9 Management of Post-Repair Incontinence

It is one thing to be able to close a vesico-vaginal fistula, but another matter to make a patient continent. We can close over 90% of cases and experienced surgeons approach 98%, but at least another 15–20% will have some incontinence. For half of these it is so bad that they are still totally wet. This has been under-reported as is evident from independent assessments of results from places quoting very low ongoing incontinence rates. When the patients are examined properly and independently some centres actually have up to 45% of patients going home still leaking to some degree. The harder you look for this problem, the more you will see. This 'incontinence gap' is a source of great frustration to fistula surgeons. Its cause is not hard to see.

The most important part of the urethra for maintaining continence is the middle section of the urethra. Here the urethra generates most pressure to keep the urine inside the bladder. The pubo-urethral ligament inserts here and there is also a thickening of muscle called the rhabdosphincter. If this has been damaged or destroyed in the long labour, then maintaining continence is troublesome if not impossible even after the fistula is closed. You can recreate an anatomically correct urethra and bladder neck but without the ligaments and muscles, it will have no physiological function.

The normal length of a female urethra is 3–5cm, the average being 4cm. In my series, 35% of patients have the fistula less than 2.5cm from the external urethral orifice (Goh types 3 and 4). These have the worst prognosis for ongoing incontinence after repair. Indeed 60% of patients have their distal fistula within 3.5cm from the urethral orifice (Goh types 2, 3 and 4). All of these patients will have the continence mechanism of the urethra either completely or at least partially destroyed. Scarring around the fistula often keeps the urethra rigid and open. It is often denervated as well.

Bladder function may be disturbed in several ways. The bladder size can range from normal to severely reduced. Its compliance can vary, ranging from being atonic with chronic retention and overflow to unstable with frequent abnormal pressure waves causing detrusor instability (now called overactive bladder), leading to sensations of urgency and to urge incontinence. Other patients have a small rigid, non-compliant bladder secondary to scarring and substantial loss of bladder tissue.

Patients with ongoing incontinence have been studied urodynamically. Roughly 40% will have genuine stress incontinence (GSI), 40% will have GSI combined with overactive bladder, 14% will leak from a small, stiff non-compliant bladder and the remaining 6% will have retention with overflow.

I have developed a special interest in the management of this ongoing incontinence, and this chapter will focus on my preferred operative procedures and management. The techniques have

evolved over the years. Previously the operation focussed on the urethra and trying to make it as anatomically normal as possible, creating a normal length and width. Then we introduced a supportive sling of autologous material, trying to recreate the pubo-urethral ligament. Combining these two principles I would get a 70% dry rate for fistula patients with ongoing incontinence. Recently my thinking has changed to not only include the urethra and sling, but also to focus on the vagina. This thinking is based on the integral theory of female urinary incontinence. If at repair the vagina is pulled together under tension, the result is a short, stiff and scarred vagina. This will pull and hold the urethra open and the patient will leak continually through the fixed open urethra. (Figure 9.1) By making sure the vagina is lax and supple, my success rate has increased. At the moment I only have a series of around 200 patients, but these women were the most severe of all cases, leaking all the time, with dreadful short, scarred vaginas, and urethras retracted into the vagina. All of the 200 patients had been operated on in other centres up to nine times before and many times the operation was for ongoing incontinence. Everything else had failed. If I had just followed the first two principles—making the urethra a normal length and width and creating a suburethral sling, only 26% of such severe cases would have been cured. By doing the same but making sure the vagina is reconstructed under no tension, 70% are completely dry and nearly all of the remaining cases improved.

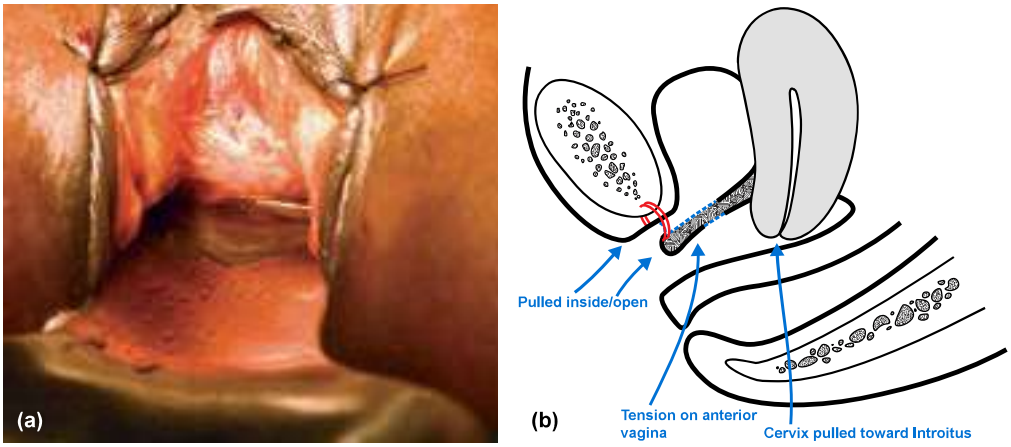

Figure 9.1
a) A patient with complete incontinence after fistula repair. Note the urine pouring through her urethra and pooling in the vagina. Her urethra was less than 1cm long and she had a very short anterior vaginal wall, less than 3cm. b) In diagrammatic form.

In summary the surgical management of ongoing incontinence follows these three main principles. You'll find that at least one principle will need to be applied to any specific patient and in some, all three will have to be addressed if the patient is to have a chance of being cured. These principles are:

1. Reconstruction of the urethra to be a normal length and width.
2. Reconstruction of the pubo-urethral ligament.
3. Reconstruction of the vagina so there is no tension on the anterior vagina.

Other surgeons have different approaches and they will be briefly discussed later in the chapter.

The management of post-repair stress incontinence falls under four headings:

- Immediate Assessment
- Conservative Measures
- Surgical Management
- Management with a Urethral Plug.

Immediate Assessment

Frequency and poor control are common just after removing the catheter after the fistula repair, but they often improve rapidly. If the patient is still wet after 48 hours, and assuming that a dye test has excluded a breakdown and that she is not in urinary retention, she needs to be categorised into one of five degrees of severity:

- 1/5. *Completely dry on strain, walk, rest and sleep and voiding normally.*
- 2/5. *Wet with exertion (coughing or effort).* This often improves over time with pelvic floor exercises.
- 3/5. *Wet on walking, dry on sitting and lying, but can void well.* Again, this can often improve with time and pelvic floor exercises. At 6 months follow up, 50% of these patients will be completely dry just with conservative management.
- 4/5. *Wet on walking, sitting and lying, but still able to void to some extent.* This seldom improves with time, and the patient will need assistance and probably a secondary stress operation. We usually do this after 3–6 months of trial of pelvic floor exercises, as some do improve with time.
- 5/5. *Wet all the time, not voiding.* The patient feels as if she still has a fistula. This rarely improves with time. It is often due to a functionless urethra and will need further management.

The best way to measure objectively how incontinent a patient is is to do a 'one hour pad test'. The full description is in Appendix B but in short, a simple kitchen scale is needed and a pad. Weigh the pad, ask the patient to empty her bladder and wear the pad. She needs to drink 500ml of water and then go through a series of exercises. You then weigh the pad at the end and subtract the original weight of the pad. This will give an estimate of how much she has leaked in the hour. It's very useful before and after an operation for stress incontinence, but results may vary somewhat depending on how hydrated she is before you start the test. To try and make it uniform it is best to do it early in the morning after she gets up, soon after having her breakfast.

Conservative Management - Pelvic Floor Exercises

In developed countries, there is objective evidence that pelvic floor exercises are of value in the management of stress incontinence. But the benefit has only been shown in motivated patients who have had proper instruction from a professional.

Great importance has been placed in the instruction of fistula patients in pelvic floor exercises. Unfortunately, the women with the worst stress incontinence are those who have ischaemic damage to the pelvic floor muscles as well. One has only to put two fingers in the vagina, and feel the fibrosis in the vagina and levator muscles and ask the patient to squeeze, to realise how little contraction there is. The most severe injuries have had all their pelvic muscles destroyed by the long labour and there are no muscles to rehabilitate at all. Kees Waaldijk terms this the 'empty pelvis syndrome'.

Other patients with stress but with less damage will benefit from instruction—but only if this is done properly. (Figure 9.2) It is essential to put two fingers in the vagina to help the patient to understand what to do and to check on progress. Simple verbal instruction is doomed to failure. The patient should also be taught to examine herself for feedback.

The routine is for the patient to tighten her pelvic floor as strongly as possible for 5–10 seconds then relax. She should continue to breathe normally. The squeeze is then repeated 10–20 times, with gaps of 10 seconds between. The patient should repeat this routine three times a day.

It is difficult to know how many patients are compliant with this regime, but whether they do these exercises or not, many with mild incontinence improve with time. A happy event is that we sometimes see patients going home with moderate stress, but returning later to tell us that the incontinence cleared up spontaneously after a few weeks.

Figure 9.2
Nurses teaching pelvic floor exercises.

Surgical Management

At least 3–6 months should pass to allow time for spontaneous improvement. A secondary stress incontinence procedure can then be considered. First, the diagnosis must be confirmed by checking that the patient is not in retention and also by doing a dye test. It is very easy to overlook a tiny residual fistula. It may be possible that she has both, a residual fistula and leakage through the urethra. Both need attention. If a dye test is negative, incontinence can be demonstrated by removing the catheter with the dye still inside it: often, the dye then gushes out—if it does not, the patient should be asked to cough, whereupon incontinence is usually readily appreciated.

Examining a patient for stress incontinence should be done without an anesthetic whilst she is standing or lying, and asking her to cough with a full or near full bladder or after a dye test as above. There are many women who leak with cough under a spinal anaesthetic in the lithotomy position who are dry under normal conditions and vice versa. You must confirm urethral leakage before you put the patient under anaesthetic. And you should always repeat a dye test in theatre at the start of any proposed stress operation just to make sure you haven't missed a small fistula.

Having said that, placing cold dye into a bladder and asking patients to cough is not particularly physiological. It is better to examine them when they have a full bladder.

Until recently a simple cystometry was performed to aid selection. The bladder was filled with water through an open bladder syringe held vertically while compressing the urethra. If the bladder pressure was estimated to be more than 20cm H_2O with only 100cm^3 in the bladder, operation was not recommended. This excluded about one third of patients. Now, all patients are given a chance with the plication and sling, and the success rate (around 70%) has actually increased. Now with the added step of vaginal reconstructions, the success rate is increasing even further.

Urethral Plication and a Fibromuscular Sling

The aim of the surgery is to lengthen and narrow the urethra and then provide support with a fibro-muscular sling. (the sling is described and illustrated in Chapter 6—Urethral Support with a Fibro-Muscular Sling)

Position the patient as for a fistula repair, and use an episiotomy if necessary. Measure the length of the urethra as follows: insert a Foley catheter; inflate the balloon; pull the catheter until the balloon abuts the bladder neck; pinch the catheter at the level of the external urethral meatus; deflate the balloon; remove the Foley while still pinching it; re-inflate the balloon. The urethral length is from where the Foley is pinched to the balloon. (Figure 9.3a) In Ethiopia, the average length before operation is 1.4cm, which is less than half the normal length. Almost all patients will have a shortened urethra.

After infiltration reflect the vaginal mucosa. Make a horizontal incision through the vagina about 2cm below the external urethral meatus. Extend the incision to the lateral vagina walls. Reflect the vagina distally off the urethra almost to the meatus and either side off the lateral vaginal walls, and suture them out of the way to the labia majora. (Figure 9.2) Dissect a little proximally under the horizontal incision to mobilise the distal bladder. With scissors, dissect the urethra and bladder off from the lateral attachments, opening the para-vesical and para-vesical space on either side.

Great care should be taken, as it is easy to open the bladder here and create another fistula. If this happens, it is usually because the first operation was for a circumferential fistula that was not repaired in a circumferential manner. Re-repair is extremely difficult, but must be attempted.

The next step is to plicate the urethra and distal bladder with three interrupted sutures in the midline. These aim to pick up the pubo-cervical fascia, or at least its remnants, and to narrow the

urethra and pull the walls of the distal bladder together. (Figure 9.3) It is important to plicate the correct tissues. Pick up the urethral muscle medial to where you have mobilised it off from the lateral vagina wall, don't pick up the tissue from the lateral vagina wall, this will not have the desired effect. If done properly it will narrow the lumen inside so its diameter will be similar to the urethra's.

Make a sling by grasping the fibro-muscular tissue on each side, developing a block of tissue to be sutured together in the midline. Of course, a sling may have been made at the primary operation, but additional tissue can usually be found to make another. Note that there may be brisk bleeding as the pedicle is elevated. This can be a source of post-operative bleeding if it is not carefully attended to.

Measure the length of the urethra again to see if it has lengthened. The average length of the urethra was doubled to 3cm in the Ethiopia series of 72 consecutive cases. (Figure 9.3i—3.5cm in this case)

Perform a dye test to ensure that the bladder has not been opened accidentally.

The vagina is now repaired. Ensure that you have repaired the corners of the vagina to the lateral wall, at the base of the pedicle. (compare Figure 6.58k) This reduces any dead space and bleeding.

If the vagina cannot be repaired without tension then a flap has to be done. It is easy to check this. If when you suture the vagina together the urethral meatus is dragged into the vaginal canal you know immediately that the urethra is being pulled open by too much tension. Undo the sutures and place a tissue flap as described in Chapter 6—Vaginal Skin Defects.

When repairing the vagina it is important to suture the vaginal skin to the lateral pelvic wall. Try to anchor it to where you have reflected the fibromuscular sling. This will help to support the urethra (like doing a colpo-suspension) and close any potential dead space where a haematoma might collect. (refer to Figure 6.58 k and l)

The Foley catheter is left on free drainage for 3–5 days, and the patient encouraged to drink as usual. After removal of the catheter, the patient is encouraged to drink normally and void. Her residual volume needs to be checked. It should be less than 100cm^3. A more accurate assessment is to measure the amount she voids and then measure the residuum. If the residual volume is >50% of the voided volume you should define this as retention. So if she voids 100ml but she has a residuum of 60ml, this is retention. It is important to check it this way as fistula patients have varying degrees of bladder loss and may have very small bladders with a capacity even less than 100ml, sometimes even only 20ml. If the patient has urinary retention she needs treatment—see Management of Retention below.

If there is no retention, the patient is also shown how to perform pelvic floor exercises. The patient is assessed, and any remaining stress is quantified into the scale referred to previously to see if there has been any improvement from before the operation. Some centres are now doing a standardised 'pad test' before and after the operation. It is nice to be able to quantify any improvement with an objective measure and is a very useful tool for research but probably out

of the capacity of most units to use it routinely. It is demanding on time and personnel. I have a urinary physiotherapist dedicated to teaching pelvic floor exercises, bladder training and doing pad tests, but this would be a luxury in most units.


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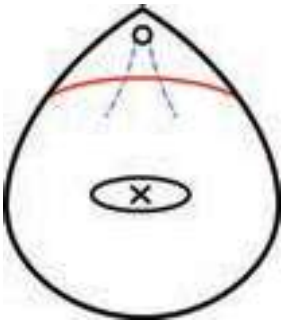
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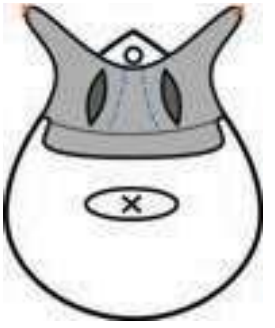
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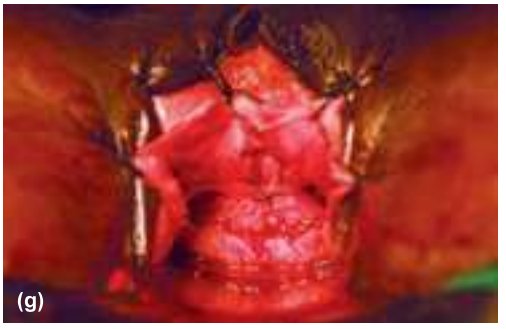
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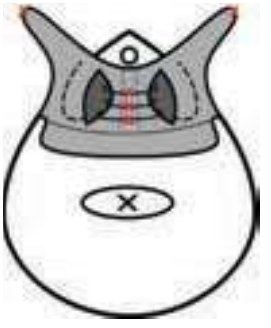
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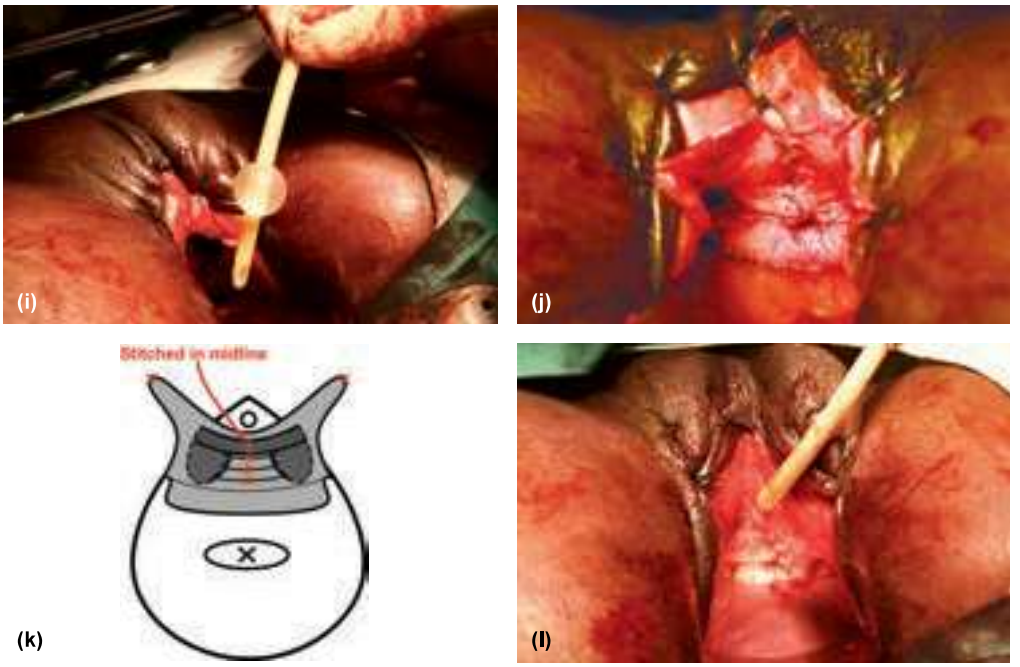

Figure 9.3
a) A patient with incontinence after fistula repair. When measured the urethra is only 1.5cm long. b) Diagrammatically the blue dotted lines outline the gaping short urethra beneath. The red line indicates the initial incision. c) The vagina has been reflected. d) Para-urethral space opened on the left and e) the right. f) Diagrammatically you can see the para-urethral spaces released from the side walls. g) The urethra has been mobilised and now it is plicated. h) Diagrammatically you can see the plication has narrowed the urethra, making it longer. i) When remeasured with 2ml in the balloon it is now 3.5cm long. j) A good fibro-muscular sling is placed (see Chapter 6—Urethral Support with a Fibro-Muscular Sling [Pubo-Coccygeal Sling]). You can also place a fascial 'sling on a string'. k) Diagrammatically. l) The vagina is repaired.

Complications

Complications of this procedure include:

- Accidental re-opening of the fistula in less than 5% of cases. This is closed at the operation, but it's important not to miss it.
- Ligation of ureters if the sutures have been placed too deep. (This has not been recognised in our experience but be mindful that these patients have distorted anatomy from the injury and repair. The ureters can be in unexpected places.)
- Retention of urine in 15% of cases.

Management of Retention

A few patients cannot pass urine at all and must have the catheter re-inserted; others have a degree of retention that, if undetected, could lead to overflow incontinence, urinary stasis, urinary tract infection and even stone formation.

All patients should have their residual urine measured before being allowed home. If it is more than 100cm³, or if the residual volume is > 50% of the voided volume proceed as follows:

- Replace the catheter, and spigot the catheter, that is block it with something. Some places use a vial of gentamycin, others the plunger of a 5ml syringe. Let the bladder fill and then release the spigot every two hours to empty the bladder. This will help 'retrain' the bladder by filling it, relaxing it. It is an old fashioned treatment for urinary problems, rarely if ever used in the West anymore, but it seems to work for fistula patients. For most fistula patients, the bladder has been empty for years and I can't see that keeping it on free drainage (empty) for a few more days would change anything. Do this bladder 'training' for 48 hours, but be careful that the spigot is released 2 hourly to avoid over distension. It's probably safer to leave it on free drainage overnight to prevent overdistension. It takes a cooperative patient and dedicated nurses. When done properly 70% will be voiding normally when you remove the catheter and check again for retention again. Make sure you check three times.
- If the residual urine is still more than 100cm³ or more than 50% of the voided volume, teach the patient double voiding. In this, the patient voids as normal, perhaps with supra-pubic pressure—pushing over her bladder with her hand. She then stands up and walks around for a few moments while the bladder 'readjusts' to having a smaller volume of urine in it, and then she tries to void again.
- If this does not fix the problem and she is still unable to empty her bladder adequately, teach her clean intermittent self-catheterisation. She should try to void as much as she can and then pass a short stiff catheter into her bladder to drain the remaining urine. She washes the catheter and keeps it clean to use the next time and she will need to do this after each void, or three to four times a day to make sure the bladder completely empties regularly throughout the day. The patient should be reassured that she is likely to improve with time and be sent home with instructions to self catheterise, and only stop when she is emptying her bladder properly so that when she passes the catheter no urine, or only a few drops, comes out. She should be sent home with about five short stiff catheters. She should wash the catheter before and after each use and reuse it for about a month. There may be a small group in whom the bladder never regains the capacity to empty, so self catheterisation may be for life. In this case, the patient should be provided with a metal catheter.

We have heard from one surgeon that the incidence of retention will be reduced if the catheter is left in for 10 days post-operation rather than 3 days as we practise. This requires further investigation but it may have some merit if there is still swelling and pain from the operation.

Some have anecdotally reported that they are unable to replicate the results that I get with these principles and procedures. On observing surgeons and teaching them, one mistake commonly found is they are not plicating the urethra properly. Instead of picking up the urethral tissue medial to where they have mobilised the urethra off from the pubic ramus, they are suturing the tissues along the pubic ramus. This doesn't lengthen and narrow the urethra as well as intended. It also makes it difficult to create a good muscle sling and impossible to place a fascial sling correctly. When they are alerted to this mistake, their results often improve.

If this Fails

If a stress operation has failed in the past, I prefer to use a tight fascial sling at the second attempt.

As described above, I harvest this from the rectus sheath through a mini-Pfannenstiel entry before starting the vaginal procedure. It is kept in sterile saline while the vagina is prepared.

The urethral meatus is often pulled inside the vagina in these patients and it is not in its correct anatomical position. Often the anterior vaginal wall is very short and the cervix has been pulled forward after many operations and is sometimes sitting really at the urethral meatus! This is the result of previous fistula repairs where the surgeon has pulled the vagina together to cover the bladder and urethra. A tight, short, distorted anterior vaginal wall results and it needs to be repaired to resemble normal anatomy. (Figure 9.1a) Mobilise the vaginal wall off from the urethra as above and if the meatus has been pulled into the vagina from previous repairs, this mobilisation and freeing of scar tissue often makes the meatus spring back to its normal position. (Figure 9.4) If the cervix is pulled forward, mobilise it as well and then suture it to the lateral vagina walls deep in the vagina to make it site in its natural position. Plicate the urethra to ensure the urethra is a good length and width. Then place a fascial sling.

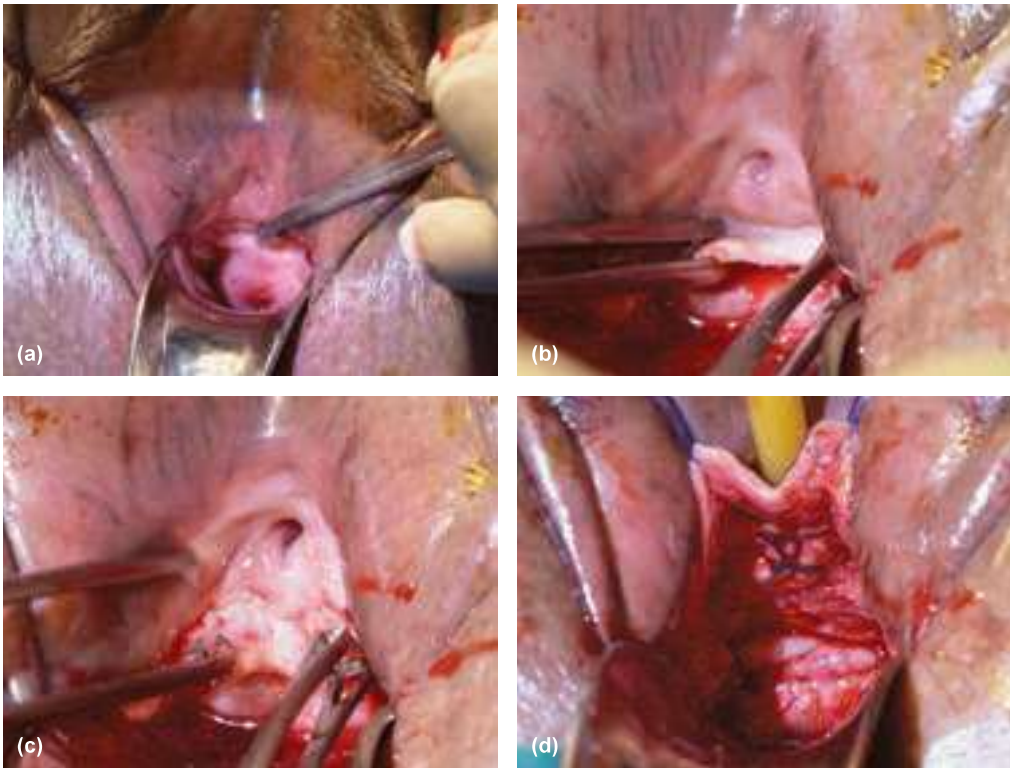

Figure 9.4
a) A patient with post-repair incontinence. Her urethra is tethered into the vagina and cervix pulled forward. The metal catheter is against the cervix and the anterior vaginal wall is only 1.5cm long. b) The vagina is mobilised off from the urethra and c) it springs forward. d) The cervix had been mobilised and pushed back to its normal position, the urethra plicated and a fibro-muscular sling placed.

Continued

Figure 9.4 *(continued)*
e) The gap in the anterior vagina is filled with a Singapore flap.

As described in Chapter 6—Urethral Support with a Fibrous Sling, harvest a 5–7cm by 1–1.5cm strip of rectus fascia but leave the abdominal wound open for the time being. I like to place an iodine gauze over the wound while I perform the urethral side of the operation, just to keep it clean. Do the same mobilisation and plication of the urethra as above, but then, with some nylon or PDS attached to either end of the strip of fascia, tunnel the fascial sling up laterally on one side of the urethra through the cave of Retzius and then the other side as described in Chapter 6. This can be done with long curved artery forceps, firmly holding each end of the suture in the tip of the artery forceps as you tunnel either side, one side after another. Pass the two ends of the suture through the rectus sheath with the artery forceps or a free needle. Tie the ends together, one loop going up either side of the urethra. Exert some tension on the urethra and be careful not to make the sutures slip as you tie it so that the strip of fascia doesn't go up either side of the tunnel and leave the nylon or PDS suture around the urethra. This can be helped by placing a superficial 3–0 vicryl suture from the sling to the urethra in the midline. (Figure 9.5)

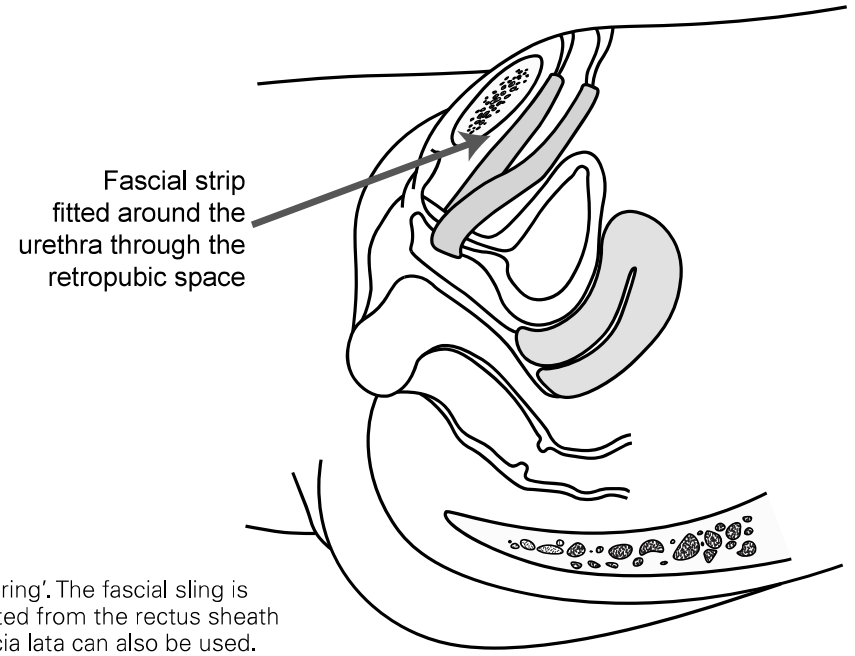

Figure 9.5
A 'sling on a string'. The fascial sling is usually harvested from the rectus sheath but tensor fascia lata can also be used.

This approach seems very sound and I use it regularly with good success, but there is a risk of perforating the bladder during the tunnelling. I have removed bladder stones that have formed around the nylon suture. When the sling was tunnelled the surgeon must have entered the bladder without noticing. When you tunnel the suture up, make sure you are creeping just along the posterior pubic symphysis, feeling where you are coming through the abdominal wall with your other hand. Then do a dye test to make sure you haven't perforated. These steps should decrease the risk of perforation.

As always, closing the vagina is just as important as the urethralisation and sling. I like to see an anterior vaginal wall at least 6cm long from the urethral meatus to the cervix. If the vaginal wall was very short and the meatus had been pulled inside the vagina and cervix forward, and you have mobilised it as above, you will have a larger gap to be filled on the anterior vaginal wall. You need to fill this with some sort of flap. My preferred option is the vascular pedicle flap, that is the Singapore flap (Figure 9.4 and see chapter 6—Vaginal Skin Defects). Not based on a blood supply, rotational flaps may contract up with time. So a vascular flap is preferable. You can also get a larger flap when doing the Singapore flap which, if the blood supply is maintained, won't contract with time, unless you compromise its blood supply somehow. However if the gap to be filled is only small, <1cm, then a rotational flap is fine.

When this has been done and sutured in place, anatomically it should start to look more normal, that is a more normal vaginal capacity, anterior vaginal length, a more normal position of the cervix and external urethral meatus. I like to re-fill the bladder with dye at this stage, then remove the catheter and see if the patient is wet either with posterior pressure on the vagina or suprapubic pressure, or by asking the patient to cough. I do like to see that there is no urine leakage but it really has no prognostic value. Plenty of my patients who leaked at the end of the operation whilst still under anaesthetic and in lithotomy position were not completely continent afterwards and others who leaked during this test were later completely dry!

Pack the vagina for 1 day. Leave the catheter for 5–7 days and always check the residual volume.

If the Urethra is Wide and Patulous

There is one final operation that I use to completely refashion a urethra. I use this operation when the urethral plug did not work because the urethra was wide and gaping, but I found that around 50% of patients become completely dry with it. (Figure 9.6)

It's based on an old operation described by Richard Turner Warwick in the 1960s. Some people unfairly call it TIT-BAPIBTA standing for Take it to Bits and Put it Back Together Again.

In this operation you mobilise the vagina off from the urethra in the standard way, then incise the whole length of the urethra posteriorly. Now you can see directly into the urethra and it is quite amazing and educational to see how abnormal these urethrae really are. They are often badly scarred and attached to the bones laterally, or dilated and patulous. Mobilise the urethral flaps and excise a strip of posterior urethra. Place a number 14 or 16 Foley catheter inside the open urethra and repair it over the catheter with interrupted 3–0 or 2–0 sutures.

You should now have a nice 3cm urethra fitting nicely and evenly around the Foley catheter. Check that it is closed properly by doing a dye test. I always add a sling, either muscle or fascia, but the next part again, is closing the vagina. It shouldn't be closed under tension and it is good to fill the dead space to either side of the urethra with some tissue to prevent it scarring out to the bones again in time. If there is plenty of vaginal skin I often use a Martius graft to fill that dead space; if not, then the Singapore flap again.

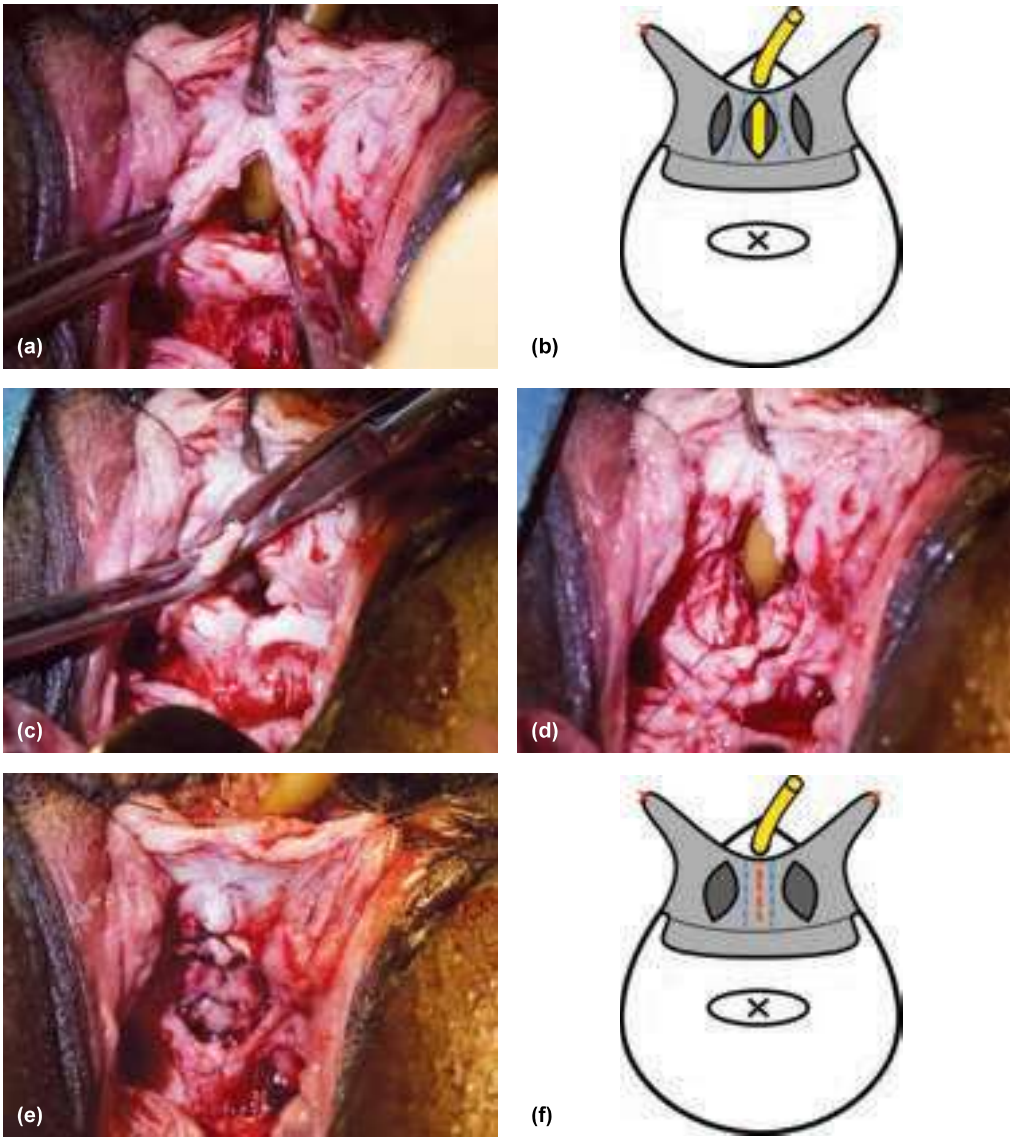

Figure 9.6
The Richard Turner Warwick procedure. a) The vagina has been mobilised off the urethra, the urethra mobilised laterally on each side and the posterior urethra incised to expose the foley catheter. Note the redundant tissue. b) In diagrammatic form. c) A small strip of posterior urethra is excised, right and left. Make sure you don't take too much—that would be a disaster. d) Repair the urethra with interrupted sutures. e) Fully repaired.

(g)

(h)

(i)

Figure 9.6 *(continued)*
f) Diagrammatically you can see that the once side urethra, outlined with blue dashes, is now narrow. g) I always place a sub-urethral sling, h) in this case a fascial sling from the rectus sheath. i) As is often the case, there was a gap in the anterior vagina that I filled with a Singapore flap.

A Slight Modification

I have recently started using a slight modification to the Singapore flap with some very good results. When you set the Singapore flap in place, put some PDS sutures through the flap on one side, then through the arcus tendinous lateral to the urethra on one side, then back through the flap near the entry point of the first suture. Don't tie it, and then do the same on the other side. Put the sutures through the flap about midway along the width of the flap in a position where you would want the flap to sit firmly (not too firmly) beneath the urethra to reinforce a sling type mechanism. When both sutures are in place, tie them and then suture the remaining edges of the flap in place. This will elevate the Singapore flap to the arcus tendinous on either side, in effect making a sling to support the urethra. I term it the Singapore sling.

In a recent series of ten patients deemed hopeless, that is with their fistulae closed but incontinence continuing despite several attempts at stress incontinence procedures, this simple step has made them dry. However, as with most things in obstetric fistula surgery, we don't have long term follow up.

Other Stress Procedures and Investigations (e.g. Urodynamics)

Ideally, urodynamic assessment should help us both to understand the cause and selection of surgery. It was available at the Addis Ababa Fistula Hospital to Carey and colleagues when they

first introduced the rectus facial sling there. They harvested the sling via a low mini-Pfannenstiel incision and mobilised the urethra off the posterior symphysis pubis, placed the sling as above and also placed a strip of omentum into the space between the urethra and posterior symphysis pubic.

A random group of incontinent patients was assessed urodynamically before doing this operation. Only 41% were found to have genuine stress incontinence with a compliant bladder. A similar percentage were found to have detrusor instability as well, which was thought to be a contraindication to surgery; the remainder had either a very small bladder or retention with overflow. Only the first group had the operation. Of these, 78% were dry on discharge, although some relapses were seen later.

In the past in Addis Ababa urodynamic testing was used to select patients for a stress procedure. Only patients with a bladder capacity of 200cm³ or more were accepted. About 70% of patients with serious stress fulfilled these criteria. Small capacity of the bladder rather than bladder wall instability appears the main contraindication in the other 30%; they are managed with urethral plugs where possible. In the hands of one surgeon who specialised in this procedure, at least 40% of these selected cases appear cured and another 40% considerably improved. This was the preferred operative method in Addis during the early 2000s but has since been abandoned. It was successful to some degree. I tend to think that if they also focussed on making the urethra more anatomically correct in addition to the sling and repairing the vagina, the success would have been better, but this has not been studied.

It raises the question of the role of urodynamic patients in fistula surgery. More recently 176 patients with ongoing incontinence after fistula repair underwent urodynamic testing in Addis Ababa. The majority had mixed incontinence, that is stress and over-active bladder, 29 had overflow, only two had isolated over-active bladder. One hundred and fifty five of them tried oxybutynin for two months but only nine were helped with regards to incontinence, although 65 had symptoms of urgency improved, but importantly not their symptoms of incontinence. By ignoring the results of urodynamic testing and performing the above operations, our success rates have been maintained or even improved. Because of the expense and lack of evidence to show the value of urodynamics in our setting, we recommend that urodynamics be kept as a research tool until there is evidence of its benefit.

There are many ways of performing the operations that are described in standard operative textbooks of urology or gynaecology, but it should be appreciated that in countries where these textbooks were written, the urethras they see are intact, whereas in a fistula patient the urethra is damaged, surrounded by fibrosis and functionless tissue. Methods used to help women with incontinence who are without a history of fistula cannot immediately be transferred to our patients. Methods applicable to fistula patients are described by Judith Goh and Hannah Krause in their book, by Michael Breen in his lecture notes and of course by Kees Waaldijk.

Kees Waaldijk, who has vast experience of fistula surgery in Northern Nigeria, has evolved his own operation for stress incontinence, which has been used in over 500 cases. This involves a radical plication of urethra and bladder base—even more so than in my operation. A form of

colpo-suspension is then performed in which the bladder base is hitched up, using the remaining pubo-cervical fascia, to the arcus tendinus region on the pelvic side wall. All this is done from below through the widely opened para-vesical space, using an aneurysm needle for access. This has worked well for Waaldijk, with up to 60% of patients being completely dry. However, this method has not been widely used by others and, as with my approach others have had trouble replicating his results.

Finally, it should be mentioned that some enthusiastic visiting surgeons have performed tension-free synthetic tape operations on selected patients. The trans-obturator method has been favoured because such good results are reported in non-fistula patients. However, our fistula patients are young, usually with scarred, rigid, shortened urethras and vaginas—quite different from patients in developed countries. It is not surprising that several unsatisfactory results have occurred, with a serious risk of later erosion of the tape. We see no place for its use on a casual basis. In my practice I have had to remove every tape that I have seen put in due to erosions and there is a paper from Niger showing a higher complication rate using the synthetic slings in fistula patients as compared to using native tissue slings and with no added curative benefit.

Only a few surgeons are regularly operating on patients with ongoing incontinence. Clearly the problem of ongoing incontinence is a major one and overall it is being poorly addressed. There is an urgent need for those surgeons involved full time in fistula surgery to develop the techniques described in this book, study the results, report them with clarity and then together work on ways to improve the outcomes for these, the most unfortunate of fistula patients.

Urethral Plug

This is put in for historical reasons as the urethral plug is now no longer made, but it may become available again, and some use permanent catheterisation with a spigot or a blockage to try and replicate it.

The urethral plug is a small, simple device that, as the name suggests, merely plugs the urethra to stop urine draining out. (Figure 9.7) It can be used for any patient who is still severely bothered by her incontinence.

There are a few patients in whom plugs will not work. These are usually patients with very small bladders or very wide urethras.

The plug is inserted into the urethra with the aid of an introducer. The patient should be able to do this quite easily herself after a few lessons. She may be helped by using a small hand-held mirror. The introducer is removed after insertion and kept in a safe place. When she feels urine in the bladder or urine starts to leak around the plug, often signalling a full bladder, the plug is simply pulled out of the urethra. The urine will run out. When that is finished, replace the introducer and reinsert the plug into the urethra.

I have seen some patients in whom there has been a demonstrable increase in bladder size over time, discharged with a bladder capacity of 100ml and completely wet, and later return with a capacity of 300ml and no longer using the plug because they are continent.

Some risks are involved with use of urethral plugs, namely infection and trauma to the urethra causing bleeding and pain. To minimise these, the patient is told to use the plug for only 12 hours a day—either all night or all day, but not both.

There have also been reports of plugs being lost in the bladder. Where an operating cystoscope was not available, the plug had to removed by open cystotomy.

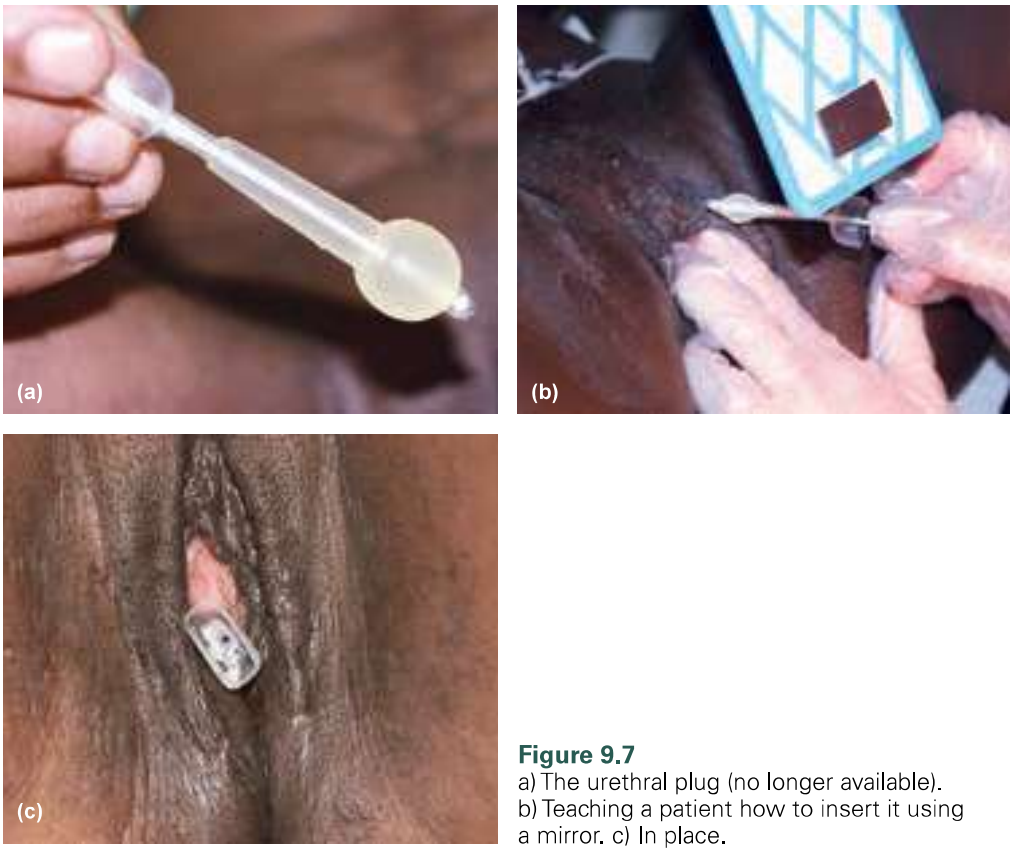

Figure 9.7
a) The urethral plug (no longer available). b) Teaching a patient how to insert it using a mirror. c) In place.

The plug is meant to be a single use device, but, owing to its cost, this is clearly not possible in the developing world. The patient is taught to clean it with soap once a day and to rinse it after each application, along with increasing the amount of fluid that she drinks. This reduces the chance of infection, and one plug can last up to about a month with this regime. The patient can return for follow up and assessment if she needs more plugs.

Because of the shortage of supply I have a few patients permanently on Foley indwelling catheters as an alternative. They have them spigotted (blocked) and they need to be sent home with a supply of catheters, syringes for the balloon and good instructions on cleanliness, drinking and catheter care. They need to go to a nearby health centre to have their catheter changed every month to try and prevent increasing colonisation of the foreign body (with some days 'rest' between removing the catheter and replacing it). They should return back to the fistula unit for checks every six months or so. Not every patient can manage this safely, nor do many patients want it.

There is anecdotal evidence from Addis Ababa where plugs were used for some years. They found that after some time the patients' kidneys showed significant hydronephrosis. It's not known whether this was present before the patients started using the plugs but it's not unreasonable to think that obstructing the urethra might lead to it. If the patient is using the plug for just 12 hours a day you would think this might not happen. If the plugs are used again or if you use a semi-permanent catheter with a spigot then it would be a good idea to perform an ultrasound before you start using it and then regularly at follow up to see if a hydronephrosis is appearing or worsening.

Further Reading

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