

RAZ, SLING, AND ARTIFICIAL SPHINCTER PROCEDURES

15

RAZ PROCEDURE Position of Bladder Neck

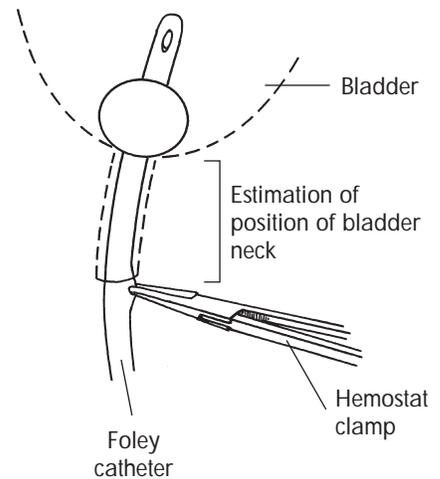
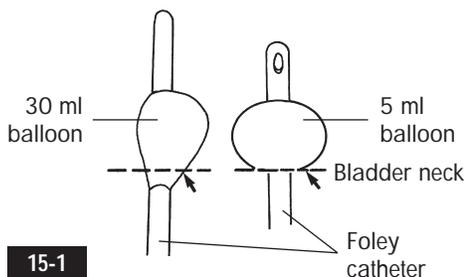
FIG. 15-1. There are two methods that can be used to determine the position of the bladder neck. The first involves inserting a Foley balloon catheter through the urethra just into the bladder, filling the catheter with 10 ml of water, and then palpating to locate the bladder neck. The size of the catheter used is crucial to the effectiveness of this technique. A 5 ml Foley balloon catheter has a different configuration than a 30 ml balloon catheter. When filled with 10 ml of water, the 30 ml balloon catheter will have a fusiform balloon form and will not fit snugly against the bladder neck. In contrast, when a 5 ml balloon catheter filled with 10 ml is used, the surgeon is able to palpate a clear delineation between the proximal urethra and the bladder neck.

FIG. 15-2. Another way to estimate the location of the bladder neck is to measure its distance from the urethral meatus. After inflating the balloon in the bladder, the surgeon places a hemostat at

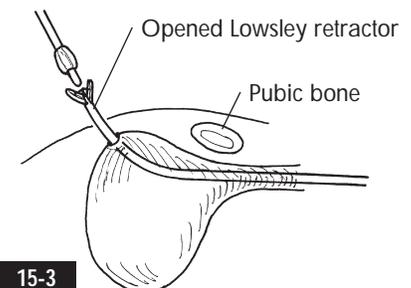
the level of the meatus. Then by deflating the balloon and removing the catheter, the surgeon can measure the distance between the hemostat and the balloon and estimate the position of the bladder neck.

If a suprapubic tube is desired, it can be placed initially or at the termination of the procedure. We prefer to simply place a Foley catheter via the urethra at the completion of the operation.

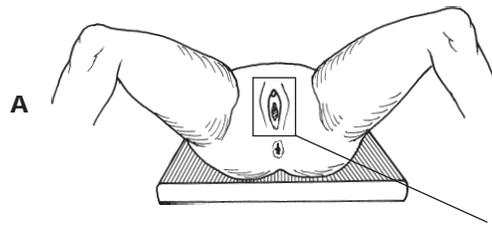
FIG. 15-3. An easy method for Foley catheter placement is first to fill the empty bladder with 300 ml of saline solution. With the patient in the Trendelenburg position, the surgeon then inserts the Lowsley retractor via the urethra and points the tip toward the suprapubic region. A cut is made over the protuberant skin, and the retractor is delivered to the skin. The Lowsley retractor is then used to grasp the tip of the Foley catheter (18 or 20 Fr) and position it in the bladder.¹ The surgeon must remember to place the suprapubic tube above the region of the abdominal incision.



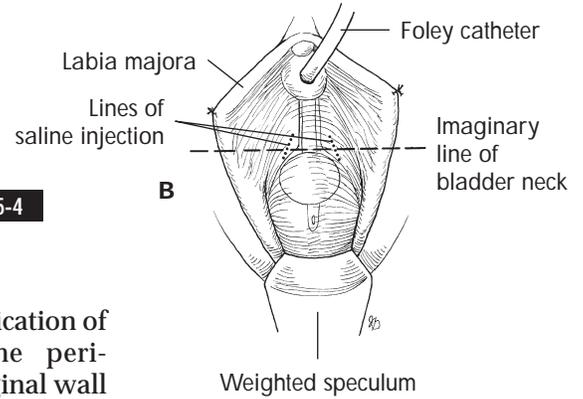
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15-3



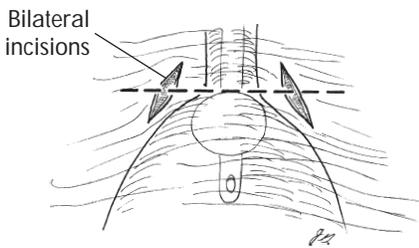
15-4



Vaginal Dissection

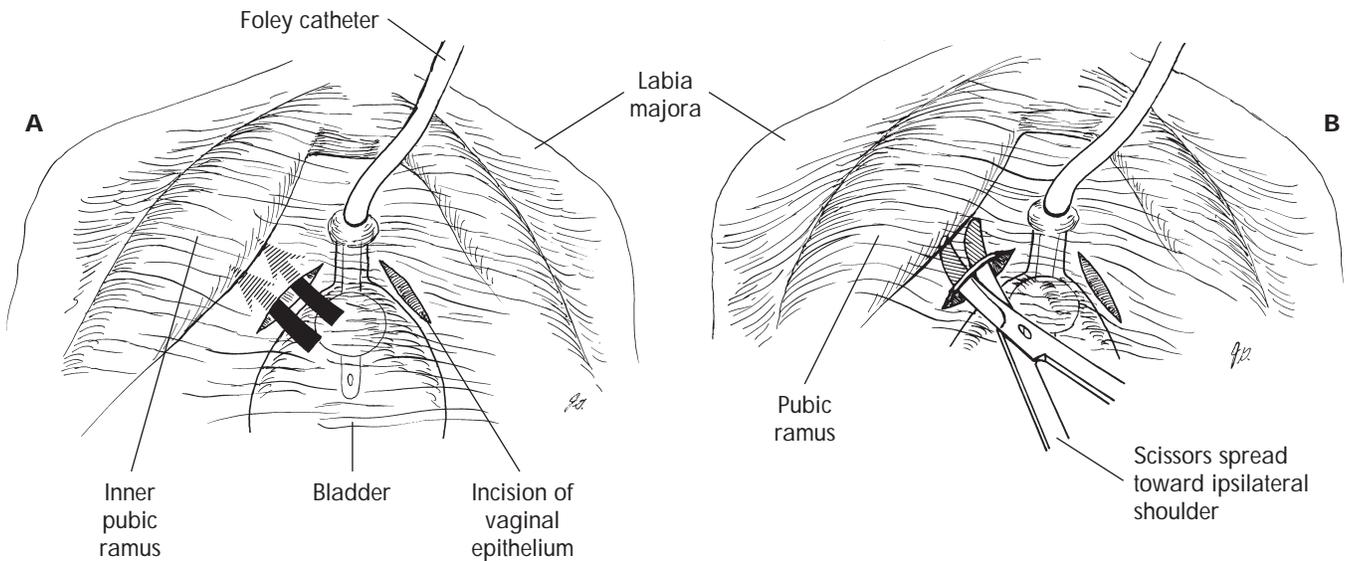
FIG. 15-4. The daily application of Premarin cream to the periurethral and anterior vaginal wall for 1 month before the operation will facilitate the epithelial dissection. After labial traction sutures are placed and a weighted speculum is inserted into the vagina, the surgeon can inject saline solution along the designated incisions to separate the vaginal epithelium from the bladder above.

FIG. 15-5. The two incisions traverse above and below an imaginary horizontal line defining the bladder neck. Traction from an Allis clamp placed above the incision will facilitate the creation of these incisions, especially if there is redundant vaginal epithelium.



15-5

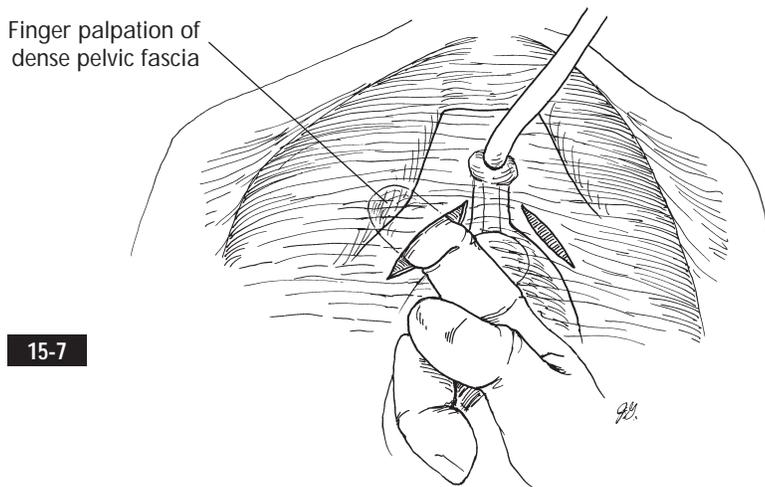
FIG. 15-6. The surgeon aims the scissors toward the ipsilateral shoulder of the patient. By using the scissors in a spreading motion rather than cutting, the surgeon establishes a plane and then a space between the vaginal epithelium and the perivesical tissues. This dissection continues until it extends just past the medial aspect of the pubic ramus bone.



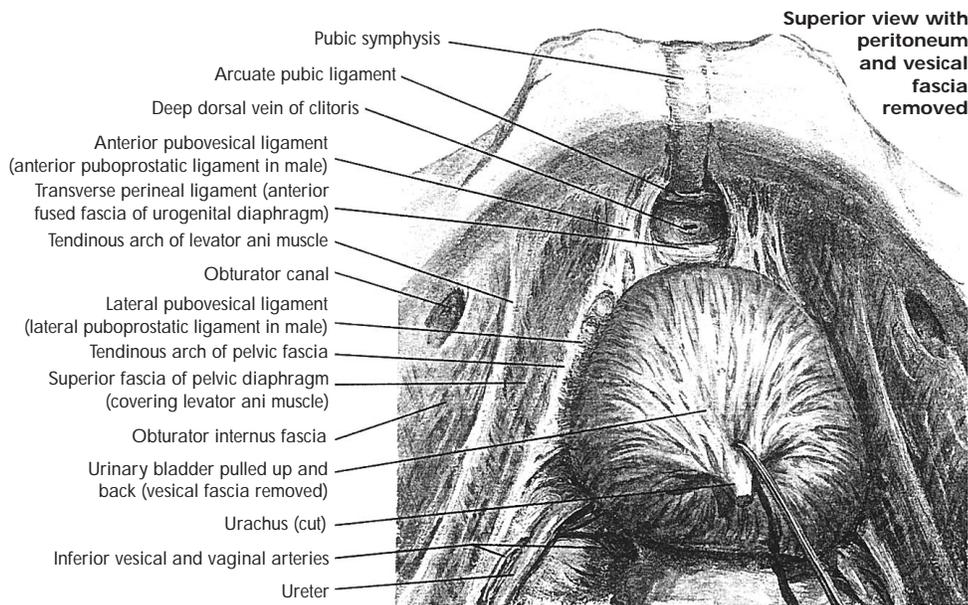
15-6

Dissection of Pelvic Fascial Complex

FIGS. 15-7 AND 15-8. With the index fingers, the surgeon can now palpate the dense pelvic fascial complex lateral to the bladder neck and proximal urethra. This dense fascia is composed of the urethral pelvic ligament and pubocervical fascia plus the endopelvic fascia, which all condense to the tendinous arch of pelvic fascia laterally.



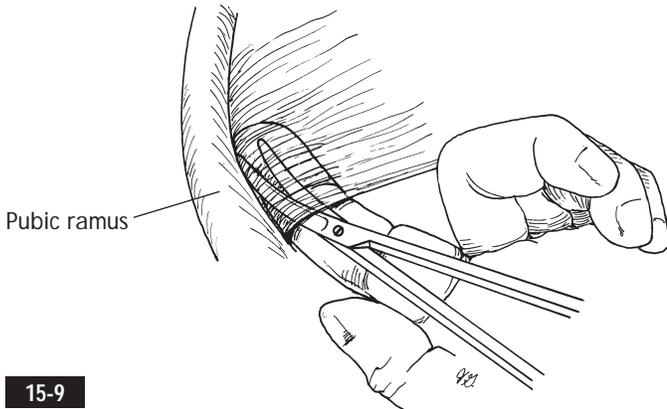
15-7



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15-8

Mayo Scissors Perforation of Fascial Complex (Urethropelvic Ligament) (Spreading Maneuver Without Cutting)



15-9

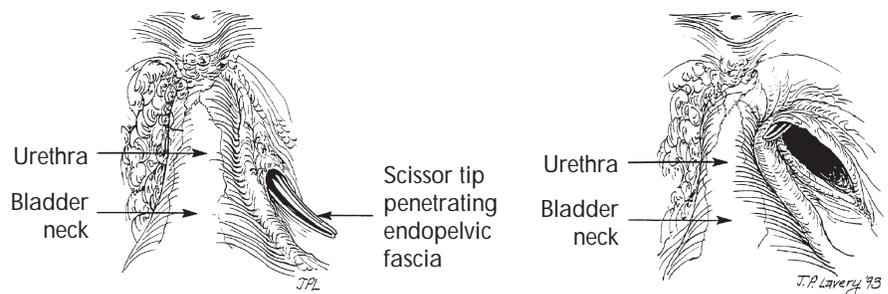
FIGS. 15-9 AND 15-10. The most important maneuver in this operation is the perforation of the dense fascia to enter the retropubic space.

By pressing against the medial aspect of the pubic ramus, the surgeon points the tips of the Mayo scissors up into this dense fascial complex.

With a spreading (not cutting) motion of the scissors, the surgeon perforates the fascial complex. The closer this dissection is to the urethra, the greater the chance of venous bleeding. At times, even careful lateral dissection will not preclude this problem.

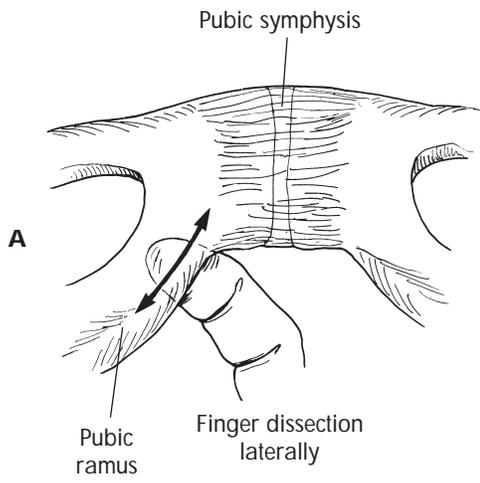
FIGS. 15-11, 15-12, AND 15-13. The surgeon can enlarge this opening by placing the index finger into this perforation and moving the finger laterally along the bone and rotating the finger while pushing up. The surgeon should be able to palpate the midline prominence of the pubic symphysis with the index finger.

This same maneuver of fascial perforation can be applied to the sling operation as well as to the placement for the American Medical System (AMS) 800 continence prosthesis.

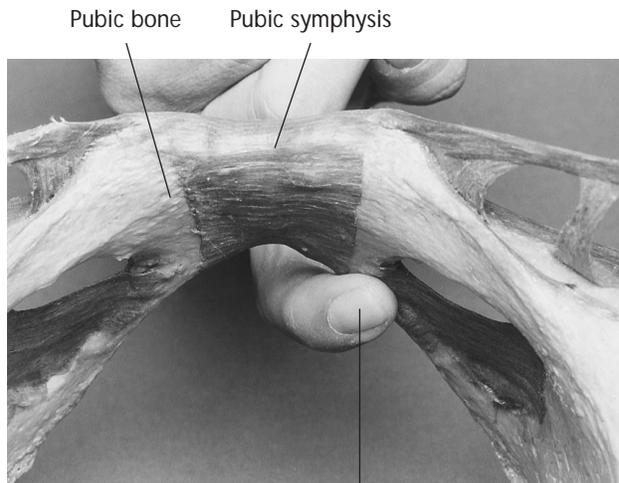


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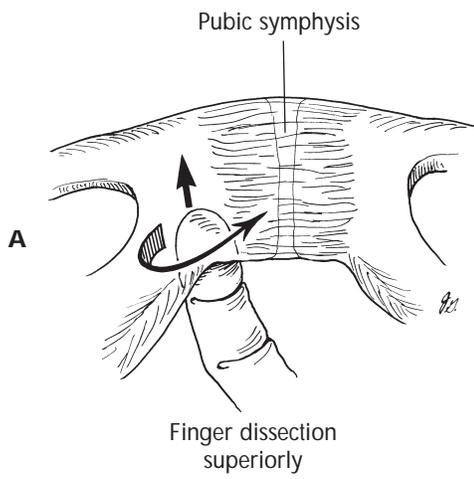
15-10



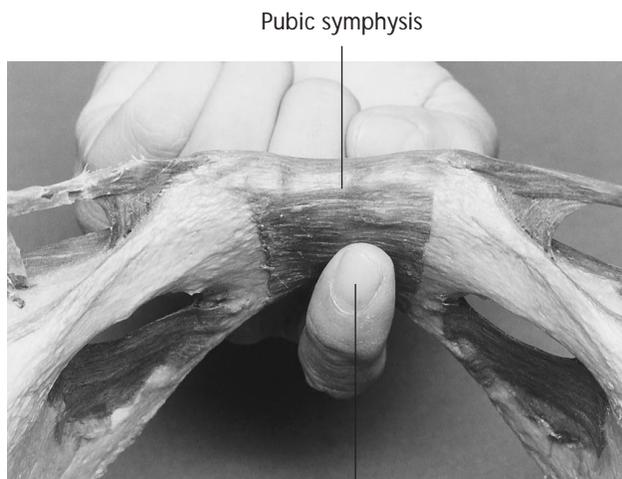
15-11



Finger perforation into retropubic space

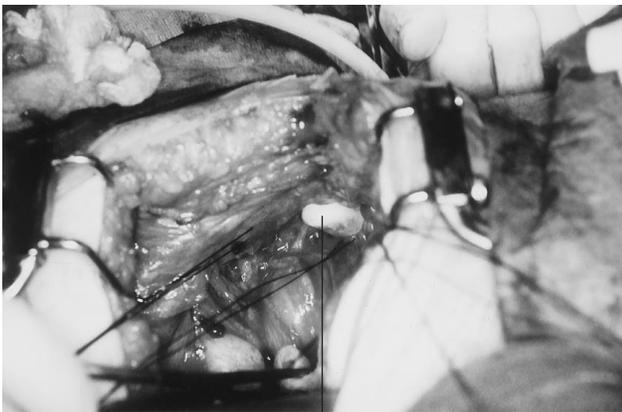


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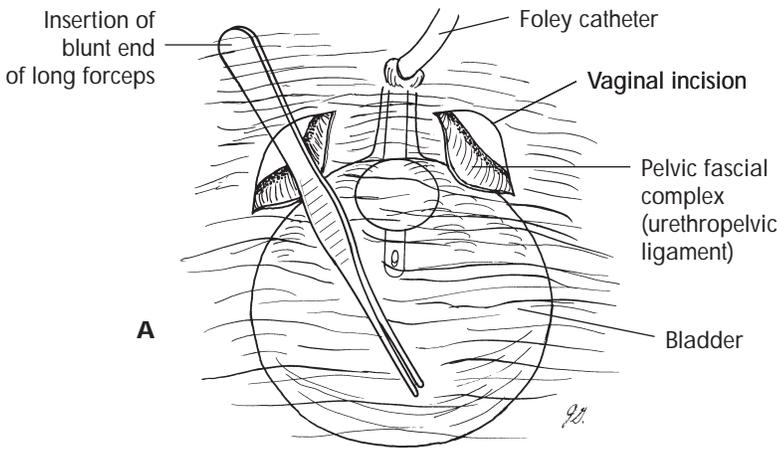
Finger dissection lateral to medial

Retropubic View

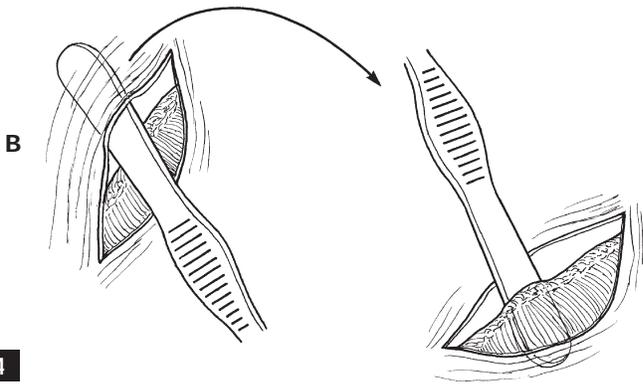


15-13

Finger through perforation of pelvic fascial complex



Inversion of Forceps Handle for Eversion of Fascial Complex



15-14

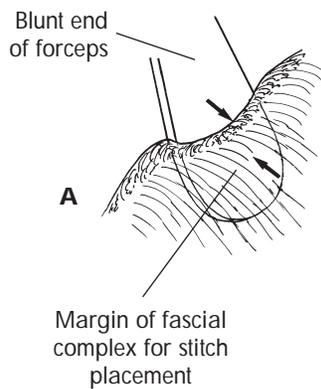
Placement of Helical Stitches

FIG. 15-14. By inserting the blunt end of long forceps up into the retropubic space (A) and then rotating it back down (B), the surgeon can secure a thick margin of fascial tissue lateral to the bladder neck.

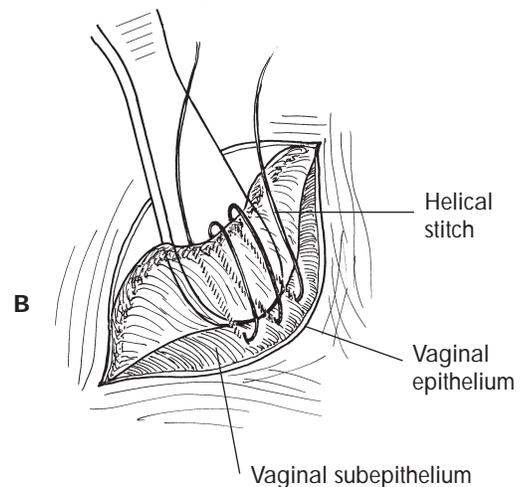
Alternatively, Allis clamps can be used to grasp this fascial complex.

FIG. 15-15. The helical stitches are performed using 1-0 Prolene (D-6731) 36-inch monofilament suture on a half-circle taper MO-6 needle. We prefer to include both the pelvic fascial complex (the urethropelvic ligament and the pubocervical fascia) and vaginal subepithelium in the helical stitches.^{1,2}

The surgeon should check on the position of the bladder neck by palpating the lateral aspect of the Foley catheter balloon before placing these stitches. If the stitches are placed too distally, the patient may have difficulty voiding during the immediate postoperative period. If the stitches are placed too proximally, the repair may not be as effective.



15-15



Rectus Fascia Suture Placement

FIG. 15-16. We prefer to use a 15-degree Stamey needle because it provides the greatest mobility and control.

FIG. 15-17. A small 5 cm suprapubic incision is made away from the site of the suprapubic tube and carried down to the rectus fascia. The surgeon inserts the Stamey needle as close to the midline as possible down alongside the pubic bone (A) and uses the left finger to guide this needle lateral to the urethra and bladder neck (B).

Placement of these stitches too laterally on the rectus fascia can entrap the medial branches of the ilioinguinal nerve with subse-

quent postoperative complication.² FIG. 15-18. The free end of the helical stitches is threaded through the Stamey needle hole on each pass and brought up to the anterior rectus fascia. The surgeon uses four needle passes to bring the paired ends of the sutures to the anterior abdomen.

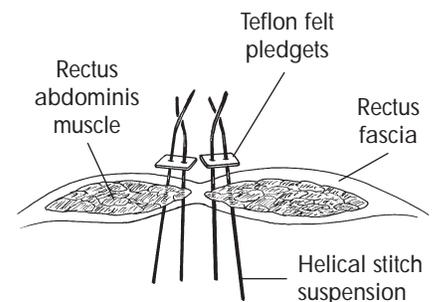
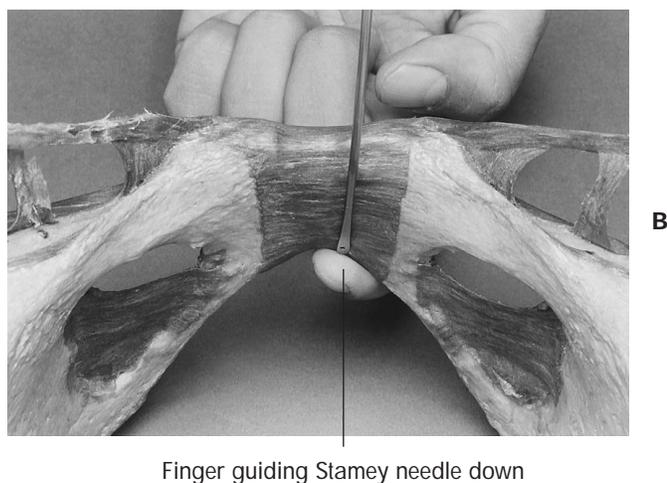
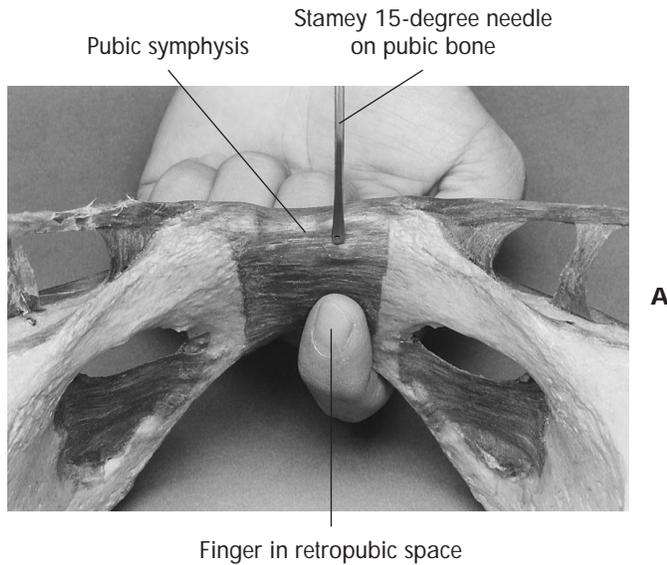
The paired sutures are sewn through two Teflon felt pledgets to prevent the Prolene stitches from tearing into the rectus fascia.

An alternative stitch fixation can be made on the pubic bone.²

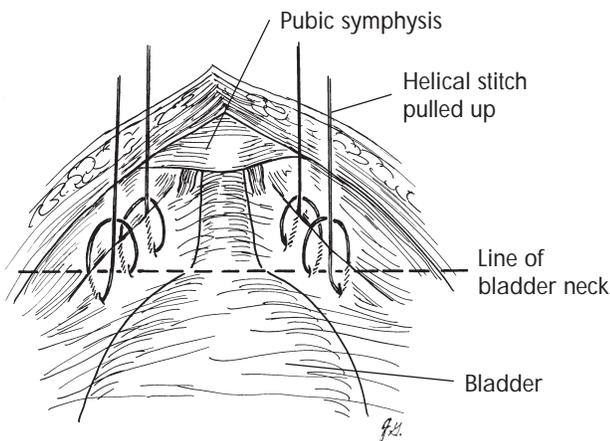
Cystoscopy is performed to check for intravesical injury.

The vaginal incisions are closed before fixation of the helical stitches.

Stamey Needle with 15-degree Bend

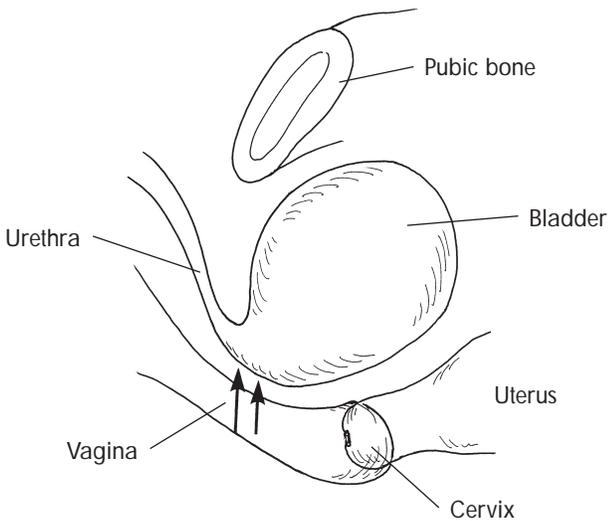


Retropubic View

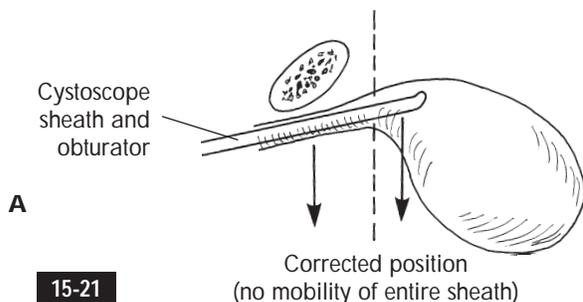


15-19

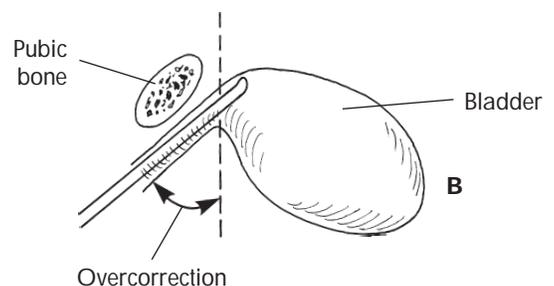
Lateral View



15-20



15-21



Optimal Lift of Suspension Stitches

FIG. 15-19. From a retropubic view, the surgeon can see that the helical stitches are in line with the bladder neck and proximal urethra.

FIG. 15-20. The goal of stress incontinence corrective surgery is to lift the bladder neck back into the abdominal space and prevent *hypermobility* at the bladder neck. In practice, it is easier to overcorrect than undercorrect.

FIG. 15-21. The surgeon must estimate the optimal lift of the stitches by placing one throw of a knot over the rectus fascia (using Teflon felt pledgets) for each pair of Prolene sutures and then clamping hemostats just above the knots to maintain this configuration.

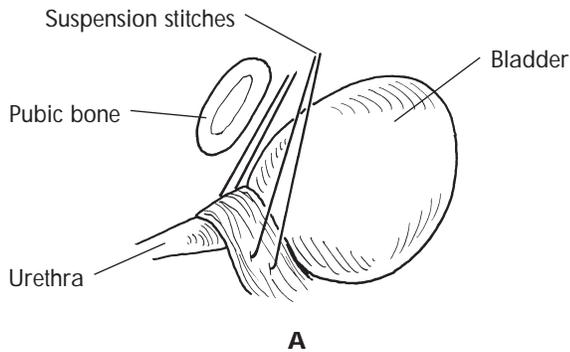
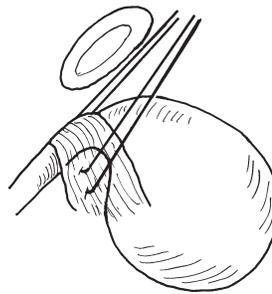
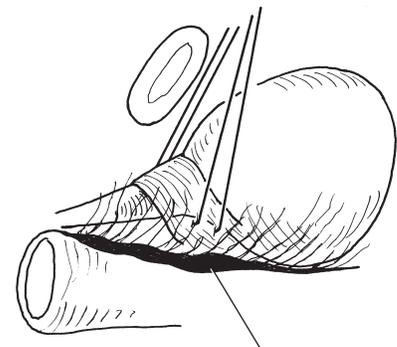
A straight probe (or cystoscope sheath) is placed via the urethra into the bladder. If the *entire* probe (not just the tip) cannot be pushed downward to reproduce bladder neck hypermobility (A), then this degree of lift is optimal, and the surgeon should replace the hemostat below the knot and throw four additional square knots. The hemostat prevents knot slippage.

If the probe tilts forward anteriorly toward the pubis, then suspension is overcorrected (B).

FIG. 15-22. The suspension should be such that the bladder neck repair is parallel to the operating room floor (A).

Overcorrection by lifting the sutures so that the bladder neck coapts is unnecessary and can lead to temporary postoperative urinary retention and pronounced symptoms of an unstable bladder (B).

Redundant vaginal epithelium may disguise the actual bladder neck repair beneath (C).

Corrected Position (Parallel to Floor)**A****Overcorrection****B****C**

Deceptive redundancy of vaginal epithelium

15-22

KEY POINTS

- Premarin cream is applied vaginally daily for 1 month preoperatively to facilitate vaginal dissection.
- The position of the bladder neck is estimated.
- A 5 ml Foley catheter is inflated to 10 ml within the bladder to define the bladder neck.
- Saline solution is injected at the incision sites to separate the vaginal epithelium from the bladder.
- Because there are venous channels medially within the fascial layers, the pelvic fascial complex is perforated as laterally as possible using the Mayo scissors and the retropubic space is thus entered.
- The blunt end of the forceps is used to expose the fascial complex.
- Helical suspension stitches are placed at the level of the bladder neck.
- After two pairs of sutures have been placed in a suprapubic position using 15-degree Stamey needles, cystoscopy is performed to check for bladder injury.
- The vaginal epithelium is closed before the suspension sutures are secured.
- The suspension should place the bladder neck back into the abdominal cavity to correct hypermobility.
- Excessive correction should be avoided. A probe test is used to check for hypermobility of the bladder neck and urethra.

POTENTIAL PROBLEMS

- *Excessive bleeding from perforation of pelvic fascial complex:* Apply tamponade and sponges → place helical stitches, which will stop the bleeding when lifted
- *Bladder is punctured during finger or scissors dissection:* Perform cystoscopy → perform vesical repair for a large laceration; otherwise place a Foley catheter → postpone the operation
- *Overcorrection:* Take down and loosen the suspension

STRESS INCONTINENCE TYPE III WITH INTRINSIC SPHINCTER DYSFUNCTION

Stress incontinence associated with an intrinsic sphincteric dysfunction is defined by an open frozen bladder neck on cystoscopy and video fluoroscopy and an abnormally low leak-point pressure by urodynamics studies.² The surgeon's objective is not only to correct the stress incontinence but also to add a *compressive component* around the bladder neck region.

The sling operation and the artificial sphincteric device (AMS 800) are the two most successful treatment options available. The effectiveness of collagen injection is unclear at present.

Sling Operation

The injection of saline solution into the vaginal epithelium is an easy way to separate the tissue planes between the vaginal epithelium and the bladder.

A 5 ml Foley balloon catheter inserted into the bladder and inflated to 10 ml defines the bladder neck for the surgeon.

A midline vertical incision or inverted-U incision over the proximal urethra and the bladder neck is made.

The surgeon inserts Mayo scissors through the incision, aims the scissors tip at the patient's ipsilateral shoulder, and uses a spreading motion to perforate the pelvic fascial complex.

As in the Raz procedure, the pelvic fascial complex (urethropelvic ligament) is identified and perforated, and the retropubic space is entered (see pp. 141-143). The fascial layers should be perforated at the region of the bladder neck and the proximal urethra.

After the pelvic fascial complex (urethropelvic ligament) is perforated with the Mayo scissors, the surgeon inserts the index finger through the perforation to create a defect slightly *wider* than the width of the index finger (≥ 2 cm).

FIG. 15-23. Once this perforation is established, the surgeon can use a strip of rectus fascia, fascia lata,^{3,4} or inorganic material such as Gore-Tex for the sling repair.⁵

We prefer organic fascial slings because of the reduced incidence of postoperative infection as compared to that with inorganic grafts. For the organic graft, there are two ways to construct the fascial sling. The usual method is to extract a strip of rectus fascia measuring 2×15 cm or even 2×17 cm. We prefer to harvest the longest strip possible because these fascial strips are often shorter than ideal. If the strip is too short, the surgeon tends to pull the fascia tighter and thus compress the proximal urethra and bladder neck more than desired.

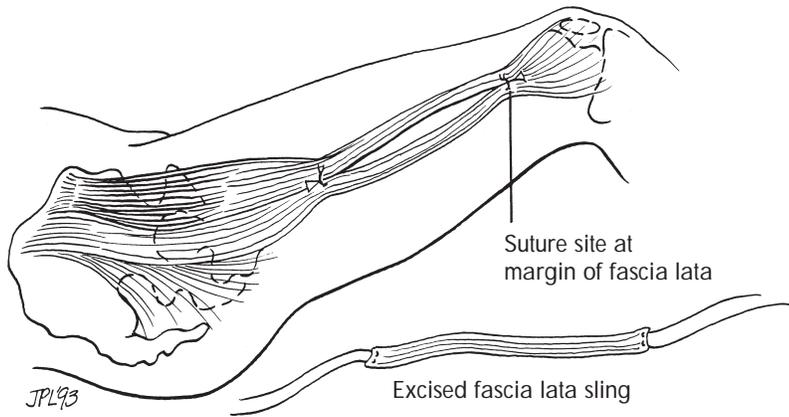
A landmark is made with a marking pen or indigo carmine to define the midpoint of the fascial strip; the landmark should be positioned over the bladder neck and urethra.

FIG. 15-24. The distal edge of the fascial strip is anchored on each side to the tissue adjacent to the bladder neck to prevent slippage and "rolling up."³

Using tonsil clamps, the surgeon bluntly perforates the posterior rectus fascia and rectus abdominis muscle from above, as is done with the Stamey needle in the Raz procedure, down into the retropubic space to receive the fascial strip. The fascia is anchored to the rectus fascia or the periosteum of the pubis.

FIG. 15-25. An alternative method is to use a shorter fascial strip (2×10 cm) with 1-0 Prolene stitches (D-6731) secured on either end. Some surgeons have reported using a 2×5 cm strip; however, we prefer a longer strip (2×10 cm) to allow for the possibility of fascial slippage or displacement.

The stitches are brought to the abdominal surface with the Stamey needle or a tonsil clamp as in the Raz procedure. We prefer to use the tonsil clamp because it creates



From Leach GE, Sirls L: *Urol Clin North Am* 2(1):61, 1994.

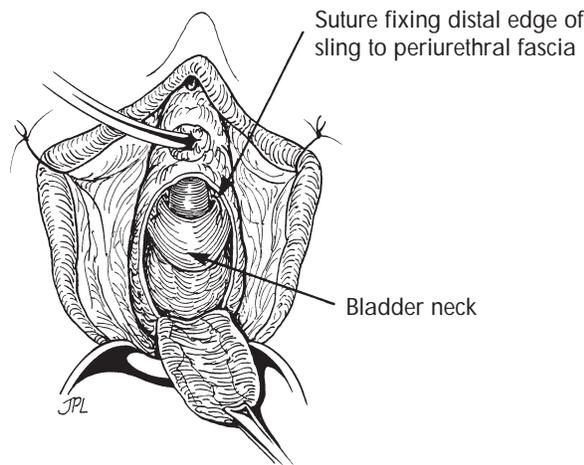
15-23

a larger defect for the fascial strip, allowing it to slide into an optimal position.

The advantage of using a short (5 to 10 cm) strip of inorganic material, such as Gore-Tex or Mersilene, is that there is no need for additional surgery to harvest a fascial strip.⁵ The disadvantage of synthetic grafts is that they have a higher risk of infection. We prefer to use the organic fascial strip.

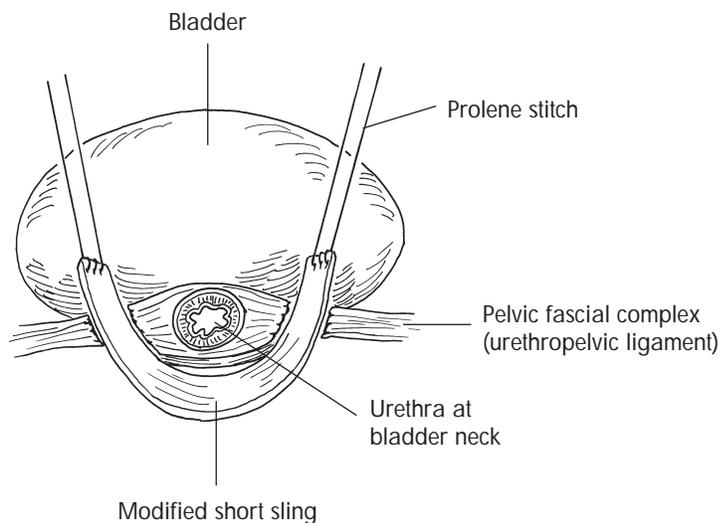
Just as with the short strip of rectus fascia, the inorganic strip must be anchored to the bladder neck/proximal urethral region. The Prolene stitches on either side are brought up to the abdominal wall.

If the fascial strip is too loosely placed around the urethra, then the surgical connection may not be effective for the long term. If it is too tight around the urethra, the patient may have a prolonged period of urinary retention with severe symptoms of an unstable bladder. Some surgeons prefer to coapt the anterior and posterior urethra in the sling procedure (with confirmation on cystoscopic examination).⁶ Others prefer only to “create a slight indentation on the floor of the proximal urethra.”² The surgeon’s experience and judgment will guide the choice of an optimal position between the two extremes.



From Leach GE, Sirls L: *Urol Clin North Am* 2(1):61, 1994.

15-24



15-25

Although we have not coapted the urethral walls, we have brought the anterior and posterior parts of the urethra close to each other as the optimal position for fascial sling compression.

All patients are informed of the use of intermittent catheterization before the operation.

AMS 800 Sphincteric Device (Narrow-Backed Model)

In contrast to the placement of the AMS 800 device around the bulbous urethra in men, the placement of the sphincteric device around the bladder neck in women is more difficult; therefore this device is used less frequently in women.

The prosthesis is well designed and, if properly placed, can produce a satisfying outcome.

FIG. 15-26. One device that has been developed to facilitate the difficult dissection around the bladder neck is a “cutter clamp.”⁷ This instrument pinches and secures the tissue between the urethra and vagina so the dissection plane can be identified (**A** and **B**). Cystoscopy is performed while the instrument is in place to ensure that the urethra is clear (**C**). When the surgeon is certain that the clamp is properly positioned, the cutting blade within the clamp is advanced (**D**). One arm of the clamp is removed, and suture material is threaded through the eye in the cutting blade (**E**). As the blade is withdrawn (**F**), the suture serves to guide the placement of a right-angle clamp, which is used to dilate the opening enough for a 2 cm cuff (**G**).

FIG. 15-27. Some surgeons advocate the vaginal packing method during placement of the AMS device.

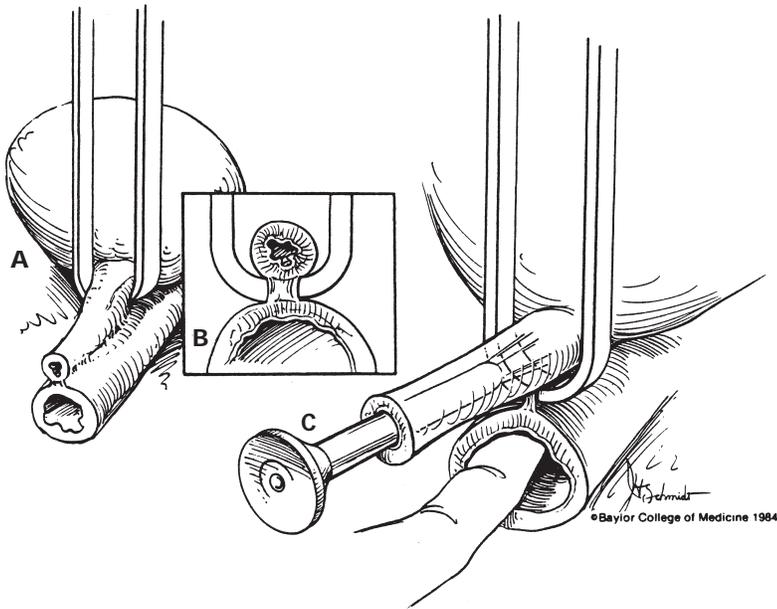
We have found a combined vaginal and retropubic dissection to be the safest method of avoiding any injury to the urinary tract, even though there are special instruments such as the cutter clamp to facilitate bladder neck dissection⁷ and special maneuvers⁸⁻¹⁰ such as vagina packing as described by Petrou and Barrett.¹¹

Commonly these patients have undergone previous cystourethropexy procedures and thus have multiple scars and adhesions within the abdominal and vaginal cavities.

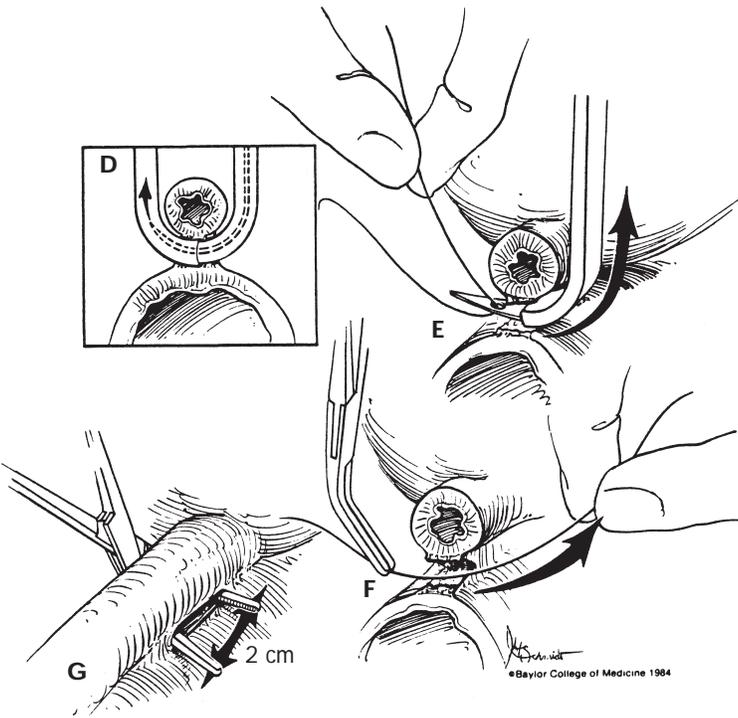
By first approaching from the vaginal side as in the Raz procedure, the surgeon perforates the pelvic fascial complex on the vaginal side and enters the retropubic space through the endopelvic fascia. If severe adhesions and scars preclude this maneuver, the surgeon should wait until the abdominal side has been exposed before puncturing the fascial layers.

Via a midline incision, as in the Burch procedure, the surgeon dissects down into the retropubic space. Scars and adhesions should be cautiously taken down especially around the proximal urethra and bladder neck (see p. 155).

By inserting the finger from the vaginal side up into the retropubic abdominal side, the surgeon passes a Penrose drain (¾ inch) around the proximal urethra and bladder neck (see Fig. 15-13).



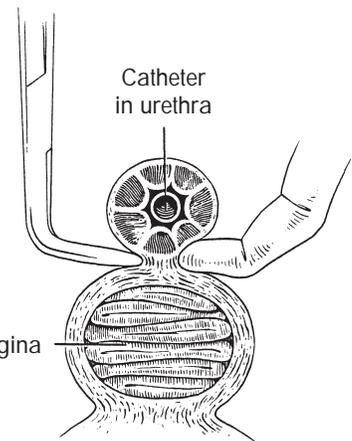
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From Scott FB: *Urol Clin North Am* 12:305, 1985.

15-26



From Petrou SP, Barrett DM: The use of artificial genitourinary sphincter (AGUS) in female urinary incontinence. In Webster G et al, editors: *Reconstructive urology*, London, 1993, Blackwell.

15-27

FIG. 15-28. The measuring tape is passed from the vaginal side and around the urethra for the cuff measurement.

FIG. 15-29. The cuff is passed from the vaginal side into the retropubic space and snapped in place so that the tubing for the reservoir lies on the abdominal side rather than the vaginal side.

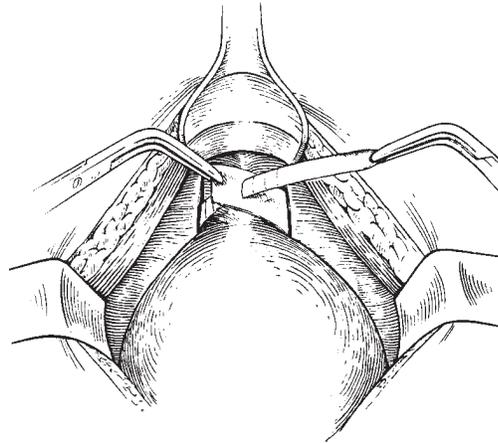
A reservoir can also be placed

in the retropubic space and the pump placed in the labia majora.

A drain is left in for 24 hours, and generous antibiotic solution irrigation should be performed before closure.

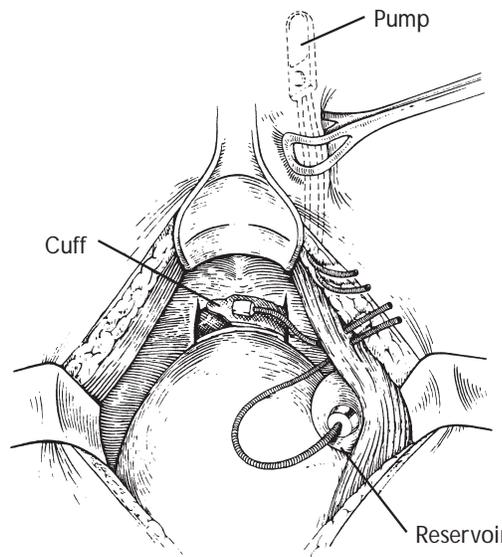
The surgeon can examine the urethra and bladder neck via a cystoscope after the procedure.

The cuff remains deactivated for 1 month.



From Petrou SP, Barrett DM: The use of artificial genitourinary sphincter (AGUS) in female urinary incontinence. In Webster G et al, editors: *Reconstructive urology*, London, 1993, Blackwell.

15-28



From Petrou SP, Barrett DM: The use of artificial genitourinary sphincter (AGUS) in female urinary incontinence. In Webster G et al, editors: *Reconstructive urology*, London, 1993, Blackwell.

15-29

KEY POINTS

SLING OPERATION

- A midline vertical incision or an inverted-U incision is made over the proximal urethra and bladder neck.
- As is performed in the Raz procedure, the pelvic fascial complex (urethropelvic ligament) is perforated.
- The type (organic or inorganic) and size (short [2 × 5 cm] or long [2 × 15 cm]) of sling are chosen.
- The sling is anchored at bladder neck and proximal urethra with sutures to prevent slippage and rolling up.
- The sling should coapt the bladder neck opening.

AMS 800 SPHINCTERIC DEVICE

- First vaginal dissection (as in the Raz procedure) and then abdominal dissection (as in the Burch procedure) are performed.
- All adhesions and scarring around the bladder neck are freed.
- Cuff measurement is obtained and the cuff is put in place, with the tubing on the abdominal side.
- The cuff remains deactivated for 1 month.

POTENTIAL PROBLEMS

SLING OPERATION

- *Difficulty dissecting from vaginal side:* Consider abdominal incision as a combined approach
- *Fascial strip not optimal:* Consider using fascia lata → consider using an inorganic strip

AMS 800 SPHINCTERIC DEVICE

- *Perforation into urinary tract:* Consider using fascial sling operation after urothelial repair → place suprapubic tube for urinary diversion

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