The beginner who feels confident having repaired some easy fistulae may feel able to progress to intermediate cases.

**Scarred juxta-urethral fistulae**

The essential step in repairing these is to get good exposure by making a generous episiotomy, bilateral if necessary (Figures 36 and 37). A tilting table really does make a difference to accessibility.

**Figure 36** In this case, the small fistula is only just visible because it is held up by scar tissue behind the pubic symphysis. An episiotomy and a tilting table will make access much easier.

**Figure 37** This small juxta-urethral fistula was hidden behind the pubis. When the metal catheter is used to push the bladder base towards the surgeon and bilateral episiotomies are performed, the fistula becomes quite accessible.
The proximal urethra is often stenosed and the lateral margins may be adherent to the pubic rami.

The beginner should only tackle those cases that are lightly adherent until experience has been obtained. One should dissect laterally into the para-vesical space to completely free the margins of the fistula from bone. The lateral margins of the fistula must be freely mobilized before starting the repair, and there will be more scar to remove. This will make the defect larger than it was initially.

The distal margin of the fistula will be the proximal urethra, so great care should be taken to put the sutures in gently and accurately. Use a small needle but take good bites. If the sutures are cut out, this will make the repair much more difficult.

**Detached juxta-urethral fistulae**

An apparently easy case of detached juxta-urethral fistula is shown in Figure 38(a); it has soft margins and is small.

When properly exposed, the urethra is seen to be detached from the bladder (Figure 38b). This is easy to re-anastomose after reflecting vaginal flaps. The anastomosis only needs to be done round three-quarters of the circumference because there is continuity of muscle and mucosa on the deep aspect. This is an unusual case in being so mobile. Most detached urethras are adherent under the pubic arch (see Figure 4 in Chapter 2). The problem here is that the urethra is short (<2 cm), so there is a high risk of stress incontinence after repair.

*Figure 38* (a) This looks like an easy case – small with soft margins. (b) On proper exposure, the urethra is seen to be detached from the bladder.
The incidence of stress appears to be reduced by an ingenious little operation devised by Andrew Browning at the Addis Ababa Fistula Hospital (see the references in the Appendix). It consists of a sling under the urethro-vesical anastomosis using fibro-muscular tissue from the paravaginal tissue under the pubic arch. The vaginal skin is reflected more from the antero-lateral wall for exposure. A block of underlying fibromuscular tissue (part of the levator complex) is grasped with Allis forceps and a rectangular block of tissue is elevated (but remains attached

Figure 39 (a) The two strips of tissue are sutured together over the urethra. (b) Tissue is grasped from the lateral vaginal wall under the pubic ramus. (c) A block of fibromuscular tissue has been dissected out on the left-hand side. (d) The two blocks have been sutured together in the midline under the urethra. This produces the same effect as tension-free tape.
superiorly). The block of tissue is mobilized just enough to come to the midline to be sutured to one from the other side. It will come to lie just under the proximal urethra and urethro-vesical anastomosis. See Figure 39.

Smaller juxta-cervical fistulae

Two examples of smaller juxta-cervical fistulae are shown in Figure 40.

The accessibility of fistulae in the region of the cervix may depend on the parity of the patient. In the multiparous, the cervix will often come down, making access easy, as in the examples shown in Figure 40. In contrast, small juxta-cervical fistulae may be difficult to reach in primiparous patients, and are not for beginners.

In repairing fistulae in the region of the cervix, it is important to appreciate the risk to the ureteric orifices. The larger the fistula, the greater is the chance that these will be close to or at the fistula margin (Figures 41 and 42). As a rough guide, if a midline fistula is no more than 1 cm in diameter, the ureters will not be at risk.

Beginners should not attempt to repair a juxta-cervical fistula unless the margins can be seen clearly all round, as in the examples in Figure 40. If they cannot, the fistula may extend well up into the cervical canal and its repair may involve a difficult dissection. (See Figure 6 in Chapter 2 and Figure 14 in Chapter 4.)

![Figure 40](a) This is a small juxta-cervical fistula where there is good access. It could be closed without identifying the ureters. (b) This is another example of a small simple juxta-cervical fistula. It is about 1 cm in diameter and 1 cm in front of the cervix. The urethra and bladder neck are undamaged, so the prognosis for continence will be excellent after repair. The ureteric orifices should be identified by the beginner in order to gain experience, although they should not be at risk in this small midline fistula.
The complete fistula surgeon must have access to ureteric catheters. Infant feeding tubes as an alternative are not very satisfactory as they are so soft. (In the author’s series, repairing almost all fistulae at presentation, just over a quarter of cases were judged to need ureteric catheterization for identification and protection.) Ureteric catheters are not easy to find in Africa, so surgeons who are advancing to repair the larger mid-vaginal or juxta-cervical fistulae must learn to recognize the position of the orifices so as to avoid them in the repair.

The experienced surgeon can find them quickly by eye with a probe, but the best way when starting is to ask the anaesthetist to give 10 mg of furosemide intravenously. In 5 minutes, a brisk diuresis will make the orifices obvious if they are near the fistula margin. (This is another reason to make sure that the patient is well hydrated before arriving in theatre.) If the orifices are near the fistula margin and ureteric catheters are not available, they should be cannulated with a small metal probe. This can be held by an assistant during the mobilization and while the first inverting corner suture is inserted as illustrated in the case shown in Figure 43.

After repairing a fistula close to the cervix without using ureteric catheters, it is good practice to clamp the urethral catheter and to make quite sure that urine is produced. This is to exclude the very small chance that the ureteric orifices have been occluded in the repair.
Figure 42 (a) This is a juxta-urethral fistula, but the cervix is close to the posterior margin under the Auvards speculum. This is caused by contraction of a large fistula. (b) A large fistula becomes smaller in the first 3 months. As the fistula contracts, the cervix is pulled down. So although the fistula appears to be small, it begins at the urethra and extends to the cervix. The ureters are at risk. (The cross indicates the position of the ureteric orifice.) (c) In this case, after mobilizing the vaginal flaps, a ureteric orifice has been found with a probe close to the left corner. The orifice should ideally be catheterized, but if no catheter were available then the corner suture could be inserted safely with the probe in place.
A simple juxta-cervical fistula (Figure 44)

The posterior margin of the fistula will be at the level of the cervix. It is best to start the operation by an anterior dissection between vagina and bladder. Make a vertical incision down the vaginal wall into the fistula margin. Enter the correct plane between the vagina and bladder through healthy tissue anteriorly. After working round the sides of the fistula, the antero-lateral flaps are sutured out of the way. This pulls the fistula up into view. Be sure to stay very close to the vaginal mucosa when dissecting laterally. If the bladder wall is entered, the ureter is at risk. The posterior margin is separated from the cervix. This is an easy plane to develop once any scar has been passed.
FIRST STEPS IN VESICO-VAGINAL FISTULA REPAIR

An easy intra-cervical fistula

Exceptionally, an intra-cervical fistula is very accessible, as in the case shown in Figure 45. It was easy to dissect between the bladder and cervix and close the fistula without identifying the ureteric orifices.

When is an abdominal repair appropriate?

Some fistula surgeons would say never. In practice, many surgeons starting fistula surgery will be experienced in abdominal but not vaginal surgery, so this approach is attractive – but beginners should beware.

It is essential to realize that any fistula that is below or likely to be close to the ureteric orifices should *not be attempted from above*. An experienced urologist may be able to do this, but it needs full abdominal relaxation, proper retractors, good light and an ability to catheterize the ureters from inside the bladder.

There are only three situations where a fistula can be repaired quite easily from above. For the novice fistula surgeon, this may be the best option – provided that the case is carefully selected.

The vault fistula after emergency hysterectomy for a ruptured uterus

Most of these are perfectly accessible from the vagina provided that they will come down, but an abdominal repair is an option for the inexperienced vaginal surgeon.

Careful bimanual examination will give an indication as to how close the fistula will come to the anterior abdominal wall. If it comes sufficiently close then this will be a good case to do from above, provided, of course, that there is good lighting and a good selection of instruments and deep retractors.
FIRST STEPS IN VESICO-VAGINAL FISTULA REPAIR

The bladder should be exposed and mobilized from above and opened in the midline to inspect the interior. The fistula should be visible. The bladder incision is continued down to the fistula, and the bladder is separated from the vagina before each is closed in one layer. If the fistula is lower than expected then the ureteric orifices should be identified, if necessary with the help of furosemide. If the case has been selected wisely, the fistula should be well above the ureteric openings.

The post-Caesarean intra-cervical fistula

The regular fistula surgeon will learn to repair these from below by dissecting up between the cervix and bladder.

There is just one situation where the repair can be quite easy from above, namely following an iatrogenic injury without any ischaemic component. This can be suspected when the patient gives the story that she was delivered of a live baby, and yet is shown to have a leak through the cervix. The fistula is almost always caused by accidental suture of the bladder into the lower uterine segment. In this case, repair is quite possible from above by dissecting between the uterus, cervix and bladder. The

Figure 45 (a) An easily accessible intra-cervical fistula. (b) The space between the bladder and cervix has been developed. (c) The defect in the bladder can now be seen and is ready for suture.
hole is often tiny. Stay in the midline to avoid uterine vessels and the ureters, and if
the fistula does not come into view easily, split the bladder vertically until the fistula
is reached. It should be above the ureteric orifices: if there is any doubt, give
furosemide to identify and avoid them. A tiny hole in the cervix does not need to be
closed.

If the delivery by Caesarean section was a stillbirth, an abdominal repair should not
be attempted, even if vaginal examination suggests that the fistula is intra-cervical.
Labour long enough to cause death of the baby will produce an ischaemic injury.
The fistula may turn out to be larger and lower than expected and will be very
difficult and unsafe to access from above (except for experienced urologists).

Before selecting any patient for an abdominal repair, make absolutely certain by dye
test and vaginal inspection under anaesthesia that the leak is coming through the
cervix and not through an occult hole in the vagina (except, of course, for the post-
hysterectomy vault fistula, in which case a final decision on approach can be made).

**The ureteric fistula**

If a ureteric injury occurs after a Caesarean section or hysterectomy, it will be deep
in the pelvis. If the ureter is dissected and divided just above the level of injury, it
will reach the bladder. In my 21 cases, it has not been necessary to perform any
bladder-lengthening manoeuvres such as the Boari flap or psoas hitch stitch. The
dome of the bladder is opened and the ureter is drawn into the bladder through a
separate stab incision. See Figure 46.

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**Figure 46**

(a) The ureter has been mobilized and drawn into the opened bladder. (b) The
ureter has been sutured to the bladder mucosa and will be additionally secured by
sutures placed in the outer bladder wall.
Which side?

The injured ureter is almost always dilated and scar tissue can be felt at the site of injury. Occasionally, it can be difficult to decide by inspection and palpation alone which ureter is damaged. In this situation, open the bladder through the fundus and look inside. Give furosemide, and expose the ureteric orifices with a retractor and confirm that one ureter is connected to the bladder and the other is not.

Labial fat grafts and fistula repair

At the Addis Ababa Fistula Hospital, fat grafts are used for all but simple repairs. It is believed that this increases the success rate, especially for the complex cases (although there is no proof of this). However, there are some experienced fistula surgeons who rarely use fat grafts – without apparently compromising their results. I believe that there is a place for fat grafts (especially following a difficult repair) but my own use has fallen to less than 10% of all cases. All are agreed that simple fistulæ do not need a fat graft, so this procedure is not described in this account for novice fistula surgeons.

Antibiotics

Some surgeons give no antibiotics, while others prescribe them throughout the postoperative period. It is well known that infection usually results from contamination during the operation, so it is my practice to give a single intravenous dose of gentamicin 160 mg at the start of surgery. I would only continue with antibiotics for 24 hours if there had been accidental faecal contamination of a repair or if there had been a sphincter repair as well. My choice would be gentamicin 80 mg and metronidazole 500 mg intravenously 8 hourly.