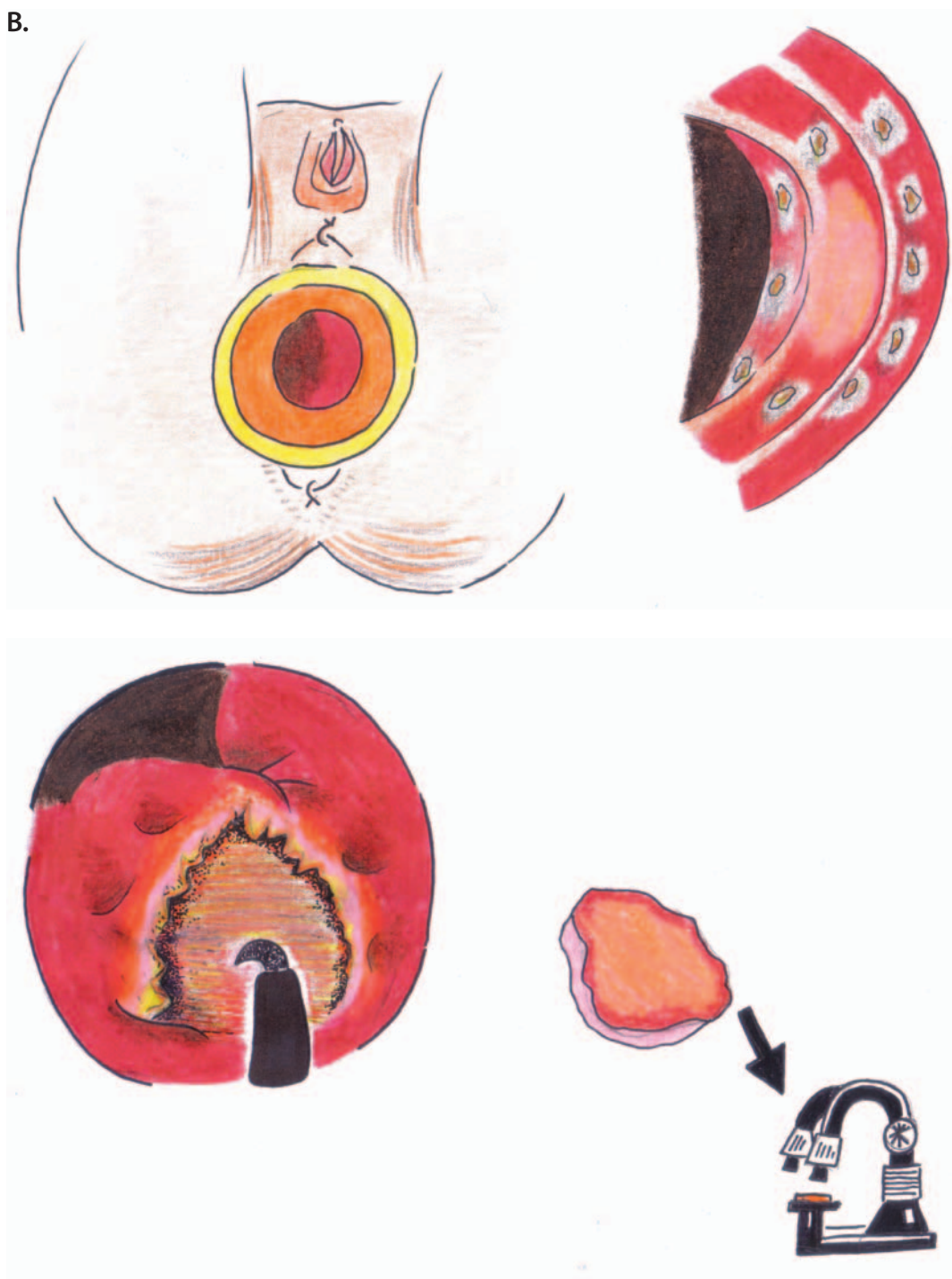
8.2. THE TAMIS (TRANSANAL MINIMALLY INVASIVE) PROCEDURE

A.



A. A single-port flexible kit is employed for endorectal excision.

B.

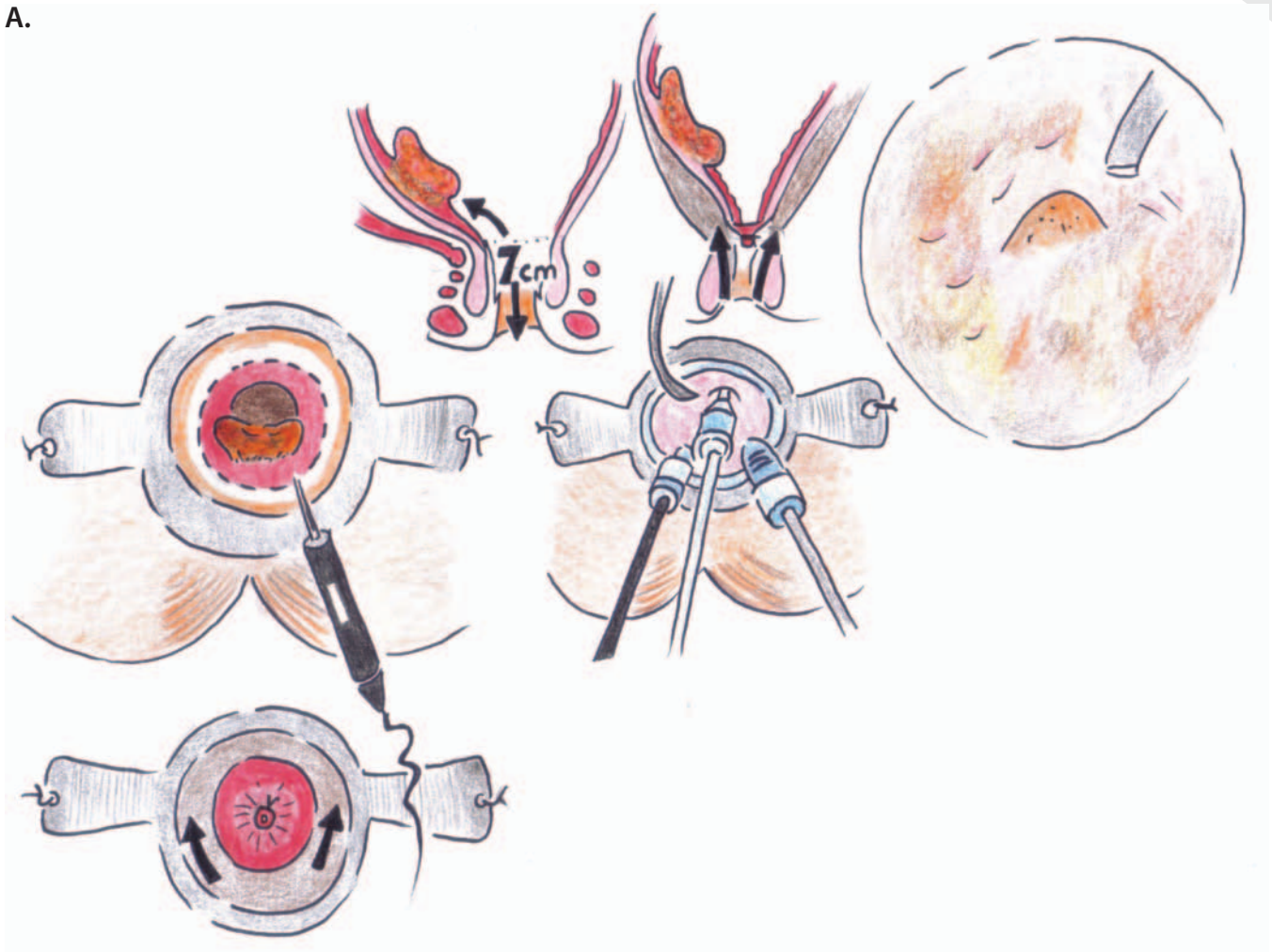


- B.** Dissection is performed with a hook electrode with the specimen sent for pathology. The defect may be left open or closed with a running endoscopic-laparoscopic suture with button closure of the ends.

Comment: The use of this approach is defined by the predicted risk of lymph node metastases which is about 10% in those cases of invasive adenocarcinoma where there is no submucosal invasion with good differentiation and no lymphovascular invasion.

8.3. PISTA PROCEDURE

A.



Combined single port transanal excision plus laparoscopic total mesorectal excision – the pull-through intersphincteric stapled transection and anastomosis (PISTA) procedure. (Patterned after Fu et al. 2013.)

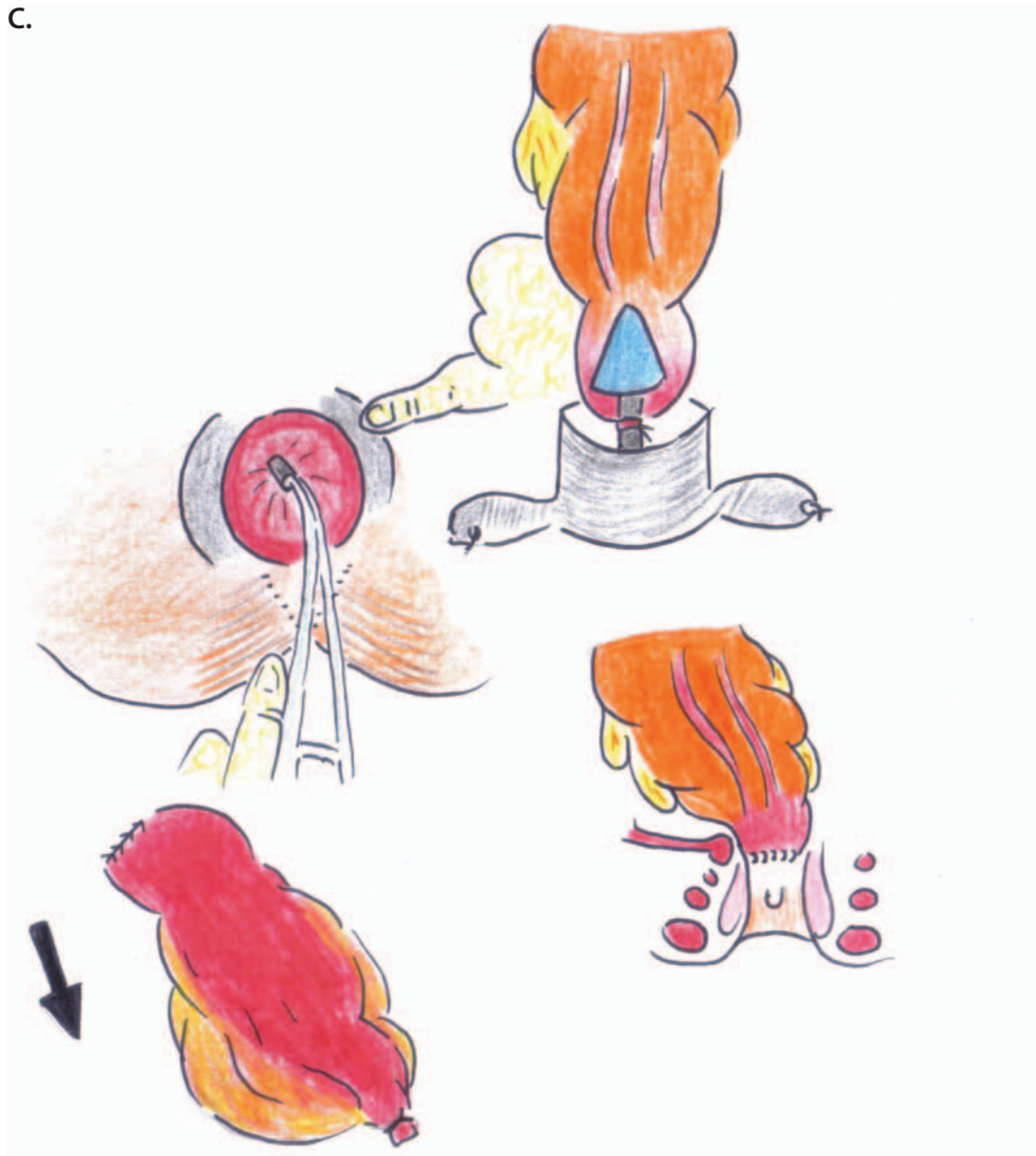
- A. A single port device is used to initially dissect the rectal tumor endorectally.

B.



B. This is combined with a laparoscopic total mesorectal excision.

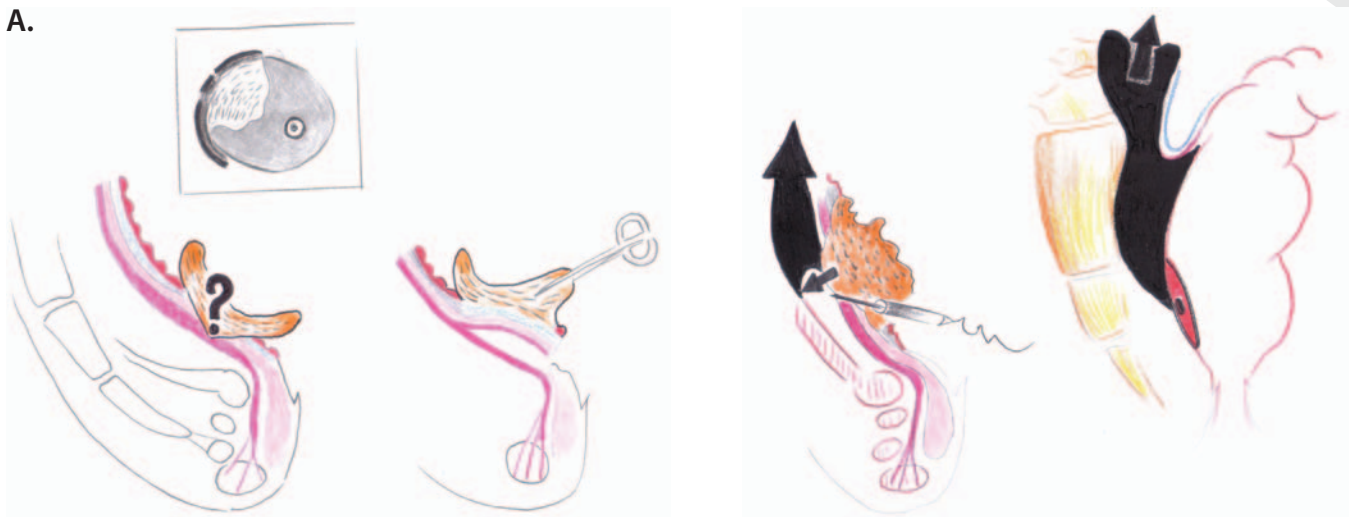
C.



C. Reconstruction is performed with a low stapled colorectal anastomosis.

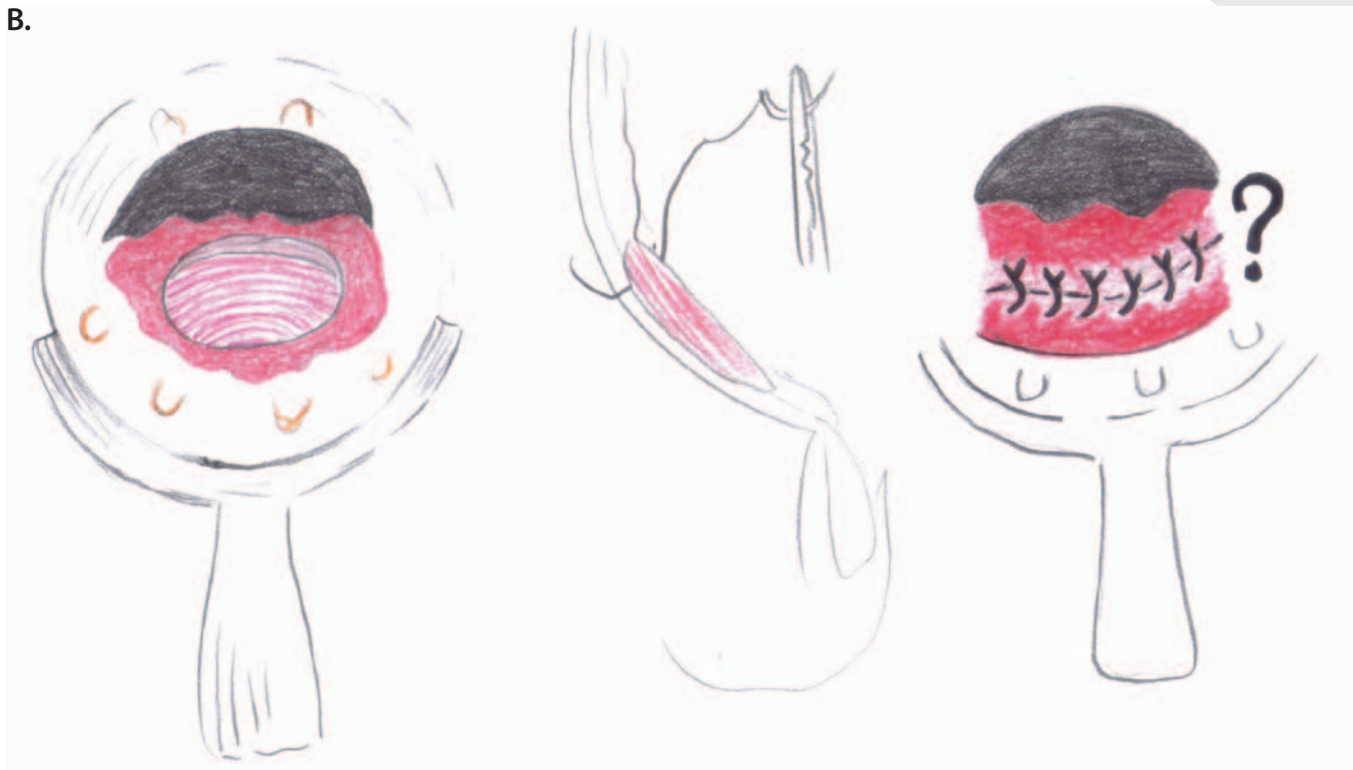
8.4. PARKS' TRANSANAL EXCISION

A.



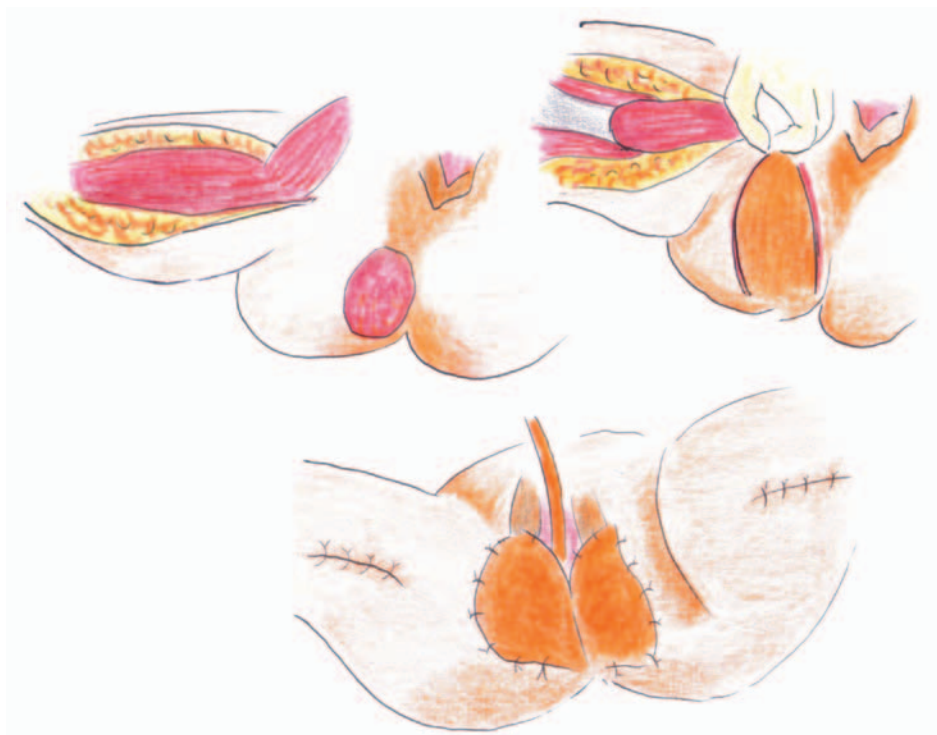
- A. Dissection of the tumor can be submucosal or full-thickness depending upon the depth of the tumor. The black arrow and area represent the diffusion of the air into the retrorectal spaces and above, as, following full-thickness excision, there is the potential risk of retro-pneumoperitoneum and pneumomediastinum.

B.



- B.** Formal closure is performed of the partial or full-thickness rectal defect. The question mark means that the option of completely suturing the surgical defect might favor the implantation of esfoliate cancer cells.

8.5. FLAP RECONSTRUCTION IN RECURRENT RECTAL CANCER



Reconstruction of a perineal defect after excision of a recurrent rectal cancer with a graciloplasty. A myocutaneous flap using gracilis muscle and a skin paddle is fashioned into the perineal defect after wide perineal resection of a recurrent rectal cancer. (Patterned after Hill and Wilson 2013.)

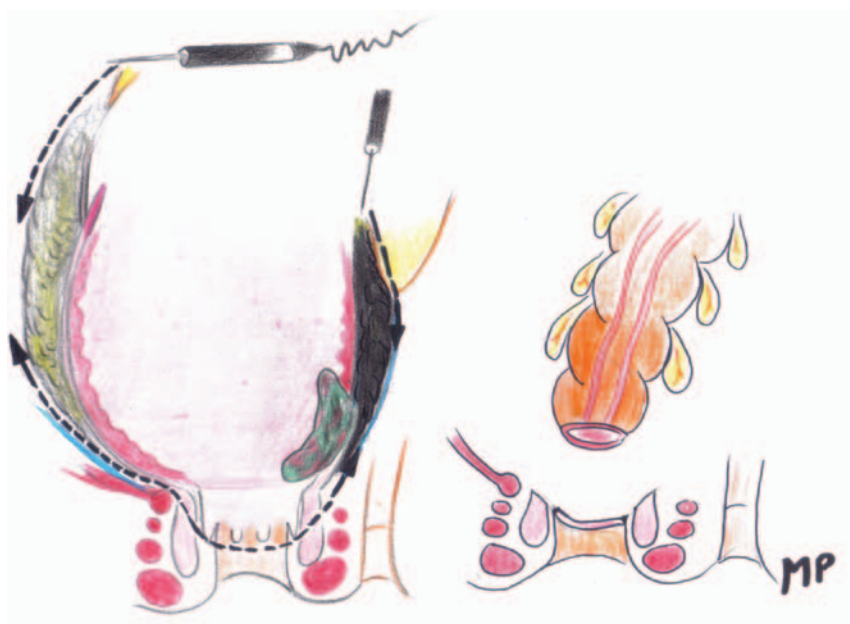
8.6. THE ULTRA-LOW ANTERIOR RESECTION WITH INTERSPHINCTERIC PROCTECTOMY AND COLOPLASTY

A.



A. The tumor is located in the lower third of the rectum.

B.



B. An intersphincteric resection with total mesorectal excision is performed with a coloanal anastomosis.

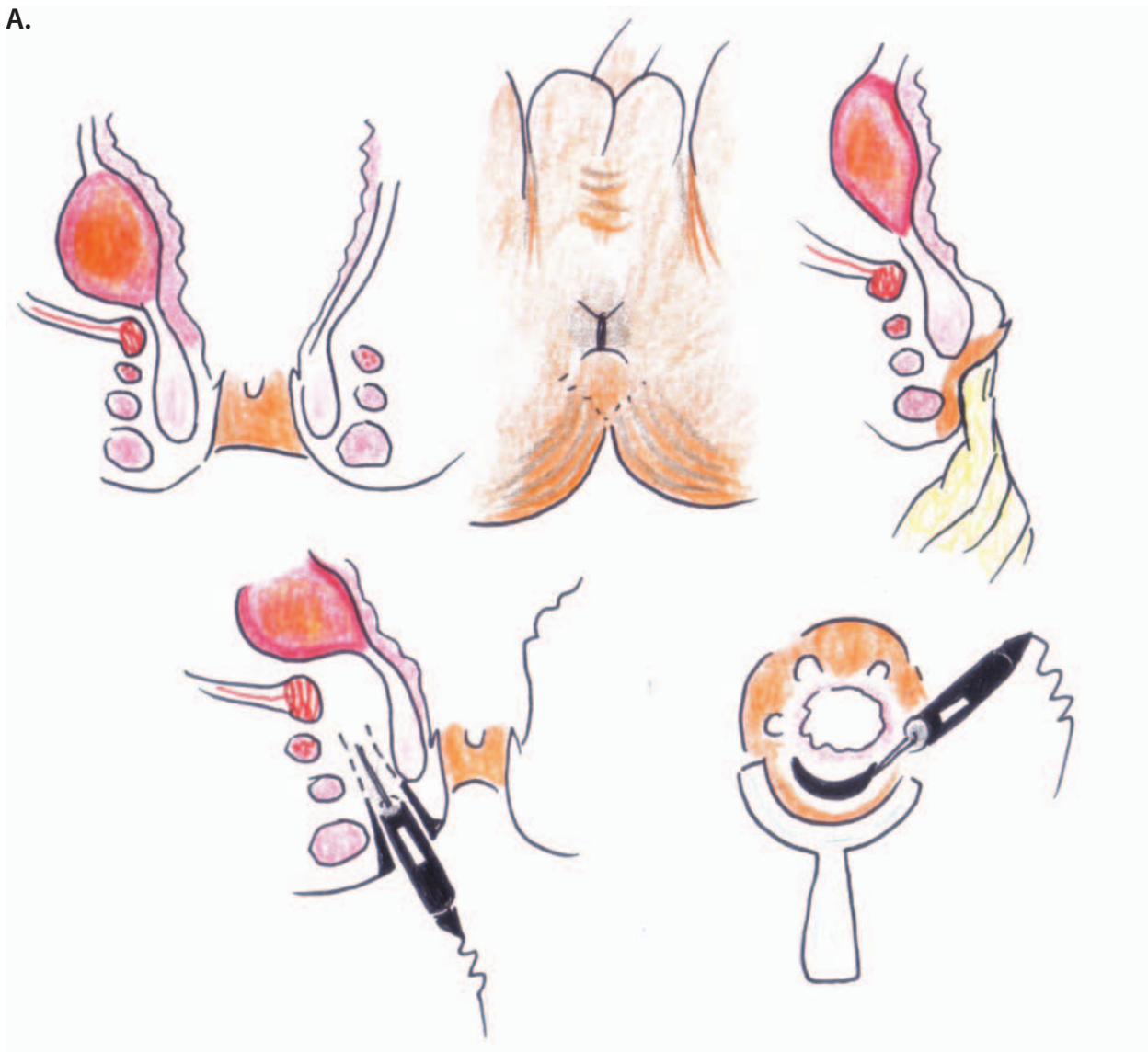
C.



- C. A Heineke-Mikulicz style Fazio coloplasty is performed to create a neorectal reservoir and was supplemented with a smooth muscle neo-sphincter transfer to support continence.

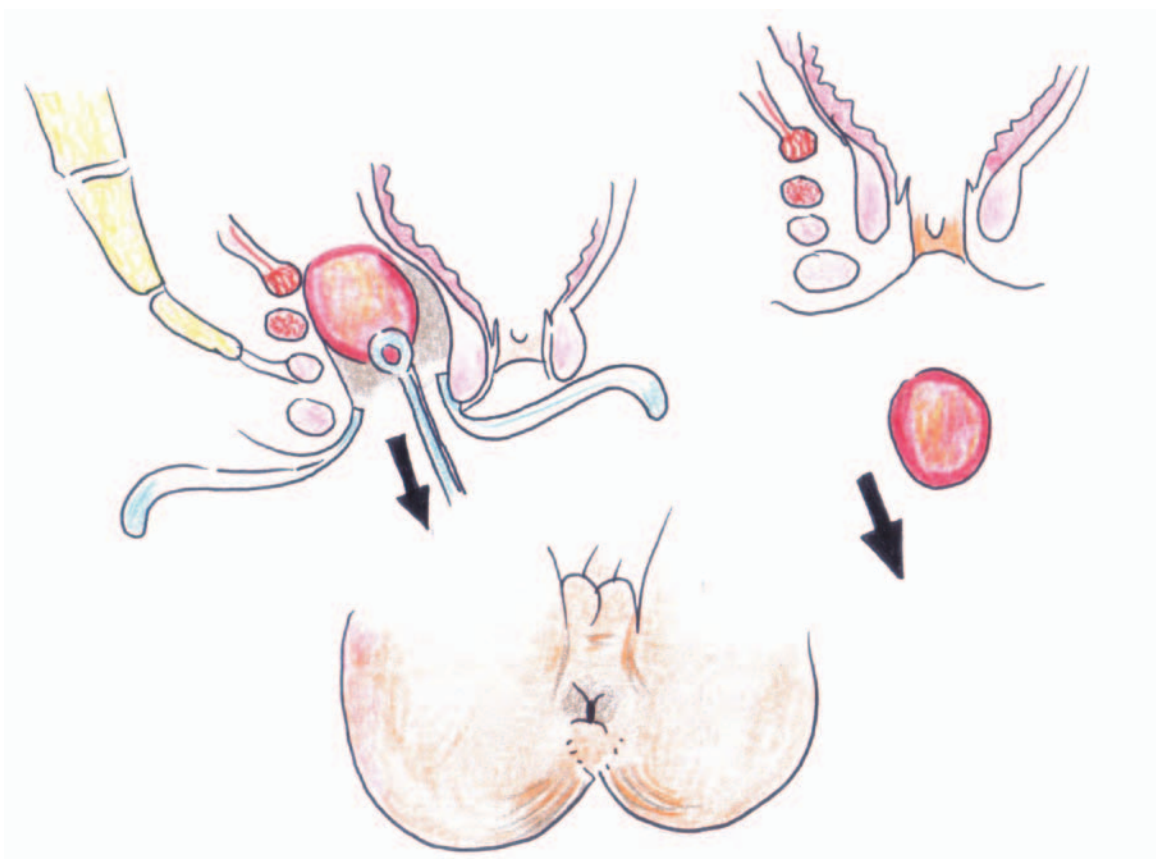
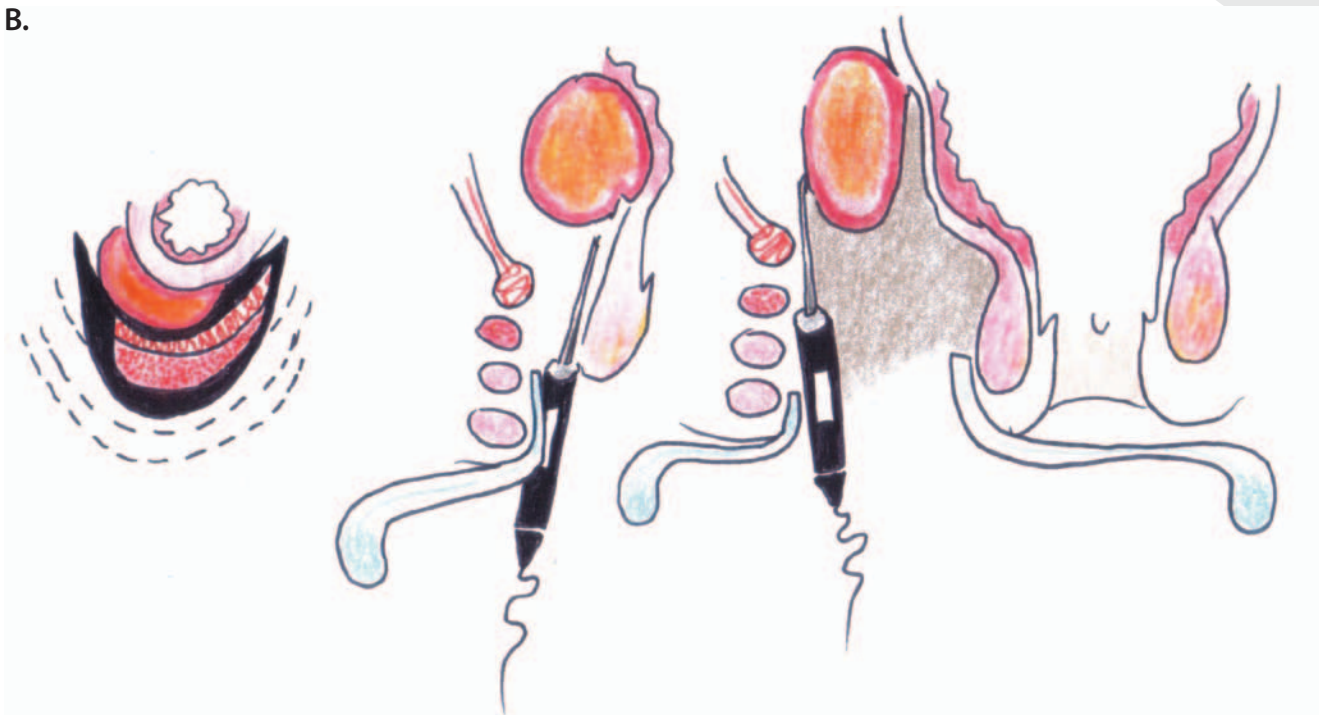
8.7. INTERSPHINCTERIC RESECTION OF A RECTAL LEIOMYOMA

A.



A. Commencement of the intersphincteric dissection of a submucosally placed benign rectal leiomyoma.

B.



- B.** Dissection continues in the intersphincteric plane above the levator floor with complete tumor excision and closure of a postanal incision.

CHAPTER 9

Miscellaneous Proctology

A chapter of “MISCELLANEA” is usually the “Cinderella chapter” of any book, but, as the readers will see, some challenging operations are illustrated herein. These include the transposition of a congenital vestibular anus from the vaginal vestibule to the perineum in an adult patient; a condition which presents with fecal incontinence and repeated vaginitis and which is often associated with other congenital anomalies, such as pyelectasia and cardiac malformations.

Another challenge for proctologists is represented by retrorectal (presacral) tumors. A trans-abdominal approach is unlikely to allow the complete removal of a large retrorectal tumor, although it may be required in high lesions which are partly inaccessible from below. For these lesions, the coloproctologist needs an armamentarium of approaches which include retro-anal, retrorectal and intersphincteric techniques as well as the Kraske post-sacral approach either with division of the anococcygeal ligament or coccygectomy [Szmulowicz and Hull 2013]. In the event of a malignant tumor, a sacrectomy may be required although fortunately quite rarely, where the resulting large sacral-perineal defect may be resurfaced with a complex flap in collaboration with the plastic surgeons [Solomon et al 2013].

Sir Alan Parks used to say that in order to be a good “pouch-surgeon” one should be prepared to deal with the most troublesome of postoperative complications. Of these, the great scourge is the pouch-vaginal fistula which often needs to be managed with the interposition of the gracilis muscle. The operative steps are illustrated in this chapter. A dehiscence of the ileo-anal suture after restorative proctocolectomy with an ileal pouch-anal anastomosis may occur in up to 10% of cases and is likely to cause peri-anastomotic sepsis and subsequently a severe anal stricture with poor function. In this context, peri-pouch sepsis is one of the most frequent events which ultimately requires excision of the ileal reservoir. This chapter shows an unusual but effective combined endoscopic-surgical operation which I carried out many years ago to release a severe stricture at the site of the pouch outlet.

Much simpler procedures, such as the performance of a deep rectal biopsy indicated in patients with suspicion of adult Hirschsprung’s disease (aganglionosis) who present with severe constipation is also shown. The search for either diseased, reduced or absent ganglion cells reminded me of an intriguing case of a young constipated male patient who underwent an

unsuccessful Stapled Trans Anal Rectal Resection (STARR) procedure followed by an unsuccessful sigmoid resection of a dolicho-sigmoid. This too proved unsuccessful and was followed by a further unsuccessful colonic resection with performance of a caeco-rectal anastomosis. When I first saw him at my Unit, he still suffered from severe constipation. Anorectal manometry and deep rectal biopsy were conducted showing an absent recto-anal inhibitory reflex with marked rectal hypoganglionosis. The diagnosis confirmed Hirschsprung's disease for a patient who had undergone three unnecessary operations.

Anal warts (condylomata) may be considered a trivial disorder, but they can occasionally become complex in a dramatic way when the patient presents with a Büschke-Löwenstein tumor, the so-called carcinoma verrucosus cuniculatus. In these patients, the anal mass looks like a big brown corrugated sun whose rays are represented by fistulous tracks full of condylomata. Although this tumor rarely gives rise to distant metastases, it is locally aggressive as shown by the case illustrated in this chapter. As far as the simple scissor excision of perianal warts is concerned, (an intervention which due to the site and the size of the surgical wounds is very unlikely to cause any anal stricture), this simple procedure still requires performance with the proper steps. The condylomata should be sent not only to the pathologist, but also to the bacteriologist in a specialized container for viral culture with performance of RT-PCR to detect human papilloma-virus (HPV) subtypes designating the patient's relative risk for squamous cancer transformation.

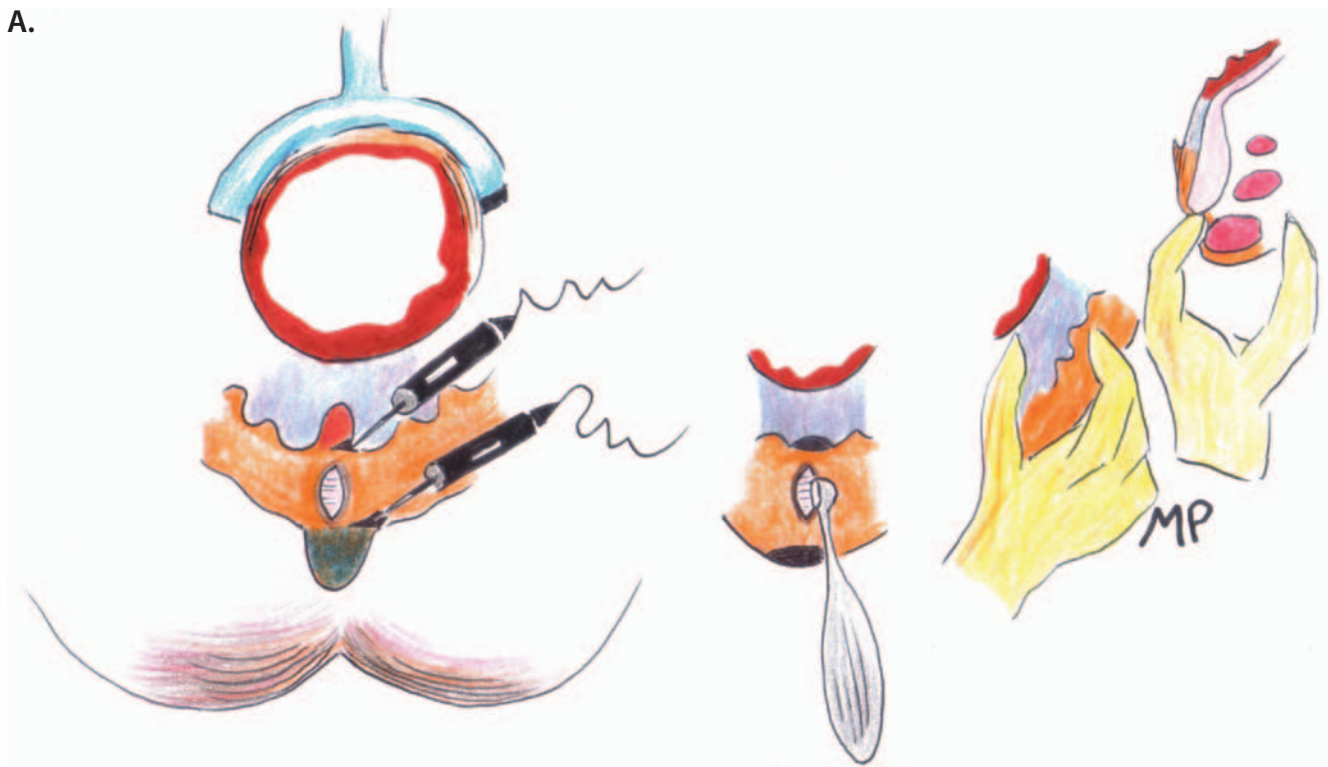
This chapter also covers the simple proctological approach to lateral internal anal sphincterotomy for chronic anal fissure in those resistant to topical therapies or Botulin toxin A injection. A case of direct repair of a traumatic cloaca, [Valente and Khanduja 2012] the management approach to Hidradenitis suppurativa, and the management of a rectourethral fistula are also illustrated as is the uses of graciloplasty transposition to fill pelvic cavities [Colubaseanu et al 2011] and to resurface perineal defects [Ruiz et al 2008].

CHAPTER 9 MISCELLANEOUS PROCTOLOGY

- 9.1.** CHRONIC ANAL FISSURE – LATERAL INTERNAL ANAL SPHINCTEROTOMY
- 9.2.** CONDYLOMATA ACCUMINATA AND THE BUSCHKE-LÖWENSTEIN TUMOR
 - 9.2.1. Condylomata Accuminata
 - 9.2.2. Excision and Reconstruction of a Buschke-Löwenstein Tumor
- 9.3.** CLOACAL REPAIR
- 9.4.** PRESACRAL TUMORS
 - 9.4.1. Transperineal Excision of a Presacral Mass
 - 9.4.2. Kraske Post-Sacral Approach to Excise a Retrorectal Mass
 - 9.4.3. Partial Sacrectomy
- 9.5.** HIDRADENITIS SUPPURATIVA
- 9.6.** MEGARECTUM
- 9.7.** VESTIBULAR ANUS WITH ANORECTAL TRANSPOSITION
- 9.8.** POUCH-VAGINAL FISTULA TREATED BY INTERPOSITION GRACILOPLASTY
- 9.9.** MANAGEMENT OF STRICTURES AFTER RESTORATIVE PROCTOCOLECTOMY WITH ILEAL POUCH-ANAL ANASTOMOSIS
 - 9.9.1. Transanal Septal Division
 - 9.9.2. Rendezvous Procedure
- 9.10.** RECTOURETHRAL FISTULA REPAIR
- 9.11.** GRACILOPLASTY

9.1. CHRONIC ANAL FISSURE – LATERAL INTERNAL ANAL SPHINCTEROTOMY

A.



- A. Chronic anal fissure with associated hypertrophied anal papilla and sentinel “pile”. Excision of papilla and tag, curettage of the fissure base. Delineation of the intersphincteric plane.

B.



- B. Open lateral internal anal sphincterotomy with diathermy after dissection of the intersphincteric space. Change after the procedure of the anal disposition.

Comment: There are now a number of sphincter-sparing alternatives in patients who do not respond to topical therapies. These include fissurectomy and anoplasty, pneumatic dilatation and fissurotomy. If a sphincterotomy is carried out, those that extend to the fissure apex (as opposed to those up to the dentate line) are less likely to be associated with postoperative leakage but more often have fissure recurrence. Evidence from Gupta would suggest that the hypertrophied anal papilla and the sentinel pile should be routinely removed as they may become troublesome enough so as to require revisional surgery.

9.2. CONDYLOMATA ACCUMINATA AND THE BUSCHKE-LÖWENSTEIN TUMOR

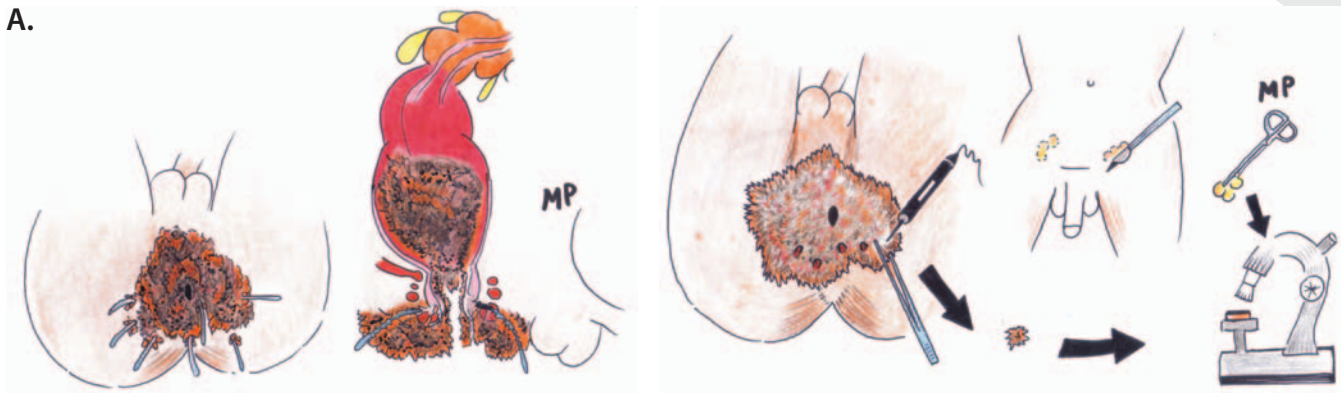
9.2.1. Condylomata Accuminata



Scissor excision of isolated condylomata accuminata after infiltration of the base with saline and adrenaline. The base of the excision is cauterized and the condylomata are sent for histological examination and for human papillomavirus RT-PCR subtyping.

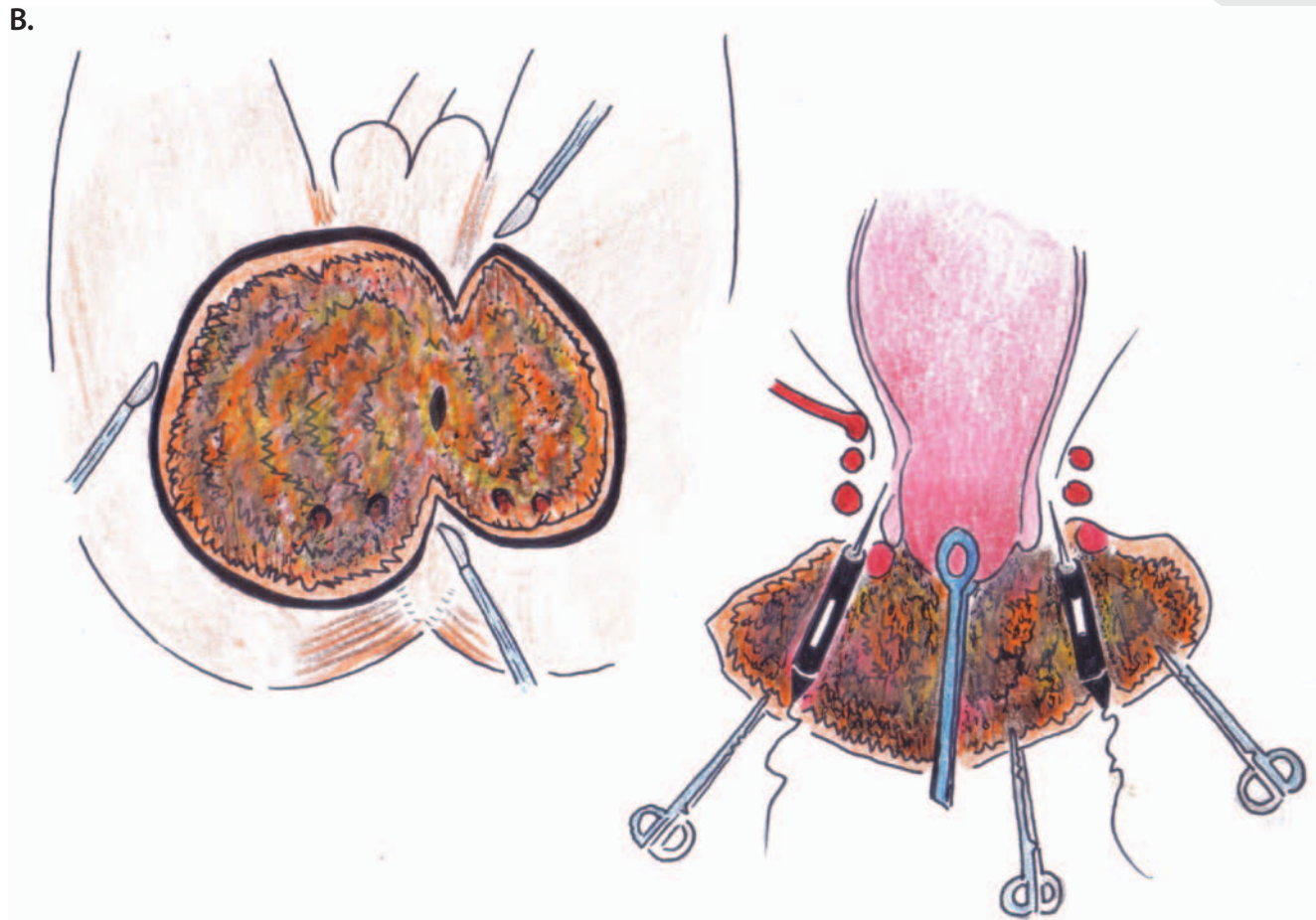
9.2.2. Excision and Reconstruction of a Buschke-Löwenstein Tumor

A.



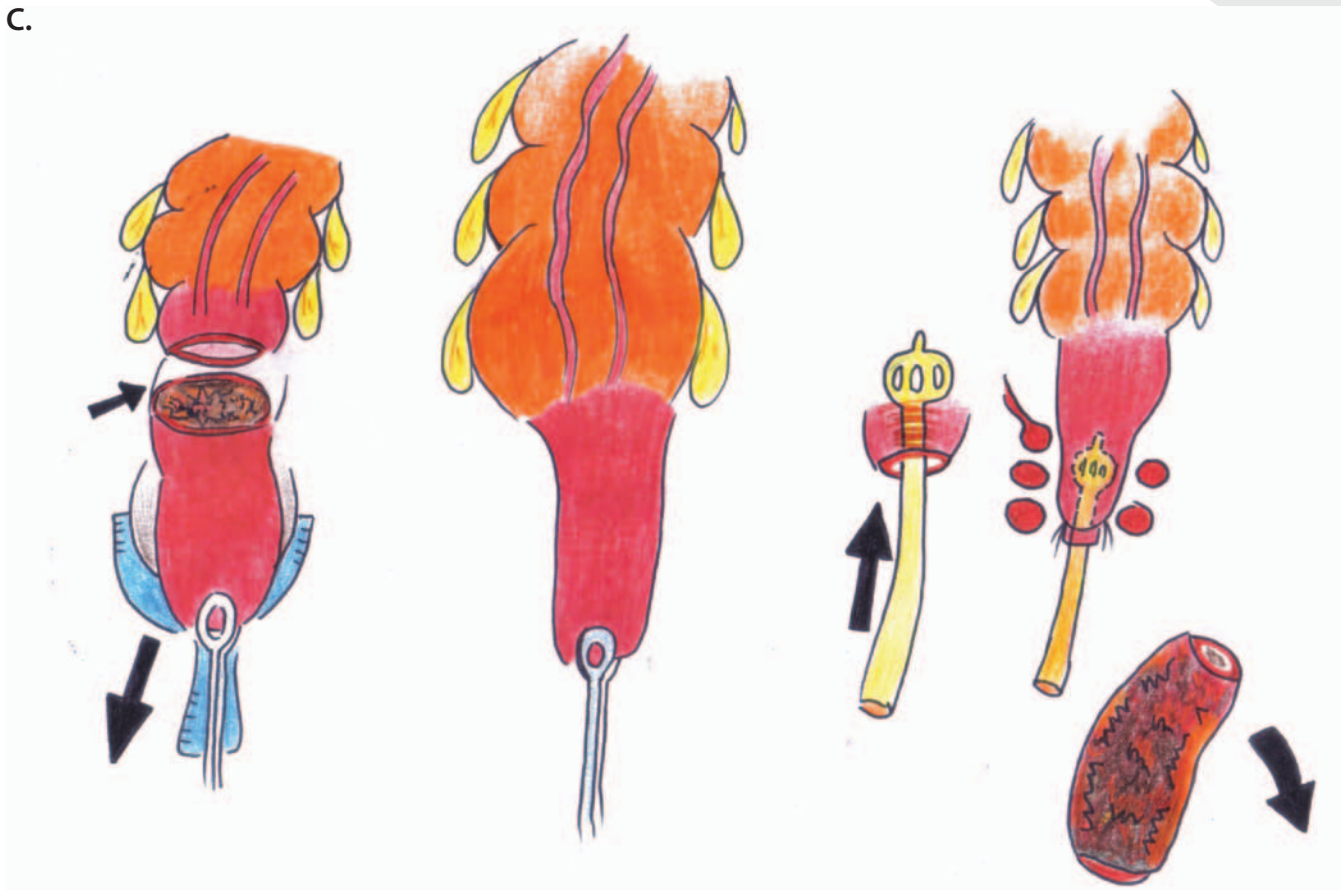
- A. Invasive Büschke-Löwenstein tumor. The patient presented with an extensive tumor with multiple condylomata intra-anally extending into the rectal ampulla with enlarged inguinal lymph nodes. The lesion and the inguinal lymph nodes were biopsied.

B.



- B.** The patient declined a colostomy. Excision of the endoanal and perianal condylomata was performed with intersphincteric proctectomy of the involved rectum.

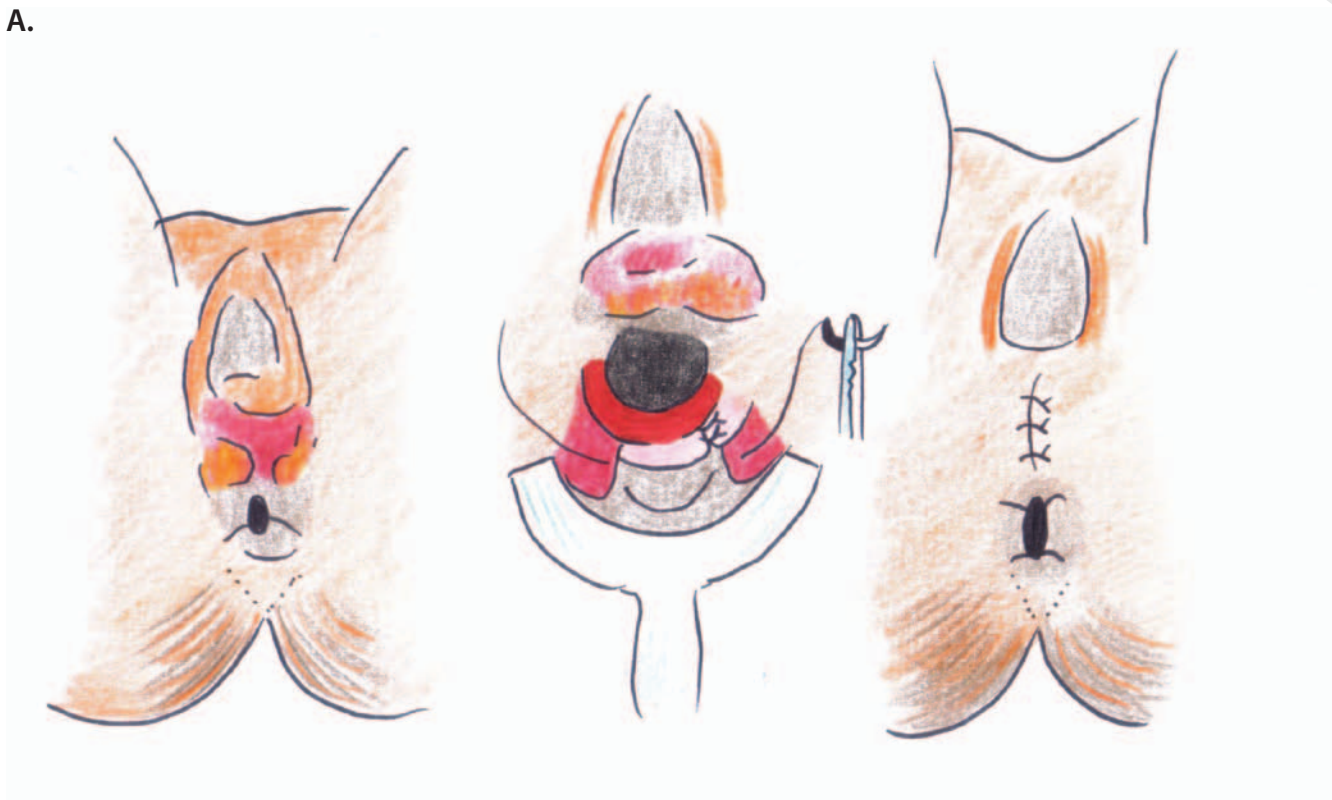
C.



- C. Reconstruction was intended as a coloanal pull-through with creation of an autologous internal anal neo-sphincter and per-anal flap reconstruction. The patient developed aggressive metastatic disease at 3 months and died with autopsy evidence of presacral, paraurethral and acetabular disease.

9.3. CLOACAL REPAIR

A.

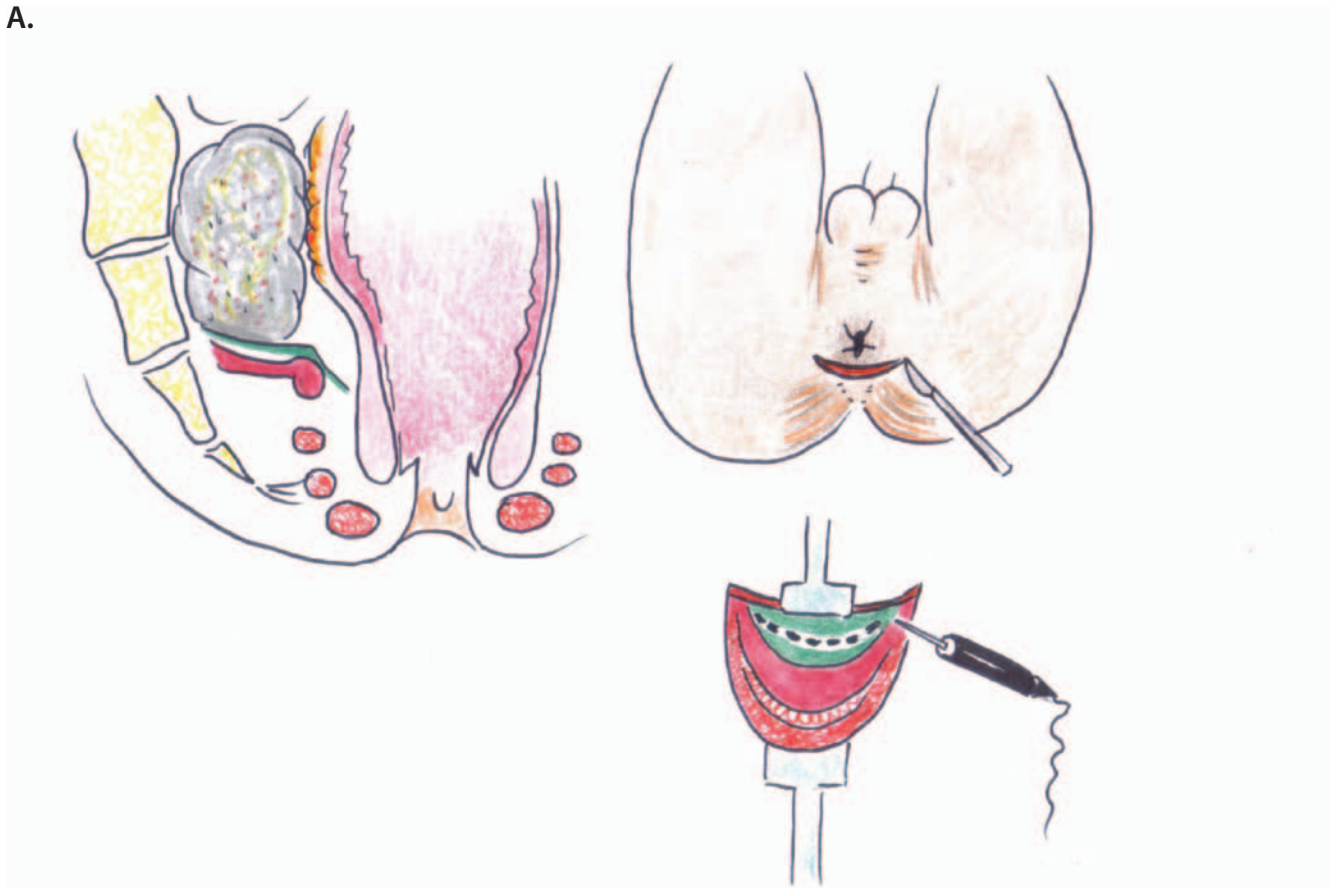


A formal layered repair (internal and external anal sphincter, levator muscle and vaginal and rectal mucosa) for a cloacal deformity. Patterned after Valente and Khanduja 2012.

9.4. PRESACRAL TUMORS

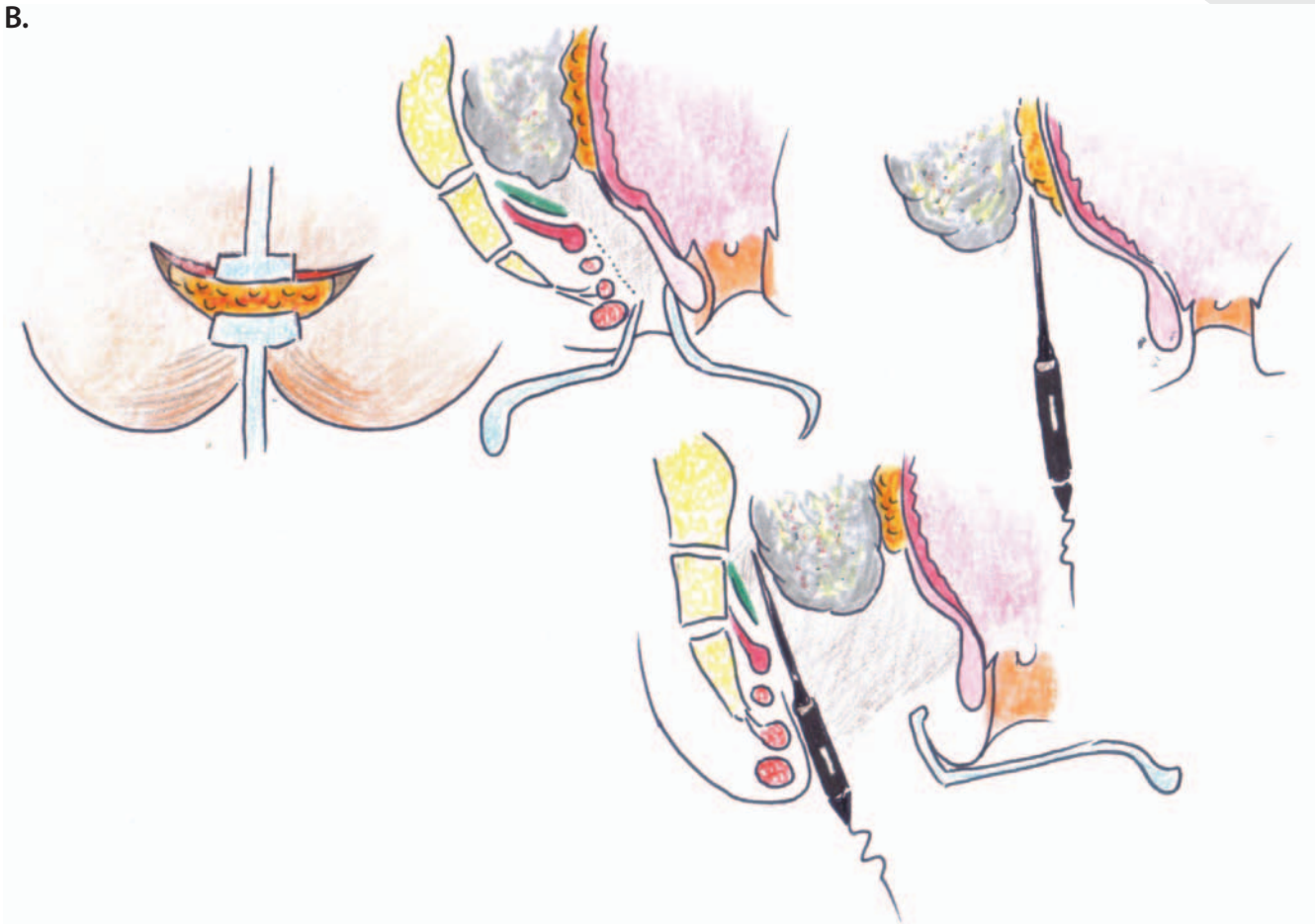
9.4.1. Transperineal Excision of a Presacral Mass

A.



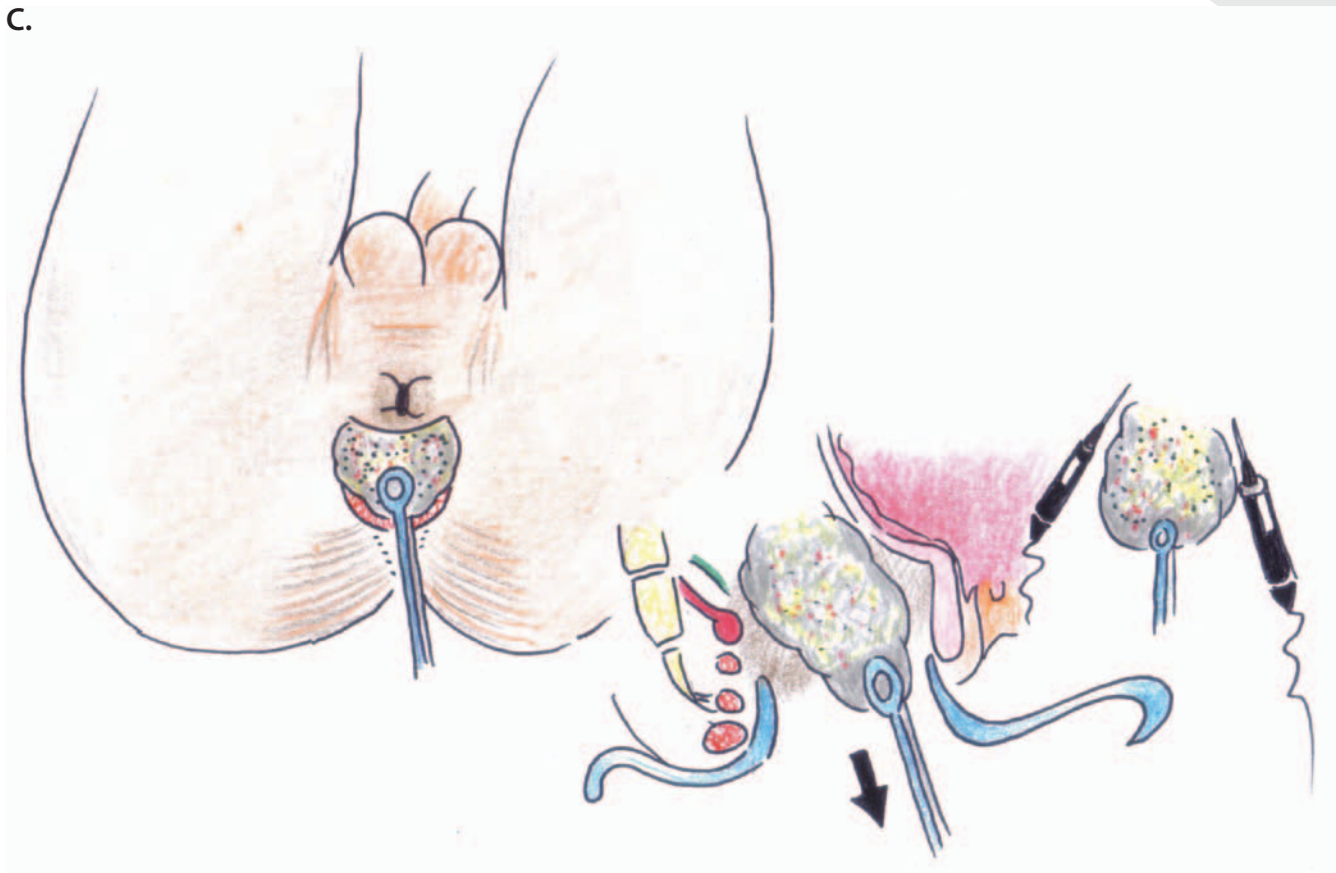
- A. A transperineal postanal approach extends to the mass by displacing the external anal sphincter posteriorly.

B.



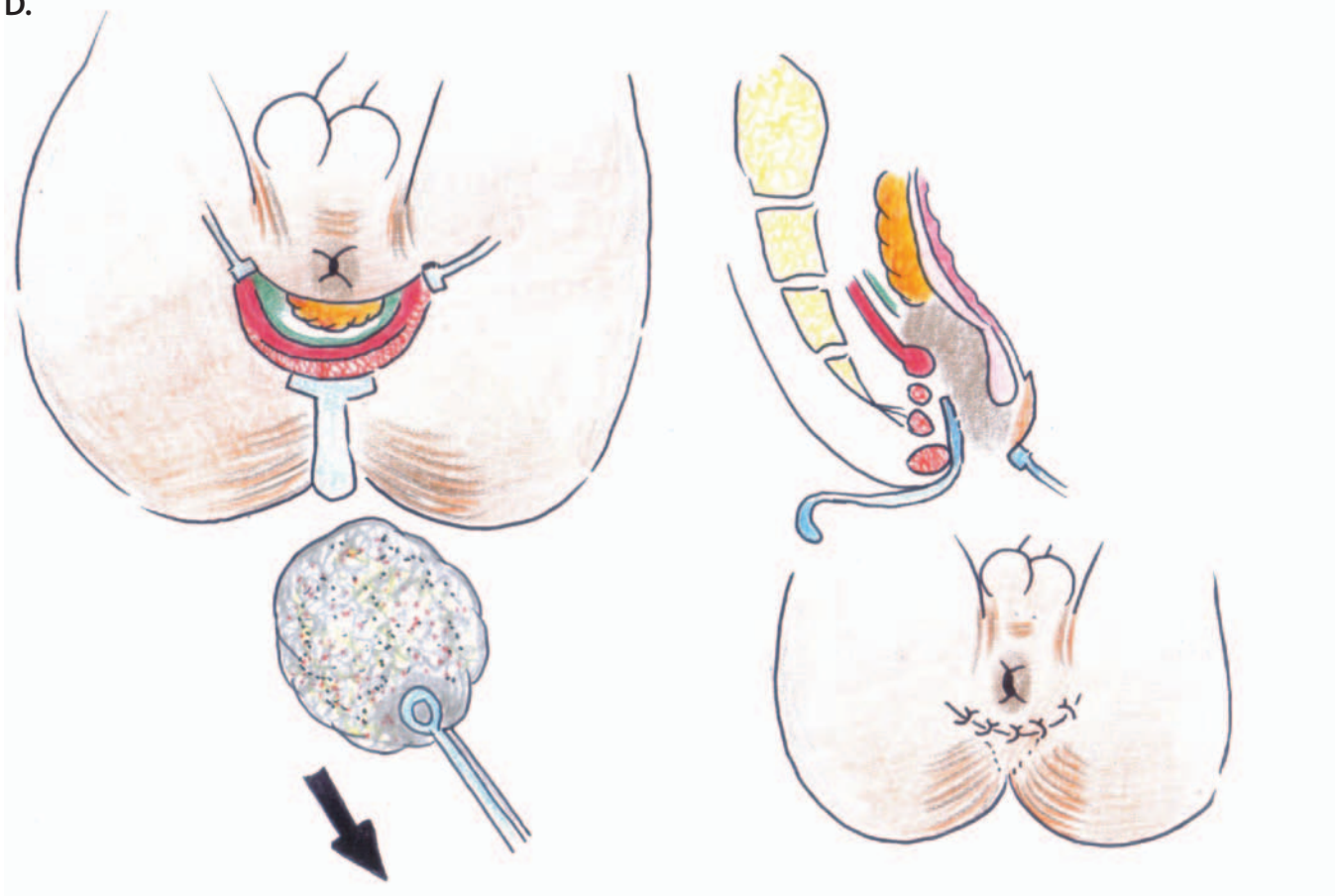
B. Entry into this intersphincteric plane exposes the presacral mass.

C.



C. Encapsulated masses can be extracted relatively bloodlessly.

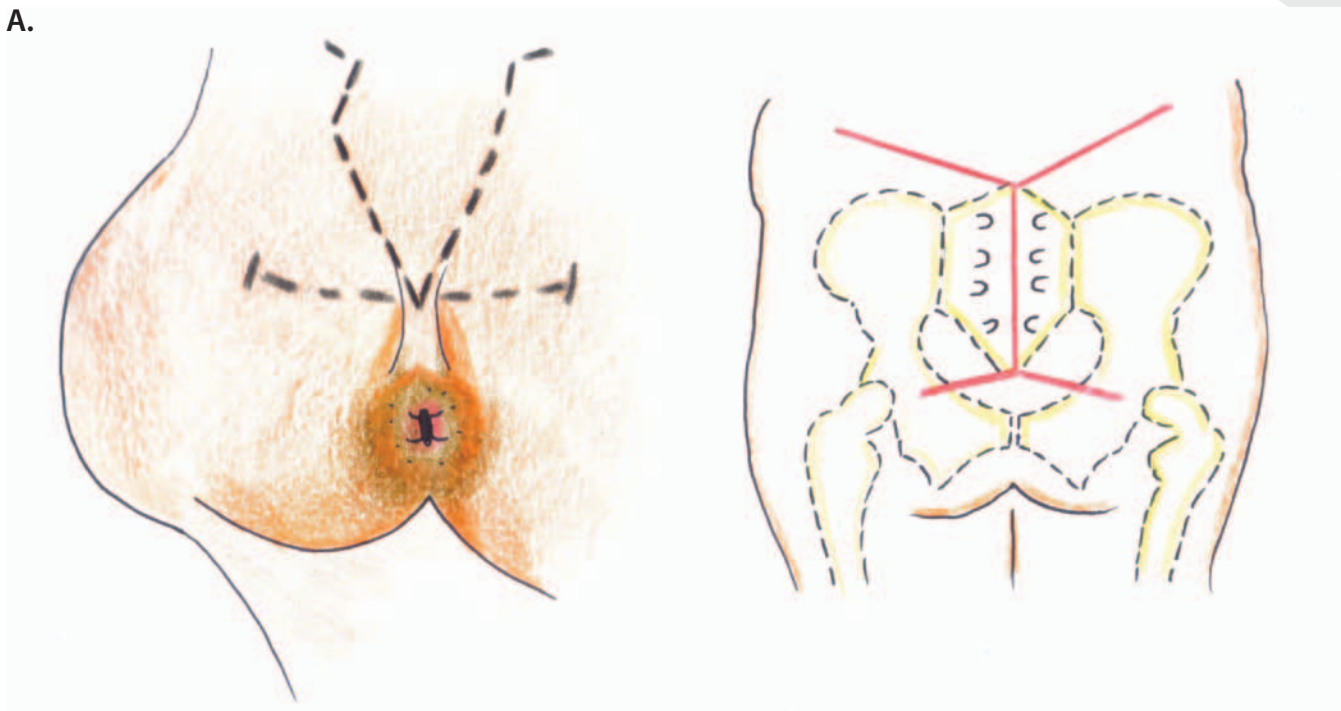
D.



D. Direct perineal closure with or without drainage of the presacral space.

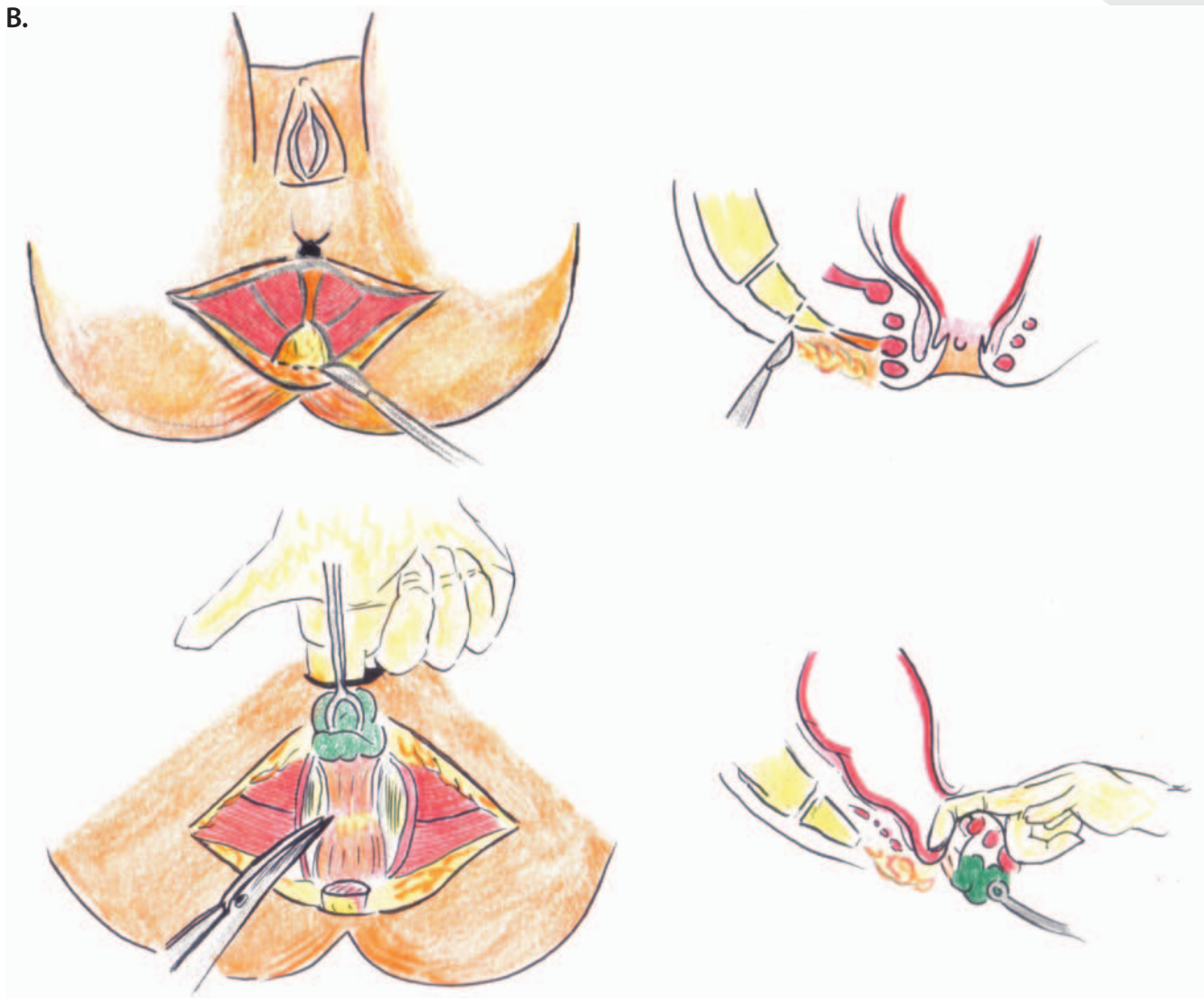
9.4.2. Kraske Post-Sacral Approach to Excise a Retrorectal Mass

A.

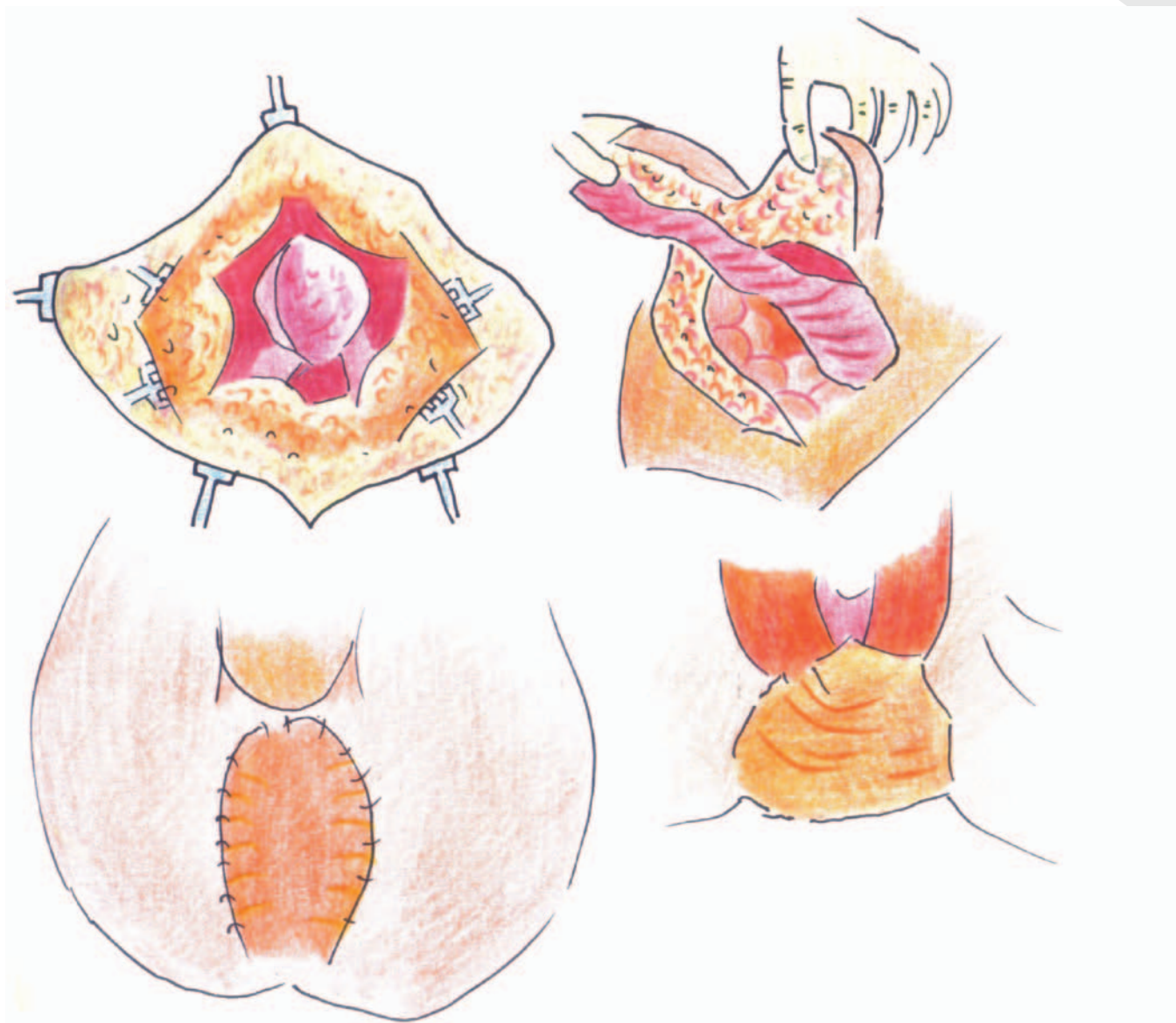


- A. The Yang I-shaped incision is used for resection of a large retrorectal angiomyxoma.

B.



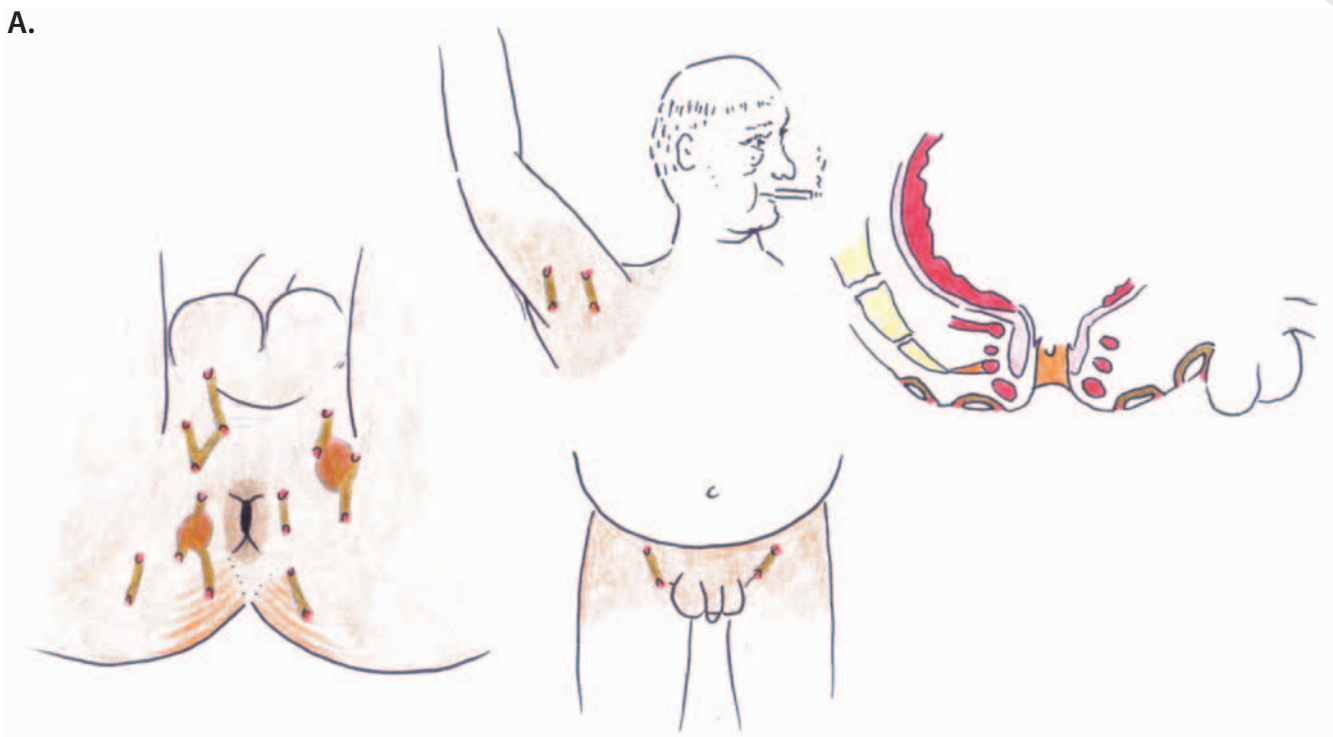
B. Division of the anococcygeal ligament allows entry into the presacral space. (Patterned after Szmulowicz and Hull 2013.)

9.4.3. Partial Sacrectomy

Partial sacrectomy (below the 3rd sacral piece) for a malignant presacral tumor with reconstruction of the perineal defect using a vertical rectus abdominis myocutaneous flap. (Patterned after Solomon et al. 2013.)

9.5. HIDRADENITIS SUPPURATIVA

A.



A. Case of hidradenitis suppurativa in an obese smoker who also had axillary disease.

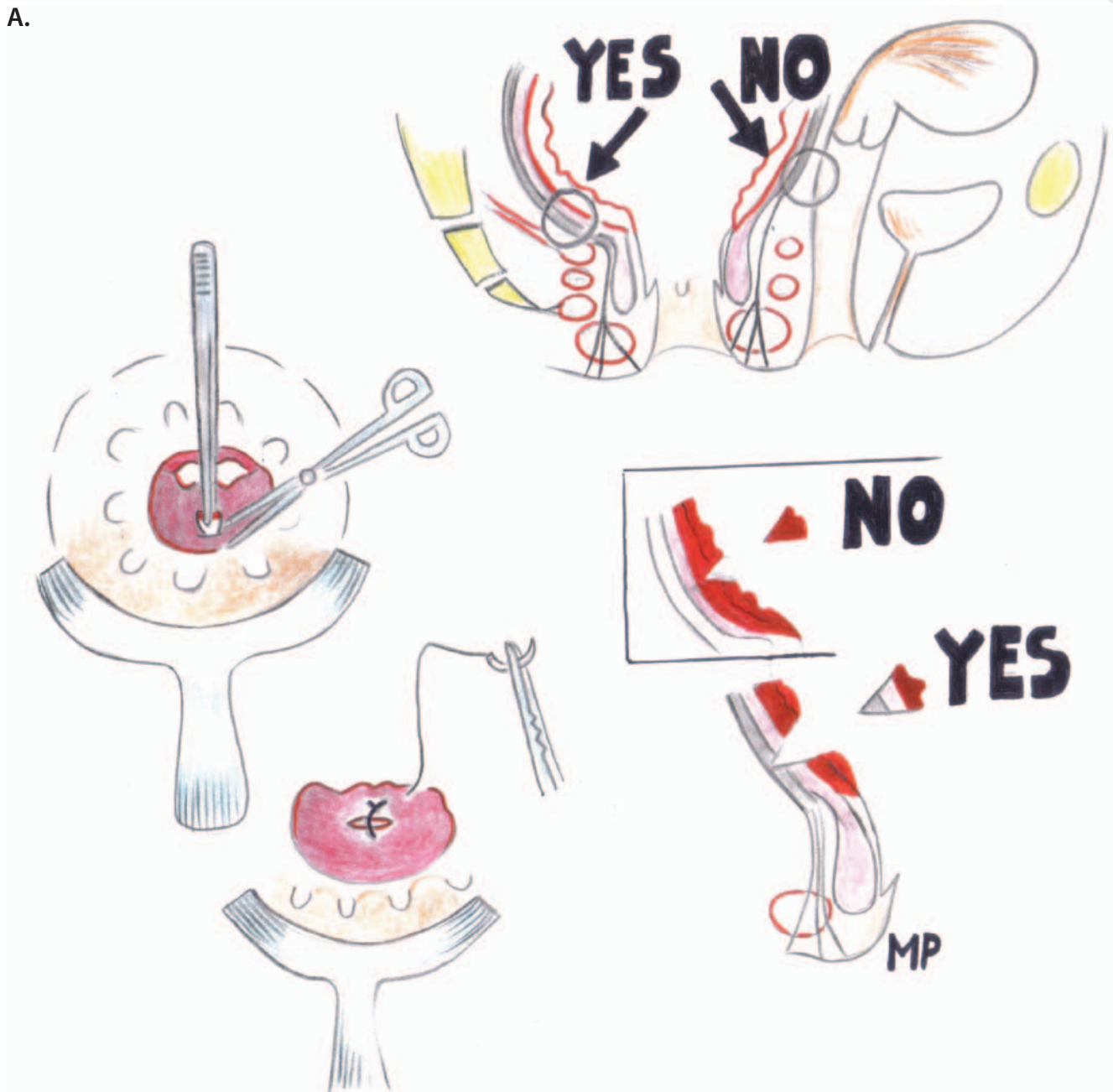
B.



B. Skin excision and curettage of superficial sinus tracks without sphincter involvement.

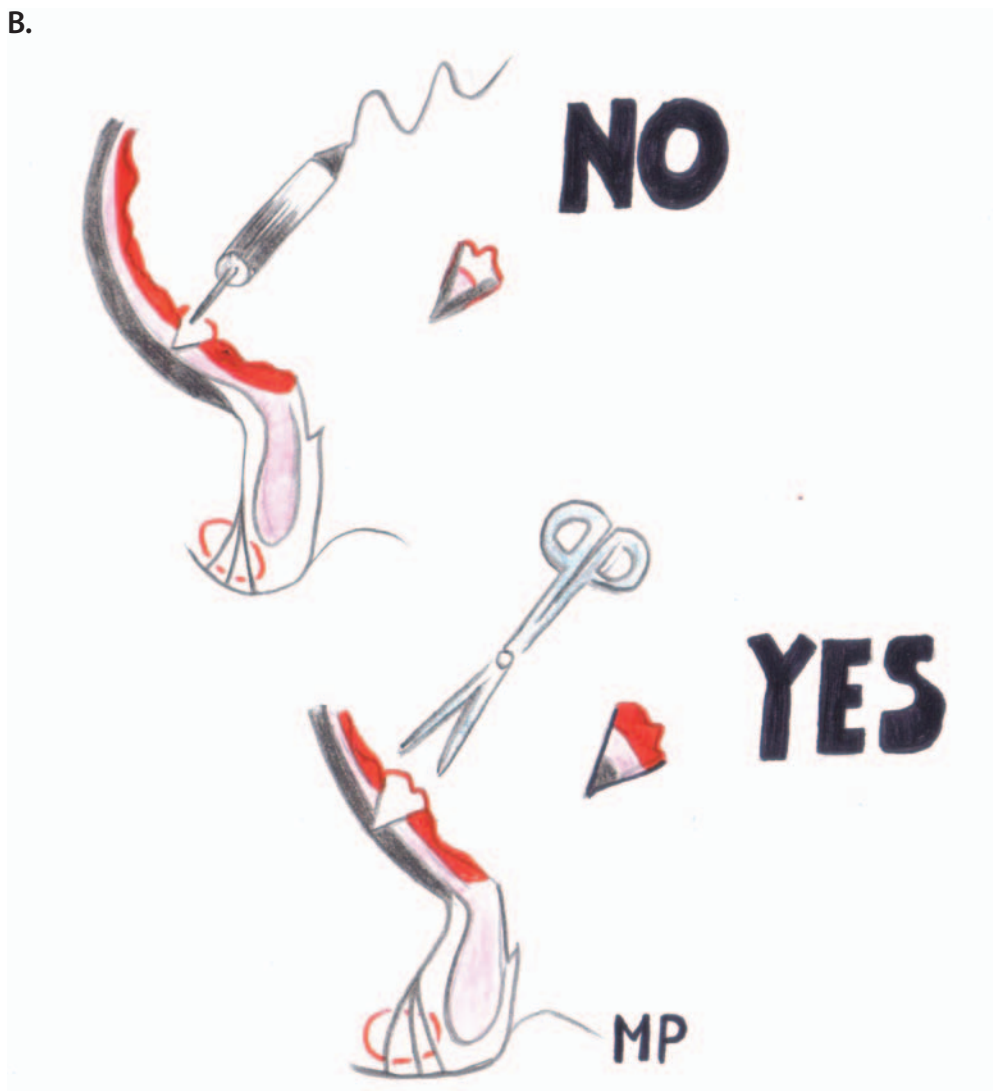
9.6. MEGARECTUM

A.



- A. Full-thickness posterior rectal biopsy performed for severe constipation and suspected Hirschprung's disease.

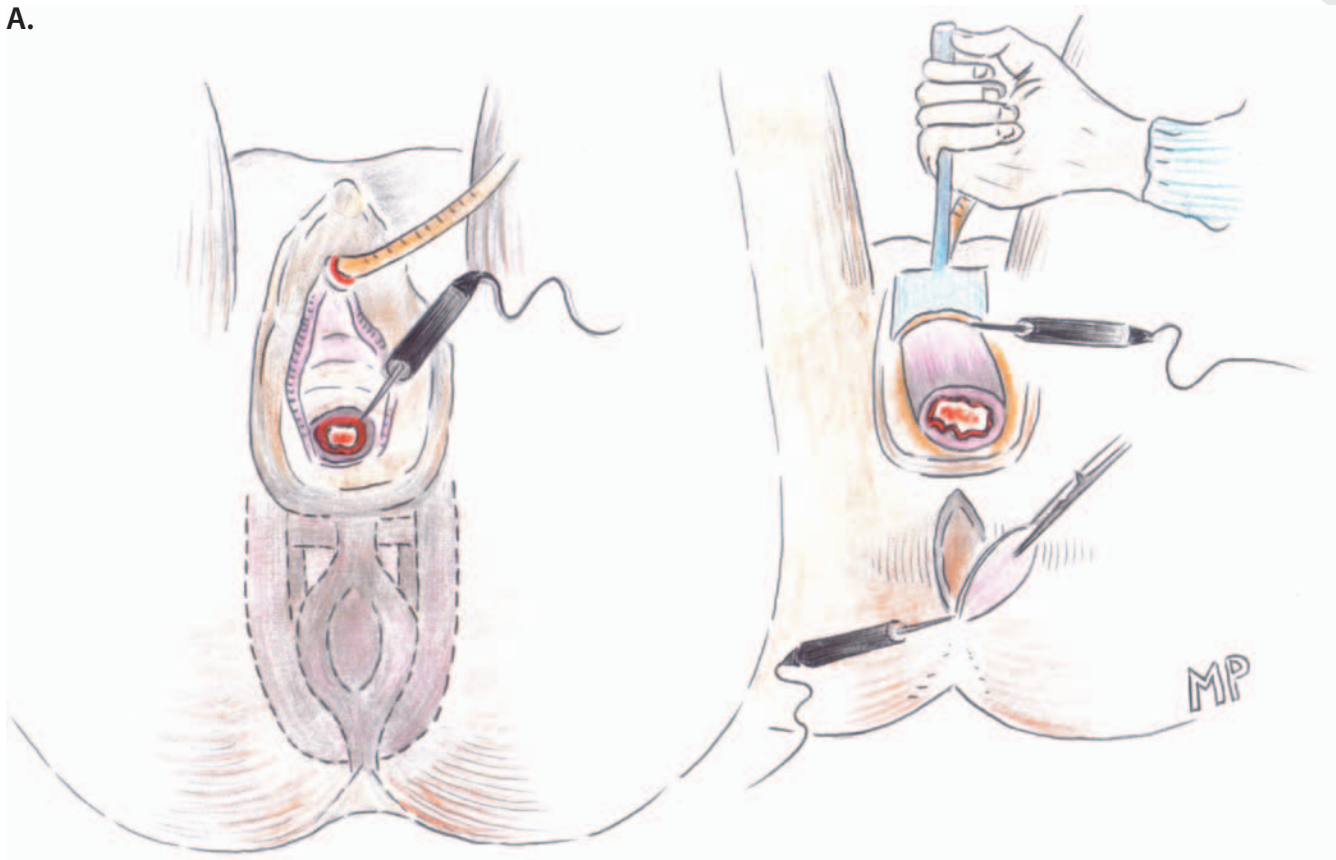
B.



- B.** The technique should include the submucosal and myenteric regions for accurate diagnosis of hypo (a) ganglionosis and immunoreactive acetylcholinesterase staining. The alternative of a suction biopsy (as described by Helen Noblett in 1969) is reserved for neonates.

9.7. VESTIBULAR ANUS WITH ANORECTAL TRANSPOSITION

A.



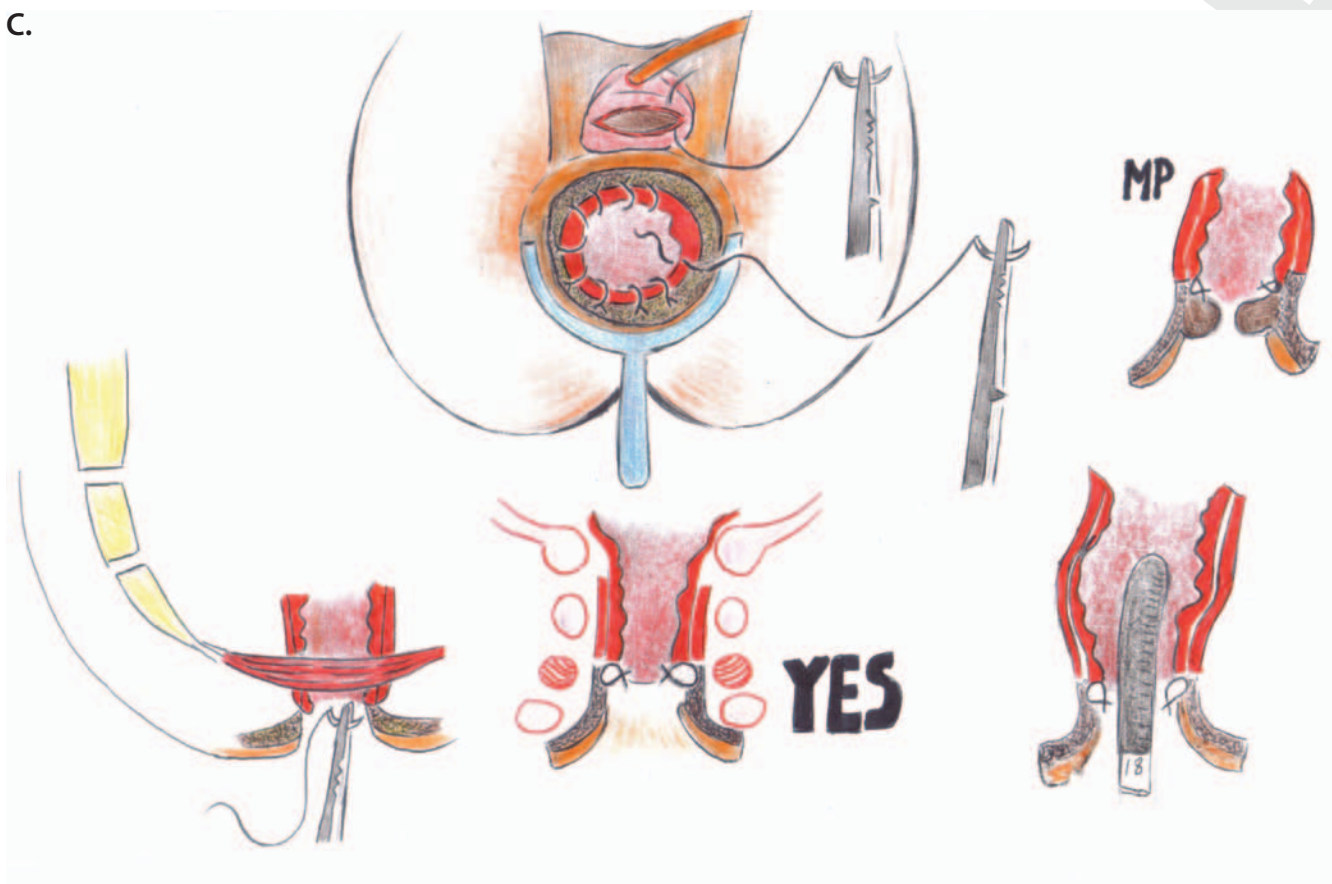
A. Demonstration of vestibular anus with flap formation to expose the sphincter apparatus.

B.



B. Dissection of the rectum with transposition through the external anal sphincter.

C.



- C. Formal rectoanal anastomosis. The patient needs to undergo postoperative anal dilations aimed at preventing anastomotic stricture, as the correct suture should be at the level of the underskin due to the congenital absence of the anal canal.

D.



D. The neo-anus is brought through the pelvic floor and external anal sphincter musculature.

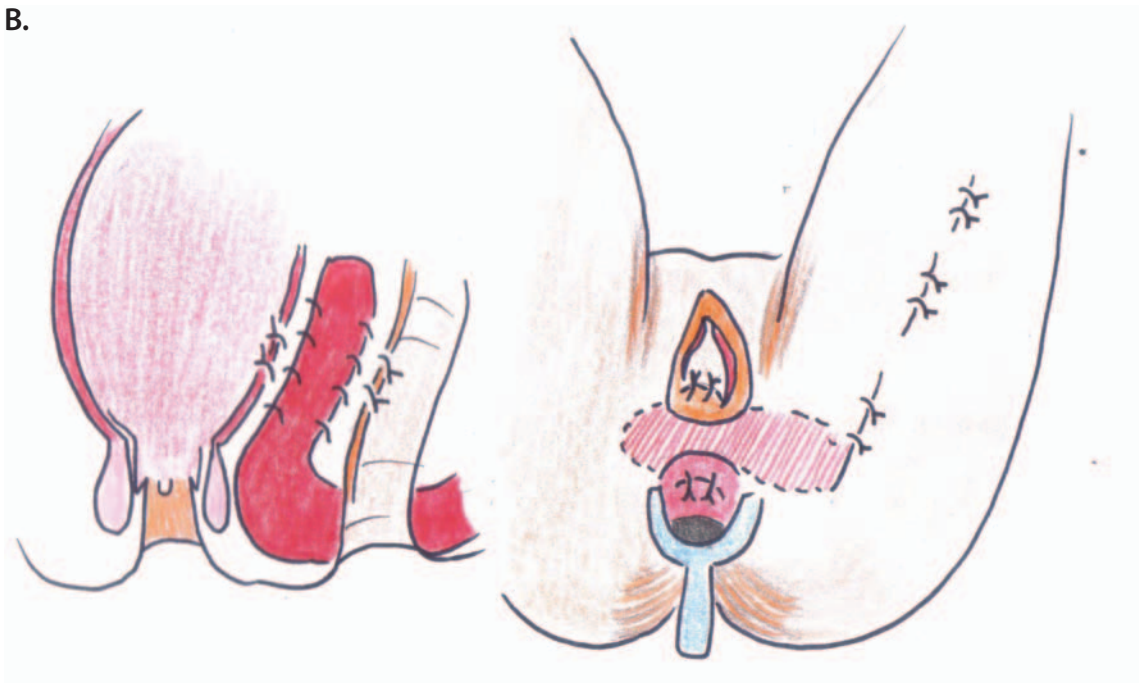
9.8. POUCH-VAGINAL FISTULA TREATED BY INTERPOSITION GRACILOPLASTY

A.



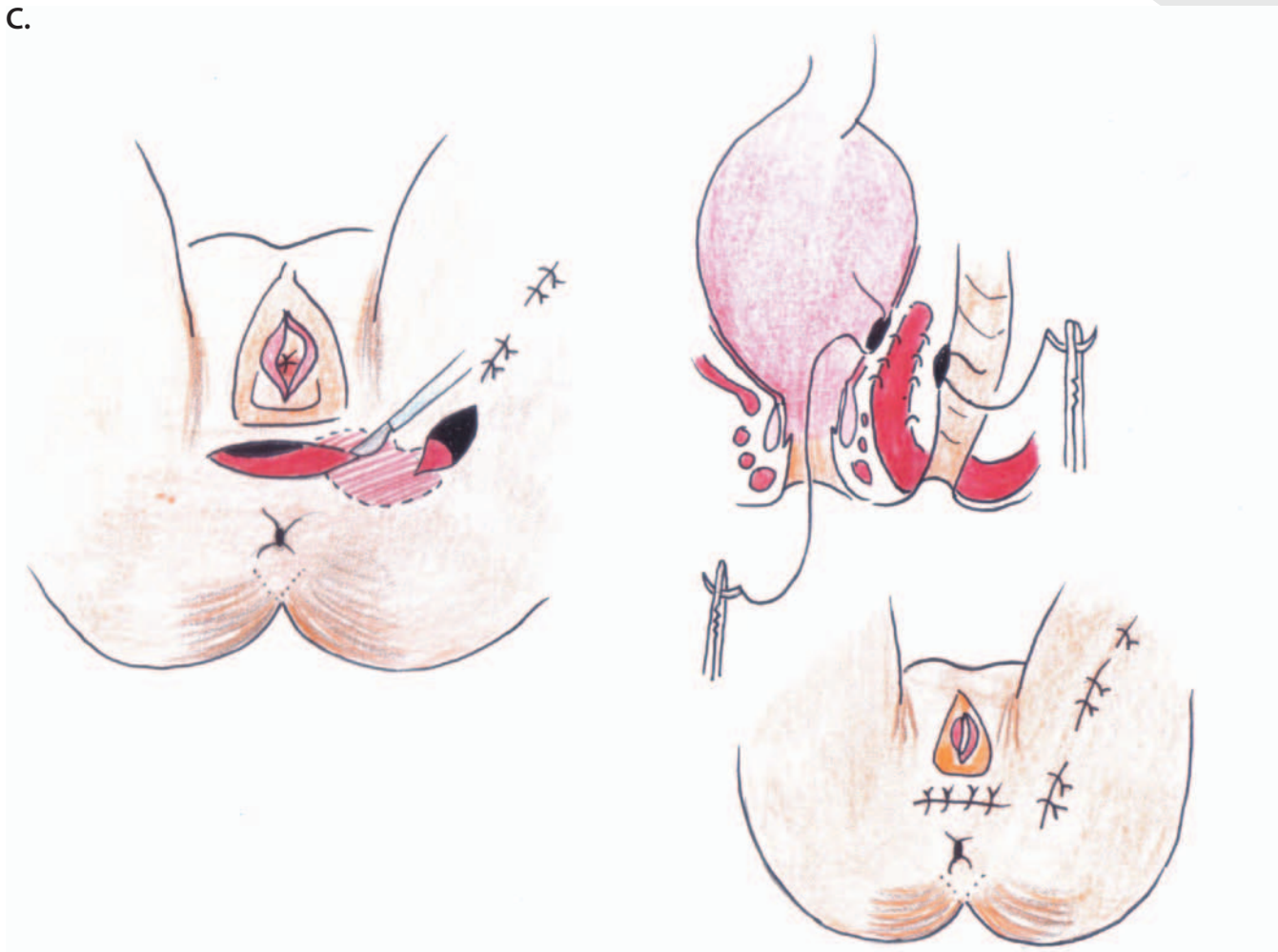
- A. Arrow shows the pouch-vaginal fistula. There is a proximal diversion. The right hand images show the gracilis harvesting which is disposed anteriorly after fistula separation and repair.

B.



B. Gracilis disposition (sagittal and axial views).

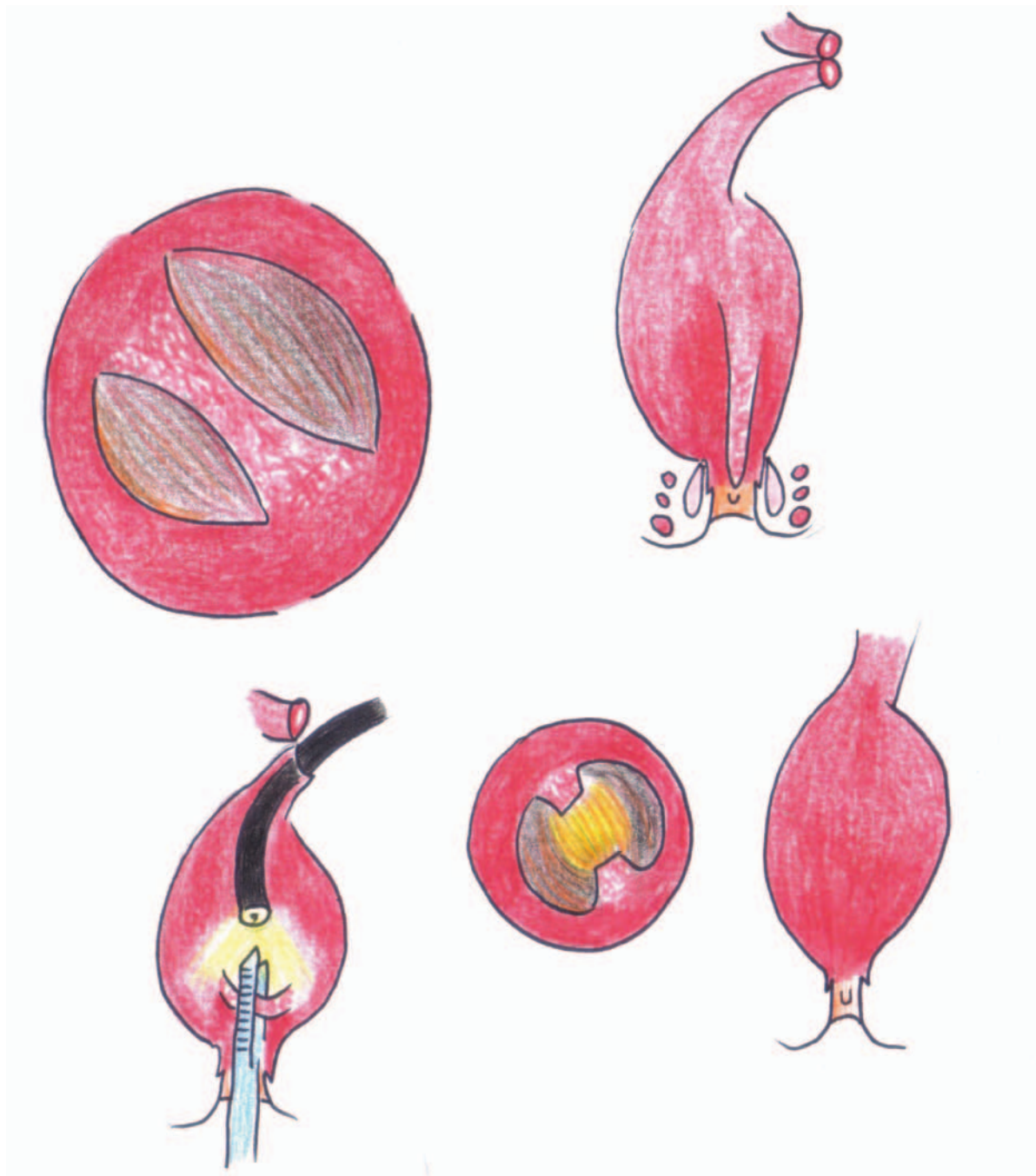
C.



C. Final appearance of the gracilis interposition and thigh scars.

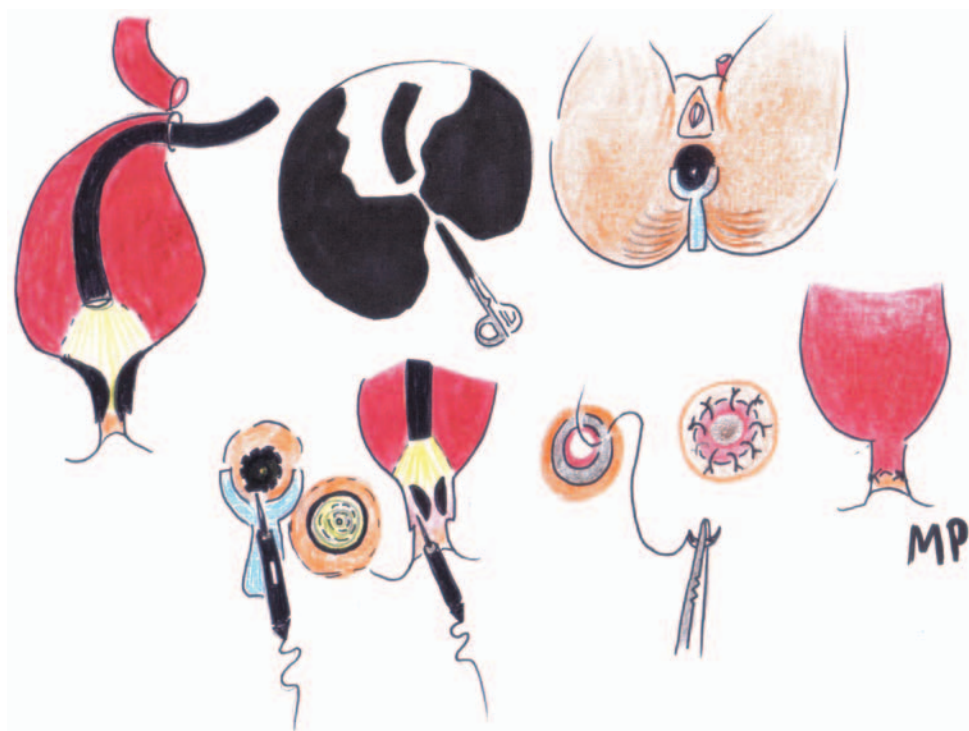
9.9. MANAGEMENT OF STRICTURES AFTER RESTORATIVE PROCTOCOLECTOMY WITH ILEAL POUCH-ANAL ANASTOMOSIS

9.9.1. Transanal Septal Division



Endoscopically assisted transanal division of a pouch septum with a GIA stapler (the patient had a covering proximal ileostomy).

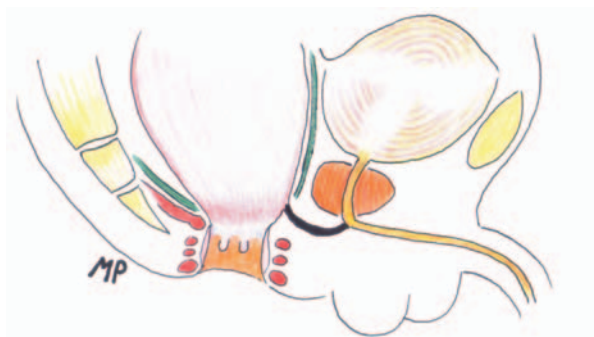
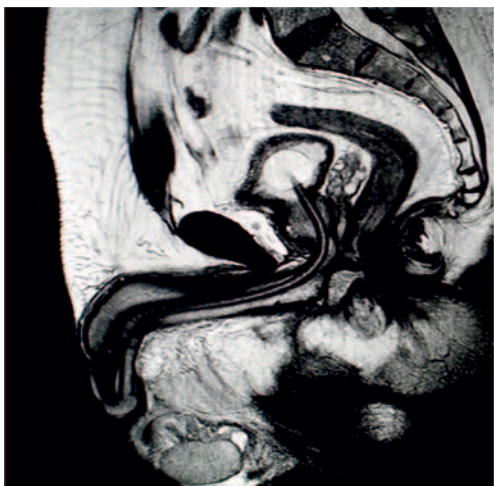
9.9.2. Rendezvous Procedure



Severe stricture of an ileal pouch-anal anastomosis. Division was performed transanally under endoscopic surveillance after cannulating the distal limb of a covering loop ileostomy. After stricture division, the pouch was advanced for a hand-sutured redo ileoanal anastomosis. The techniques described above have been modified from an original description by Eric Dozois of the Mayo Clinic as an alternative to pouch excision.

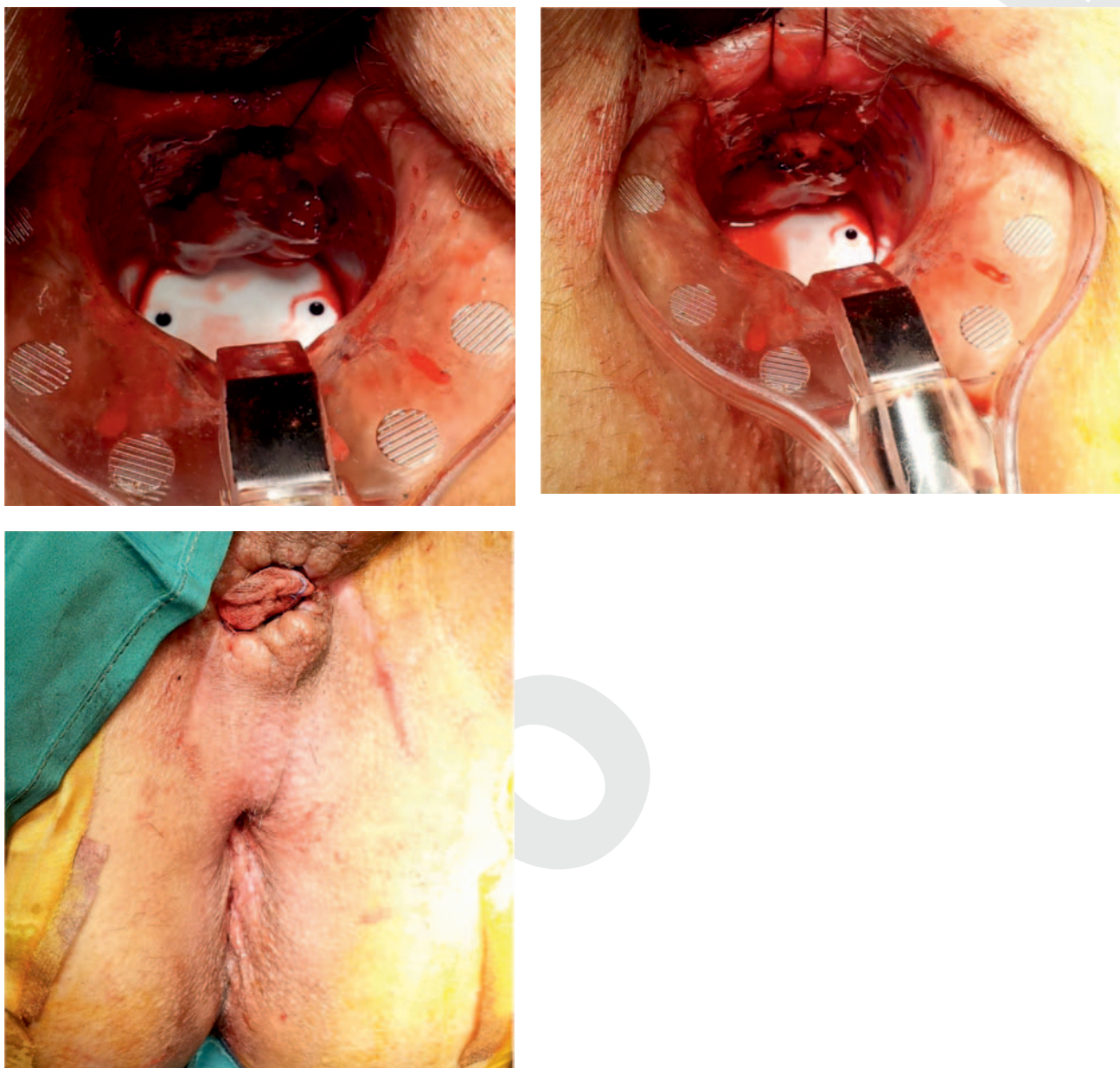
9.10. RECTOURETHRAL FISTULA REPAIR

A.



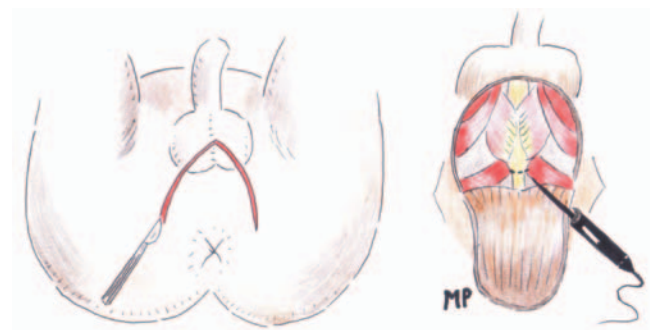
- A. A 56-year old male presenting with a rectourethral fistula confirmed on MR imaging. A schematic is shown of the fistula anatomy and a perineal opening is cannulated with a Foley catheter in the operative photograph.

B.



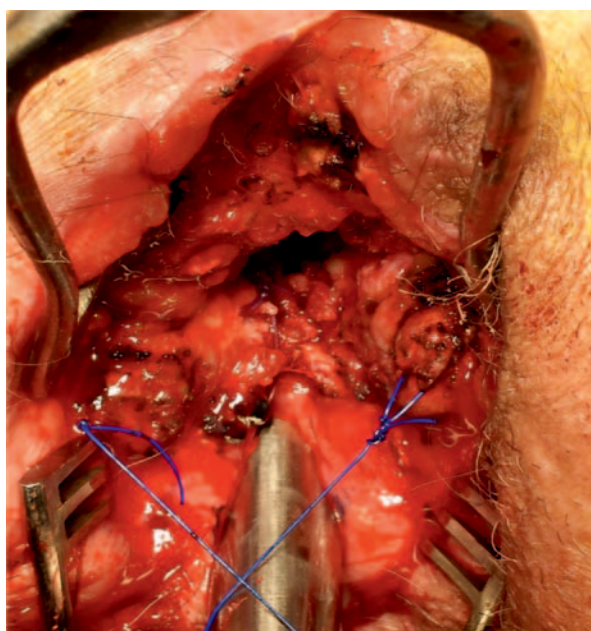
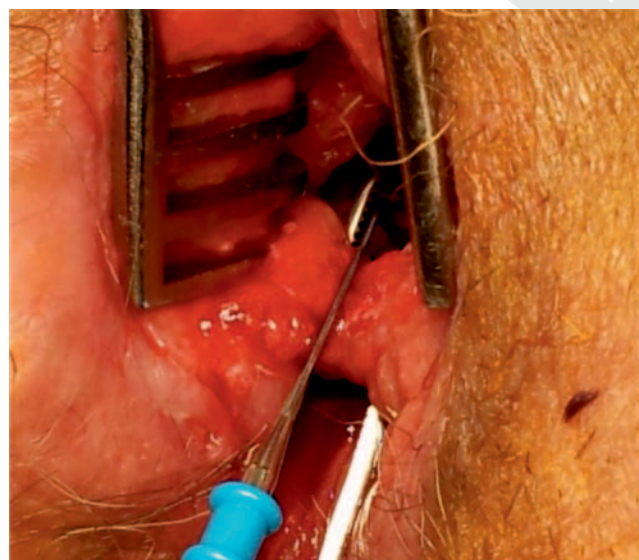
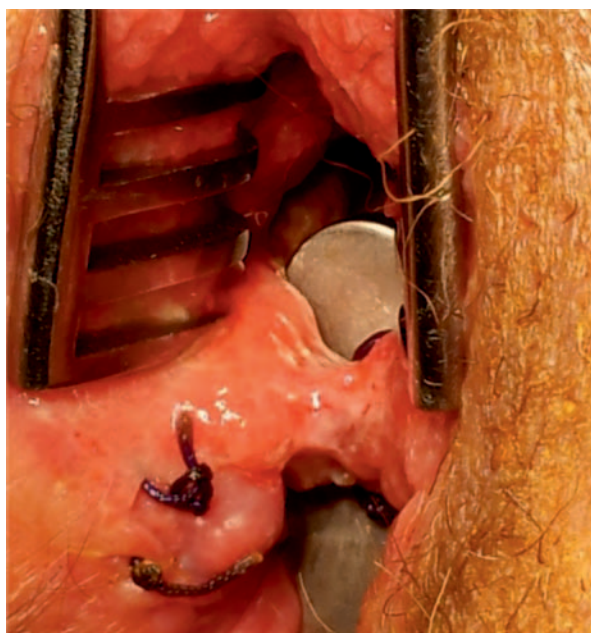
- B. An anterior mucosal flap is fashioned. The patient refused proximal diversion so the perianal fistula wound was packed after excision.

C.



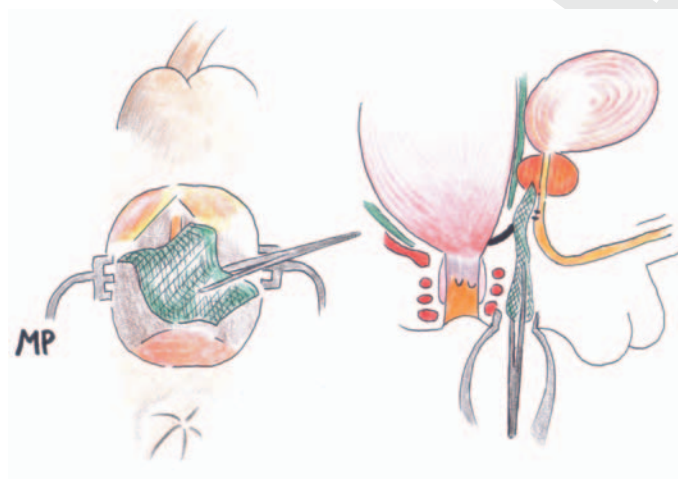
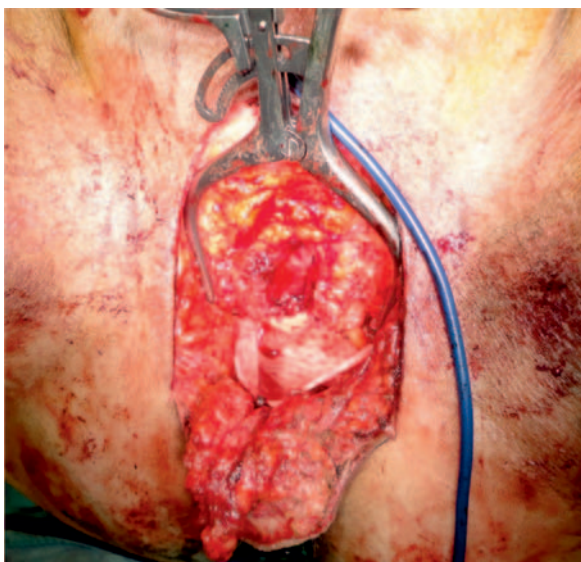
- C. The fistula recurred. Repeat surgery was performed through a window perineal incision as shown in the schematic image.

D.



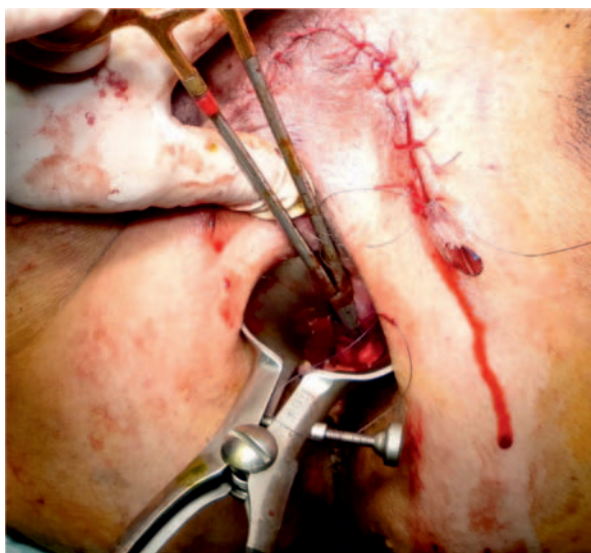
- D. A wide communicating trans-sphincteric fistula connected the rectum to the perineum. A fistulotomy was performed with demonstration and marking with a Prolene suture of the external sphincter for delayed reconstruction.

E.



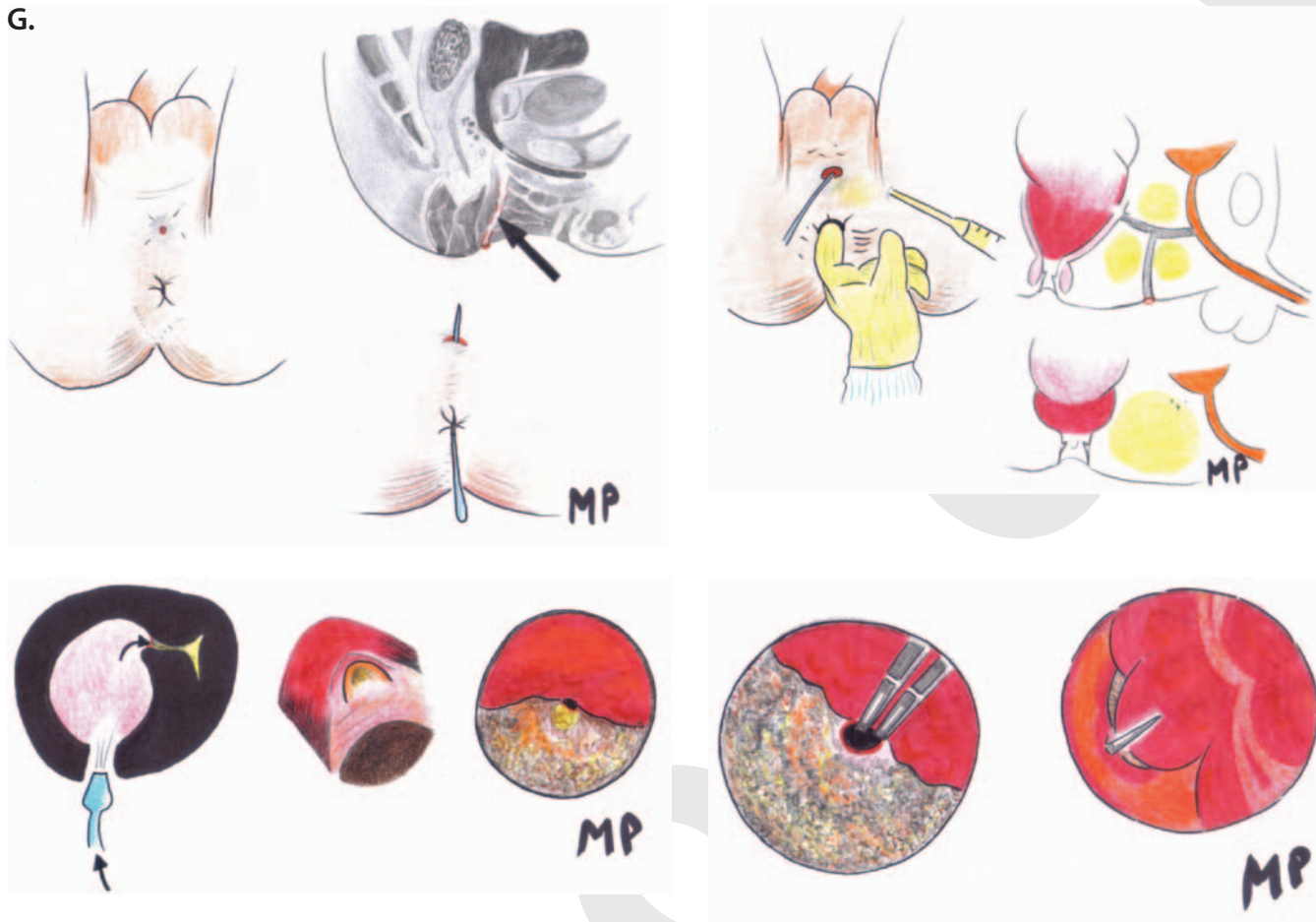
E. Insertion of biologic mesh between the rectum and the membranous urethra.

F.



- F. Skin flap closure with fashioning of repeat anterior advancement anoplasty and proximal diversion. The bottom left photograph shows the wound at one month with complete healing at 2 months (bottom right hand image). The patient remained continent without any need for a delayed sphincter repair.

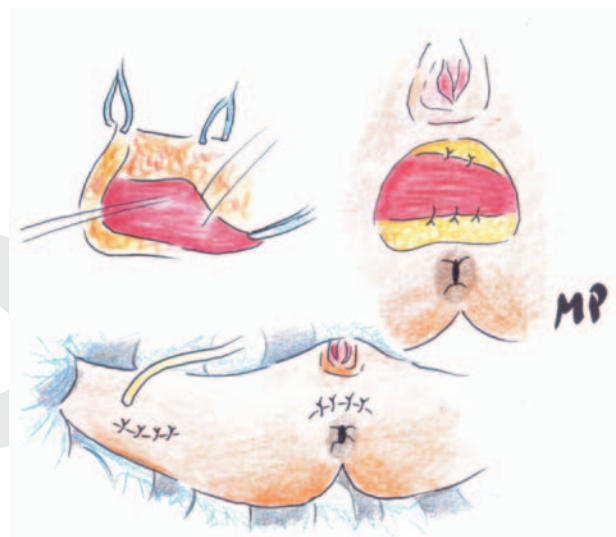
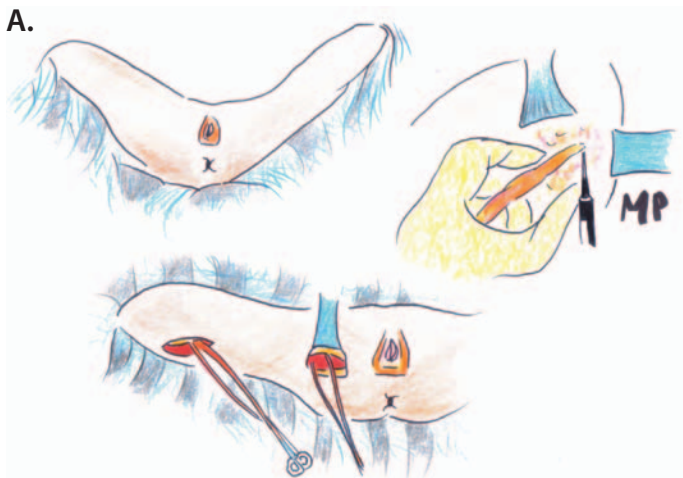
G.



- G. Alternatives for management include the use of centrifuged autologous fat (*top images*) or graciloplasty. The TAMIS procedure may also be used to define and endoscopically repair the fistula with or without the interposition of biologic mesh (*bottom images*).

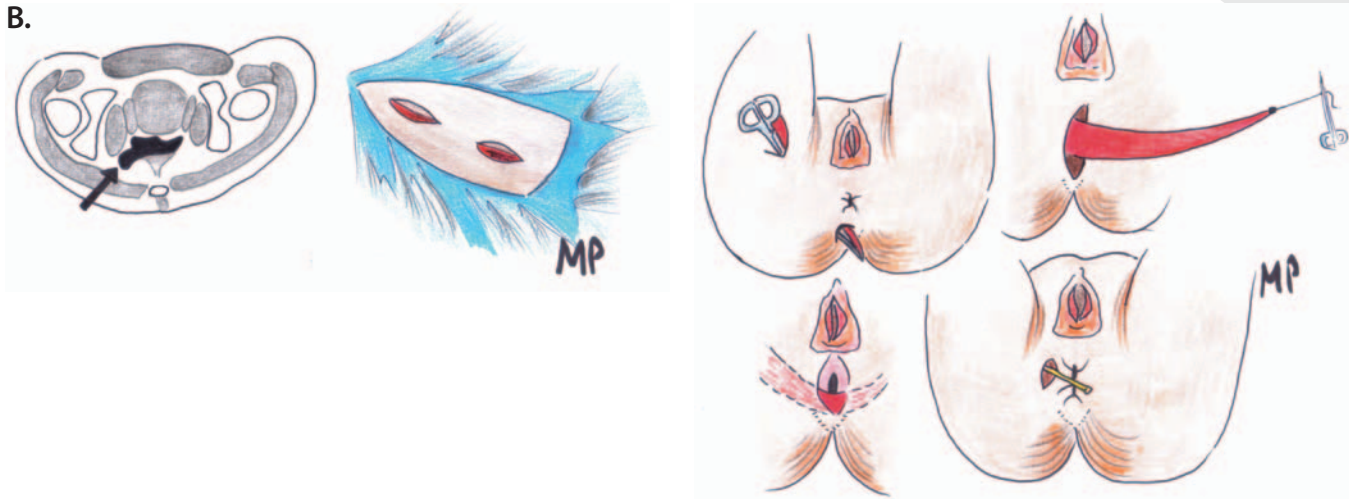
9.11. GRACILOPLASTY

A.



- A. Graciloplasty may be performed for rectourethral (9.10.), rectovaginal and rectovesical fistulae. The gracilis is harvested through multiple small thigh incisions preserving its neurovascular supply. The gracilis is positioned between the visceral repair suture lines. (Technique patterned after Ruiz et al. 2008.)

B.



- B.** The gracilis may also be used as an interposition filler of the pelvis in cases of severe pelvic sepsis. (Patterned after Colubaseanu et al. 2013.) An alternative is the use of an omental interposition.

Appendix

Sapimed Italy provided disposable examination and operation equipment used exclusively in this patient series with a range of transparent proctoscopes and rectoscopes with a portable pen light system or an LED fiberoptic EcoLite system.

ANOSCOPES: Self-lighting disposable diagnostic and operative anoscopes are equipped with a pen-light, (a portable light source that fits directly into the handle). The self-light system is compatible with a Sapimed EcoLite LED light source.



sapi med SpA

RECTOSCOPES WITH INSUFFLATOR: A range of single-use, diagnostic and pediatric rectoscopes were used with an attaching magnifying glass and air insufflator.



sapi med
S.p.A.

SUCTION BAND HEMORRHOID LIGATOR: The disposable hemorrhoid banding ligators are designed for single-patient use, available in 3 variants; for use with suction, forceps and for suction use without an external surgical aspirator.



sapi med SpA

BEAK RETRACTORS: Sapimed has a variety of disposable retractors (Beaks) which are sufficiently flexible for examination and operation use.



sapi**med** S.p.A.

LED LIGHT SOURCE: The Ecolite is a new generation, lightweight, portable light source comparable to a 100 Watt halogen lamp but with less wattage consumption.





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