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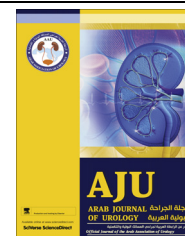
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## DELAYED REPAIR OF PFUI REVIEW

# The combined perineo-abdominal transpubic urethroplasty



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### KEYWORDS

Transpubic;  
Perineo-abdominal;  
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### ABBREVIATIONS

PFUI, pelvic fracture  
urethral injury;  
PBBF, para-urethral  
bladder base fistula

**Abstract** Research pertaining to transpubic urethral surgery is described. The operative technique of the perineo-abdominal transpubic approach for pelvic fracture urethral injury (PFUI) is reported in detail. Under all circumstances the operation should be started by a perineal exposure and liberal circumferential mobilisation of the bulbar urethra. The operation proceeds to an abdominal exposure only when a tension-free urethral anastomosis cannot be made from the perineal approach. An omental wrap of the urethral anastomosis is mandatory to guard against the surrounding fibrosis and callus formation. The operation might be indicated for PFUI with a long urethral gap when the urethral anastomosis cannot be made from the perineal approach, and in complex PFUI associated with an intra-abdominal complication. The combined perineo-abdominal transpubic procedure provides a wide and excellent exposure for an easy and neat bulboprosthetic urethral anastomosis. Success rates are usually 98–100% and are sustained in the long term.

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### Historical background

The earliest description of a planned transpubic urethroplasty is credited to Pierce in 1962 [1]. He removed the entire pubic bone after transecting the superior and inferior pubic rami bilaterally using a Gigli saw through an abdominal incision. The excellent exposure thus provided allowed the posterior urethral stricture to be corrected in seven patients. Unfortunately, Pierce later stopped using this procedure because of complications resulting from

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the 'dead space' left after removing the pubic bone [2]. However, in 1968 Paine and Coombes [3] used the transpubic approach in one patient. They divided an osteoplastic flap subperiosteally from the pubic bone using a Gigli saw and after making the urethral anastomosis the bone flap was fixed back into position by wire sutures.

Transpubic urethroplasty became popular only in 1973 when Waterhouse et al. [4] used it in eight patients, with successful results. First, through an abdominal incision they divided the pubic bone bilaterally using a Gigli saw and, removed a wedge of the pubic bone. The site of bone removal was then packed firmly before making a perineal incision to mobilise the bulbar urethra which was then transected at its proximal blind end. The intercrural septum was then incised and the anterior urethra was passed up through it into the abdomen and anastomosed to the roof of the prostatic urethra. Notable, no intervening scar tissue was excised. However, copious discharge from the fairly large dead space persisted for a long time and the mean (range) length of hospitalisation was reported to reach 28 (14–50) days [5]. Also, bleeding might be so profuse that it was usual to firmly pack the site of bone resection before undertaking the perineal exposure. Accordingly, total pubectomy in transpubic urethroplasty has been abandoned by almost all investigators.

Transpubic urethroplasty only became accepted as a standard urological procedure after Turner-Warwick described some useful modifications [6]. First, urethral anastomosis was first attempted from the perineum in every case. Second, a small wedge of pubic bone was resected rather than total pubectomy. Third, the fibrous tissue was meticulously and completely excised. Fourth, the mobilised anterior urethra was passed up into the abdomen through the subpubic tunnel or re-routed over the right or left crus of the penis to create a tension-free end-to-end bulbo-prostatic urethral anastomosis. Fifth, an omental pedicle was brought down to wrap the site of the anastomosis.

### Operative technique

Under epidural or general anaesthesia, and with the patient in the lithotomy position, a midline perineal incision was made. The two bulbospongiosus muscles are separated to expose the bulbar urethra. The latter is then circumferentially mobilised distally up to, but not beyond, the penoscrotal junction, and proximally up to the prostatic apex, where it is transected [7]. After a meticulous and complete resection of the fibrous pre-prostatic tissue, urethral anastomosis is attempted. If a tension-free anastomosis cannot be made from the perineum the operation proceeds to a perineo-abdominal phase by making a midline suprapubic incision. Then by careful and sharp dissection

of the retropubic space the prostate is freed from the posterior surface of the pubis. The anterior surface of the pubis is then cleared for  $\approx 2$  cm on each side and a 2–2.5 cm wedge-shaped piece of bone is resected subperiosteally from the medial portions of the pubic bones using an osteotome.

An antegrade sound is then passed through the opened bladder and its tip palpated at the prostatic apex, which is trimmed until healthy pliable mucosa is reached. The two urethral ends are then spatulated and the mucosa tacked laterally by 4–6 sutures. The mobilised anterior urethra is then brought up through the subpubic tunnel or re-routed around the right or left penile crus into the abdomen. A tension-free end-to-end bulbo-prostatic urethral anastomosis is created by 6–8 sutures of 3/0 or 4/0 polyglycolic acid over a Silastic Foley catheter of 8–16F, according to patient age. After closing the bladder around a suprapubic catheter, the site of the anastomosis and intra-abdominal part of the anterior urethra are covered and surrounded by an omental pedicle. Finally, the perineal and abdominal wounds are closed [8].

In PFUI associated with intra-abdominal complications (complex PFUI), the operative procedure might be started by the abdominal exposure. In these cases the prostate is usually fixed and incarcerated to one or the other side of the pelvic wall. The abdominal retropubic approach provides a wide exposure for a better disengagement of the incarcerated prostate, which greatly facilitates the urethral anastomosis. The urethral stent is removed at 3–4 weeks after surgery, and voiding along with retrograde urethrography then are done, and if they are satisfactory the suprapubic catheter is closed for 1–2 days before its removal.

### Indications

PFUIs can be simple or complex, and each might have a short or long urethral gap. Complex PFUIs include cases associated with intra-abdominal pathological conditions such as a urinoma cavity, a para-urethral bladder base fistula (PBBF), urethro-rectal fistula, or incompetent bladder neck [9]. Hence, it is generally accepted that a complex PVUI might require a perineo-abdominal transpubic urethroplasty [6,9,10].

For simple PFUIs with a short urethral gap between the urethral ends, it is generally accepted that they are usually repaired from the perineum [7,10,11]. However, there is considerable debate about the correction in cases with a long urethral gap ( $> 2.5$  cm). Correction of these cases should be attempted first through the perineum, and if a tension-free anastomosis cannot be made, the operation can proceed to a perineo-abdominal procedure [6,7]. However, many authors repair such cases by using one or more of the four manoeuvres of the elaborated perineal approach, with a success rate of  $> 95\%$  [10,11].

## Advantages

The perineo-abdominal transpubic approach has several advantages. First, it provides an excellent and wide exposure for creating a bulbo-prostatic urethral anastomosis under vision. Second, it greatly facilitates the complete excision of an associated PBBF. A previous study showed that all repairs of a PBBF that were made through the perineum failed, while all repairs that made by a perineo-abdominal approach had a successful outcome [9]. Also, Webster [12] holds that excision of complicated fistulae between the bladder base and urethra will require a perineo-abdominal approach. Third, it allows the synchronous repair of an initial trauma-related urethro-rectal fistula and the correction of an associated bladder neck incompetence [6,9]. Fourth, some patients, especially those who were dependent on a suprapubic catheter for many months or years, have multiple or large bladder stones, and in these cases the stones can be removed during the abdominal exposure. Fifth, it permits the use of greater omentum to envelop the site of the urethral anastomosis [6,7].

## Postoperative results

Patients usually are ambulatory on the second or third day after surgery, with no pelvic instability, abnormal gait or pelvic girdle pain [6,8]. The hospital stay is now shortened to 3–5 days instead of 2–3 weeks as previously. A successful result, classified as voiding in the same way as before the original trauma, a wide-calibre urethra at the site of repair, as shown by the urethro-gram, and no need for periodic dilatation or visual urethrotomy, is usually 98–100% [6,8]. Successful results have been reported to be sustained for up to 24 years, despite the fibrosis and callus formation surrounding the site of repair [8]. Obviously, this is partly attributable to the omental wrapping around the site of anasto-

mosis. Also, incontinence of urine does not develop as a direct result of transpubic urethroplasty [6,8].

## Conflict of interest

None.

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None.

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