

CHAPTER 2

JUXTA-URETHRAL AND LARGE FISTULAS INVOLVING THE URETHRA

Section 2.1: Non-circumferential
Section 2.2: Circumferential 3/4 and 4/4 without significant gap
Section 2.3: Circumferential 4/4 defect with significant gap: circumferential dissection
Section 2.4: Overcoming size discrepancy and different ways of closing large fistulas

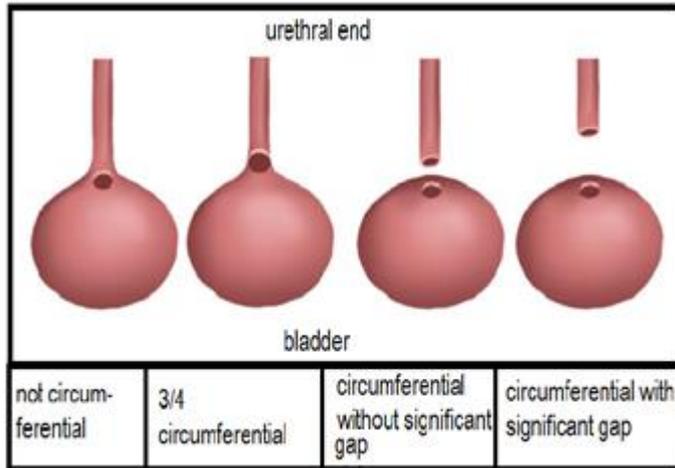


Fig. 2.1: This shows the different types of juxta-urethral fistulas.

In juxta-urethral fistulas, the fistula involves the proximal urethra and the distal bladder (See Fig. 2.1 and 2.2). They can either be:

- (a) *Non-circumferential*: involves posterior ± lateral wall: See example Fig. 2.3a
- (b) *3/4 circumferential*: involves the posterior + lateral ± part of anterior wall.
- (c) *4/4 circumferential*: involves the posterior, lateral and complete anterior wall i.e. the urethra is completely transected. These can be subdivided into those without a significant gap and those with a significant gap (Fig. 2.3b).

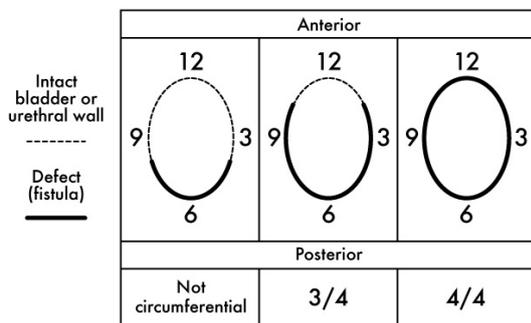


Fig. 2.2: The circle represents the urethra or bladder wall – a cross-section at the level of the fistula. The thin line is the remaining intact bladder or urethral wall. The bold line is the defect (fistula).

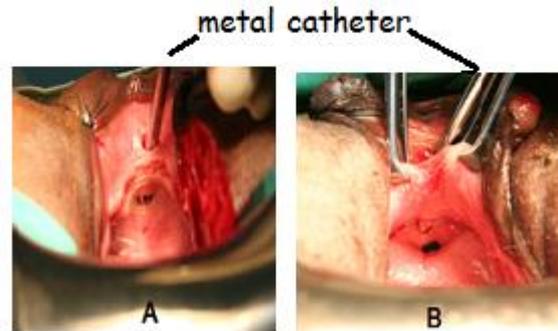


Fig. 2.3a: Shows a non-circumferential juxta-urethral fistula. Fig. 2.3b: Shows a circumferential defect where you can see the urethral end (as shown by the metal catheter) is separate from the bladder opening.

During repair:

- (a) *Not circumferential*: repair starts lateral to medial on the posterior wall.
- (b) *Circumferential 3/4 and 4/4*: repair starts first medial to lateral (12 o'clock to 9 or 3 o'clock) on the anterior wall; then lateral to medial (9 or 3 o'clock to 6 o'clock) on the posterior wall.

(2.1) JUXTA-URETHRAL FISTULAS: NON-CIRCUMFERENTIAL

The distal dissection and closure is more difficult than for most fistulas so the following tips are needed:

(a) Dissection-distal lateral

Make the lateral incisions and the incision around the fistula in the routine manner as described in chapter 1 and shown in Fig. 2.4a.

⚠ Top Tip! It may be difficult to get access to make the distal incision. In this case, (after the lateral incisions are made but before the distal incision), place the Allis forceps on the areas marked X in Fig. 2.4a and pull it up. Using the scissors, cut under the vagina by pushing the sharp tips of the curved scissors beneath the vaginal skin under the Allis forceps so that the area X is mobilized upwards. Once the vagina is freed up here, it

is then much easier to make the central part of the distal incision (distal to the fistula/ urethral opening) see Fig. 2.4 b+c .

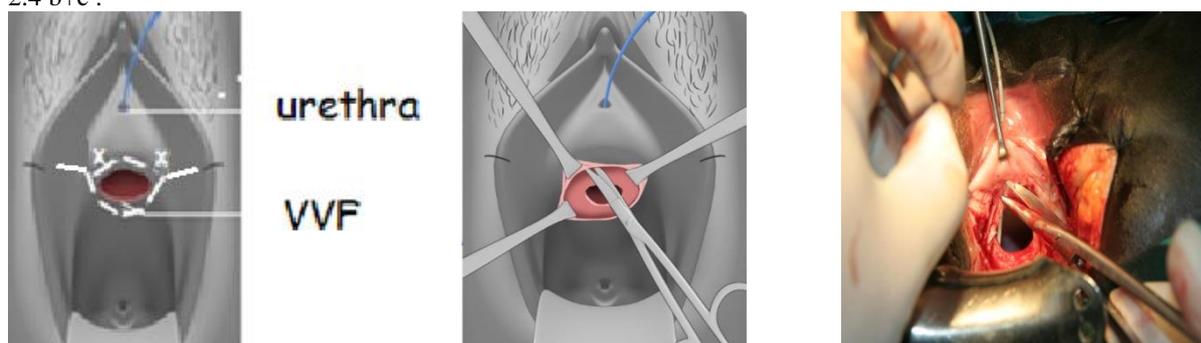


Fig. 2.4a: Shows the area marked X which is formed by the initial incisions.

Figs 2.4 b+c: Show the X area being dissected by pulling up on an Allis forceps. Note the scissors is aiming laterally towards the patient's shoulder. The Allis forceps in the photograph would be better placed just above where you will cut as in diagram b.

(b) Dissection-distal central

After doing the distal lateral dissection, this is the next step. Use sharp dissection with a knife or scissors.



Fig. 2.4d: Shows the distal flap being mobilized by inserting one blade of scissors between the vagina and urethra and then cutting.

Fig. 2.4e: Shows the metal catheter in the urethra. In this case, the incision is made with the scalpel.

! Tip! A neat trick (Fig. 2.4d) when cutting or mobilizing the distal vagina: get one blade of the scissors flat in between the vagina and urethra laterally on one side and then turn the scissors horizontal. Cut to separate the vagina off the urethra. This is not always possible and if the tissues are very scarred it is easier to mobilize the central part with a knife instead. The urethra can be very short here, so be sure to stay superficial in the vaginal wall dissection.

! Tip! If you have difficulty with mobilizing the distal vagina, extend the lateral incisions. When dissecting near the urethra, stay close to the vaginal skin. Otherwise, you will end up with a very thin urethral wall to anastomose to the bladder, and the sutures in the urethra will tear the tissues.

! Tip! Some operators like to place a metal catheter in the urethra to help exposure (Fig. 2.4e). By pushing this forward, it can help display the tissue to be cut. However, it can also reduce the mobility of the tissues, so it may be necessary to remove it at some stages. You can also put the metal catheter into the fistula to push forward the proximal wall or angles to improve the vision of the corners.

! Top Tip! After all the dissection is done, if you still cannot see the lateral angles of the fistula clearly, it means you need to mobilize more laterally. You must see the angle before you close it. If you still fail to see the angle clearly this means you are dealing with a circumferential defect and need to do circumferential dissection.

(c) Closure-angles

I would often take four bites when doing a difficult angle as shown in Fig. 2.5a. This is repeated on the opposite angle.

- **Bite 1:** When closing the fistula, the distal bite of the angle suture first goes into the periosteum (or the tissue over the bone) of the inner surface of the inferior pubic ramus. (If you think of the pelvic outlet as a

circle, these are placed at 11 o'clock on the right and 1 o'clock on the left). This gives a very good hold for the suture. A useful way of checking that your stitch has gone deep enough into the periosteum and to confirm you have a strong hold (purchase) of periosteal or peri-urethral tissue, is to pull on both ends of the stitch after you have gone through the periosteum and see if the patient moves as you pull on it! When taking the bite on the left side, try placing with a back-hand grip as this often gives a better approach.

- **Bite 2 + 3:** There is no problem with going into the urethral or bladder lumen if necessary to get good closure.
- The backhand grip is extremely useful for placing all or most of the sutures at or near the angle on the left side (See Appendix 2). Mount the needle facing your left and raise your elbow up in the air to do this.

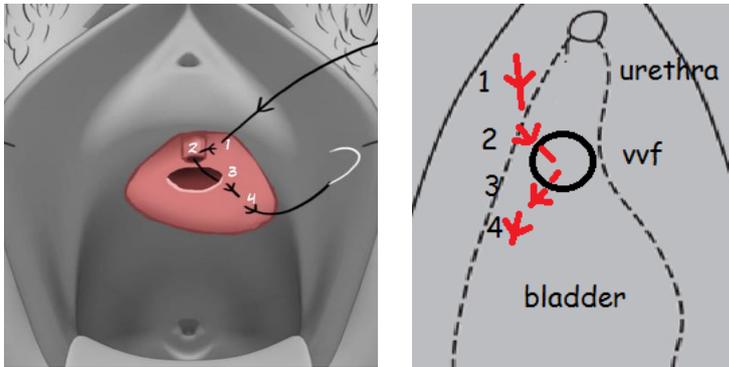


Fig. 2.5a: Shows the closure of a difficult angle.

- The first bite is well above the angle to get a good bite.
- The second bite goes into the urethral lumen (out to in) on the distal part of the angle.
- The third bite passes from in to out on the proximal (bladder) part of the angle.
- The fourth bite is proximal to the angle.

⚠ Top Tip! Using the 4-bite angle closure technique is useful for any difficult angle that involves the urethra.

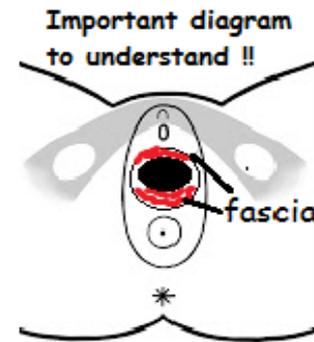


Fig. 2.5b: When closing any fistula which involves the urethra, try to incorporate any fascia present (shown in red) on both distal and proximal ends of the fistula into the urethral + bladder closure to give extra strength.

- Distally take the fascia or, if the fascia is absent, bite onto the periosteum.
- Proximally take the fascia which usually has a shiny appearance.

⚠ Tip! If the angle of the fistula goes very lateral: (a) Make sure that the lateral dissection is sufficient. (b) Consider if circumferential dissection would help (see below). (c) If the angle is formed by a lateral tear of the bladder, suture directly as in Fig. 2.5c.

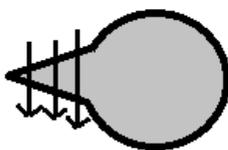
⚠ Top Tip! It is often a good idea to include the pubo-cervical fascia in the closure of the fistula as shown in Fig. 2.5b. Suture from:

- The distal fascia which is tightly connected to the urethra and para-urethral tissue. If the distal fascia is poor, takes good bites of the periosteum instead.
- To the bladder edge proximally (c) then bite the proximal fascia which is found between the bladder and vagina. In fact, some surgeons only pick up the fascia distally and proximally without picking up the urethra/ bladder as these are closely adherent to the fascia so should close as you approximate the fascia.

The advantages of doing this are:

- With the sutures mainly in the fascia, it means there is less risk of causing ischaemia to the urethra. This is particularly important when the urethra is short.
- It should improve the continence mechanism by correcting the defects in the endopelvic fascia which prevent it from functioning effectively.

CAUTION! Remember that the ureters run between the bladder wall and the pubocervical fascia so if your bites are too deep in the fascia proximally, you may catch the ureters.



⚠ Tip! Sometimes the angle/ defect in the bladder goes quite lateral i.e. it is like a lateral tear in the bladder. In this case, just close the angle first with 1-3 simple sutures working from lateral to medial. Once this lateral part is closed, then you may later consider using the suture in Fig. 2.5a.

Fig. 2.5c: Shows a lateral extension of the fistula being closed first.

(d) Closure-central part

- When the fistula is almost closed, it may help to place all the central sutures first with the metal catheter in place and leave them on artery forceps. After they are all placed, they can be tied after replacing the metal catheter with a Foley catheter.
- It may also be very helpful to use the metal catheter (inserted into the urethra and bladder) to stretch the urethral and bladder walls as you place the stitches.

If the urethra is very fragile: If you are about to put a suture through the urethra, feel the thickness of the urethra by pressing against the metal catheter in the urethra. If the urethra feels very thin, then it is better to take bites out more laterally and only put 1-2 sutures in the urethra itself. Also, you may want to consider using a smaller needle here to avoid more damage to an already compromised urethra. If you see after placing a suture that the urethra is likely to tear (i.e. small hole occurs after inserting the needle or as you begin to tie the suture), it is better not to tie the suture. Take the suture out and place a suture more laterally where the urethra is stronger.

⚠️ Top Tip! If the urethra is very fragile and tears as you place or tie a suture, the best way to deal with this is to close the defect with the help of a muscle patch. Usually, the para-urethral (bulbocavernous) muscle is easily accessible. You may even consider placing a Martius flap over the repair.



While in theory, in order to lengthen the urethra and hopefully reduce the risk of stress incontinence, closing a juxta-urethral fistula longitudinally seems a good idea, in practice this usually creates too much tension and risks stenosis. There is a real risk of a stricture developing later which is difficult to deal with. Therefore there is no benefit to the increased length gained in the urethra. For this reason, transverse closure is a better idea in most cases. Note: This applies to juxta-urethral fistulas rather than pure urethral fistulas which usually have to be closed longitudinally(as seen in Fig. 2.8).

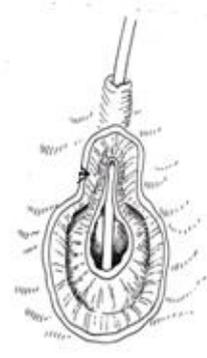


Fig. 2.6a: Shows a torn urethra + VVF.

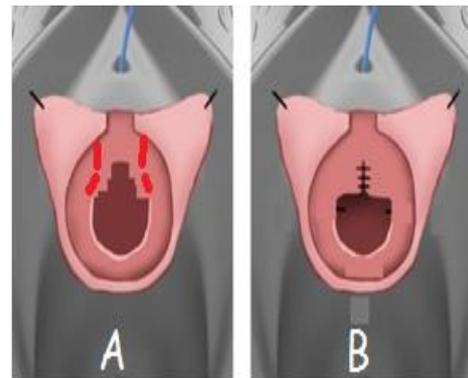


Fig. 2.6b: Shows two incisions (red) made to mobilize the tissues to lengthen the urethra.

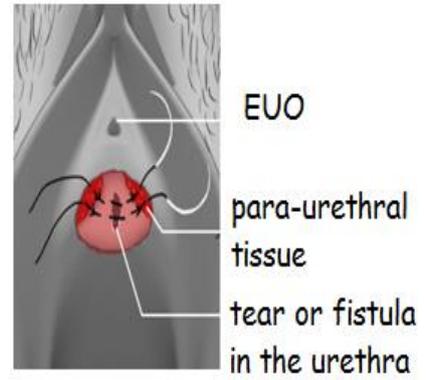


Fig. 2.7: Show the para-urethral tissue being used in closure of urethral tear.

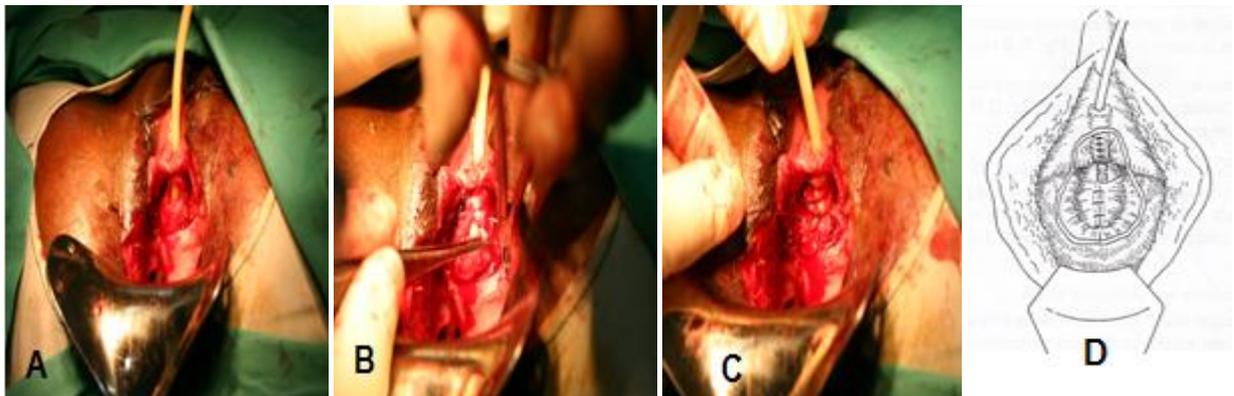


Fig. 2.8: These three photographs and one diagram show longitudinal closure of a urethral fistula. A shows the unrepaired urethral fistula. In B the longitudinal (side-to-side) repair is being started with the edges being grasped with dissecting forceps. In C and D the repair is completed with interrupted sutures.

If the urethra is very short or already torn in the midline: This usually only occurs with a large defect. If the urethra is less than 1-2 cm, it is often possible to lengthen it to allow it to be re-anastomosed to the bladder.

- (a) Make two vertical incisions (Fig. 2.6b) on either side (2.5-3 cm apart) to mobilize the tissues. These allow the urethral tissue to come together. These are similar to the incisions made for a neourethra in section 4.1. The incisions are made deep and just medial to the ischiopubic ramus bone.
- (b) If the tissues are very fragile: If you just try to stitch the urethra, the stitches will pull through. It is better to pick up the pillars of para-urethral tissue on either side (bulbocavernosus) with Allis forceps and mobilize (see Fig. 2.7). The tissue is found just beneath the skin on either side lateral to the urethra. Stitch from para-urethral tissue to the urethra and then the para-urethral tissue on the other side (Fig. 2.7). Using the para-urethral tissue prevents the stitches cutting through.

If there is a small fistula confined to the urethra which usually occurs after a previous repair, then you usually need to use the para-urethral tissue on either side to help in the closure of the fistula as in Fig. 2.7.

(2.2) JUXTA-URETHRAL: INCOMPLETE (3/4) AND COMPLETE (4/4) CIRCUMFERENTIAL DEFECT WITHOUT SIGNIFICANT GAP

- (a) **3/4 Defects:** The defect extends more laterally than that in section 2.1 i.e. involves the posterior, lateral and part of the anterior walls. These are more common than complete (4/4) defects and usually there is a bridge of tissue on the anterior bladder joining the urethra and the bladder.
- (b) **4/4 Defects without significant gap:** Even though they are circumferential, if there is no difficulty bringing the tissues together, there is no need to do a full circumferential dissection provided there is not much scarring or stenosis at the junction of the urethra and bladder.

With both of these defects, the difference from non-circumferential defects is that the anterior part of the fistula has to be closed first.

! Tip! To avoid confusion, remember that the anterior urethra (12 o'clock in diagrams) and the anterior bladder (12 o'clock) are adjacent to the pubic bone.

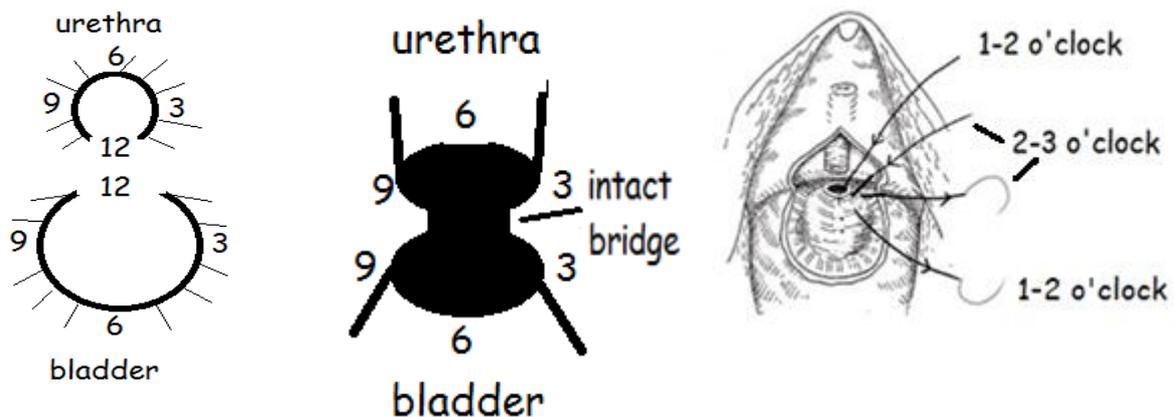


Fig. 2.9a: Imagine the edges of the defect in the bladder and urethra (dark line - almost a circle) to be a clock face with the intact anterior bridge between 11 and 1 o'clock. Start suturing on the anterior aspect (1-2 o'clock on left or 10-11 o'clock on right) coming round the defect to close it and working each side in turn until you reach 6 o'clock on the defect.

Fig. 2.9b: Shows the first (1-2 o'clock) and second (2-3 o'clock) stitch being inserted antero-laterally for 3/4 defects.

Closure: To close the anterior part of the defect, start medially to lateral on the anterior wall i.e. start where the tissue bridge ends. The distal part of the stitch bites into periosteum and para-urethral tissue. The proximal part of the stitch bites the bladder more anteriorly than laterally.

- (1) The first stitch is inserted at 1-2 o'clock on left and at 11-10 o'clock on right (see Fig. 2.9b). You may sometimes use the four-bite angle stitch when doing these as in Fig. 2.5a if this gives a secure closure.
- (2) A second stitch is inserted a little more laterally at 2-3 o'clock on left or 10-9 o'clock on right (see Fig. 2.9b). Usually, it only takes 1-2 stitches to close the anterior defect.
- (3) Once the anterior part is closed, start laterally at 3 and 9 o'clock to close the lateral and posterior defect as usual. Often the 4-bite angle stitch as in Fig. 2.5a is useful.

! Tip! When closing the bladder, remember to hold the lateral proximal bladder with Allis forceps close to the angle and pull it medially to see the angles clearly (see Fig. 1.23a+b). Otherwise, you will leave gaps.

! Tip! If you are struggling to close the angles in these defects and you have mobilized well laterally, then it is often easier to do a full circumferential dissection as in section 2.3. This will allow a better closure of the angles.

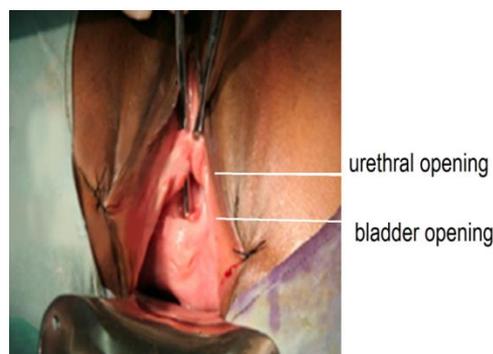
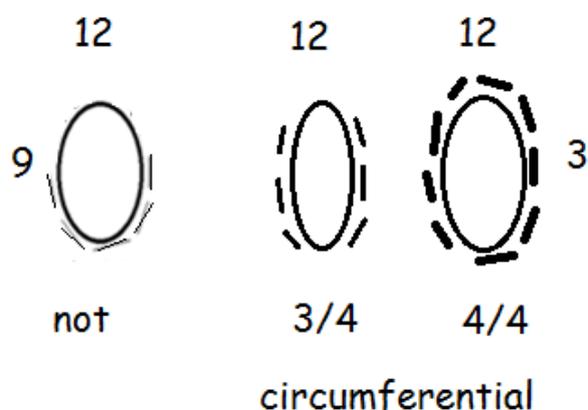


Fig. 2.10: Shows where the sutures are inserted in the different defects.

Fig 2.11: Shows a complete circumferential defect with a wide (3-4 cm) gap.

Dissection: In each of the above defects, you follow the previous dissection steps (see section 2.1).

(2.3) JUXTA-URETHRAL COMPLETE (4/4) CIRCUMFERENTIAL DEFECT WITH SIGNIFICANT GAP: CIRCUMFERENTIAL DISSECTION

Almost all circumferential fistulas involve the urethra and they occur against the posterior pubic symphysis. There is no connection between the urethra and the bladder i.e. there is separation of the urethra from the bladder with a defect posteriorly, laterally and anteriorly, from ischaemic tissue loss. In this case, as there is a significant gap, an end-to-end anastomosis must be performed between the bladder and the urethra.

- The proximal end (bladder opening) is usually obvious on vaginal examination.
- The distal end (urethral opening) is more difficult to see as it retracts behind the pubic symphysis. It is often stenotic and it may have to be opened and/or dilated.

It is important to recognize circumferential defects because if you only see the obvious defect (which is the bladder opening), you will not close the defect properly. You may end up closing the bladder and causing obstruction. The indications for circumferential dissection are:

- If there is a large gap > 1 cm between the proximal end of the urethra and the bladder. The aim is to bring the bladder down to the urethra without tension.
- If it will make it easier to close the angles of the fistula more securely.
- If there is a lot of scar tissue or if there is a stricture of the urethral end: the circumferential dissection often helps to remove it.

The main advantages of circumferential dissection are:

- It greatly increases the mobility of the bladder and a difficult repair becomes easier. If there is any difficulty in bringing the bladder and urethra together, then it is usually worth doing.
- It may reduce the incidence of stress incontinence.

If the urethra is stenosed: The urethral end of the fistula is commonly blocked and can be unblocked by:

- (a) Using an artery forceps: Place it into the urethral meatus with the curve and tip facing upwards (towards the clitoris). Then as you steady the forceps with your left hand, give a sharp smack on the artery forceps with the palm of your right hand. Surprisingly this does not usually cause false passages.
- (b) Pushing the metal catheter (with the curve facing upwards) through. Place a finger at the proximal end of the blocked urethra to make sure the catheter only goes through the urethra.
- (c) If there is still difficulty: use urethral or Hegar dilators.
- (d) You can make a small incision with a scalpel in the urethral end of the fistula at 12 o'clock position as you stretch the urethra with the metal catheter.

! Tip! When dilating the urethra, stay close to the bone to avoid perforating through the (posterior) urethral wall.

! Top Tip! After circumferential dissection (see below), it is a good idea to cut out any stenotic area of the urethra or bladder on the assumption that if you tear and dilate scarred tissue it will just re-stenose. Cutting back to healthy tissue should give a better result. (The Foley catheter should pass in with ease.) Otherwise, these patients will be at high risk of urethral stenosis later (see section 6.3).

- Usually, just cut off the stenosed tip of the proximal end of the urethra. If that is not sufficient, make a small incision at 12 o'clock in the urethral end ("spatulation") until the catheter passes without resistance. Usually, you only need an incision of a few millimetres.
- Occasionally the bladder end of the fistula is also stenosed and any scar tissue should be excised.

CIRCUMFERENTIAL DISSECTION AND REPAIR: This needs the exaggerated lithotomy position and very steep head down tilt.

Incision: Either: (a) Do all the usual incisions and dissection as for any fistula and then do the extra incision or (b) Do the distal dissection and then make the extra incision for circumferential dissection. The proximal and lateral dissection may be done after the extra incision. (Reflect the distal vagina off the urethra first and suture it out of the way, which helps to bring the fistula into view.) By doing the extra incision early, this brings the bladder down which makes it easier to do the proximal and lateral dissection.

Extra incision: Make a transverse incision (Fig. 2.12a) between the bladder and the urethra. You can then mobilize the anterior bladder off the back of the pubic symphysis allowing it to be sutured to the urethra with much less tension.

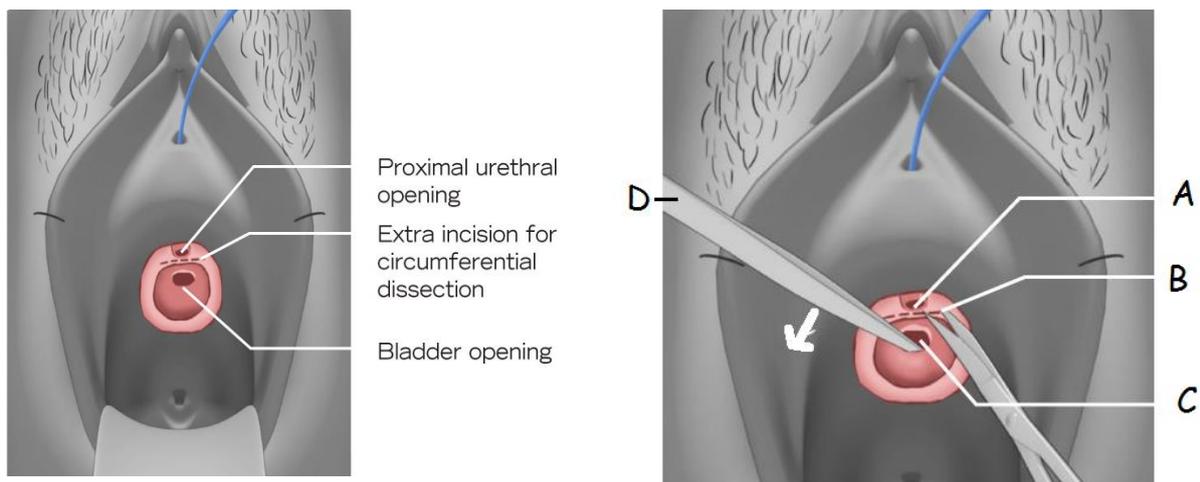


Fig. 2.12a: Shows where the extra incision is made anteriorly between the bladder and the urethra.

Fig. 2.12b: The dissecting forceps/pickups (D) are used to stretch the bladder proximally as you make the extra incision (B) and dissect the bladder off the pubic bone. A = proximal urethra C = bladder opening.

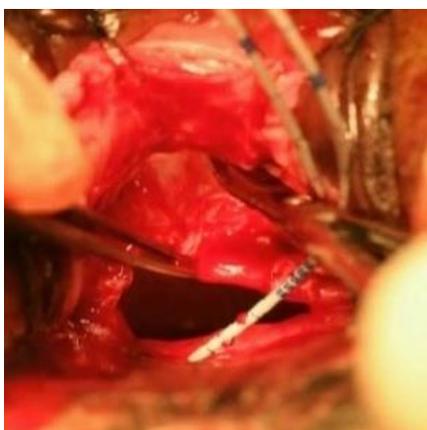


Fig. 2.13: Shows dissection of the anterior bladder off the pubic bone.

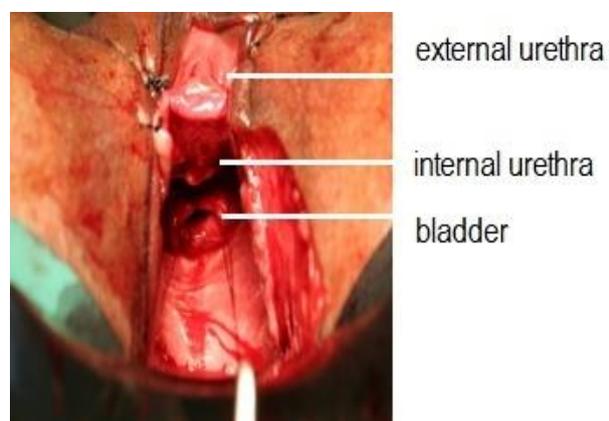


Fig. 2.14: Shows the bladder after circumferential dissection ready for end-to-end anastomosis to the urethra.

- Put the toothed dissecting forceps on the proximal edge of the bladder to stretch it proximally as shown in Fig. 2.12b. Another option is to grasp the edge of the bladder as high as possible with Allis or dissecting forceps and pull down on these (see Fig. 2.13). Now make the extra transverse incision with a knife or scissors. When making the extra (transverse) incision, stay close to the symphysis to avoid injuring the bladder. It is often easier to use scissors in dissection rather than the knife. Your left-hand stretches the bladder; your right-hand does sharp dissection with scissors/knife (Fig. 2.13).
- Mobilize the bladder well by sharp and blunt dissection to get into the retropubic space. There is usually a lot of scar tissue to be released. Sharp scissors are used for this.
- Once through the scar tissue, there will be a very clear palpable and visual release of the anterior bladder from the posterior pubis. You will see para-vesical fatty tissue and small vessels. It is critical to keep the dissection close to the pubis to avoid tearing or cutting of the thin anterior bladder.
- Redundant scar tissue at either the bladder or the urethra side of the fistula should be excised before anastomosing the bladder to the urethra. You should now see the fistula opening of the bladder and the proximal urethra as shown in Fig. 2.14.

Tip! The ureters often have to be catheterized during circumferential dissection. However, the catheters cannot be pulled through the urethra until the anterior layer of the fistula is closed. Because the catheters are not fixed, they will often come out during dissection and may be difficult to re-insert. One way to fix them temporarily is to pass the catheters under a small fold of the drapes using a towel clip to keep them in place. Alternatively, they may be placed under the sutures used to retract the labia minora.

Closure - Anterior row (11, 12 + 1 o'clock): The anterior wall of the bladder is stitched/ re-attached to the anterior wall of the urethra i.e. 12 o'clock on the urethra is sutured to 12 o'clock on the bladder. This is best done by placing three interrupted sutures at 12, 11 and 1 o'clock before tying any of them (Fig. 2.15a). The distal bite of each stitch goes mainly into the periosteum beside the urethra rather than through the urethra because the urethra is fixed to the symphysis. However, part of the bite may go through the urethra. A 2/0 Vicryl J602H 5/8 needle is ideal as it is strong enough to go through the periosteum (see Fig. 2.17b).

	The distal bites go mainly into the periosteum beside the urethra rather than into the urethra itself. If you only go into the urethra, you will tear it. By going into the periosteum beside the urethra it brings the bladder and the urethra together. Check with the metal catheter that you do not occlude the urethra after you have placed the stitches.
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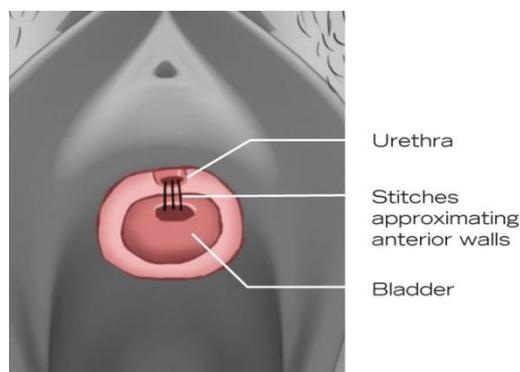


Fig. 2.15a: Shows the anterior layer of sutures in place.

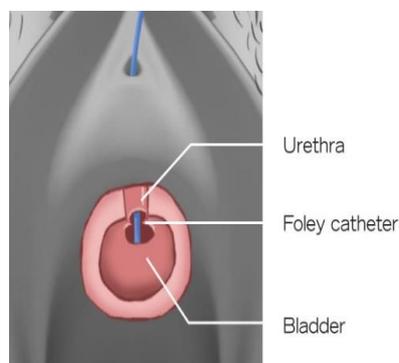


Fig. 2.15b: Shows the bladder and urethra approximated after the sutures have been tied.

- The proximal bite of each stitch is through the bladder. Take a good size bite but avoid the mucosa if possible.
- The first suture is placed at 12 o'clock picking up the anterior urethra and the pubic symphysis and then the anterior bladder wall (Fig. 2.16, 2.17a).
- The other sutures are placed at 11 and 1 o'clock.
- Check with the metal catheter after each of these bites that the urethra/ proximal bladder is not blocked.

Tip! It is often easiest to place the distal bite of the 12 o'clock stitch in a more transverse direction rather than vertical. To do this, direct the suture from the patient's right to left through the periosteum at 12 o'clock with a forehead throw of the needle.



Fig 2.17b: Shows the UR 6 needle which is particularly useful for all the anterior and lateral sutures.

Fig.2.16: Shows the 12 o'clock stitch being inserted into the periosteum.

Fig. 2.17a: Shows the 12 o'clock suture now being inserted into the anterior bladder.

Closure –antero-laterally (10 + 2 o'clock; 9 + 3 o'clock): Once the anterior row is placed, then close laterally on each side.

- A suture is placed on each side at 10 + 2 o'clock. However, the distal bites of these are placed more from the antero-lateral aspect of the urethra rather than trying to get bites of the periosteum i.e. these bites include mainly para-urethral tissue and the side of the urethra.
- Place sutures at 9 and 3 o'clock (you do not usually need to use the four bite suture as in Fig. 2.5a to do this as the lateral part of the fistula should be easy to close after circumferential dissection). The distal bites may have to be through the periosteum laterally if there is no other tissue available i.e. stitch bladder to bone.

Closure- posteriorly (8, 7, 6, 5, and 4 o'clock): The posterior row closure is performed as usual with any VVF with stitches at 8, 7, 6, 5, and 4 o'clock.

Note: Most of the distal sutures are placed in the periosteum and para-urethral tissue rather than the urethra. Not all repairs will require 12 sutures as shown in Fig. 2.18b. Aim for the minimum number required to close the defect.

	<p>It is important to place the urethral catheter before you finish the repair. Otherwise, if there is difficulty inserting it later, you may pass the catheter through the anterior wall of the repair so it ends up retropubically, which can be difficult to recognise. It is a good idea to have the metal catheter in place as you insert (but do not tie) the central 3-4 sutures. Then remove the metal catheter and insert the Foley catheter. Then tie all the central sutures. This prevents the Foley catheter from being caught by sutures.</p>
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!Tip! Occasionally with bad circumferential fistulas, there is an upward tear in the anterior bladder when it is dissected off the pubic bone (Fig. 2.18c). To reach the apex, you often need to 'walk around' using two Allis forceps. Start laterally on one side and work your way around anteriorly until you reach the apex. Once mobilized, it is better to close this tear separately before doing the rest of the circumferential repair. It is easiest to do this in 1-2 continuous layers.



Fig. 2.18a: The repair is completed by closing the posterior layer.

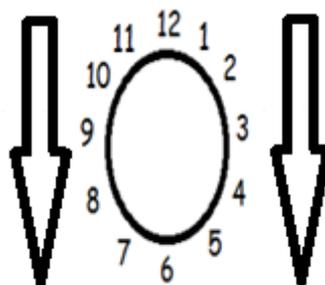


Fig. 2.18b: This summarises where the sutures are placed looking at the **bladder** aspect of the fistula.

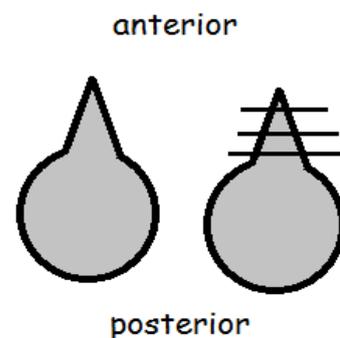


Fig. 2.18c: This shows an extension or tear of the anterior bladder wall which is closed separately before the circumferential repair.

(2.4) OVERCOMING SIZE DISCREPANCY AND WAYS OF CLOSING LARGE FISTULAS

Most large defects are circumferential, involve the urethra and need full mobilization on the bladder side. The problems with most large fistulas are:

- i. The distal part (urethra) is narrower than the proximal part (bladder) as seen in Fig. 2.19a+b+c. This means you have to squeeze together (concertina) the sides of the bladder when stitching, which reduces bladder capacity.
- ii. During closure of the defect, it will mean a lot of sutures are placed in the para-urethral and urethral tissues distally. The typical situation is where you are faced with a large defect and a short urethra of only one centimetre. You may end up with a urethra that sloughs off due to ischaemia.
- iii. Closure tends to pull the ureters distally towards the urethra. It is thought that ureters placed immediately adjacent to the proximal urethra could contribute to incontinence after repair.

There are several ways to overcome the problems of width discrepancy:

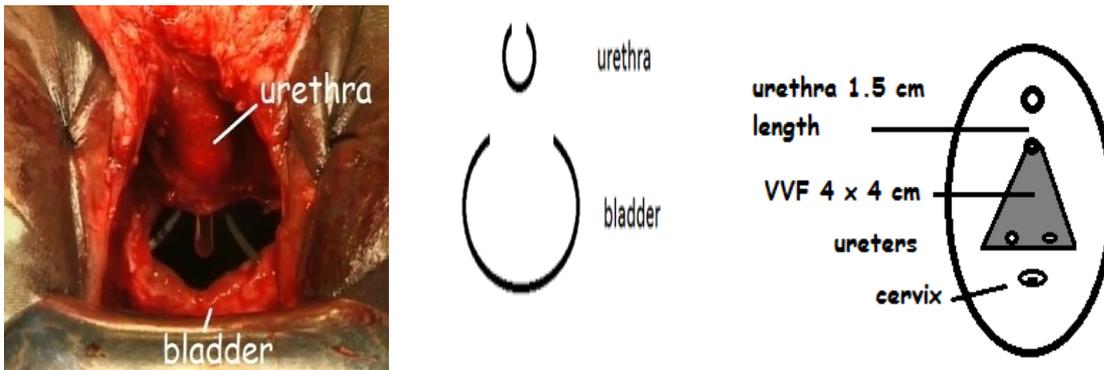


Fig. 2.19a: Shows a juxta-urethral fistula where a normal size urethra needs to be joined to a wide bladder defect. Fig. 2.19b: A cross-section view of urethra and bladder as seen in Fig. 2.19a. The black represents the edges of defects in the bladder and urethra. Fig. 2.19c: Shows an example of a VVF with discrepancy.

(OPTION 1): TRANSVERSE APPROACH

This is the traditional approach with transverse closure but modified to try to avoid the above problems.

- Most of the distal lateral sutures are placed in the bone/periosteum and the distal fascia. Only a few central sutures go through the urethra or the fascia over the urethra.
- Then the proximal sutures are placed in the bladder and more especially the fascia overlying the bladder.

If you have done a circumferential repair after the anterior sutures of 12, 11 and 1 o'clock and 10 and 2 o'clock have been placed, in relation to Fig. 2.19e:

- Place the most lateral sutures (marked 1) at 3 and 9 o'clock.
- The next sutures (marked 2) are placed at 8+7 and 4+5 o'clock.
- Then do midline sutures (marked 3) at 6 o'clock.
- You may then place extra stitches in between these to make sure there is no mucosa protruding.

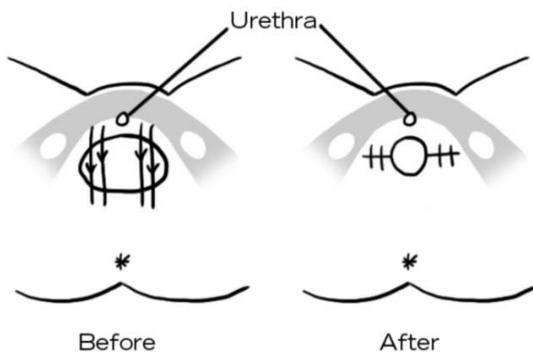


Fig. 2.19d: Shows diagrammatically how the bladder is reduced in size before joining to the urethra.

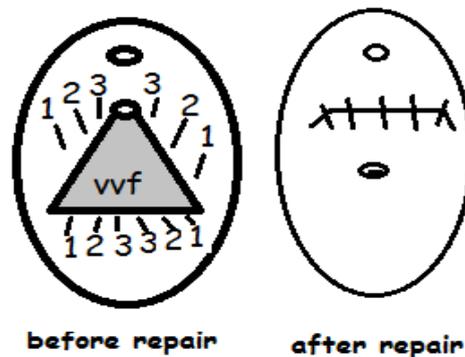


Fig. 2.19e: Shows the placement of the sutures.

During transverse closure, there are two main ways of overcoming the discrepancy:

- Take the distal bites vertical and the proximal bites more horizontal as in Fig. 2.19h.
- To close the sides of the defect (3+9 o'clock, 4+8 o'clock): for every one distal bite of the para-urethral tissue, take two proximal bites of the bladder which concertinas (squeezes together) the defect (Fig. 2.19 f+g). It may take several of these stitches to close the sides of the defect and there is a risk of making the bladder smaller using this method.
- Once the sides are closed, the central part of the fistula (7,6 + 5 o'clock) is closed by taking the distal bites vertically and the proximal bites more horizontally so that you end up with wider bites of the proximal edge as shown in Fig. 2.19h.

Tip! When trying to close a large defect transversely, it is a good idea to incorporate the fascia distally and proximally into the repair as shown in Fig. 2.5b. This is less likely to result in ischaemia of the distal end of the fistula.

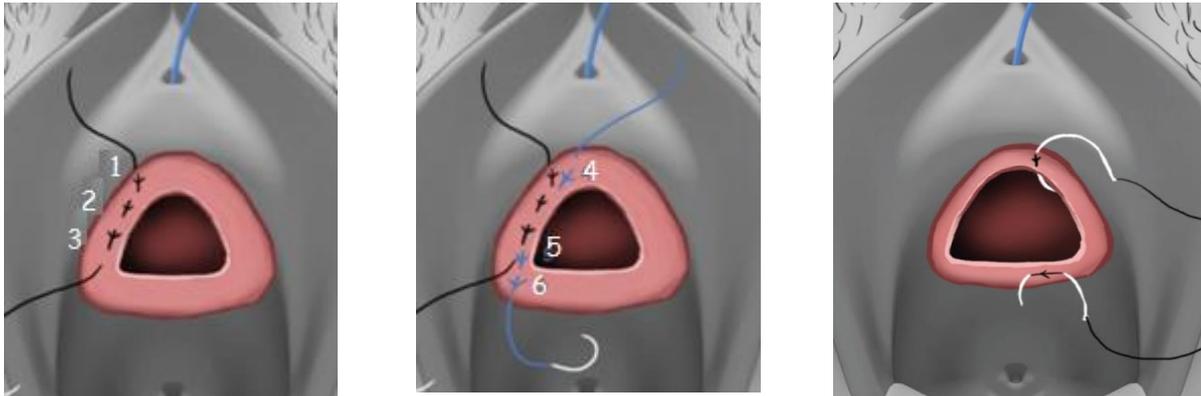


Fig. 2.19f: The first stitch is black with bites marked 1, 2 and 3.

Fig. 2.19g: The second stitch is blue with bites marked 4, 5 and 6.

Fig. 2.19h: The distal bites are taken vertically while the proximal bites are taken horizontally.

(OPTION 2): REDUCING THE BLADDER CIRCUMFERENCE BEFORE CLOSURE

(A) Formation of two legs followed by transverse closure: This is a very good way to manage very large defects.

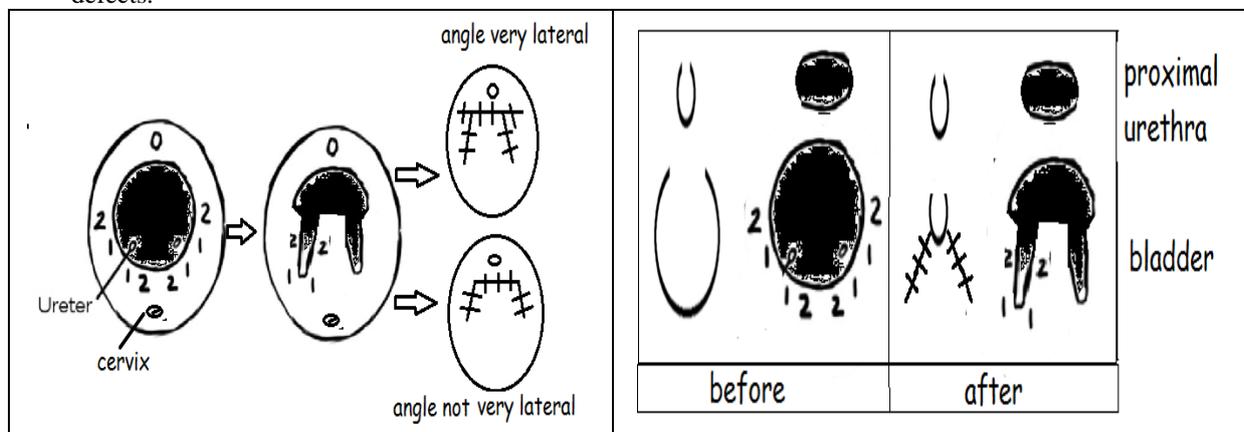
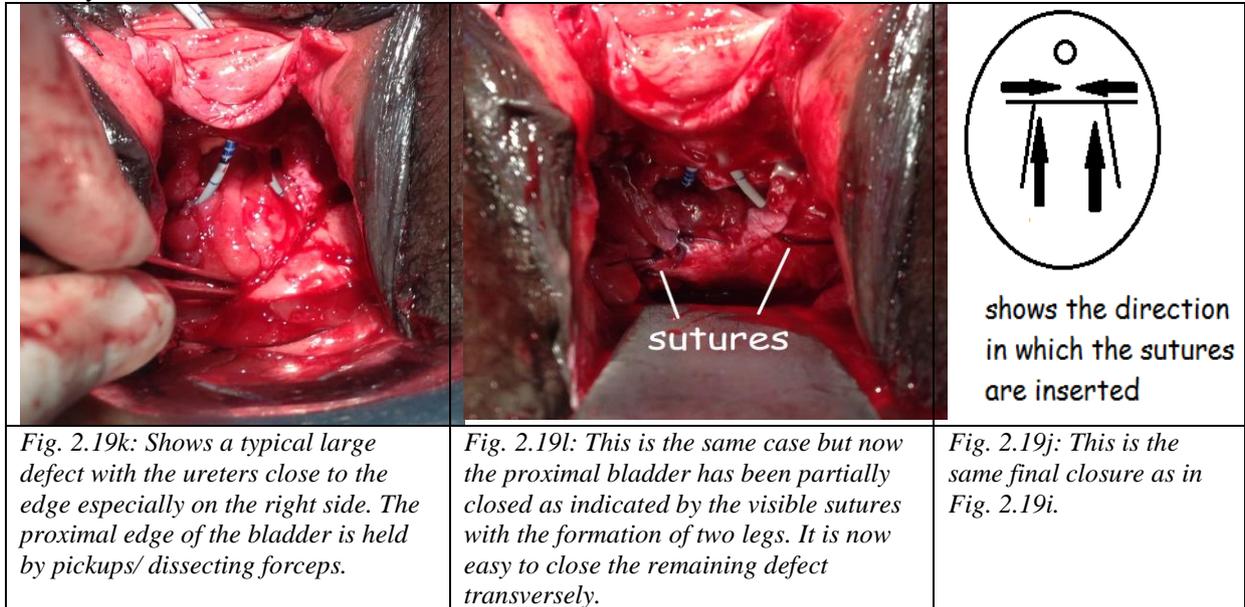


Fig. 2.19i: Shows the formation of two legs before the rest of the fistula is closed transversely. By reducing the size of the bladder defect, it is then easier to match it to the size of the urethral defect.

- If a circumferential dissection has been performed, then the sutures are inserted at 12, 1, 11, 2 and 10 o'clock.
- Legs closure is started laterally on each side close to the ureters by stitching the bladder to the bladder as in Fig. 2.19i. (Often both ureters are close to the edge or just outside of the bladder and need to be turned back into the bladder.) In the process of doing this, a leg is formed on either side. Usually, 3-4 sutures are required on both sides. It is usually safer to work on both sides simultaneously rather than completing one side and then doing the other. However, in some cases, you only need to make a leg on one side (Fig. 2.20 a+b).
- It is easiest to think of the bladder closure being performed in the line of the ureteric catheters as they travel distally towards the urethra. One of the advantages of this method is that it tends to keep the ureters in place rather than pulling them distally towards the urethral opening.

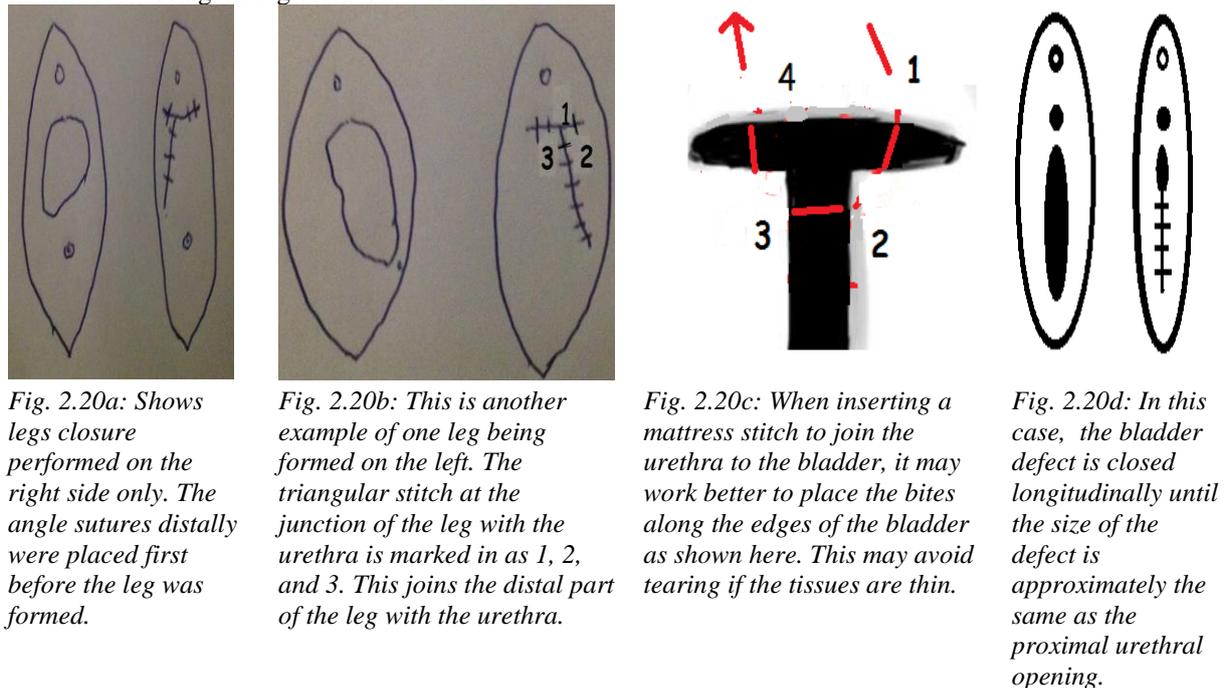
- The rest of the fistula is closed transversely (see Fig. 2.19j).
- On each side, at the junction of the urethra and the leg, it is a good idea to take a three bite stitch i.e. bite of the urethra, bite of the leg laterally and bite of the leg medially (see Fig. 2.20b + c).

! Tip! As you work distally on each side as you form the legs, watch that the distance between the two legs distally (width of the remaining open bladder) is sufficient to join to the urethra. Be careful not to go too far distally.



(B) Formation of one leg on one side followed by transverse closure: In some cases when the fistula is more to one side, it may only be necessary to form a leg on one side as shown in Fig. 2.20 a + b. The end result is similar to the formation of a T-junction (see step 3 chapter 1) although in a T-junction the leg is in the midline.

(C) Closure of bladder longitudinally: Occasionally it is possible to reduce the size of the bladder longitudinally so that the remaining defect is then joined to the urethra (see Fig. 2.20d). You can think of this as the formation of one leg in the midline. The T-junction of the urethra and the bladder in the midline will be closed with a mattress (preferred) or a triangular suture. The mattress stitch is inserted as the last suture when the defect is small. Note that this closure is essentially the same as in Fig. 1.20 d + e but starting in a reverse manner i.e. closing the leg of the bladder first.



(OPTION 3) FORMATION OF TWO LEGS FOLLOWING URETHRAL RECONSTRUCTION OR LENGTHENING

This is an option which is used occasionally after urethral lengthening (see below) or after formation of neo-urethra from the bladder or vagina (chapter 4).

(1) *Urethral lengthening*: If the urethra is very short, in some cases it is possible to first close the tissue proximal to the urethra longitudinally to lengthen the urethra to 2-3 cm (see Fig. 2.19m and 2.6b).

(2) *Legs*:

- (a) Place a triangular stitch at points 1, 2 and 3 as shown in Fig. 2.19n (A).
 - Point 1 and 2 = urethra or distal bladder.
 - Point 3 = proximal bladder near the midline. Make sure the stitch is placed extra- mucosal on the muscle layer and avoid going into the bladder lumen.
- (b) When tied, this results in the formation of two legs as shown in Fig. 2.19n: (B).
- (c) To close each leg, for exposure use two Allis forceps to hold the edges apart as you close each leg with interrupted sutures. Push a metal catheter into the angle to show it clearly as you place the stitch. Tie and leave the short end on artery forceps. It is easy to leave gaps so check carefully.

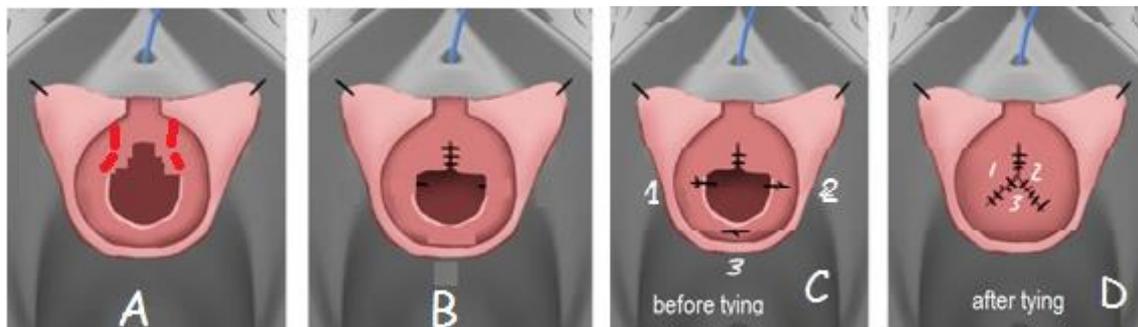
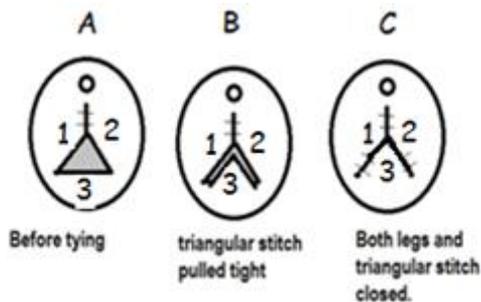


Fig. 2.19m:A: Shows a short urethra which can be lengthened from side to side. Incisions are shown in red. B: Shows the urethra now lengthened. C: Shows the triangular stitch being placed at points 1, 2, 3. D: The triangular stitch is tied and a legs closure has been completed to close the fistula.



!Tip! When performing Legs closure, it is better to place but not to tie the initial triangular stitch because it can be difficult to find the angles (feet ends) of the repair. Place the triangular stitch but do not tie it. Then pull it tight to see where the “feet” angles will be. Place the angle (feet) stitches in and tie them. Only tie the triangular stitch once both legs are fully closed.

Fig. 2.19n: This shows the placement of the triangular stitch (1, 2, 3) in forming a legs closure.

<i>Summary of dealing with width discrepancy in large fistulas</i>	
<p>Either:</p> <ul style="list-style-type: none"> ➤ Start transverse closure: Taking bites vertically distally and more horizontal proximally will overcome the problem in most cases. If not, you may occasionally have to make a T-junction in the midline (Fig. 1.20d+e). ➤ If a large discrepancy is obvious before closure, legs closure (Fig. 2.19i) is the best option. 	<div style="text-align: center;"> <p>Large fistula with width discrepancy: Close the angles and decide which way to close</p> <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid black; padding: 5px; width: 45%;"> <p>Discrepancy not very large or if you are not sure: Attempt transverse closure</p> </div> <div style="border: 1px solid black; padding: 5px; width: 45%;"> <p>Discrepancy very large Reduce the bladder defect with a legs closure</p> </div> </div> <div style="display: flex; justify-content: center; margin-top: 10px;"> <div style="border: 1px solid black; padding: 5px; margin: 0 10px;">Successful</div> <div style="border: 1px solid black; padding: 5px; margin: 0 10px;">Not successful: i.e. too much tissue on bladder side, make into a T closure</div> </div> </div>