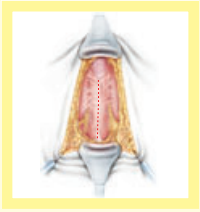
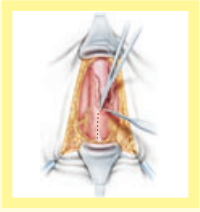
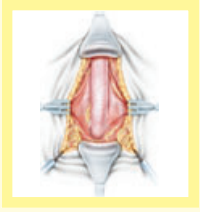
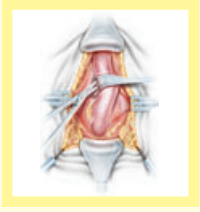
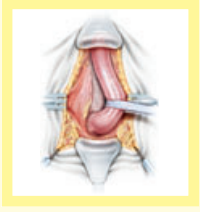
Surgery Illustrated











Surgical Atlas

Vessel-sparing excision and primary anastomosis (for proximal bulbar urethral strictures)

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ILLUSTRATIONS by STEPHAN SPITZER, www.spitzer-illustration.com

INTRODUCTION

The technique with the highest success rate, both short and long-term, for reconstructing the anterior urethra is excision of the stricture with primary anastomosis (EPA). EPA appears to have a high rate of durability. To achieve a tension-free anastomosis it is imperative to use manoeuvres that shorten the distance that the corpus spongiosum must traverse. The current technique for mobilizing the urethra consists of detaching the corpus spongiosum from the corpora cavernosa and dividing the attachments of the proximal corpus spongiosum to the perineal body. This, de facto, sacrifices the arteries to the bulb. However, the intact vascular supply to the urethra might be important if placing an artificial urethral sphincter is considered. The dual arterial supply to the urethra might be essential for preventing possible ischaemic erosion, a complication of placing the artificial urethral sphincter.

Widespread screening for prostate cancer is identifying more patients with localized disease who are candidates for radical prostatectomy. One potential morbidity of surgery is urinary incontinence, and this must be considered. Also, a vessel-sparing anastomotic bulbar urethroplasty could be beneficial when the distal vascular supply to the urethra is compromised, either by congenital anomalies such as hypospadias, by previous surgery, or by pre-existing traumatic penile injury.

We describe a modification to EPA in the bulbous urethra, which includes mobilizing and preserving the arteries to the bulb. The continuity of the corpus spongiosum is maintained. This technique demands that the strictured urethra be excised with the attached spongiofibrosis. In cases of significant spongiofibrosis the technique is not appropriate.

PATIENT SELECTION

Our technique of EPA requires that the stricture be excised and the anastomosis made without creating chordee, penile foreshortening, or tension at the anastomosis. While there are 'guidelines' as to stricture length, there are no absolute thresholds for the length of stricture. Variables such as penile length and the anatomy of the perineum are important. Appropriate patients all have their strictures in the most proximal bulbous urethra.

As noted above, some patients can benefit particularly from the vessel-sparing approach,

and thus our initial experience was with patients after radical prostatectomy. However, like other men, all men with proximal bulbous urethral strictures might develop prostate cancer in the future, and thus the technique described could apply to all appropriate strictures where EPA bulbar urethroplasty is contemplated. Likewise, observations in children suggest that after EPA there is atrophy of the corpus spongiosum as a consequence of that technique. The modification described here might avoid this consequence.

PREOPERATIVE EVALUATION

Preparation for surgery includes a thorough history, physical examination, routine laboratory tests, and an evaluation of the stricture. Characterization of the anatomy of the stricture includes a dynamic retrograde urethrogram, voiding urethrogram, and endoscopic evaluation. These diagnostic tools assess the stricture anatomy by defining the location, length and calibre of the stricture. Also, some information on the depth and density of spongiofibrosis is obtained.

Patients must have a sterile urine culture at the time of surgery, and where necessary, are treated with broad-spectrum antibiotics peri-operatively.

PREPARATION, POSITIONING AND EQUIPMENT

For EPA the patient is placed under general anaesthesia, supine and with a 16 F suprapubic catheter inserted after distending the bladder. If a suprapubic catheter is already in place it is exchanged with sterile technique.

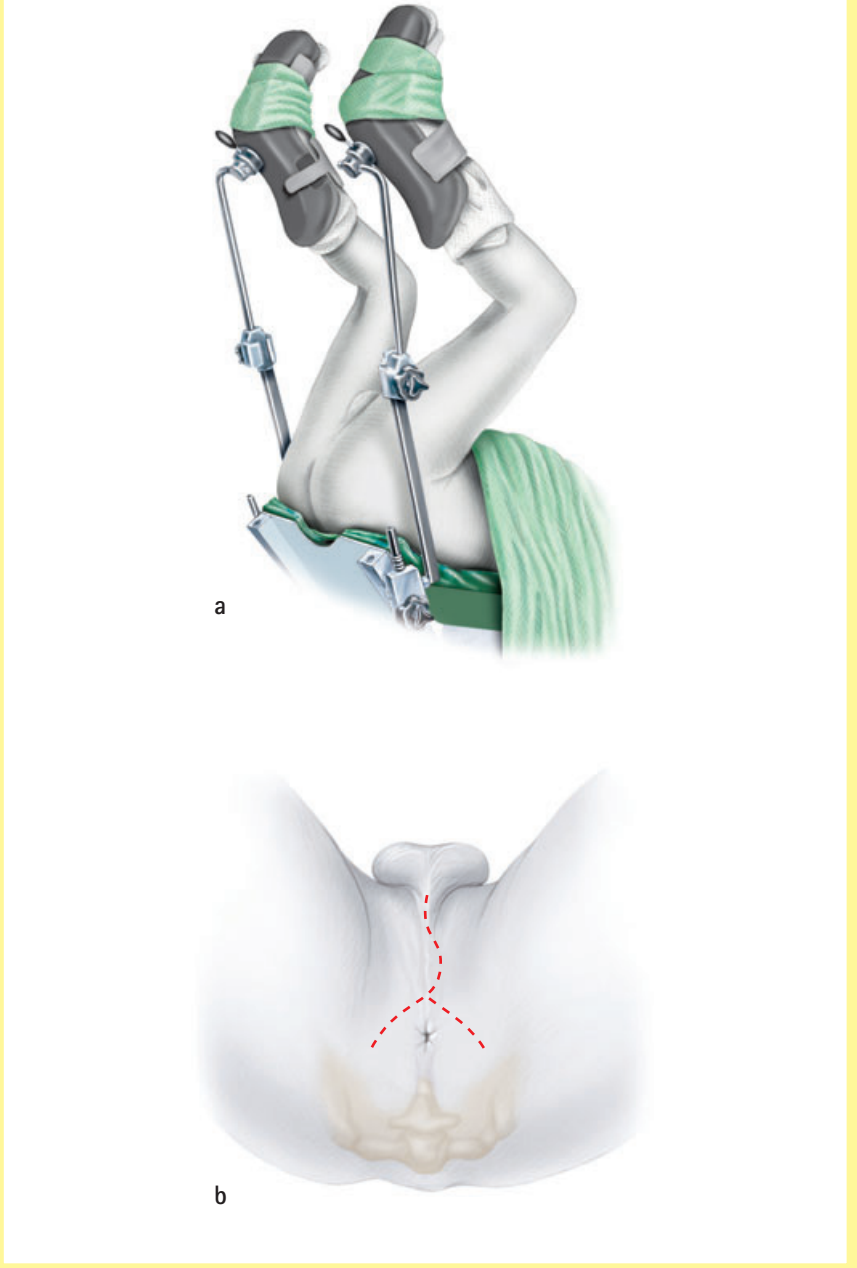
Figure 1

The patient is carefully positioned into the exaggerated lithotomy position, using boot-style stirrups. The buttocks portion of the table is raised. The legs are carefully positioned to assure that there is no pressure on the feet or lower extremities. The forced kyphotic curve from placing the patient in the lithotomy position is padded with a solid gel roll.

At our institution, we use the following equipment: boot-style stirrups (O-YFSI Yellofin®, Allen Medical Systems, Acton, MA); a Hurwitz cystostomy trocar; 7.5 F paediatric cystoscope; 17 F flexible cystoscope; and a Jordan-Bookwalter perineal retractor

TECHNIQUE

The perineum, genitalia and lower abdomen are prepared and draped. The urethra is approached through an inverted-Y (λ-shaped) perineal incision that is carried sharply to the midline fusion of the ischiocavernosus musculature (Fig. 1b).



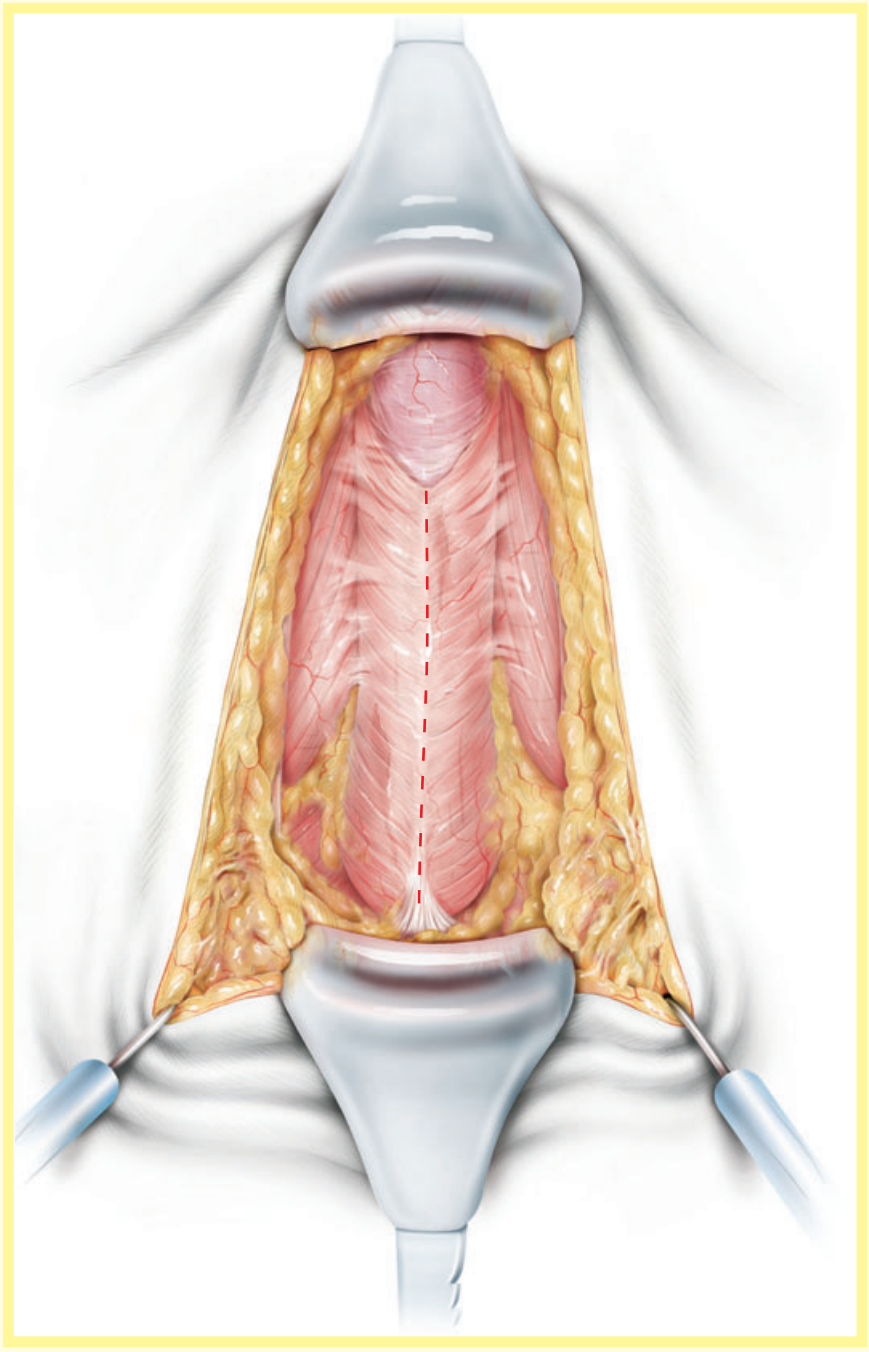
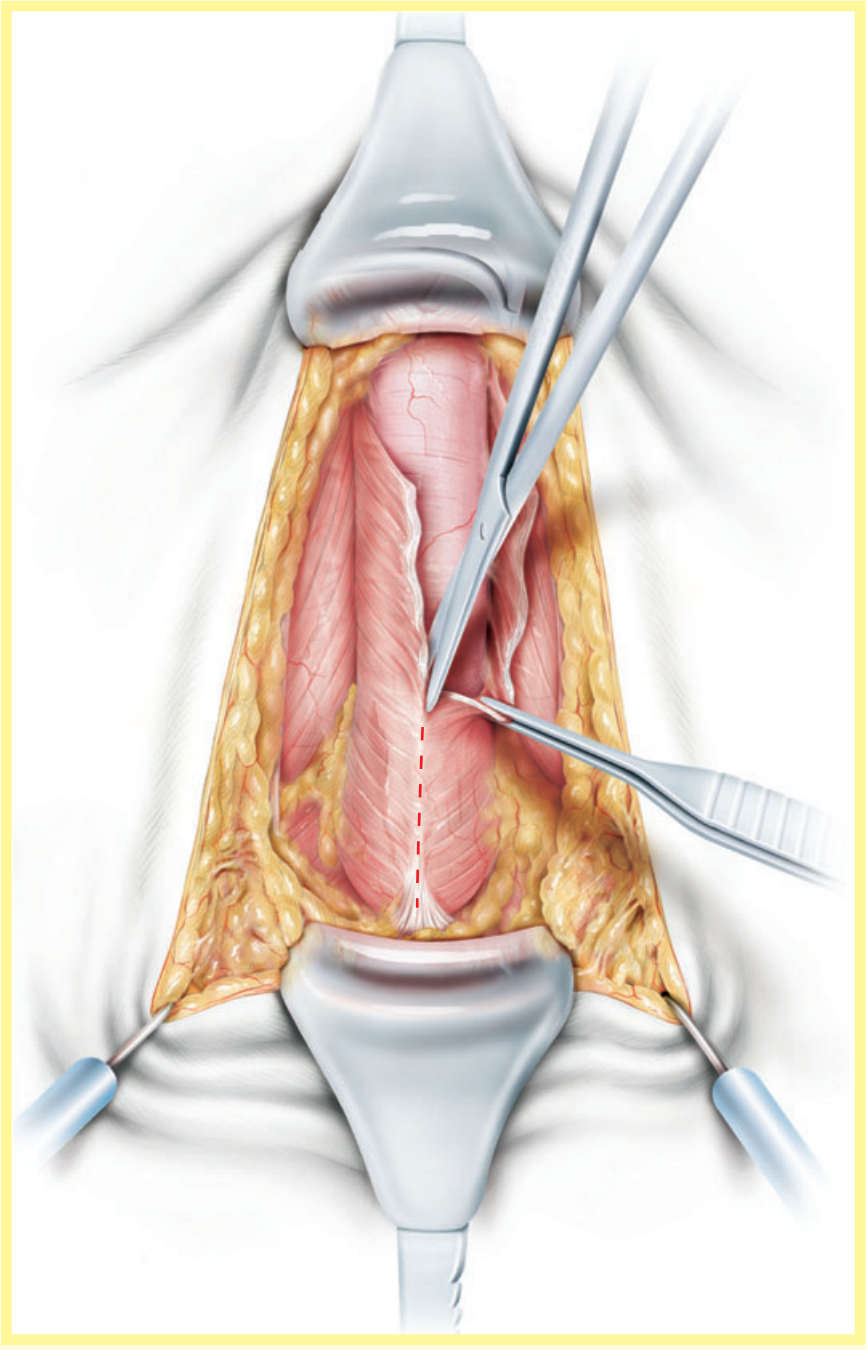


Figure 2

The ischiocavernosus musculature is meticulously detached from the corpus spongiosum.

Figures 3 and 4

The Jordan-Bookwalter retractor is placed for exposure (Fig. 4). The ischiocavernosus muscles are retracted by the lateral blades, and the posterior retractor aids with the partial detachment of the bulbospongiosum from the perineal body. The proximal blood supply is not disturbed.



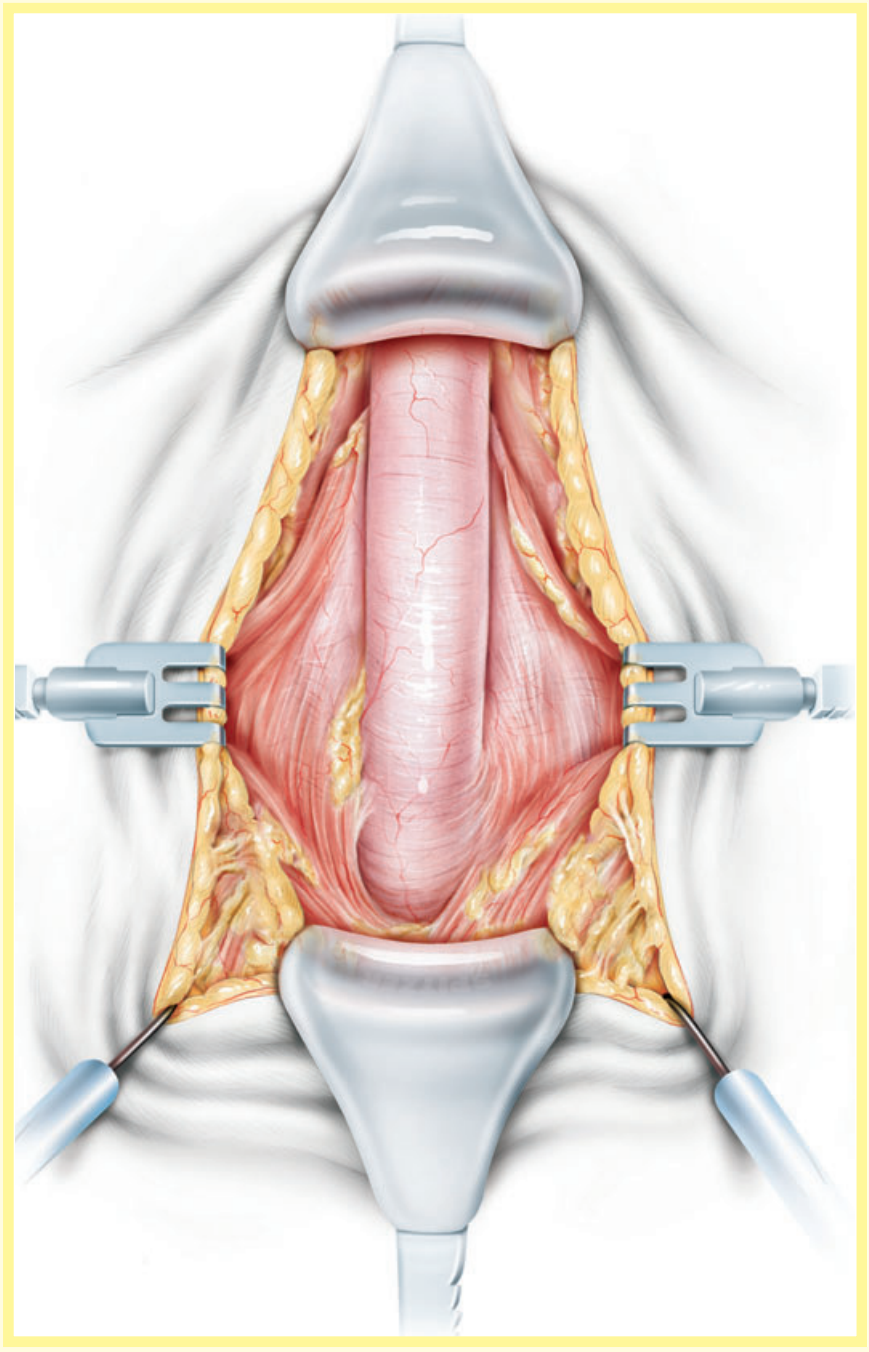
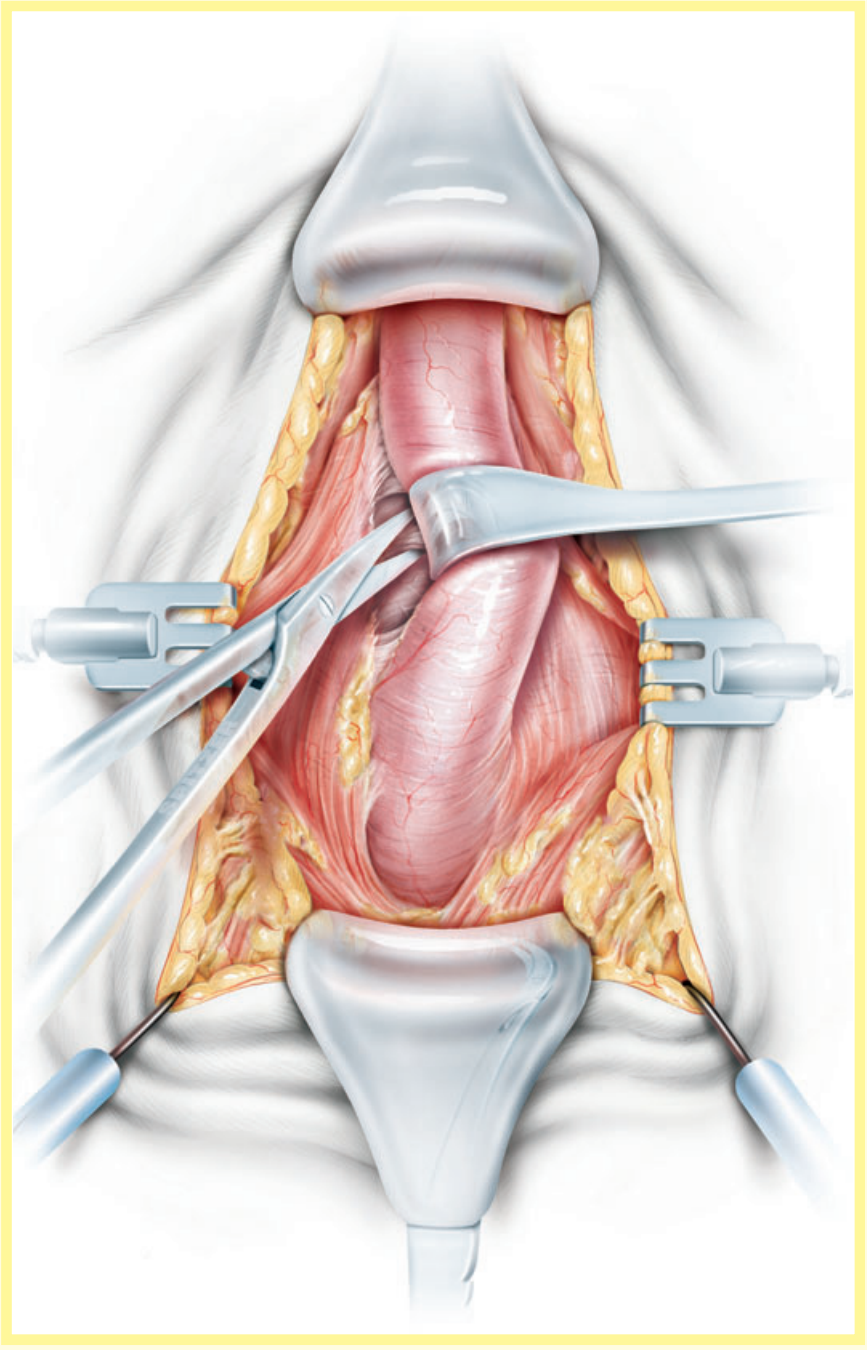


Figure 5

The corpus spongiosum is detached from the corpora cavernosa and from the triangular ligament, dissecting distally to the penoscrotal angle if necessary.



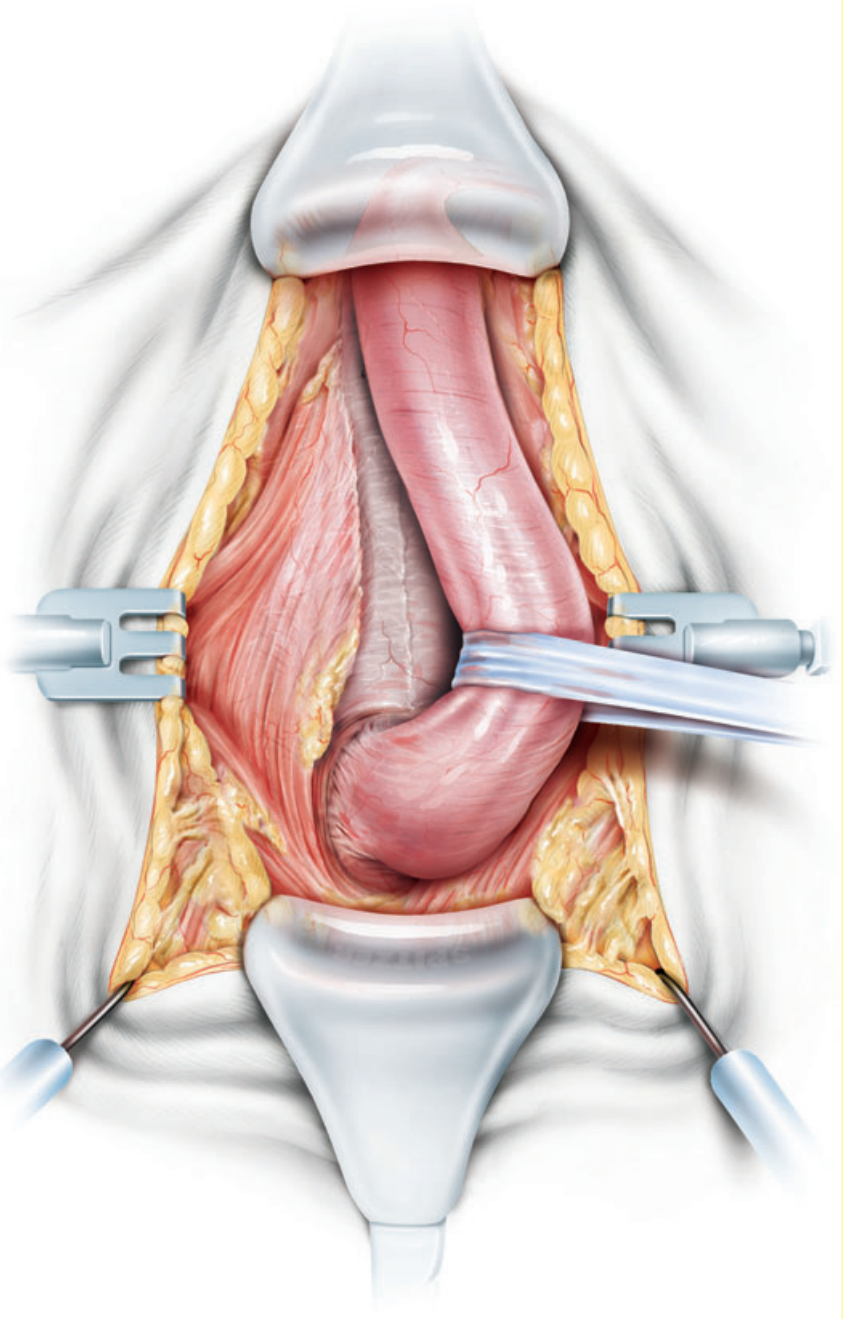
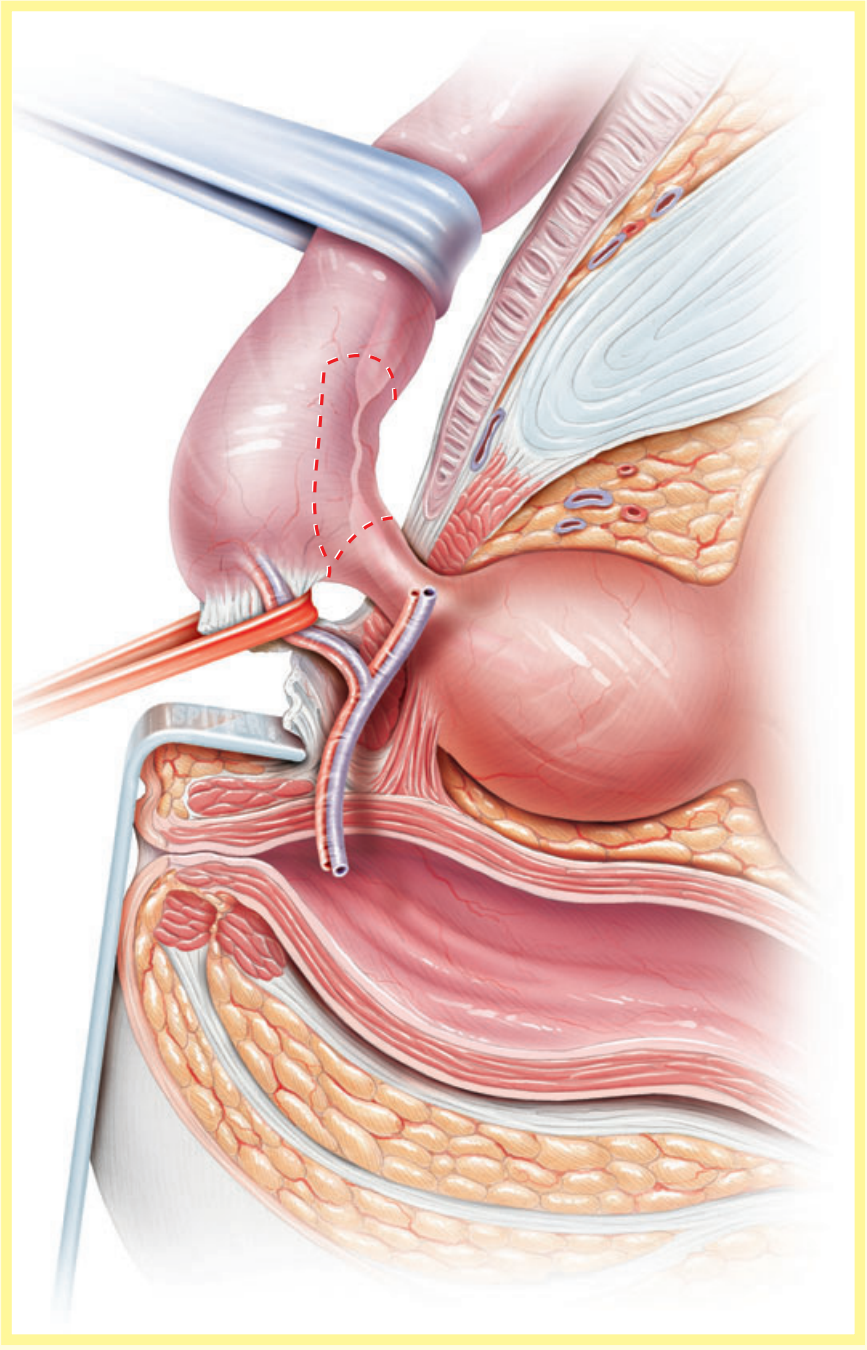


Figure 6

Buck's fascia is dissected from the corpus spongiosum, increasing its compliance. The corpus spongiosum is detached to the departure of the bulbous urethra from the membranous urethra, to facilitate a tension-free anastomosis. At this point the membranous urethra as well as the proximal vascular compartment have been dissected free from the adjacent tissues.

Figure 7

If advantageous, the triangular ligament is divided and the intercrural space is dissected. The space between the membranous urethra and the proximal vasculature is then developed and tagged with a vessel loop, thus preserving the arteries to the bulb.



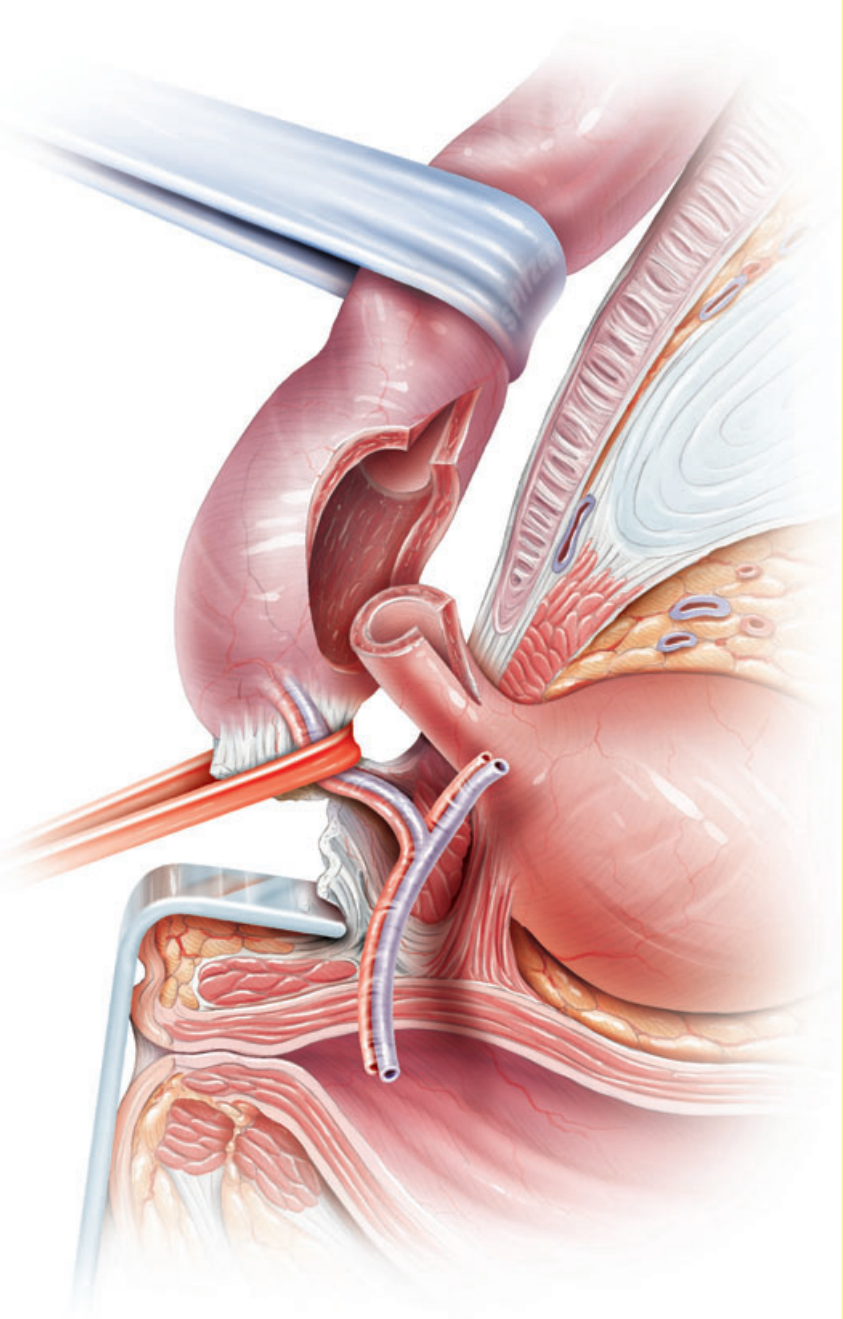


Figure 8

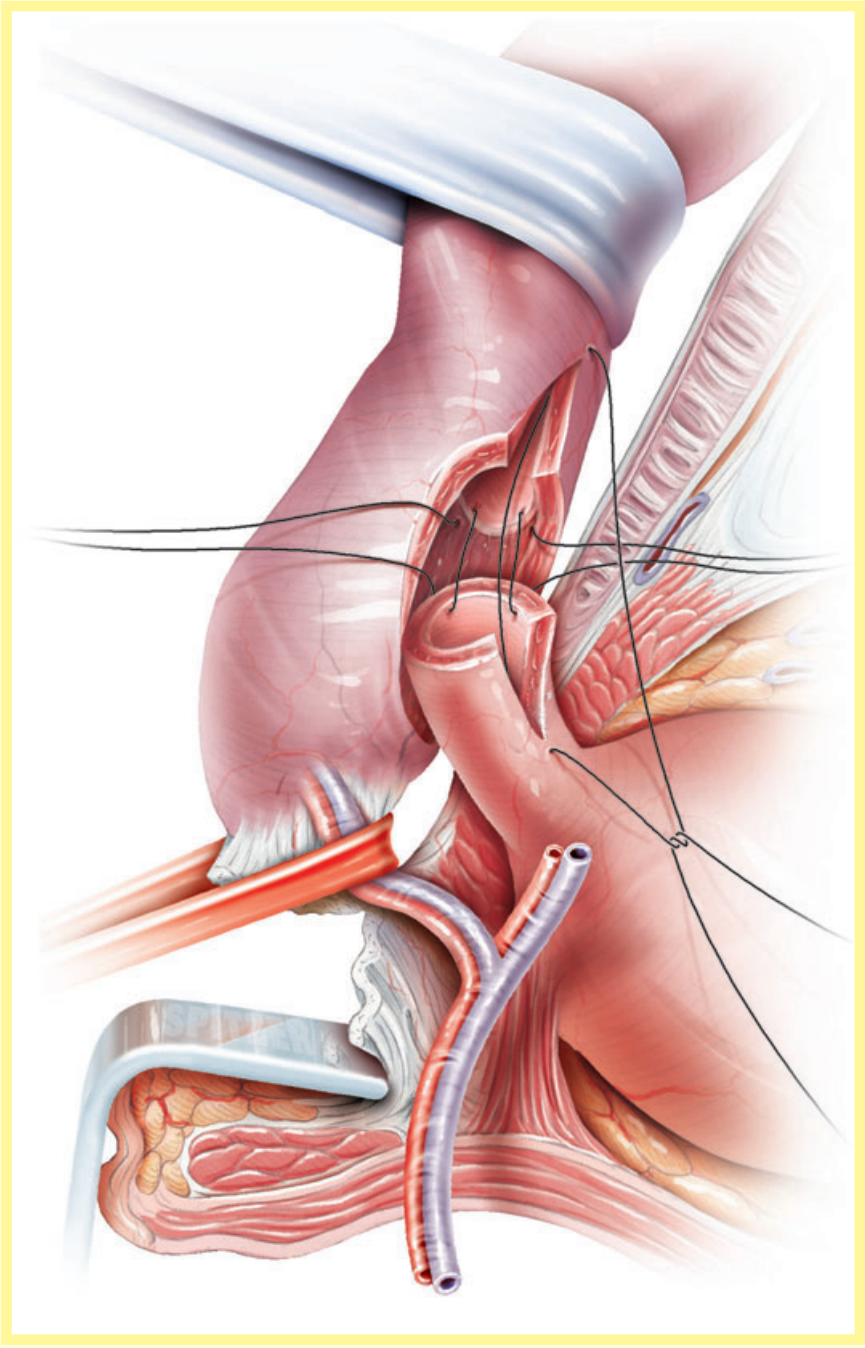
The cystoscope is introduced. The distal extent of the stricture is carefully marked. The urethra is divided at the departure of the bulbous urethra, which in most cases corresponds to the proximal extent of the stricture. The normal appearing proximal urethra is spatulated.

Endoscopy is used to assess the membranous and prostatic portions of the urethra, the bladder, ensure that the suprapubic catheter is at the dome of the bladder, and to verify that spatulation is into normal epithelium.

Distally, the stenotic segment is excised. The distal urethra is spatulated into normal urethra, and bougies are used to evaluate the urethral calibre.

Figure 9

Eight to 10 anastomotic sutures are placed, alternating polydioxanone with poliglecaprone 25. With the sutures placed, but not seated, the stenting 14 F Foley catheter is passed. The sutures are then seated, and a tension-free anastomosis made.



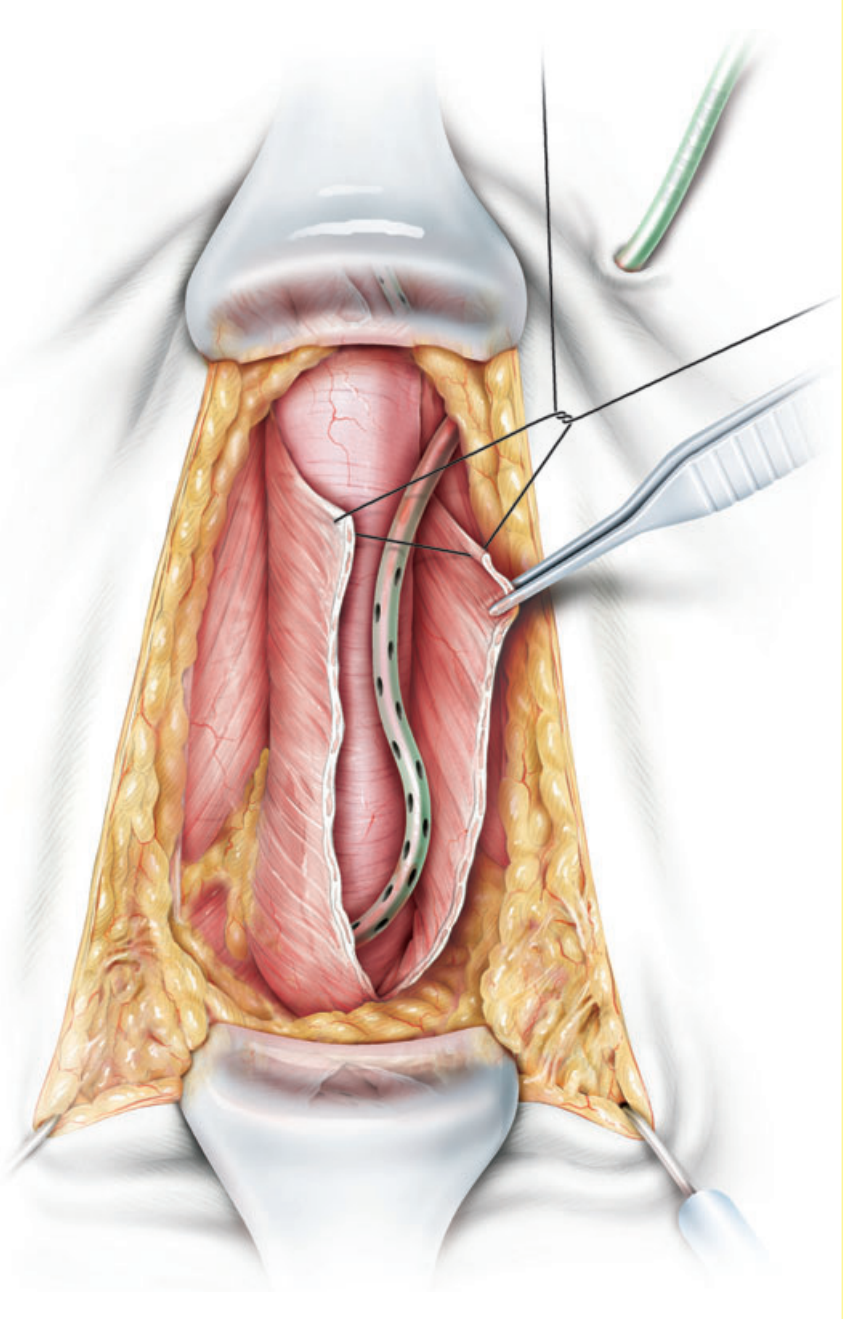


Figure 10

The corpus spongiosum is reattached to the triangular ligament. The Colles' fascia and ischiocavernosus musculature are closed in the midline. A 10 F TLS drain is placed deep to the muscle closure adjacent to the corpus spongiosum, and brought out through a small stab wound adjacent to the scrotum. The subcutaneous tissues are closed with absorbable suture. A 15 F Blake drain is placed deep to the subcutaneous closure, but superficial to the closure of Colles' fascia and brought out through a small stab wound adjacent to the scrotum. The skin is closed with absorbable suture.

POSTOPERATIVE CARE

The surgical wound is dressed with translucent dressing. The suprapubic catheter is dressed. The stenting urethral catheter, as well as the two drains, are affixed to the lower abdomen. The patient is treated with broad-spectrum i.v. antibiotics for 48–72 h, which are followed by suppressive antibiotics until catheter removal. The patient is also treated with analgesics, bladder antispasmodics, stool softener, and diazepam to help prevent erections.

The patient is discharged after the two drains are removed, usually within 2–3 days after surgery. The capped Foley is kept taped to the abdominal wall, while the suprapubic catheter is left to gravity drainage. The patient is instructed to avoid sitting erect as long as the urethral catheter is in place.

At ≈21 days after surgery the patient is assessed in the office, where the urethral stent is removed and a voiding urethrogram taken. If there is no extravasation the suprapubic catheter is plugged, and can be removed 3–4 days later as long as the patient continues to void without difficulty.

A flexible cysto-urethroscopy is performed ≈6 months after surgery. An office appointment is scheduled at 18 months after surgery, with a yearly follow-up thereafter (either in the office or with the referring urologist). The long-term follow-up relies mainly on patient symptoms (subjective diminished force-of-stream, UTI, urinary retention, etc.), while diagnostic procedures such as urethroscopy and/or retrograde urethrogram are done selectively.

FROM SURGEON TO SURGEON

As described above, the goals for our technique of EPA are to obtain a durable reconstruction while preserving the proximal vasculature. In one patient with a short bulbous urethral stricture due to straddle trauma, an attempt at developing this surgical plane was unsuccessful because of marked fibrosis following the straddle injury and multiple urethrotomies.

Whether this modification is advantageous cannot yet be confirmed; it appears to yield an equivalent efficacy. The follow-up will determine if it is indeed equivalent to current techniques. Likewise, further use of this procedure at other centres is needed to see if there is validity to the premise that preserving the proximal blood supply is better in children, is better for the man who might need an artificial sphincter, or better in general.

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