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INITIAL MANAGEMENT OF PFUI
REVIEW

# The management of the acute setting of pelvic fracture urethral injury (realignment vs. suprapubic cystostomy alone)

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**KEYWORDS**

Pelvic fracture;
Urethral injury;
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**ABBREVIATIONS**

PFUI, pelvic fracture urethral injury;
STDU, suprapubic tube with delayed urethroplasty;
ED, erectile dysfunction;
EPR, early non-endoscopic realignment;

**Abstract** ***Background:*** In patients with pelvic fracture urethral injury there are two options for management: First, to realign as an early primary realignment over a catheter; and second, to place a suprapubic tube with delayed urethroplasty of the inevitable stricture.

***Methods:*** We reviewed previous reports from 1990 to the present, comparing early endoscopic realignment, early open realignment and suprapubic tube placement, to determine the rates of incontinence, erectile dysfunction and stricture formation.

***Results:*** Twenty-nine articles were identified. The rates of erectile dysfunction, incontinence, and stricture formation, respectively, were: for early endoscopic realignment, 20.5%, 5.8% and 43.8%; for open realignment over a catheter, 16.7%, 4.7% and 48.9%; and for a suprapubic tube and delayed urethroplasty 13.7%, 5.0%, and 89.0%. A one-way anova showed no difference in the mean rate of erectile dysfunction ($P = 0.53$) or incontinence ($P = 0.73$), and only stricture formation was significantly different ($P < 0.1$).

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EER, early endoscopic realignment

***Conclusion:*** The rates of incontinence and erectile dysfunction are similar between the groups. Only the rate of stricture formation was higher in the suprapubic tube and delayed urethroplasty group.



## Introduction

In patients with pelvic fracture urethral injury (PFUI), there are two options for management. The first is early primary realignment over a catheter, and the second is to place a suprapubic tube with delayed urethroplasty (STDU) of the inevitable stricture. Here we evaluate the historical development of the treatment of PFUI and review contemporary reports for the risks and benefits of each therapy, using a one-way anova to compare the mean rates of complications.

### *Historical overview*

Young [1] in 1929 was the first to report the immediate open surgical repair of a PFUI via a perineal approach. Later, it was determined that the lithotomy position associated with the perineal approach was unfavourable with concomitant pelvic fractures; the perineal approach was abandoned for a retropubic approach [2,3]. Whilst the retropubic approach might be safer for a patient with recent fractures, the repair necessitates exploration and dissection of an already traumatised region [4]. Importantly, further reports showed a greater risk of erectile dysfunction (ED) associated with the retropubic approach than with a STDU (0% vs. 33%), probably due to damage to the surrounding neurovascular bundle [5]. There was also concern that dissecting the retropubic space could convert a partial urethral tear into a complete urethral tear [6]. With this being the case, the immediate open retropubic surgical repair of an acute PFUI injury fell out of favour.

Meanwhile, urologists were also working on realignment techniques, to bring the urethra together over a catheter, without retropubic dissection. The first realignment was reported in 1934 [7]. Traction was then added to the catheter placed through the urethra, via weights, to aid in the re-approximation of the urethral edges [8]. Several further studies showed that there was still fibrous tissue bridging the gap, and not mucosa, even with the aid of weights [2,9]. In addition, the use of weights was abandoned as it was shown to cause worse incontinence because of damage to the bladder neck, and distal urethral necrosis [10].

In 1953, Johanson [11] was the first to question whether or not the STDU was superior to the realignment strategy. Whilst the stricture is inevitable, a STDU guarantees that the degree of ED is due to the initial injury and not the manipulation for early non-endoscopic realignment (EPR) [12]. Suprapubic cystotomy became the preferred treatment for the next 30 years [4]. In the early 1990s novel techniques for minimally invasive, radiological and endoscopic techniques for realignment were introduced which challenged the standard of suprapubic cystotomy alone [13–16]. Since then, there have been many reports arguing for both methods of the management.

### *Complications*

The goal of management is to realign the urethra whilst minimising the risks of ED, incontinence and subsequent urethral stricture [4]; Table 1 [13–41] and Fig. 1 summarise the findings of the above complications in early endoscopic realignment (EER), early open primary realignment, and STDU in studies from 1990 to the present. Importantly, in these series, many of the patients did not undergo primary realignment because of haemodynamic instability of the patient, or failure of primary realignment, which might be associated with a worse initial injury.

### *ED*

The main concern of EPR is further damage to the neurovascular bundle. Whilst the open retropubic approach probably affects the neurovascular bundle [5], increasing the risk of ED [4,42], there is growing evidence that this is no longer the case with primary EER techniques currently used [4,32,35]. Dhabuwala et al. [43] were the first to suggest that the injury, not the treatment, induced the ED. Kotkin and Koch [35] went on to report their experience with EPR vs. simple catheter placement (with partial disruption), and found no difference to suggest that EPR made the ED worse. MRI [44] and MRI with duplex ultrasonography [45] studies show that patients with ED have more significant damage than those with no ED, all in a cohort of patients who had been treated only with STDU. Table 1 summarises the finding that rates of ED are equal between EER ($P = 0.53$), EPR and STDU, at 20.5%, 16.7% and 13.7%, respectively.

### *Incontinence*

Incontinence after a PFUI is rare, and when present it is believed that the initial injury is responsible for the