

# PSOAS HITCH, BOARI FLAP, AND COMBINATION OF PSOAS HITCH AND BOARI FLAP

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The psoas hitch procedure, Boari flap, and transureteroureterostomy are useful operative procedures for reestablishing continuity between the ureter and bladder. Of the three, the most versatile and the one associated with the fewest complications is the psoas hitch procedure. The psoas hitch is a means of extending the bladder's dome or lateral wall cephalad and anchoring the bladder to the surface of the psoas muscle, thereby bridging a gap between the ureter and bladder.

The psoas hitch procedure has been used in a variety of clinical situations: when the distal ureter is scarred secondary to chronic infection or previous surgery, when the ureter has been damaged by trauma, and even when a simple antirefluxing reimplantation of the ureter is necessary.<sup>1</sup>

There are clinical situations when the ureter has already been damaged and severed from the bladder for which vesical-psoas fixation can be performed without first opening the bladder.

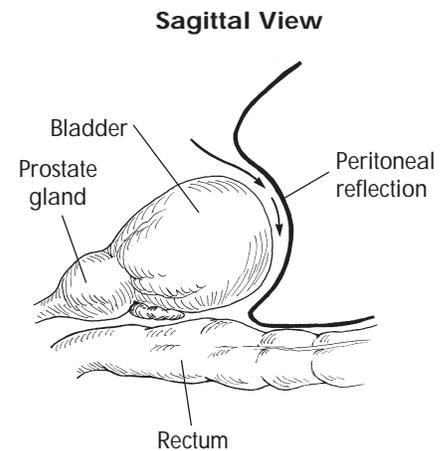
Another possible application is when ureteral reimplantation is contraindicated because of a diseased, fibrotic bladder; in this case the bladder could be manipulated cephalad to the psoas muscle for a psoas hitch procedure.

## PSOAS HITCH PROCEDURE

With the bladder filled with saline solution instilled through a Foley catheter, the surgeon can easily define the perivesical spaces between the bladder and pelvic walls.

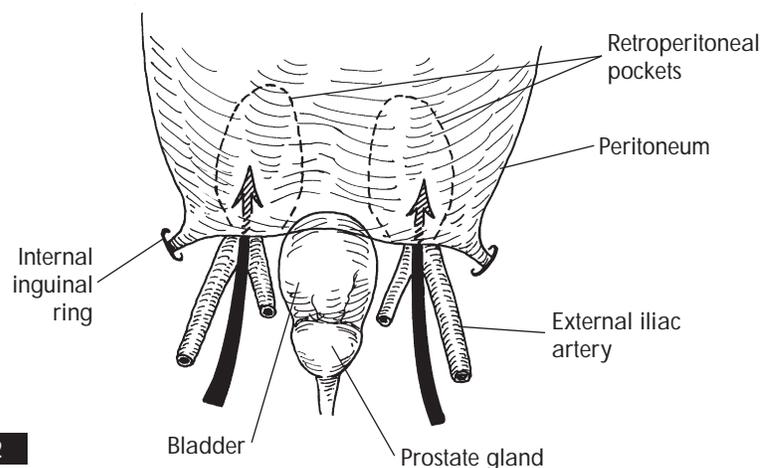
FIG. 7-1. The inferior and posterior peritoneal reflection is easily dissected from the bladder while the bladder is full. This maneuver is not always necessary; however, it provides maneuverability of the bladder dome for the psoas hitch procedure.

FIG. 7-2. As described in Chapter 18, the surgeon defines a space called the *retroperitoneal pocket* on each side cephalad to the perivesical space (see p. 169). The bladder should first be deflated.



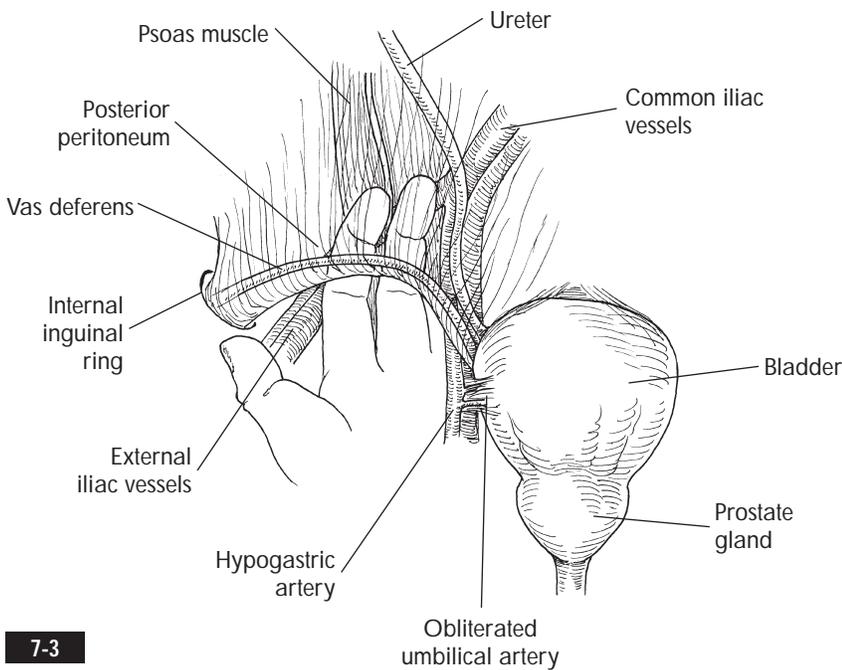
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## Development of Retroperitoneal Pockets



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FIG. 7-3. The index and middle fingers are used to define a space between the posterior peritoneum and the retroperitoneum.



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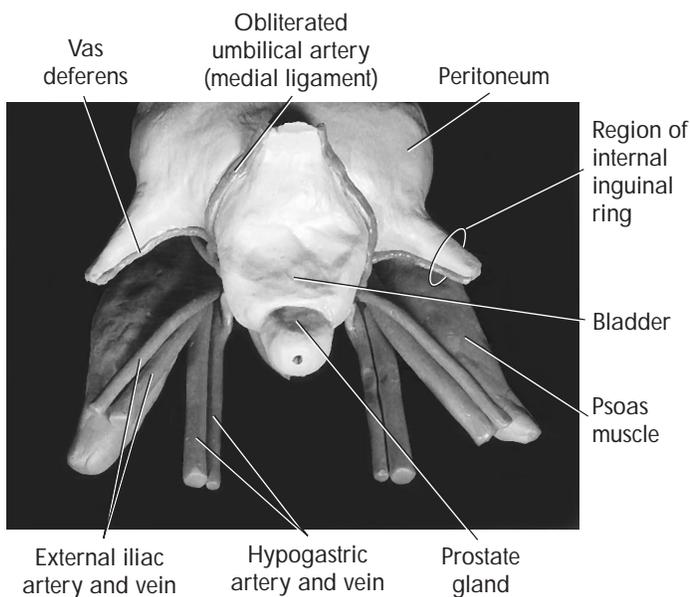
FIG. 7-4. When the surgeon successfully performs this maneuver, the following landmarks should be adjacent to the fingers: medial to the fingers are the ureter, bladder, and obliterated umbilical artery; lateral to the fingers are the internal inguinal ring, external iliac vessels, and pelvic wall; inferior to the fingers are the psoas muscle, genitofemoral nerve, and hypogastric vessels; and superior to the fingers are the vas deferens and peritoneal shelf.

By this one maneuver, the surgeon exposes not only the psoas muscle and genitofemoral nerve but also the proximal ureter above the obliterated umbilical artery.

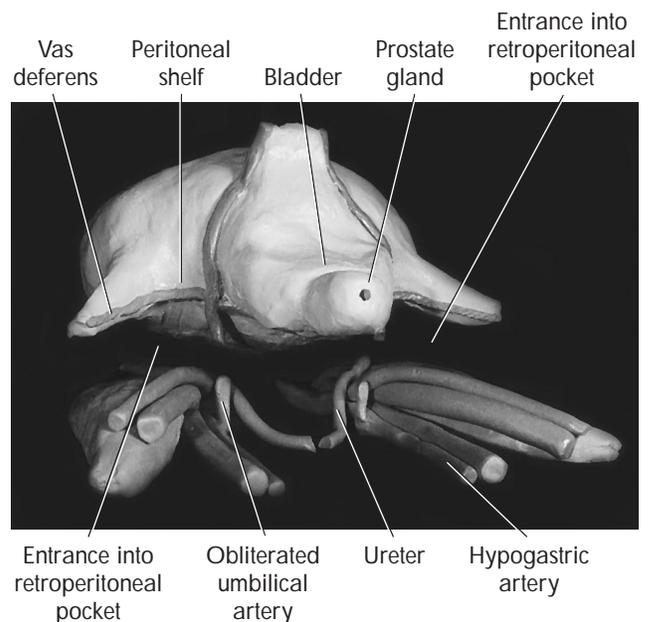
Depending on the configuration of the bladder and the thickness of its walls, sometimes the contralateral obliterated umbilical artery and superior vesical artery must be divided to gain more maneuverability.

FIG. 7-5. The bladder, intact or opened, can be stretched onto the psoas muscle more laterally or more superiorly depending on the surgeon's choice, and the genitofemoral nerve can be mobilized

Top View



Frontal View



7-4

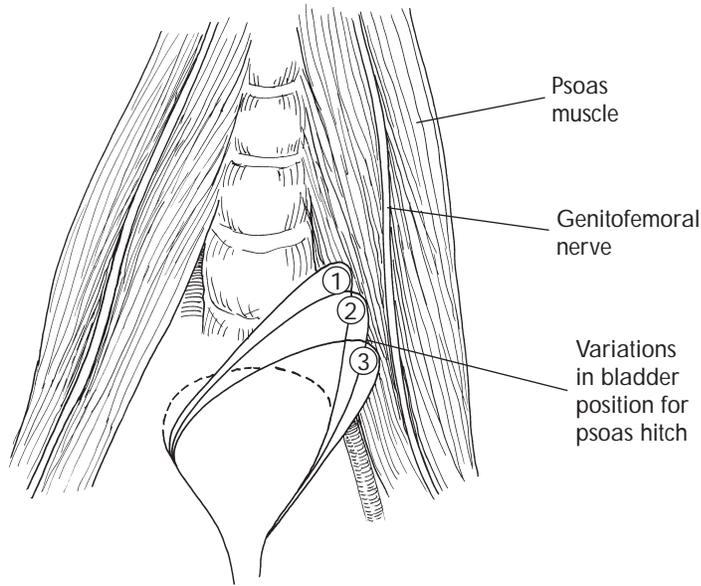
laterally if necessary. If the bladder is contracted, the surgeon can bathe the bladder dome with local anesthetic (lidocaine 1%), which will make it much easier to stretch the bladder cephalad to a greater extent than expected for fixation.

FIG. 7-6. The bladder is stretched to its maximum and two stitches (0 Vicryl) are placed for vesical-psoas fixation. Full deep suture bites of the bladder are necessary for stabilization. Once fixed, the bladder is opened for the ureteral reimplantation.

FIG. 7-7. If the bladder has been opened by a horizontal incision<sup>2</sup> before the psoas hitch procedure, the surgeon places two fingers into the bladder dome and stretches the bladder maximally in the cephalad lateral direction for placement of the anchoring stitches. Whether the bladder is closed or opened, the important point is to stretch the bladder cephalad as far as possible with tension to gain maximal length.

FIG. 7-8. The ureter and the fixed bladder wall should overlap at least 4 to 6 cm. Ureteral reimplantation can be accomplished in a tunneled fashion or by the Le Duc method (see p. 129).

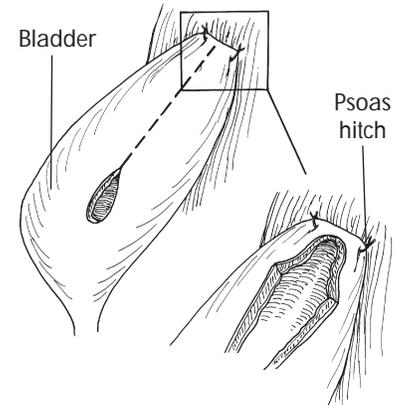
To ensure an antirefluxing system, a 4:1 ratio of the tunnel length to ureteral width is optimal.



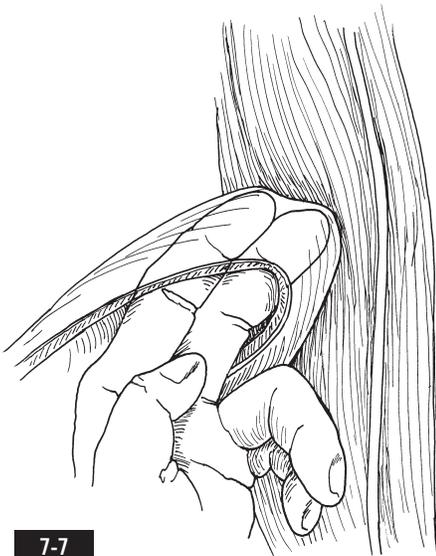
7-5

After spatulating the ureter, the surgeon should anchor the ureter to the full thickness of the bladder with interrupted stitches (2-0 to 4-0 Vicryl).

FIG. 7-9. A stent and a Malecot suprapubic tube are brought out through the bladder and abdomen and fixed in place. Alternatively, self-retaining stents and a Foley catheter through the urethra function just as well but may produce irritative symptoms postoperatively. A drain is placed in the perivesical space.

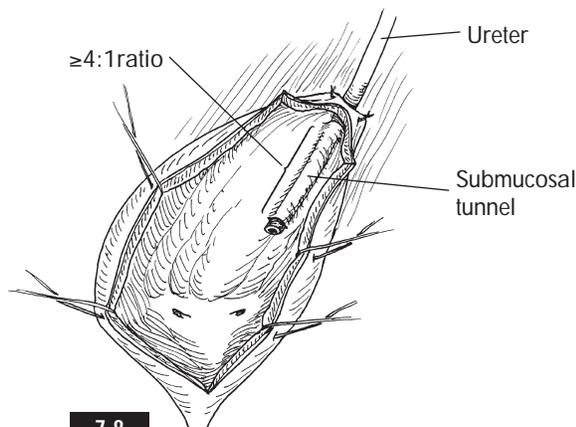


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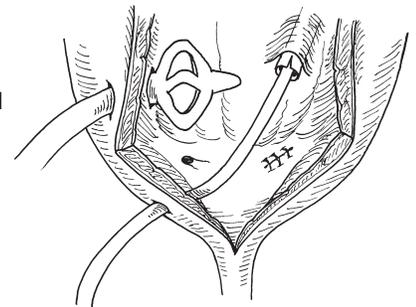


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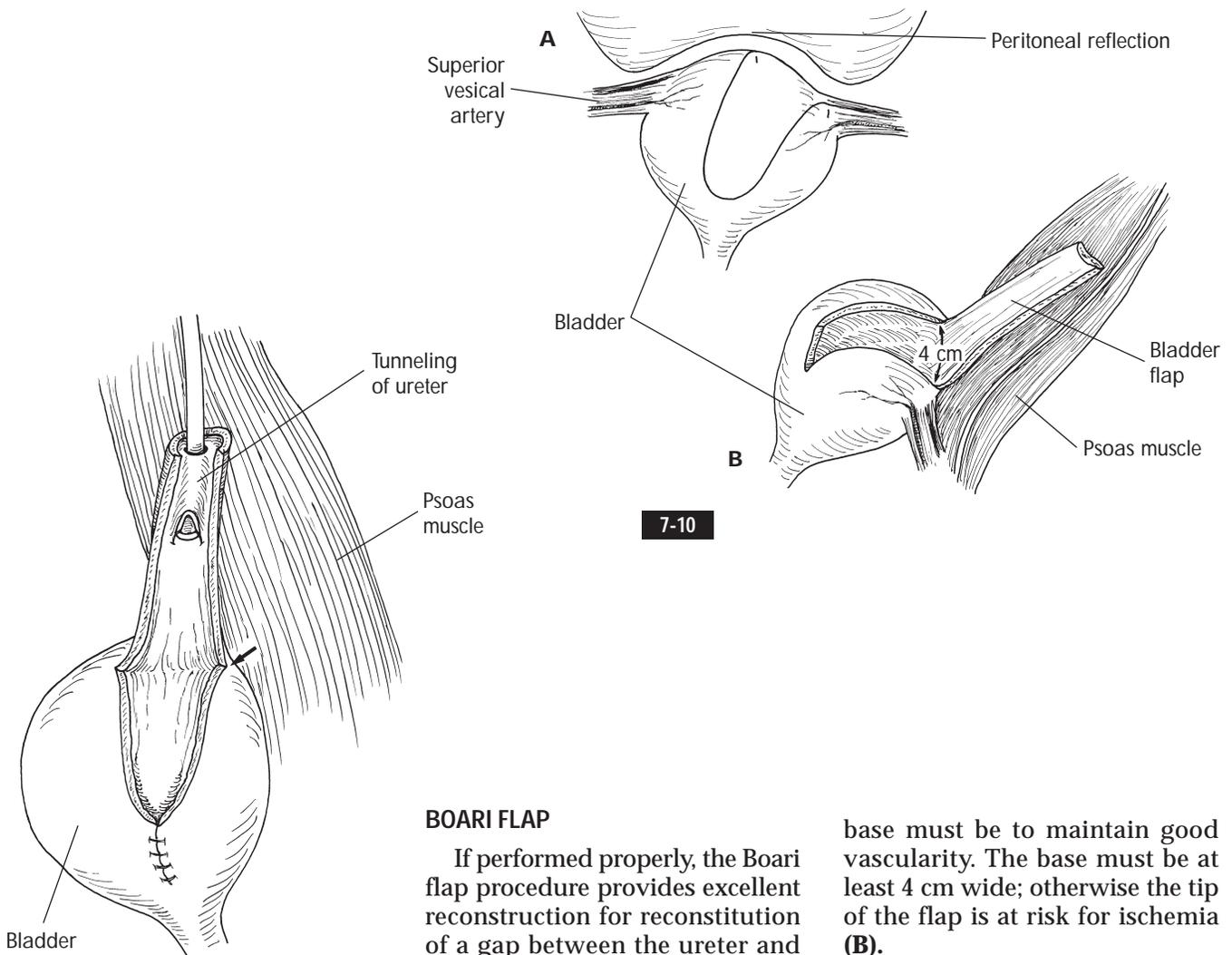
#### Psoas Hitch with Ureteral Reimplantation



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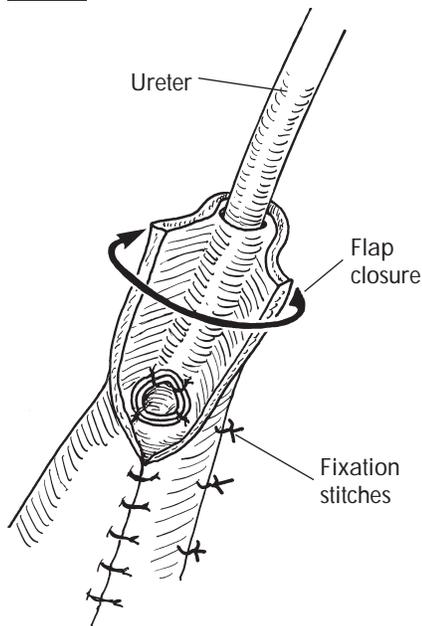
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7-10

Bladder

7-11



7-12

**BOARI FLAP**

If performed properly, the Boari flap procedure provides excellent reconstruction for reconstitution of a gap between the ureter and the bladder.

It is a second choice to the psoas hitch procedure because the Boari flap involves more variables that must be overcome for a successful result.<sup>2,3</sup>

The preliminary exposure is identical to the operation for the psoas hitch: isolation of the retroperitoneum and the proximal ureter and clearing of the upper half of the bladder from its peritoneal reflection.

FIG. 7-10. In contrast to the psoas hitch procedure, with the Boari flap the preservation of the superior vesical arteries is important, especially for the ipsilateral side (A).

The flap for Boari tubularization must be thought of as a wedge of vesical wall. The longer the flap created, the wider the

base must be to maintain good vascularity. The base must be at least 4 cm wide; otherwise the tip of the flap is at risk for ischemia (B).

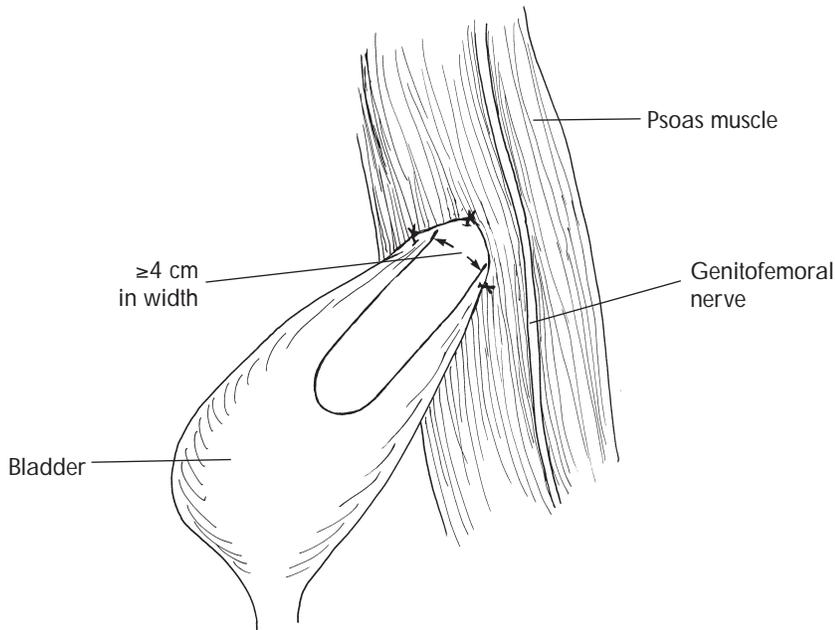
FIG. 7-11. An end-to-end anastomosis between the ureter and the bladder flap will invariably result in a stricture. The importance of a generous overlap of 3 to 4 cm between the ureter and the flap is important for a good reconstruction.

The posterior bladder at the flap base is first fixed with anchoring stitches to the psoas muscle (*arrow*). The surgeon can then perform a tunneling or a Le Duc ureteral reimplantation.<sup>4</sup>

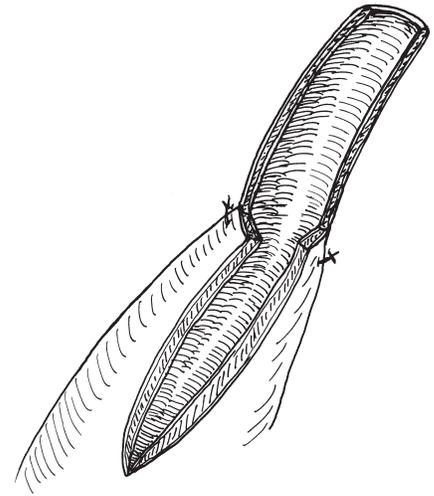
FIG. 7-12. The flap is reapproximated around the ureter, and a stent, suprapubic tube, and drain are placed.

Additional fixation stitches on the Boari flap ensure that no tension is placed on the anastomotic site and that no retraction of the flap occurs.<sup>4</sup>

### Combination of Psoas Hitch and Boari Flap



7-13



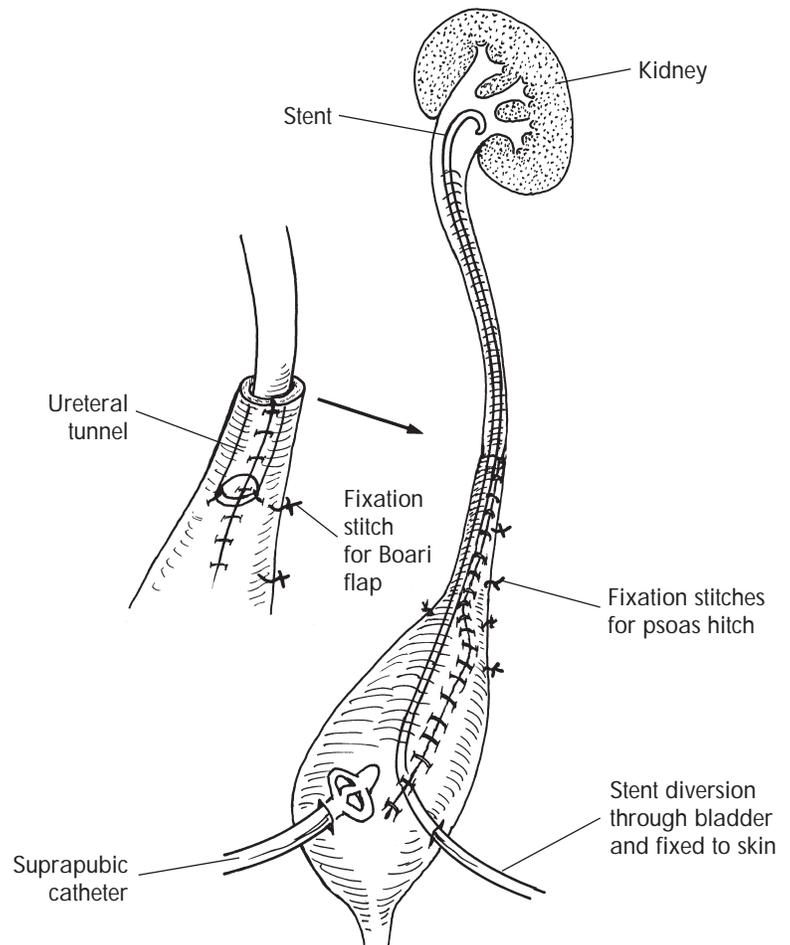
7-14

### COMBINATION OF PSOAS HITCH AND BOARI FLAP

FIG. 7-13. If a vesical-*psaos* fixation has already been completed and the ureter still cannot be overlapped even after mobilizing the kidney and ureter (see pp. 49-50), the surgeon has the option of performing a combined *psaos* hitch and Boari flap procedure.

FIGS. 7-14 AND 7-15. The combination procedure requires that the base of the Boari flap be 4 cm or greater in width and that the *psaos* fixation stitches be wider apart than the usual placement.

In this situation we have not used flaps greater than 4 cm in length; the longer the flap, the greater the chance of ischemia and subsequent contracture.



7-15

## KEY POINTS

### PSOAS HITCH

- The perivesical space is defined and the retroperitoneal pockets are created to isolate the psoas muscle and the proximal ureter.
- The peritoneal reflection is dissected from the bladder.
- If necessary, the contralateral obliterated umbilical artery and even the superior vesical artery are divided for greater maneuverability.
- Bladder wall or dome is bathed in local anesthetic (lidocaine 1%) before a gradual stretch of the bladder wall is performed for the anchoring stitches.
- Vesical-psoas fixation stitches are placed, avoiding the genitofemoral nerve.
- The ureter and the fixed bladder are overlapped by 4 cm.
- Ureteral reimplantation with a tunneling technique or Le Duc procedure is performed.
- Fixation of posterior surface of distal ureter to solid bladder muscle is crucial to prevent reflux.
- A ratio of 4:1 tunnel length to ureteral width for an antirefluxing system is optimal.
- A stent, suprapubic tube, and drain are placed.

### BOARI FLAP

- The bladder is filled with saline solution to free the peritoneal reflection.
- Retroperitoneal pockets are created to isolate the proximal ureter and psoas muscle.
- The flap should have a wide base of no less than 4 cm.
- A tunneling or a Le Duc ureteral reimplantation is performed.
- A stent, suprapubic tube, and drain are placed.

## POTENTIAL PROBLEMS

### PSOAS HITCH

- *Poor maneuverability of superior bladder:* Divide the obliterated umbilical artery and the superior vesical artery bilaterally
- *Genitofemoral nerve at fixation site:* Mobilize the nerve laterally
- *Urethral gap too wide:* Mobilize the kidney and its pedicle to gain 2 to 3 cm (see pp. 49-50) → perform combination Boari flap with psoas hitch → consider transureteroureterostomy

### BOARI FLAP

- *Excessive tension when ureter is tunneled into flap:* Fix flap to psoas muscle → mobilize kidney to gain 2 to 3 cm

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