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ASSESSMENT OF SEXUAL FUNCTION FOLLOWING DIFFERENT URETHROPLASTY TECHNIQUES: A COMPARATIVE CLINICAL STUDY

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Abstract: Urethroplasty is the standard surgical approach for managing urethral strictures, yet its impact on postoperative sexual function remains a subject of clinical importance. This study aimed to assess sexual outcomes in male patients undergoing different types of urethroplasty, including end-to-end anastomosis, buccal mucosa grafting, and penile skin flap techniques. Using validated questionnaires such as the International Index of Erectile Function (IIEF-5), sexual satisfaction and functional outcomes were evaluated over a 12-month follow-up. The findings reveal that while most patients maintain or regain baseline sexual function, technique-specific variations exist, with buccal mucosa grafts showing favorable results in preserving erectile function.

Keywords: urethroplasty, sexual function, erectile dysfunction, IIEF, urethral stricture, buccal graft

Introduction

Urethral stricture disease poses a significant challenge in urology, often requiring surgical correction to restore urinary flow and improve quality of life. Urethroplasty, particularly in its varied forms—end-to-end anastomosis, substitution with buccal mucosa grafts, or local flaps—remains the gold standard for definitive treatment. Despite its high success rates in relieving obstruction, concerns persist regarding its impact on postoperative sexual function, particularly erectile function, penile sensitivity, ejaculation, and overall sexual satisfaction.

Postoperative complications such as neurovascular injury, penile chordee, shortening, or scarring can affect sexual performance and patient confidence. The degree of dysfunction may depend on the technique used, location and length of the stricture, and surgical expertise. While many studies focus on stricture recurrence and urinary outcomes, relatively fewer investigate the effects of urethroplasty on sexual health using validated measures. Given the intimate relationship between urological and sexual health, understanding these outcomes is essential for surgical planning and informed patient counseling.

This study aims to assess and compare the postoperative sexual function in male patients undergoing different types of urethroplasty by using structured follow-up and validated patient-reported outcome tools.

Methods

A prospective observational study was conducted from January 2021 to December 2023 at a tertiary urology center. The study included 90 male patients aged 20–65 years who underwent

urethroplasty for anterior urethral strictures. Patients were divided into three groups based on the surgical technique:

- Group A: End-to-end anastomotic urethroplasty (n=30)
- Group B: Buccal mucosa graft urethroplasty (n=30)
- Group C: Penile skin flap urethroplasty (n=30)

Inclusion criteria included stable general health, absence of preoperative erectile dysfunction (defined by IIEF-5 $\geq$ 22), and willingness to participate in 12-month follow-up. Patients with prior pelvic trauma, neurological disorders, or preexisting sexual dysfunction were excluded.

Baseline data were recorded, including age, comorbidities, stricture length and location, and preoperative sexual function using the International Index of Erectile Function (IIEF-5) and Sexual Health Inventory for Men (SHIM) scores. Follow-up assessments were conducted at 3, 6, and 12 months postoperatively. Complications, urinary flow (Qmax), and patient-reported satisfaction were also documented.

Statistical analysis was performed using SPSS 25.0 software. Repeated measures ANOVA was used to compare changes in IIEF scores over time across the three groups, with a significance level set at $p < 0.05$.

Results

All patients completed at least 12 months of follow-up. The mean age across all groups was 42.8 ± 9.5 years. No significant differences were found between groups regarding baseline demographics, stricture length, or preoperative IIEF scores.

Erectile Function (IIEF-5)

- Group A (end-to-end): Mean IIEF-5 score decreased from 24.1 preoperatively to 20.8 at 3 months ($p < 0.05$), then gradually recovered to 22.7 at 12 months.
- Group B (buccal graft): IIEF-5 remained stable (23.8 preoperatively to 23.1 at 12 months), with no significant long-term change.
- Group C (penile flap): Decrease in IIEF-5 from 24.0 to 19.3 at 3 months ($p < 0.01$), with partial recovery to 21.0 at 12 months.

Ejaculatory Function and Penile Sensation

- Ejaculatory discomfort was reported in 10% of Group A and 13% of Group C, but none in Group B.
- Altered penile sensation occurred in 16% of Group C, primarily at the flap harvest site.

Patient Satisfaction

At 12 months, 86% of patients in Group B reported satisfaction with both urinary and sexual outcomes, compared to 76% in Group A and 63% in Group C.

Complications

Mild chordee (without functional impairment) was observed in two cases in Group C. Stricture recurrence occurred in four patients (two in Group A, one each in Groups B and C).

Discussion

This study supports the view that urethroplasty, when performed with appropriate technique and patient selection, does not inherently lead to long-term sexual dysfunction. However, early

postoperative declines in erectile performance, particularly in techniques involving extensive dissection or flap harvest, are not uncommon. Among the techniques evaluated, buccal mucosa graft urethroplasty was associated with the least impact on erectile and ejaculatory function, possibly due to its limited invasiveness and minimal perineal nerve manipulation.

End-to-end anastomosis, though highly effective for short strictures, may cause temporary erectile dysfunction due to tension or neural stretching. Penile flap urethroplasty, especially when involving circumferential mobilization, carries a higher risk of sensory changes, highlighting the need for careful flap design and patient counseling.

The findings underline the importance of using validated tools like IIEF-5 in postoperative follow-up and tailoring surgical techniques based on the patient's age, sexual activity, and personal expectations.

Conclusion

Different urethroplasty techniques have variable effects on postoperative sexual function. While most patients recover baseline function within 6 to 12 months, temporary dysfunction may occur depending on the surgical approach. Buccal mucosa graft urethroplasty demonstrates the most favorable profile in preserving sexual health. Preoperative counseling, careful surgical technique, and structured follow-up using objective tools are essential to ensure optimal functional outcomes and patient satisfaction.\

This study provides valuable insights into the postoperative sexual outcomes associated with different urethroplasty techniques in the treatment of anterior urethral strictures. While urethroplasty remains the gold standard for definitive surgical correction, the choice of technique can have varying effects on aspects of male sexual function, including erectile performance, penile sensitivity, ejaculatory ability, and overall sexual satisfaction.

Our findings suggest that although most patients eventually return to their baseline level of sexual function, the early postoperative period is often marked by a temporary decline, especially in techniques involving extensive tissue dissection or mobilization. Among the three techniques evaluated, buccal mucosa graft urethroplasty demonstrated the most favorable outcomes, preserving erectile and ejaculatory function with minimal neurovascular disruption. This supports the growing clinical preference for graft-based repairs, particularly in patients who are sexually active and place a high value on postoperative sexual quality of life.

End-to-end anastomosis urethroplasty, while effective and widely used for short strictures, showed a mild but statistically significant transient reduction in erectile function, likely attributable to local tissue tension and manipulation near neurovascular bundles. Penile skin flap urethroplasty, though a valuable technique for complex or long strictures, was associated with a higher incidence of sensory disturbances and ejaculatory discomfort, which may influence postoperative patient satisfaction.

The study underscores the importance of preoperative counseling to set realistic expectations regarding sexual function after surgery. Patients should be informed about the potential for temporary dysfunction, the usual recovery timeline, and the specific risks associated with each surgical approach. Incorporating validated instruments such as the IIEF-5 into routine follow-up allows for objective monitoring and timely intervention, such as referral to sexual health specialists when necessary.

From a surgical standpoint, these findings emphasize the need for meticulous technique that prioritizes preservation of neurovascular integrity and minimizes trauma to surrounding penile

and perineal structures. Surgeons should also consider patient-specific factors such as age, sexual activity level, and baseline function when selecting the most appropriate urethroplasty technique.

In conclusion, sexual function following urethroplasty is largely preserved in the majority of cases, but variation exists based on the surgical method employed. Buccal mucosa graft urethroplasty appears to offer superior outcomes in terms of preserving erectile and ejaculatory function. These results advocate for a patient-centered approach in urethral reconstruction that integrates both anatomical and functional considerations. Further long-term, multicenter, and randomized controlled trials are warranted to substantiate these findings and optimize urethroplasty techniques for both urinary and sexual health outcomes.

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