

Sexual and Functional Outcome after Anterior Urethroplasty: A Mini Review

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ABSTRACT

Background: Urethral surgery outcomes are often evaluated by assessing urinary flow and urethral patency. However, sexual consequences may appear after urethroplasty, impairing quality of life and patient's perception of success.

Objective: The aim of the study was to evaluate the relationship between anterior urethral reconstruction and postoperative sexual dysfunction, including the proposed factors predicting sexual outcomes.

Methods: PubMed, Google scholar and Science direct were searched using the following keywords: Sexual dysfunction, Urethroplasty, Erectile dysfunction and Urethral stricture. The authors also screened references from the relevant literature, including all the identified studies and reviews, only the most recent or complete study was included between January 2002 and June 2021. Documents in a language apart from English have been excluded as sources for interpretation. Papers apart from main scientific studies had been excluded (documents unavailable as total written text, conversation, conference abstract papers and dissertations).

Conclusion: Sexual dysfunction after anterior urethral reconstruction is an important issue that must be appropriately discussed during preoperative patient counselling. Reported outcomes after anterior urethroplasty should include sexual consequences and relevance, evaluated using validated tools.

Keywords: Sexual dysfunction, Urethroplasty, Erectile dysfunction, Urethral stricture.

INTRODUCTION

The goal of urethroplasty is to restore voiding function, thus most literatures apply this criterion to define successful urethroplasty, but now focus is shifting toward inadvertent complications such as sexual dysfunction (SD). Sexual dysfunction includes erectile dysfunction, ejaculatory disorders, penile chordee and genital sensory disorders. Current available studies declare that the denovo post-urethroplasty SD is not common, nearly 1% after anterior urethroplasty⁽¹⁾.

In 1993, **Mundy *et al.***⁽²⁾ were the first to document erectile dysfunction (ED) following urethroplasty. In a series of 200 patients, they reported 5% persistent ED following anastomotic urethroplasty (AU) and 0.9% after patch urethroplasty. Numerous more research have evaluated the subject since their report⁽²⁾.

Palminteri *et al.*⁽³⁾ emphasised the value of preoperative counselling for patients, particularly with regard to the effects of operations on sexual health. In a research analysing the results of ventral buccal mucosa graft (BMG) urethroplasty, 73% of patients reported experiencing medium to high levels of anxiety before the procedure, and 27% said they had not received enough information on potential sexual side effects.

The majority (85%) of those who underwent urethroplasty admitted to being frightened that the procedure might not fix their issue, while 35% and 31%, respectively, claimed to be afraid of postoperative genital scars and a worsening of their sexual life⁽³⁾.

Erectile dysfunction after anterior urethroplasty:

Etiology of ED:

De novo ED after anterior urethral repair may have a neurogenic or vascular origin⁽⁴⁻⁵⁾ due to:

- (1) Damage to the cavernosalspongiosal branches or bulbar arteries while mobilising or transecting the bulbar urethra.
- (2) Damage to the cavernous nerves caused by urethral intercrural dissection. These nerves travel near the proximal bulbar urethra at the 1 and 11 o'clock locations.
- (3) Damage to the perineal nerve, which travels next to the ischiocavernous and bulbospongiosus muscles as it arises from the pudendal nerve at the ischiorectal fossa.
- (4) It increases the length of the branches that innervate the bulbospongiosus muscle and helps the corpus spongiosum, which may be crucial for erection, however the exact process is unknown. The perineal nerve extends along the ventral side of the penis, providing sensory branches that innervate the frenular region as well as the ventral side of the penis.
- (5) **Yucel and Baskin**⁽⁴⁾ identified a connection between the perineal and penile dorsal nerves, suggesting that this connection may be the cause of some mysterious neurological reflexes that result in erection, orgasm, and ejaculation⁽⁴⁾.

Psychosomatic factors may also play a role in the onset of ED. **Coursey *et al.***⁽⁵⁾ found that 27.3% of the patients related worsened erections after circumcision in otherwise healthy controls. They suggest that alterations in penile appearance could affect short-term sexual performance⁽⁵⁾.

Predictive factors for ED after anterior urethroplasty:

Factors such as age, stricture location, length of stricture and procedure have been proposed to affect sexual function after urethroplasty.

Age at the time of the urethroplasty:

BMSFI was employed by **Erickson et al.** ⁽⁶⁾ to assess SD following urethral reconstruction. In contrast to younger patients, they discovered that patients over 50 years showed a considerable drop in mean EF domain. **Anger et al.** ⁽⁷⁾ further claimed that preoperative EF and age may have a negative impact on postoperative sexual outcome. In their prospective review, men had worse preoperative EF values (mean 20 vs. 29, $P=0.11$) and were older (mean age 47 vs. 36.8 years, $P=0.17$) compared to those who had postoperative EF scores > 20 , albeit the differences did not reach statistical significance ⁽⁷⁾. Although data showed that older men had lower preoperative IIEF scores and a steeper fall in IIEF values, other investigators could not detect any correlation between age and the prevalence of ED ^(8,9). **Chapman et al.** ⁽¹⁰⁾ did not discover a connection between age and SD after doing a multivariate analysis.

Length of stricture:

Given that men with worse postoperative EF had significantly longer strictures than those with better or unchanged erections, **Coursey et al.** ⁽⁵⁾ reported that stricture length as a prognostic indicator (mean 6.8 vs. 4 cm). Additional research, however, disproves this connection ⁽¹⁰⁾.

Location of stricture

Erickson et al. ⁽¹¹⁾ discovered an overall postoperative ED of 66% in a subanalysis of men with normal preoperative EF, with bulbar repairs accounting for 16 (76%) of the cases and penile urethroplasties for 3 (38%). It is significant to highlight that after a median of 6 months, all men but 2 had recovered to their baseline EF.

Ejaculatory dysfunction after anterior urethroplasty:

Ejaculatory dysfunction (EjD) can already exist prior to urethroplasty, causing changes in ejaculatory function after bulbar urethroplasty. Ejaculatory function itself may be affected by urethral blockage. The stated preoperative prevalence ranges widely from 0 to 85%. According to **Erickson et al.** ⁽¹¹⁾ 25% of patients reported poor preoperative ejaculatory function. The most common related problems were poor ejaculatory volume (100%), vigor (91%) and pain with ejaculation (100%) ⁽¹¹⁾.

The majority of research found that urethral lumen restoration resulted in enhanced ejaculatory function. But occasionally EjD continued or even got worse. This could be explained by perineal nerve injury or by

the division of the bulbospongiosus muscle (BSM) after bulbar urethroplasty. Semen emission is found to be significantly influenced by BSM. When the BSM is totally divided along its midline, when the central tendon of the perineum is being dissected, or when the perineal nerve is emerging from the ischioanal fossa, the perineal nerve can be injured, leading to both sensitivity deficiencies and potentially dysfunctional ejaculation ⁽¹²⁾.

Finally, before urethroplasty, individuals may already have EjD caused by urethral lumen obstruction. In most cases, urethral repairs improve ejaculatory function, although in 0–20% of individuals, it may deteriorate. The following actions can be taken to lessen the likelihood of ejaculatory disorders, according to **Palminteri et al.** ⁽³⁾: (1) Careful midline opening of the bulbospongiosus muscle; (2) Avoiding damaging the nerve branches located more laterally; (3) Avoid dividing the perineal central tendon that participates in the ejaculatory mechanism; (4) Good coverage of the ventral graft with corpus spongiosum; and appropriate reconstruction of the bulbo ⁽³⁾.

Penile shortening and curvature

Potential post-urethral reconstructive problems include penile length loss and penile curvature, which, depending on their severity, may severely impede sexual function and lead to patient dissatisfaction with the procedure's results ⁽¹³⁾.

Penile shortening and curvature after bulbar urethroplasty

Coursey et al. ⁽⁵⁾ in their assessment of the alteration in penile angulation and shortening following anterior urethroplasty used a non-validated questionnaire. Most patients said their penile angle remained unchanged. Patients with changed erectile angle or penile length exhibited strictures that were noticeably longer than those without ($P=0.05$). 8.9% AU and 7.7% BMG urethroplasties were observed to have a "significant alteration" in the erect angle. However, the majority of patients claimed that it became better over time ⁽⁵⁾.

After various anterior urethroplasties, 225 patients were evaluated by **Kessler et al.** ⁽¹³⁾. Patients in this study reported no, little, moderate and severe curvature in 74.7%, 15.1%, 10.2% and 15.6% of cases. In comparison with the overall severe shortening (15.6%), EPA was related with a larger percentage of severe penile shortening (30%). In 22% and 14% of instances, the EPA group experienced moderate or severe penile curvature, whereas the BMG urethroplasty group reported 4% moderate and 4% severe postoperative penile curvature. Patients who had BMG urethroplasty did not all experience significant shortening. Although AU is an effective treatment, it may only be appropriate for short (3 cm)

bulbar strictures due to the increased risk of chordee and penile shortening⁽¹³⁾.

Barbagli et al.⁽¹⁴⁾ used EPA in 153 patients in line with this theory, of them 91 (59.5%) had strictures < 2 cm and 58 (37.9%) had strictures between 2 and 3 cm. Strictures bigger than 3 cm were present in only 4 patients (2.6%). No patient had any worries concerning penile chordee or ED.

Regarding the application of replacement methods. None of the patients in their series of 2-sided bulbar urethroplasty procedures using BMG reported postoperative curvature or loss of penile length⁽¹⁵⁾.

Furr et al.⁽¹⁶⁾ compared the results of EPA urethroplasty and dorsal BMG urethroplasty in a cohort of 179 patients. Tethering with erections was significantly more frequent with EPA (23.4%) compared to BMG (3.1%). On the other hand, 76% of patients who used tethering said their sexual activity was completely joyful.

Cold glans sensation and decreased penile sensitivity

After urethroplasty, patients may report alterations in genital region sensitivity and incomplete glans tumescence. The unfavourable effects could make it difficult to enjoy sexual activity. Traditional explanations for cold glans include the transection of the corpus spongiosum for primary anastomosis, which reduces the distal blood flow to the glans and, as a result, reduces the stiffness of the glans. During bulbar urethral dissection, damage to the perineal nerve branches may be responsible for genital sensitivity issues⁽¹²⁾. Following ventral BMG bulbar urethroplasty, 42% of individuals described alterations in sensitivity in the scrotum or perineum, and 4% of cases reported cold glans (all of them had a completely engorged glans). In contrast, none of the patients had issues with their sexual behaviour as a result of these sensitivity disorders⁽³⁾.

In another comparison of EPA vs. dorsal graft urethroplasty, **Furr et al.**⁽¹⁶⁾ reported decreased glans filling in 10.6% and 9.4% of patients, respectively. They also found decreased penile sensation in 23.4% and 18.8% of EPA and grafting cohorts. Only 5.2% of EPA patients complained of cold glans, with none in the augmentation group (P=0.19). However, despite of cold glans, 4 of 5 patients reported satisfactory sexual intercourse.

Finally, cold glans is described by 0–5% of patients after urethroplasty. Decreased glans tumescence is highly variable, ranging from 0% to 60% in grafting series and from 10% to 16% in anastomotic series. Genital altered sensitivity is reported in 10% to 50% of patients⁽¹²⁾.

However, what is really important is how these alterations affect patient's sexual life and satisfaction with their urethroplasty, as some of studies stated that patients maintained a satisfactory sexual life regardless of presenting such disorders^(14,16).

CONCLUSION

Sexual dysfunction after anterior urethral reconstruction is an important issue that must be appropriately discussed during preoperative patient counselling. Reported outcomes after anterior urethroplasty should include sexual consequences and relevance, evaluated using validated tools.

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