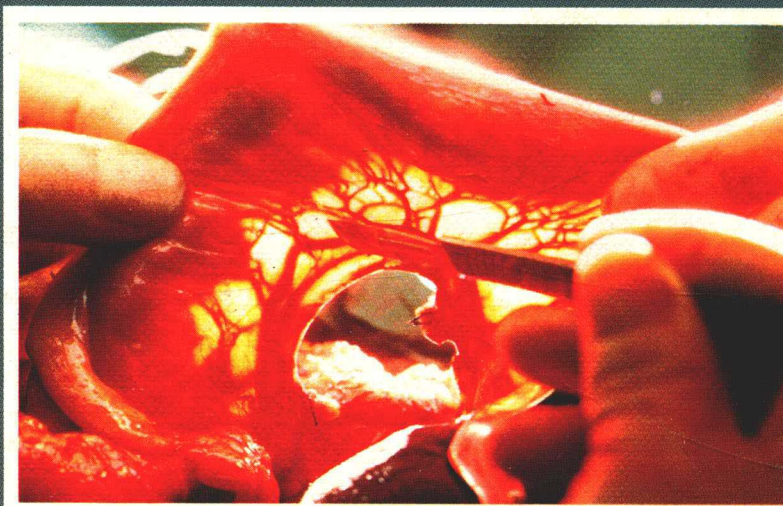
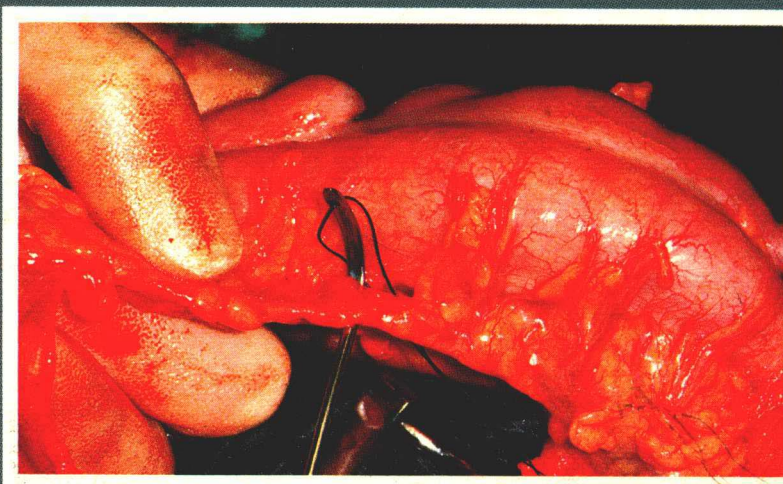


*A Colour Atlas of*  
**COLORECTAL  
SURGERY**

**P. F. JONES • R. J. P. SIWEK**





A Colour Atlas of

# Colorectal Surgery

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Dedicated to  
**O. V. Lloyd-Davies, MS, FRCS,**  
one of the founding fathers of  
colorectal surgery



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# Introduction

Operative surgery can only be learnt in the operating theatre. First, by observation during active assistance, and later by performing operations: this in turn progresses from operating under the guidance of a more experienced surgeon to solo work. Later, the surgeon recognises that not only is a particular operation rarely done in precisely the same way twice but also that personal modifications of the techniques learnt and adopted as an apprentice are gradually introduced.

To attempt, therefore, to freeze the steps of an operation in a series of photographs is somewhat artificial. The sequence can only show how one surgeon performed the operation on a particular occasion. It may give the apprentice useful guidance on the general procedure, and hints on points of procedure and potential difficulty, but it is not definitive, and is open to many modifications.

The limits which have been set for us as to the size of this book mean that only a certain number of procedures can be illustrated, and we have had to eliminate all those normally practised on outpatients, including the endoscopic procedures. Other operations excluded have been those for congenital deformities such as Hirschsprung's disease and anorectal anomalies.

The operations selected for illustration are necessarily a personal choice; other surgeons would undoubtedly have made a different selection. The aim is to present methods which, with a few exceptions, will be serviceable for surgeons who do not specialise in the colorectal field, and which are known to give satisfactory results. We are quite conscious of having omitted other good procedures and have attempted to surmount this by references in the text.

## Plan of the Book

A short introduction covering some of the principles of large bowel surgery is followed by a section on 'Mobilisation of the Colon'. This is intended to show that all colonic resections follow the same basic pattern, because mobilisation is dependent on attachments and blood supply. These manoeuvres are therefore described only once, and are not repeated for each resection.

There are many methods for the safe anastomosis of large intestine, and each surgeon does this in an individual way. We have chosen to illustrate a simple method which we have used for all oesophageal, small and large bowel anastomoses for the past 15 years, and have found to be effective and safe.

Following accounts of the main elective operations, the important sphere of the emergency surgery of the colon and rectum is covered in some detail. Practice has changed considerably over the last 15 years, with increasing use of primary resection. Results in this field depend particularly on careful attention to both principles and details.

Peter F Jones  
Richard J P Siwek



# Acknowledgements

It is a particular pleasure to pay tribute in the dedication to the great contribution which O. V. Lloyd-Davies has made to colorectal surgery. His part in developing the lithotomy-Trendelenburg position, and the many instruments which he devised, are only one aspect of that contribution. More than a generation of surgeons have learnt from him what can be achieved by truly radical cancer surgery, how often the patient can be spared a permanent stoma, and how much the patient can benefit from a meticulous surgical and anastomotic technique. We hope that he will find that many of his ideas and practices are reflected in this book.

We are very glad to acknowledge the great help we have received in the making of this book. Mr Alexander Munro, ChM, FRCS, of Inverness gave a great deal of good advice at the planning stage and provided figures **18** to **24** in Section 40. Mr Geoffrey Orr, FRCS, of Greenock, Mr David Valerio, MS, FRCS, of Grantham, and Mr John Pollet, PhD, FRCS, of Runcorn, were constantly helpful in securing pictures of various procedures. A succession of registrars must also be similarly mentioned: Dr Dan Coit, MD, Mr Wilson Hendry, MD, FRCS, Mr Sandie Thomson, FRCS, Mr John Duncan, ChM, FRCS, and Mr Dilraj Gopal, FRCS. Mr George Youngson, PhD, FRCS, kindly lent us two slides.

We are very much indebted to Mr Nigel Lukins of the Department of Medical Illustration for his skilful interpretation of our sketches in his drawings.

Tribute must be paid to the patience and understanding displayed by the anaesthetists who looked after the patients illustrated here: it is a particular pleasure to thank Dr Edith Beveridge, FFARCS, and Dr George Robertson, MD, FFARCS, for their constant help and encouragement.

We greatly appreciate the work of Sister Anne Smith and Charge Nurse Keith Kellas, who did so much to create an orderly yet relaxed atmosphere in theatre.

We are very much indebted to Miss Mary Grassick, who has typed and retyped the whole of the manuscript with such willingness and accuracy.





# GENERAL PRINCIPLES OF COLORECTAL SURGERY

The large intestine is a remarkable organ which, in the majority of individuals, harmlessly transmits the faecal load, with its heavy population of pathogenic bacteria, from the ileocaecal valve to the anus, from the time of birth onwards. The wall of the large bowel is no more than 4-5 mm thick, and of no special strength and yet it normally allows no significant bacterial penetration. When, however, rupture of the colon does occur the virulence of the ensuing peritonitis is speedily apparent.

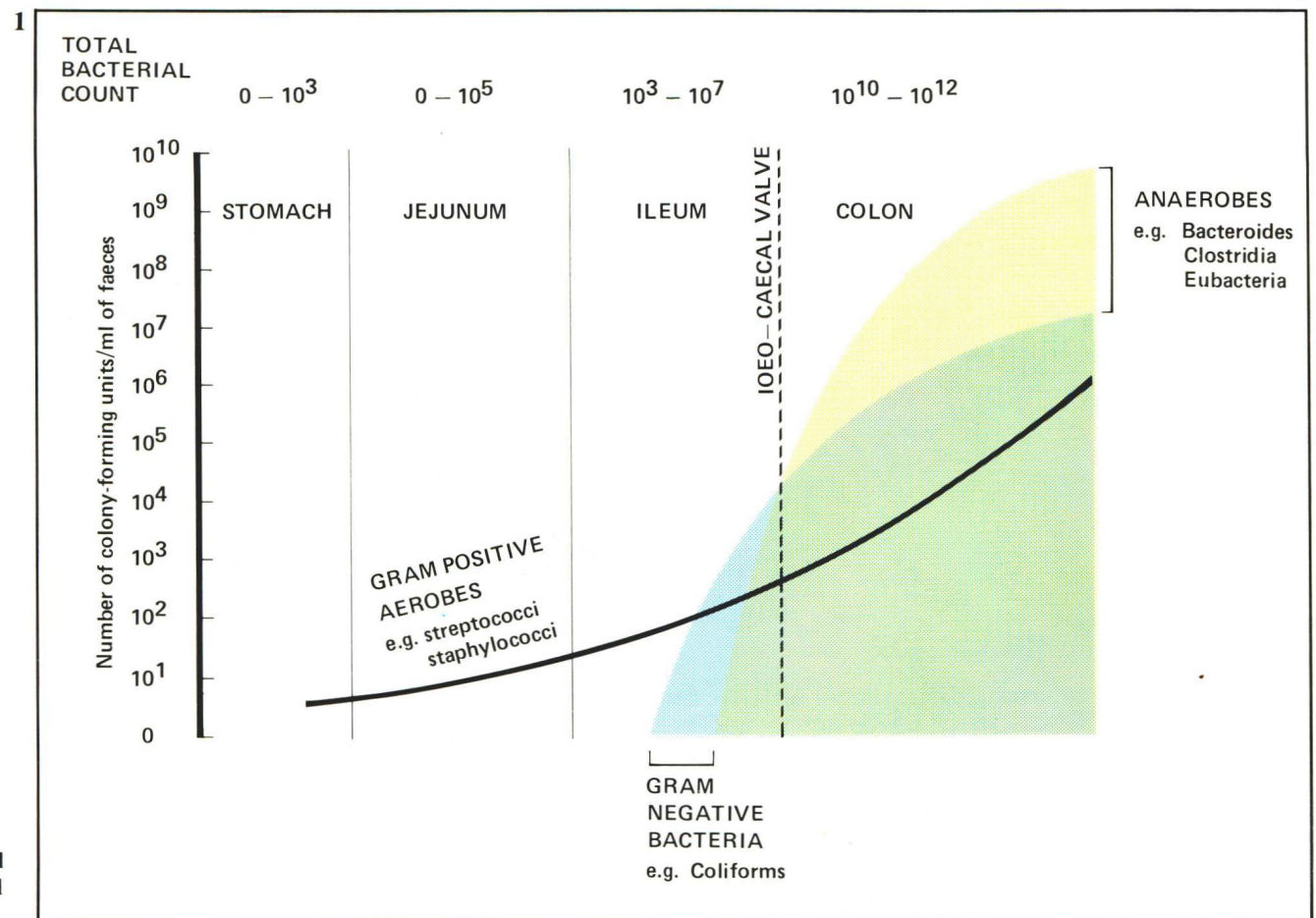
It was the gravity of the infective complications which made earlier surgeons chary of operating upon the colon. These risks are still real and remind the surgeon that safety in large bowel surgery depends upon careful and thoughtful preparation of the patient for surgery, and on meticulous operative technique based on a precise knowledge of the anatomy, attachments and blood supply of the colon and rectum.

## 1 BACTERIAL CONTENT

The upper reaches of the small bowel are relatively free of bacteria, and it is only in the lower ileum that a sharp rise in the population of the classical bowel organism — *E. coli* — is found. Up to this point, anaerobes are relatively few, but their numbers increase in a remarkable manner once the faecal stream has passed the ileocaecal valve: anaerobes then vastly out-number aerobes (1) by a factor of 100-10,000 to one, and the major anaerobic genus is *Bacteroides*. Such is the multiplication of bacteria in the colon that one-third of the weight of dried faeces is made up of viable bacteria<sup>1</sup>. These figures are impressive, but in normal circumstances this population is rendered harmless by the bowel being repeatedly cleared by peristaltic activity. However,

when intestinal obstruction occurs a very important consequence is that the bacterial content in bowel above the obstruction rises very quickly, making perforation of obstructed bowel doubly dangerous. It also means that any ischaemic damage to the wall is greatly potentiated by the high bacterial content.

With this knowledge, it is standard practice to handle the colon carefully, and to take particular care when it is distended. In the emergency section special attention is given to the handling of obstructed bowel, to the ways of clearing obstructed colon of its dangerous accumulated contents, and to overcoming the effects of perforation.



1 Bacterial population of the normal alimentary tract. (After Simon and Gorbach<sup>1</sup>).



## Preoperative bowel Preparation

In elective colorectal surgery, the principal preoperative task, other than standard work-up of the patient, is to ensure that the whole large bowel is empty of faeces at the time of operation. Apart from making the operation easier, it is much safer for a colonic anastomosis to be made on empty bowel, with no likelihood of solid faecal masses being pressed on to and through the healing anastomosis in the days immediately after operation.

**Elective Bowel Preparation.** In the past it was customary to admit the patient some days before colectomy for bowel preparation by purging, low-residue diet and bowel washouts. This time-consuming and demoralising process has been gradually discarded in favour of a concentrated 24-hour period of preparation on the day before operation. Some favour whole-gut irrigation: a nasogastric tube is passed, an injection of metoclopramide given and normal saline is infused down the tube at 4 L per hour, for 2-3 hours. Irrigation ceases when the watery stools passed per rectum run clear. The alternative to this method is to let the patient drink a hyperosmotic solution of 10% mannitol, or polyethylene glycol (PEG), so that an *osmotic* diarrhoea is produced: clearly the patient must be well hydrated before this method is commenced.

All these methods are effective but there is no doubt that patients find whole-gut irrigation unpleasant, and they generally prefer drinking a flavoured hyperosmotic solution. Mannitol is more palatable than PEG but has the disadvantage of producing an explosive gas mixture in the bowel — this appears to be mainly hydrogen and methane. This is not of importance in colonic resection because there is no indication for using diathermy but it is of considerable significance if endoscopic fulguration or removal of polypi is contemplated and in these circumstances is totally contraindicated. PEG is apparently quite safe in this regard.

In preparing the colon and rectum for resection we much prefer the use of Mannitol, because a smaller volume can be used and patients find it relatively easy to swallow a litre of 10% mannitol, flavoured with orange juice. This almost always provides a clear colon and it is our standard method. Reports that Mannitol gives encouragement to bacterial growth have to be accepted, but this does not appear to be of practical significance.

## Antibiotic cover

No aspect of colorectal surgery has received greater attention in recent years than the use of antibiotics before, during and after operation. A very diverse series of regimes have been recommended and confusion has reigned over which is to be preferred.

In this situation we can only describe the methods which have served us well and which have been shown to result in low mortality and morbidity.

There is general agreement that the clearance of faeces from the colon is important, and it should be a rule that an anastomosis is not performed below a loaded colon. If preoperative preparation has failed to overcome an obstruction the surgeon has two choices. Either the colon is cleared by on-table washout (page 157) or a colostomy must be constructed: this may take the form of a Hartmann's resection or a double-barrelled colostomy.

Surgical technique undoubtedly plays a part in securing good results. Mechanical protection of the wound edges by some physical barrier, care in handling the bowel, and the minutiae of anastomotic technique all contribute to a safe operation.

The major question is whether antibiotics are important in the prevention of sepsis in elective large bowel surgery. At present there is a strong emphasis on the use of prophylactic parenteral antibiotics, but there is now good evidence<sup>2</sup> that better results, in respect of wound infection and residual abscesses, can be obtained with a combination of careful surgical technique and antibiotic lavage of the peritoneal cavity and wound (see pages 163 to 165). This is both cheaper and safer than giving parenteral antibiotics, which carry a risk of serious complications such as pseudomembranous colitis.

Our own practice throughout the accumulation of the results given later, for both elective and emergency colonic surgery, has been to use parenteral antibiotics solely in the treatment of generalised peritonitis, or of extra-abdominal postoperative complications such as bronchopneumonia. Using a regime of careful operative technique, wound protection and peritoneal and incisional antibiotic lavage, the wound sepsis rate for both cold and emergency colorectal surgery (as seen during observation in the ward) has consistently been 4-6%. We have therefore seen no reason to change to any parenteral antibiotic regime.



## Operative Technique

The first step in a safe operation is to achieve good exposure and in colorectal surgery correct positioning of the patient plays an important part in this.

### Use of lithotomy-Trendelenburg position

It is a serious mistake to limit the use of this position to excision of the rectum. It is of great help in any operation on the colon beyond the transverse colon because:

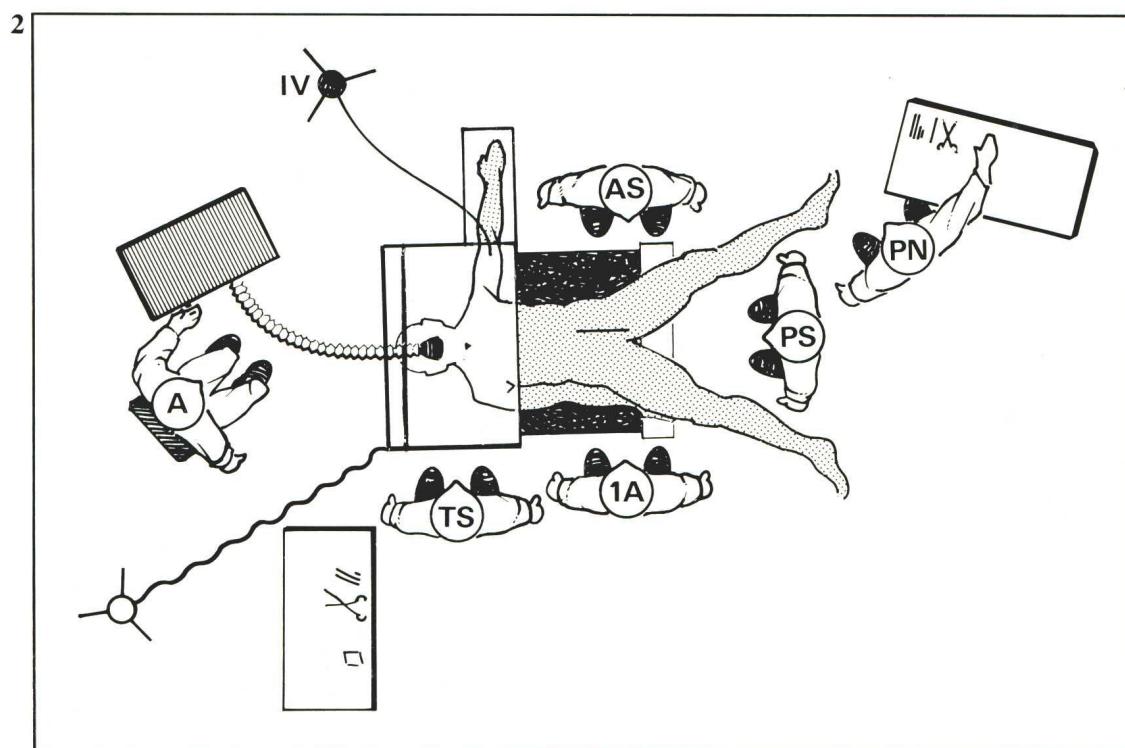
- 1) It provides a valuable additional position, between the legs, for the second assistant, who can then retract bladder or uterus to provide a good view during rectal excision. Also, if the surgeon changes place with the second assistant and stands between the legs whilst the assistant retracts the left costal margin, the surgeon has an excellent view of the splenic flexure.
- 2) There is immediate access to the rectum. This is essential in an anterior resection for lavage of the rectal stump, but is also most useful when there is a need to pass a sigmoidoscope — to check the position of an impalpable polyp, or the level of inflammatory changes.
- 3) In the emergency surgery of the colon and rectum, when the extent and nature of the surgery required cannot be wholly anticipated, it is essential to have access to the rectum, for washout or sigmoidoscopy (or in the case of bleeding for

colonoscopy). Occasionally it is most useful to be able to perform cystoscopy without disturbing the patient.

- 4) Whenever injury to the left colon or rectum is likely then it is wise to place the patient in this useful position. Lavage of the unprepared bowel can be carried out and it may be invaluable to be able to carry out endoscopy of the rectum and sigmoid, especially in the detection of extraperitoneal tears.

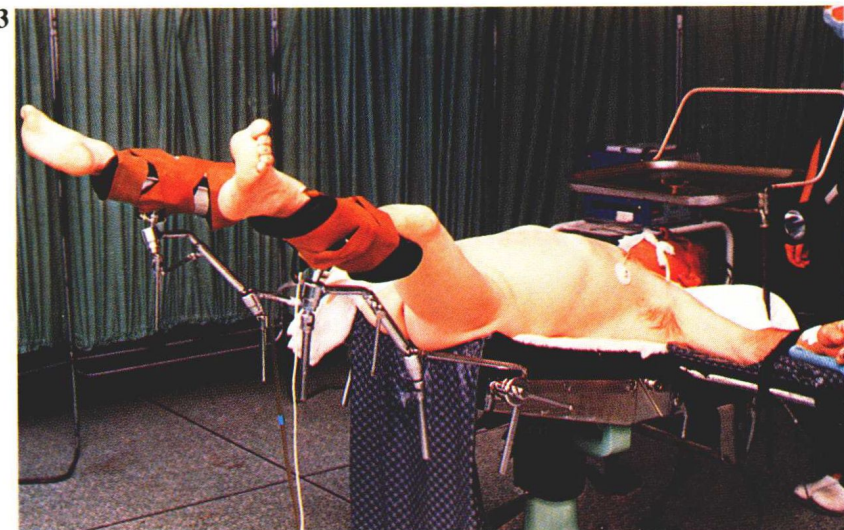
The essential apparatus for achieving this position is a pair of the leg supports devised by O.V. Lloyd-Davies specifically for synchronous combined excision of the rectum. However, they have proved their worth constantly over the years in providing speedy positioning of the patient in this valuable posture for many other operations. With a little practice the theatre team can place the patient in this position in two minutes — time which is more than saved by the greater ease of conduct of the operation.

An essential part of the use of this position is to have a standardised and convenient method of arranging the participants in the operation. Figure 2 shows one way of arranging the team which works well, and Figures 3-6 show the details of the arrangements. The Mayo table, which is clamped to the operating table over the patient's head, is equipped with a hoop towel screen, and this enables the anaesthetist to have free access to the patient whilst remaining completely separate from the operative field.

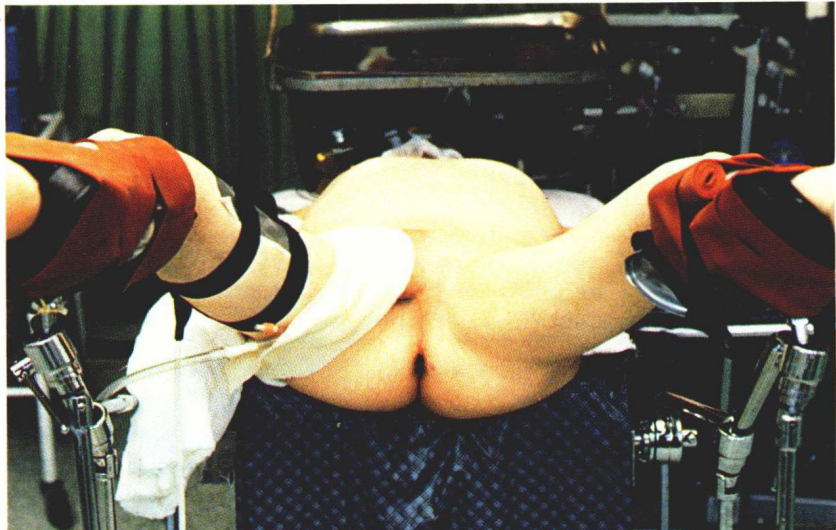


**2 The Lithotomy-Trendelenburg position diagram of the arrangements around the table.** The abdominal surgeon (AS) stands to the left of the table, with the first assistant (IA) opposite. The theatre sister (TS) stands beside the Mayo over-table which is placed above the head and shoulders of the patient: the towel screen is secured to this table. When the sterile drapes are placed over the table and screen, and a large towel is hung (wavy line) between the towel screen and a drip stand, the theatre sister's trolley and the operative field are completely isolated from the anaesthetist's field of work. If an abdominal-perineal excision is being performed a small oblong instrument table is placed at the foot of the operating table and the perineal surgeon (PS) can sit in front of this, and place instruments upon it. The scrub nurse for the perineal end will usually stand to the surgeon's right. If an anterior resection is being performed the oblong table is not used and the second assistant stands between the legs to retract.





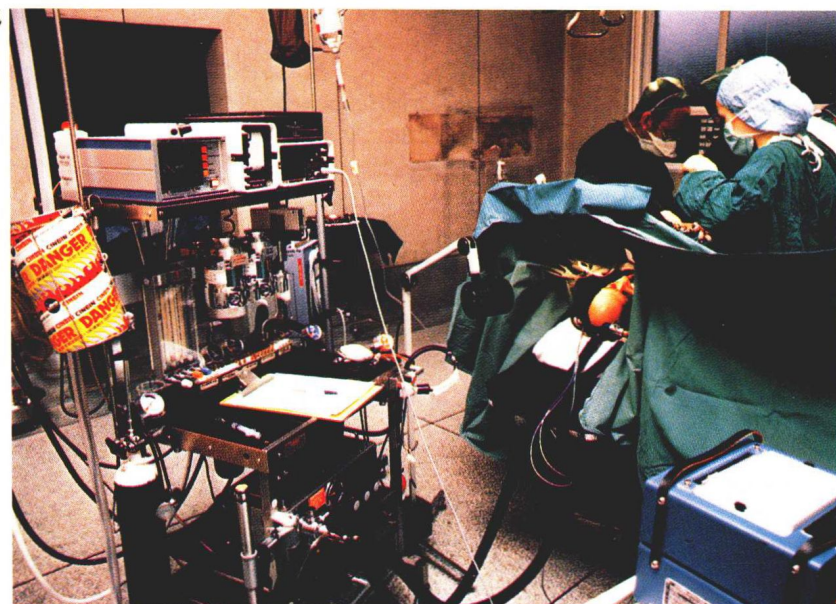
**3** The Mayo over-table is shown in the top right-hand corner, with the hoop towel screen attached. The left arm is supported on an arm board and is available to the anaesthetist. The right arm is secured to the patient's side.



**4** The buttocks slightly overhang the end of the table. After the patient is catheterised the scrotum and penis are held away from the operative field in the perineum with wide elastoplast. Some use a perineal support to elevate the buttocks, but we have not found this necessary.



**5** The operating team in place during an anterior resection. The position of the large towel which separates the scrub nurse's trolley from the anaesthetist is clearly shown.



**6** View of the anaesthetist's area, showing that the arrangement of the Mayo table and the towels allow free access to the patient's head, illumination being provided by a small portable spotlight.