

# Anal Continence Following Soave Procedure

## *Analysis of Results in 100 Patients*

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The Soave procedure is an increasingly popular procedure for the definitive therapy of patients with ulcerative colitis. The authors present their experience with 100 patients in whom total proctocolectomy, rectal mucosal stripping, and ileoanal anastomosis (generally using an S-pouch) were carried out. The physiological and anatomical basis of continence is presented, and anastomosis at the top of the columns of Morgagni is recommended. Of the 100 patients in whom this procedure was performed, there was no mortality either in-hospital or later. Of the 12 patients in whom the anastomosis was done 1 cm above the top of the columns (and thus columnar epithelium was retained), six have recurrent anorectal disease, but all are continent both day and night. Three patients in whom the anastomosis was done at the dentate line have had difficulty with continence; two are now continent, but one, after being totally incontinent for 4 years, has required a permanent ileostomy. Of the 69 patients in whom the anastomosis was done at the top of the columns of Morgagni, five are incontinent at night only and two have seepage during both day and night. Thus, if the anastomosis is done at the level recommended, namely, at the top of the columns of Morgagni, retaining no columnar epithelium and anastomosing the ileal pouch to transitional epithelium (which the authors believe not to be subject to the disease of ulcerative colitis), daytime continence will be achieved in 97% and total day and night continence in 90%. The evidence presented suggests that a properly done pull-through procedure with ileoanal anastomosis is the procedure of choice for ulcerative colitis.

**T**HE ROLE OF SURGERY in inflammatory bowel disease of the colon differs depending on the diagnosis. In granulomatous inflammatory bowel disease (GIBD, Crohn's disease of the colon, granulomatous enteritis), surgical treatment of the colonic lesions is generally confined to severe complications that compromise the ability of the patient, a situation similar to that of regional enteritis confined to the small bowel. The reason is obvious: recurrence is common, and "cures"

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probably amount to less than 50% of those patients operated on.

For those patients identified as having ulcerative colitis, however, the role of surgery is a much more salutary one, since total proctocolectomy results in cure. In addition, there is a controversial but definitely increased incidence of carcinoma as the duration and activity of the disease increase.<sup>1</sup> Ulcerative colitis is often a disease of relatively young individuals. Until recently, with the alternative to a diseased colon being permanent ileostomy, there was reluctance on the part of both physician and patient for total proctocolectomy, even for severe disease or when the incidence of carcinoma was definitely increased, for example, when random biopsy on routine colonoscopy showed moderate to severe dysplasia.

With the advent of sphincter-saving operations, such as first proposed by Ravitch and Sabiston,<sup>2,3</sup> and adapted by Martin<sup>4-6</sup> from the Soave procedure<sup>7</sup> performed in the pediatric population for Hirschsprung's disease, total proctocolectomy with preservation of continence has become a reality. One of the goals of this operation is total continence, both day and night, so that patients can lead essentially normal lives.

The achievement of the goal of total daytime and nighttime continence, however, differs widely between various series, with some series reporting nighttime incontinence as high as 34%.<sup>8</sup> In this study, we review our experience with our first 100 cases of pull-through procedure, generally carried out with an S-shaped pouch, with an eye toward the anatomical features that we believe are associated with true continence. The results, herein reported, suggest that the level of anastomosis is critical in determining whether the patients will have normal bowel function and normal daytime and nighttime continence.

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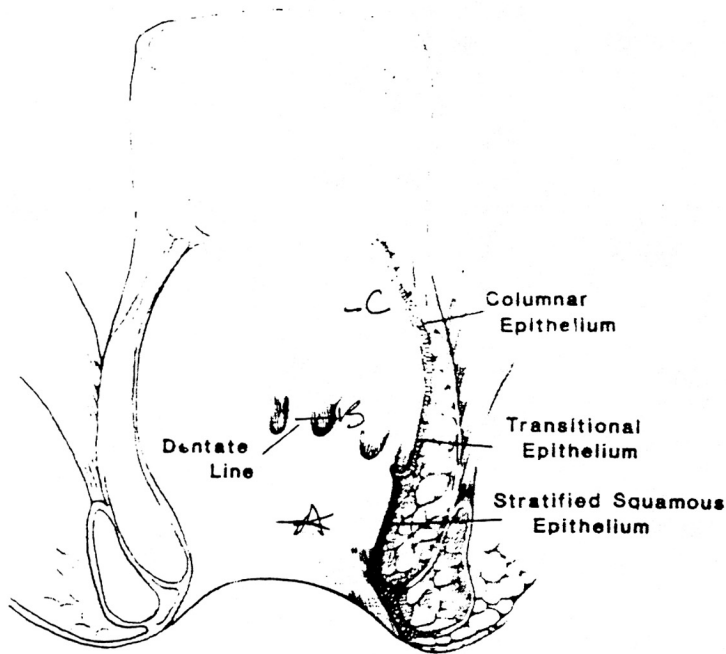


FIG. 1. The three zones of the rectum are pictured. See text for details on physiology and anatomy.

### The Physiology of Continence

To understand the basis for the operative procedure we propose, a brief description of the anorectal canal and its anatomical zones is appropriate (Fig. 1).

#### Zone I

Zone I is the true anal canal, below the dentate line. It is also called the vermillion because the color resembles the vermillion of the lips. Squamous cell epithelium is present. It differs from the true skin in that there are no hair follicles or sweat glands. Sensation is acute but meaningless, since by the time stool is appreciated in this area it is beyond the sphincter. The acute sensation, however, results in a great deal of pain and irritation should the patient experience leakage.

#### Zone II

This is the area of the columns of Morgagni above the dentate line to the tops of the columns. The color of this transitional epithelium is more violaceous. The epithelium itself is cuboidal, not rectocolumnar epithelium, and thus is not subject to the disease of ulcerative colitis. True pain sensation is absent; however, there are delicate proprioceptive nerve endings constituting the afferent phase of the reflex arc, which are believed to constrict the involuntary sphincters, thus being responsible for continence.

#### Zone III

This is the area above the columns of Morgagni. The transitional epithelium ends and the proper mucous-con-

taining glands containing columnar epithelium begin. This epithelium is subject to the disease of ulcerative colitis. Proprioceptive nerve endings are deep within the muscle wall of the rectum. Upon distention, they are likely responsible for the sensation of the urge to defecate. This area, however, is thought not to be involved in triggering the involuntary sphincter reflex.

Thus, on a theoretical basis, an anastomosis should be performed at the tops of the columns of Morgagni, where transitional epithelium not subject to ulcerative colitis exists, and where nerve fibers responsible for continence exist, below the rectocolumnar epithelium, which may be involved with ulcerative colitis. This is also the area where the involuntary sphincter would be triggered. As with many operations, results depend on a balance of removing all of the diseased mucosa while preserving, however, those aspects of sphincter function that are responsible for continence.

### Patient Data

#### Patient Population

At the University of Cincinnati Medical Center, we have adopted the philosophy of trying to perform a single operation for ulcerative colitis, the so-called ileoanal pull-through (Soave) procedure with an S-shaped pouch whenever possible. This is easily done electively, but continued activity, especially in the rectal segment, sometimes necessitates inpatient hospitalization and preparation of the patient in order that the rectal segment be sufficiently quiescent so as to allow mucosal stripping.<sup>6</sup> Outpatient preparation includes sulfa compounds and systemic steroids, but especially steroid enemas. When these fail to promote rectal quiescence for the 4-5 inch segment of rectum required, inpatient hospitalization with total parenteral nutrition (TPN), sulfa-containing drugs, rectal steroid irrigations together with systemic steroids, as well as intravenous antibiotics for periods of 1 to 6 weeks, will be required to allow healing of the critical 10 or 12 cm of rectal mucosa that will be stripped during the operation. Obviously, in the event that the ulcerations are too deep and not healed, one may inadvertently leave nests of mucosa that may subsequently become carcinomatous. These retained areas of mucosa may also interfere with a satisfactory result.

In a nonelective situation, such as massive hemorrhage or toxic megacolon, patients under go subtotal colectomy, leaving the rectum for a future procedure. We have also carried out a number of procedures in patients who have had a previous total abdominal colectomy with the rectum retained. Patients who have had attempted pull-through operations and other procedures that have failed and have been reoperated on by us are not included in this report.

While other centers have adopted an age limit on patients undergoing the procedure, we have not. Our oldest patient is 67 years old, and a number of patients are 55 years of age and above. Our impression is that these patients do as well as younger patients, and that an age limit is unnecessary.

Obviously, there are situations in which patients with ulcerative colitis should not undergo this procedure. An example of this might be a patient with a carcinoma and widespread disease where the rectum is relatively spared, in whom an ileorectal anastomosis might be appropriate. There are several patients in this series who have been operated on for carcinoma, but, in the absence of obvious widespread disease, a Soave procedure has been undertaken.

### *Technical Details*

The operation is carried out by two teams working simultaneously, utilizing Lloyd-Davies stirrups. This allows one team to work within the abdomen while the other team carries out the ileoanal anastomosis. As we have gained experience with the procedure, operative time has decreased to the point where it is routinely between 3.5 and 4.3 hours, and the requirement for transfusion is rare. There is a learning curve to this, as with all other procedures, and it is fair to say that the operation currently carried out at the University of Cincinnati Medical Center is not the same procedure as was done 5 years ago but has been extensively modified technically, often in subtle ways unnoticeable even to the surgeons.

There are several aspects to this procedure that we believe may be important to continence. Mucosal stripping is almost exclusively carried out from above. This may be important, especially in older patients, to prevent everting the rectum and thus possibly damaging some of the delicate nerve supply. Other technical details include a small pouch, no more than 8–9 cm on a side, which resides entirely in the sacral hollow and below the pelvic floor. There is a completely diverting ileostomy of the Brooke type with the distal end turned in, which is closed after approximately 4 months. The loop ileostomy, which has been done in children, is fraught with technical misadventures in adults.<sup>9</sup> A further point concerning the pouch is that we use an S-shaped pouch whenever possible. The segment of bowel exiting the pouch should be only between 1–1.5 cm in length, sufficient so that the finger can enter the pouch with ease with rectal exam. We believe that, in the operation described by Parks,<sup>10</sup> the segment that exits the pouch is too long, and, for that reason, these patients have difficulty in emptying the pouch.

### *Report of the Series*

Our series represents 100 consecutive cases of personal experience (LWM and JEF). Forty-nine patients are less

than 18 years of age, mostly adolescents, and 51 are over 18 years old, with the oldest patient being 67 years old. Eighty-eight cases are ulcerative colitis and 12 are familial polyposis. Included in the latter group are patients with previous ileorectal anastomoses for familial polyposis, who have been converted to the pull-through procedure because of strictures and the concern that the stricture represented malignant change. In the ulcerative colitis group, there have been approximately 10 patients in whom the final pathology report has been indeterminate. These patients appear to do as well as those patients with a definitive pathologic diagnosis of ulcerative colitis.

There has been 98% follow-up of the cases. For patients from out of town, we have contacted the referring physician, seen the patients in our offices, or been in contact by phone. For the purposes of this review, one of the authors (JEF or LWM) or a research nurse contacted the patient to determine the state of continence.

Most of the patients had been on steroids (40–100 g prednisolone/day) for uncontrolled ulcerative colitis. A number of the patients with chronic ulcerative colitis, and a few with frank carcinoma without spread, have had the operation performed because of severe dysplasia.

### *Level of Anastomosis*

The level of the anastomosis was decided prospectively and verified by reviewing operative notes and by physical examination as well as proctoscopy and sigmoidoscopy.

### **Results**

One hundred patients formed the subject of this study. Forty-nine are children (*i.e.*, under the age of 18) and 51 are adults. There have been no operative deaths and no late deaths in the series. Follow-up is complete in all but two patients, whose movement from their original places of residence have made it impossible to locate the patients or their physician. Of the remaining 98 patients, 14 are awaiting ileostomy closure and therefore have not been considered further since we cannot judge continence. The remaining 84 patients form the basis for the review of this series.

Of the 84 patients, 12 are in group I, in whom at least a 1 cm cuff of columnar epithelium was preserved at the time of operation. All of these patients are continent both day and night, but six have experienced recurrent ano-rectal disease, presumably a recurrence of the original disease in the residual columnar epithelium. Three of the six have experienced more than one episode, and in one patient it has occurred four times. All but one have responded promptly to hydrocortisone suppositories. In an additional patient, systemic prednisone has been prescribed because of noncompliance with rectal suppositories.

TABLE 1. Comparison of Average Number of Stools per Day in Patients with S-shaped Pouch versus J-shaped Pouch

	Number of Patients	Average Number of Stools per Day	
		1 week after Operation	1 year after Operation
S-pouch	93	6-8	2-4
J-pouch	7	5-12	6-8

In group II, comprised of three patients, the anastomosis was carried out at the dentate line. There has been no recurrent disease. All of these patients have had problems with continence, as will be subsequently detailed.

The remaining 69 patients forming group III have had the anastomosis at the top of the columns of Morgagni and the ileostomy has been closed.

Of the 84 patients available for analysis, four have permanent ileostomies. One patient subsequently turned out to have Crohn's disease with recurrence in the pouch, finally requiring resection of the pouch and permanent ileostomy. In another patient, from group II, severe nighttime incontinence persisted for 4 years, after which the patient chose to return to a permanent ileostomy. In a third patient, operated on early in the series, pelvic sepsis due to a pelvic abscess created so much induration that did not resolve that ongoing sepsis resulted in a permanent ileostomy. A fourth patient was lost to follow-up for 16 years and subsequently has recently reappeared with a permanent ileostomy performed in another city. We have as yet been unable to determine the reason for the ileostomy.

### Continence

*Group I (1 cm of columnar epithelium cuff).* All patients are continent.

*Group II (anastomosis at the dentate line, columns of Morgagni stripped).* There is no recurrent disease, but all three patients have had great difficulty with continence. One remains continent after a 2-month initial period of soilage. One patient experienced nighttime incontinence for 1 year but subsequently has remained continent for the succeeding 10 years. In a third patient, nighttime incontinence persisted for 4 years, and the patient chose to return to a permanent ileostomy, as was mentioned earlier.

*Group III.* After an initial period of experimentation, we have attempted to do all of the operations with the anastomosis at the level of the top of the columns of Morgagni. At the present time, 69 such operations have been carried out in patients who have had their ileostomies closed and can be evaluated. The transitional epithelium has been retained in this group of patients. Of these 69 patients, seven have difficulty with continence. Of these

seven, five patients are totally continent during the day and have seepage at night that requires a pad. These patients are, respectively, 5 years, 20 months, 5 years, 3 years, and 1 year following ileostomy. Additionally, two patients are incontinent both day and night at 18 and 7 months, respectively, despite medication that includes opiates. Thus, of those patients in whom the anastomosis has been carried out at the top of the columns of Morgagni, close to 90% are continent day and night. Analysis of these cases reveals that in two patients, stripping was probably carried out a little beyond the top of the columns of Morgagni.

Another cause of incontinence in patients who have been previously well appears to be pouchitis, resulting in uncontrollable diarrhea. In two additional patients, who were previously continent both day and night, the occurrence of pouchitis, diagnosed by history, physical examination, and visual examination of the pouch, responded to Flagyl® and continence returned.

### S-pouches versus J-pouches

As stated earlier, the technical aspects of the operation on a theoretical basis dictate that an S-shaped pouch be carried out with a short egress loop of no more than 1 to 1.5 cm, so that the pouch can be easily digitalized. The S-pouch has been carried out in all but seven patients, in whom difficulty in the length of the blood supply or in the way the pouch lay, if it were to be constructed as fashioned, dictated that a J-pouch be carried out. This has given us the opportunity to compare these two pouches. Those patients with a J-pouch have a greater number of stools both 1 week after operation and approximately 1 year after operation (Table 1). Whether this is due to the anatomical set-up, to the fact that the peristalsis has not been interrupted, or to the lack of an efferent loop is not apparent from this study.

### Discussion

Ulcerative colitis is a disease primarily of the young. Its complications include debility, extensive morbidity, bleeding, and loss of work.

In addition, there is a significant risk of cancer, which, although controversial, appears to increase geometrically as the duration and activity of the disease surpass 10 years. The object of operation in ulcerative colitis is to completely rid patients of the disease and rehabilitate them to function normally in society. That most of these patients are young people dictates that an operation that does not interfere with courtship and subsequent marriage is preferable. Because of this, there is great interest in the Soave (or pull-through) procedure as originally proposed by Ravitch and Sabiston,<sup>2,3</sup> and pioneered and modified by Martin.<sup>4-6</sup> However, in several series, there has been

a substantial incidence of nighttime incontinence, leading the patient to wear a pad and at times causing discomfort because of irritation. To our way of thinking, the presence of this incontinence interferes with total rehabilitation and may interfere with the desirability of operation if a substantial incidence of nighttime or even daytime incontinence is present, thus interfering with the patient's complete return to normal function within society.

In this paper, we have described what we believe to be the anatomical and physiological basis for continence, that is, the neural supply (described by others) that requires that in the rectal mucosal stripping, so essential a part of the Soave procedure, the columns of Morgagni and their delicate nerve supply be preserved. We also believe that doing the stripping from above and not everting the rectal mucosa may lessen damage to this delicate nerve network. Thus, we continue to advocate the stripping of rectal mucosa completely from above, a technique that we believe, with practice, is just as easily achieved as everting the rectum.

The results of this study suggest that after the initial period of trial and error in determining the level of the anastomosis, the anastomosis is properly done at the top of the columns of Morgagni and, if properly carried out, will result in total continence in the overwhelming majority of these patients, thus enabling return to society. Our experience suggests that the transitional epithelium covering the anorectal columns of Morgagni must be preserved to ensure continence of liquid stool both day and night, and that sensory nerve endings in the area must be preserved to initiate reflex closure of the sphincters. Clinically, while ulcerative colitis *may* include the transitional epithelium by both gross and microscopic examination, our experience suggests that the involvement of transitional epithelium may represent a secondary phenomenon similar to "backwash" ileitis, and that it is reversible and does not occur after the more proximal columnar epithelium has been removed. Conservation of the muscular wall of the rectum above the level of the columns appears to protect the deeper proprioceptive nerve elements, thus preserving the sensation of a full rectum, which may be significant in the ability to differentiate stool from flatus. (Incidentally, the ability to differentiate stool from flatus is the last feature of rehabilitation from this operation and it often takes up to a year for patients to learn this ability. The assumption of a knee-chest position and passing of gas may facilitate the learning of this ability.)

If the patient is properly prepared and there is no significant inflammation of the rectal segment, the ideal level of the anastomosis can be identified by gross inspection. If the gross appearance is distorted by inflammation, preservation of 1 cm of the mucosa above the dentate line may be sufficiently accurate, but it is preferable that the local mucosa be free of disease at the time of operation

to permit accurate identification of the landmarks and thus afford better healing.

A complete review of our results following this operation is beyond the scope of this article. Suffice it to say that in 100 patients there has been no operative mortality and no later mortality. The incidence of pouchitis in this series is 7%, but it is not clear what this represents. It may represent stasis secondary to a stricture, which has occurred in two or three patients in this series and required antibiotic control, or it may (as others have suggested) represent a recurrence of inflammatory bowel disease, in which case it responds either to Flagyl or sulfa drugs. In our series, the overall incidence of pouchitis has been less than 10%, although it is not clear that pouchitis will not continue to recur in an increasing number of patients as the distance from the operation increases. However, we have extensive 5 and 6-year follow-up on a variety of patients, both children and adults, and it does not appear as if this incidence is increasing.

Finally, it does not appear necessary to have an upper age limit for this procedure. We have performed the operation on a number of patients over 55 years of age, and it is clear that they do as well as patients who are younger. Thus, contrary to the opinion of some, the operation need not be limited to children and is perfectly suitable for adults even in the older age group.

### Conclusion

As things presently stand, the pull-through procedure as currently described is probably the procedure of choice for ulcerative colitis. It has not gained universal acceptance, because of its technical difficulty, the amount of time necessary in its performance, and the usual skepticism. In our hands, however, it gives very satisfactory results with very little long-term morbidity. If proper continence can be achieved following the pull-through procedure for ulcerative colitis, rehabilitation of patients and their return to function in society and a normal lifestyle is assured.

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## DISCUSSION

DR. JUDSON G. RANDOLPH (Washington, D.C.): I apologize for rising again, but I was given the privilege of reading this manuscript, and I think you can recognize that this is really what our Southern Surgical Association is all about—wonderful, unbelievable surgical experience, which takes into account the anatomy and the physiology of the patients both before and after their disease is treated and then a very careful analysis of the results. I then am cheerleader for Dr. Joe Fischer and his several colleagues, most notably Dr. Lester Martin.

This work had its beginning, at least in this country, in 1947 in a paper presented by a young imaginative surgeon named Dr. Mark Ravitch and a medical student not yet able to put M.D. after his name, Mr. David Sabiston. The essence of the operation, as they described it, for various forms of benign disease of the colon was a mucosal stripping of the rectum, seen here in this slide. (Slide) I think you can see the circular muscle of the rectum and the mucosa stripped away as the seromuscular tunnel is prepared to receive the normal bowel. It was in 1964 that Franco Soave of Genoa adapted the Ravitch-Sabiston procedure so successfully to Hirschsprung's disease that it has become a very frequently performed procedure.

Dr. Lester Martin first performed this procedure in a child with ulcerative colitis in 1967, and that beginning culminates in this beautiful presentation today of 100 patients in both the childhood and adult ages. On reading the manuscript, you will recognize the enormous operative effort that is described, and you will see what a fundamental contribution Dr. Fischer has given us today. In the colitis patients, the operative technique is difficult to master, Dr. Fischer, and so I ask you and Dr. Martin several questions.

You spoke of a learning curve, and we would like to know what are the most difficult elements of this operation in the ulcerative colitis patient? Is it more difficult in the adult? What differences do you find that the use of pouch makes *versus* no pouch? How does one recognize the columns of Morgagni in patients that are so severely diseased?

Finally, if you know, whatever became of that medical student named Sabiston?

DR. HARVEY J. SUGERMAN (Richmond, Virginia): I rise to bring to the attention of the presenter, Dr. Fischer, the fact that we have done 34 of these procedures at the Medical College of Virginia. In 21, we used the standard J-pouch by Utsunomiya, 11 with a reversed J-pouch, and two with an S-pouch. We have been able to do the stripping in all of the patients from below and have only found it necessary to strip for approximately 5 cm, rather than 10 as proposed by the Cincinnati group. We have connected the ileum to the dentate line and have not had a problem with incontinence. There has been a problem with patients having to get up at night to have a bowel movement, but they were not having accidents after 1 month following ileostomy closure.

The reason for doing the reverse J-pouch and the S-pouch was that our patients with the standard J-pouch had, as in the Mayo Clinic series, an average of six stools per day, with a range of four to 12. We wanted to decrease the frequency of stools with these other pouch types. Unfortunately, there has been an unacceptable incidence of complications with the reversed J-pouch, and, thus, we have switched to the S-pouch.

We have also found that we can usually close the ileostomy sooner than 4 months. The vast majority of our patients have had their ileostomies closed at 6 weeks following the ileoanal procedure and a few as soon as 4 weeks. My main question concerns the need for the long rectal stripping. In my experience, it can all be done from below to just above the levator sling, with a dentate line anastomosis. This provides excellent rectal continence.

DR. LESTER W. MARTIN (Closing discussion): First, I would like to express my appreciation to Drs. Hutson and Sawyers and the Program Committee for allowing us to present our material.

Dr. Randolph asked, "Is the procedure more difficult in the adult than it is in the child?" Certain pathologic and physiologic differences do influence the technique and can add to the complexity of the procedure.

The mucosal stripping is more difficult if the rectum has been diseased for a number of years. Submucosal fibrosis and scarring tend to cause the mucosa to be more adherent. Long-standing disease is also associated with complications of the disease such as amyloidosis, hepatic fibrosis, and colonic carcinoma. With advancing years, the anorectal musculature becomes weaker, so that beyond the age of 50, the incidence of incontinence will be increased by any compromise of technique.

The teenager affords the surgeon a wider margin for error because he is strong and healthy; his muscles are strong, and healing is prompt.

"How do you recognize the columns of Morgagni?" It is best to time the operation when the area is not inflamed. The columns are distinct and the mucosa has a slightly violaceous hue. When they are diffusely inflamed, they are difficult to recognize. If one is forced to operate when the area is inflamed, one simply must estimate the level. My own policy in this situation is to leave 1.0 to 1.5 cm of mucosa above the dentate line, leaving more mucosa in the older individual to assure complete continence. Also, the older individual is probably less likely to develop recurrent disease in a small area of retained mucosa than is the younger patient.

Dr. Sugerman, the mucosal dissection can be accomplished either from above or from below, but it must be performed with care and precision. We believe that the technique sometimes advocated of mobilization of the mucosa to the dentate line, then eversion to permit an easier anastomosis outside the anus, can cause damage to some of the delicate muscles and nerves that are so important in involuntary continence.

"Can one get by with a shorter segment of stripping?" Yes, I think one can. When we first began doing the operation, we attempted to do it the way Dr. Soave described it; namely, beginning the mucosal dissection well above the peritoneal reflection. We now begin the dissection below the peritoneal floor and develop a cuff approximately 5.0 cm in length. Anatomical studies suggest that dissection outside the muscular wall lower than the 5.0 cm level is likely to endanger the delicate nerves to the bladder and to the ejaculatory mechanism.

"Can one close the ileostomy in less than 6 months?" Yes, I think one can close them in less than 6 months. We closed one after 1 month because of complications of the ileostomy in a markedly obese patient, but we do not advise it. Most of the patients are chronically ill. Their wound healing is poor. Several weeks may be required to taper the systemic steroids. It is simply a good policy to have the patient in good health before what is essentially an elective procedure. It is important that the pelvic extraperitoneal suture lines be well healed. To close the ileostomy too soon is to invite disaster.

I understood Dr. Sugerman to say that he did the anastomosis at the dentate line and that he had encountered no incontinence. Resection to the level of the dentate line should result in daytime voluntary continence but soilage at nighttime. We call this an unsatisfactory result. I also understood Dr. Sugerman to say that in 10 patients, he did a "reverse J pouch." I do not think I know what a "reverse J pouch" is and can not visualize what he is describing. Maybe he is creating a type of reversed loop that is building in a partial obstruction, which, in turn, produces continence.

As far as the configuration of reservoir, an S or a J or a Fonksrud isoperistaltic reservoir probably is of little significance. Of far greater importance is its location beneath the peritoneal floor. Other than that, it must be attached low—to the top of the columns—and it must be of sufficient diameter to prevent apposition of its walls with a peristaltic wave to avoid creating an urge to defecate with every peristaltic wave. It should be large enough to provide sufficient storage so that the patient has an acceptable stool frequency.

Dr. Randolph's comments were of interest.

We appreciate the privilege of the floor.