
Staged urethroplasty: comparison of early functional results and quality of life in mesh graft and buccal mucosa technique

Daniel Pfalzgraf, MD,^{1,2} Luis Kluth, MD,¹ Philip Reiss, MD,¹ Margit Fisch, MD,¹ Roland Dahlem, MD¹

¹Department of Urology, University Medical Centre Hamburg-Eppendorf, Hamburg, Germany

²Department of Urology, University Medical Centre Mannheim, Heidelberg University, Mannheim, Germany

PFALZGRAF D, KLUTH L, REISS P, FISCH M, DAHLEM R. Staged urethroplasty: comparison of early functional results and quality of life in mesh graft and buccal mucosa technique. *Can J Urol* 2015;22(2): 7720-7726.

Introduction: To assess bothersome results of surgery and changes in quality of life (QoL) in patients with two-staged urethral reconstruction.

In patients requiring two-staged urethroplasty a functional corpus spongiosum is usually absent, and complications such as urinary dribbling, ejaculation problems and penile deviation can be expected. Data on these complications, patient satisfaction and QoL is limited.

Materials and methods: Retrospective analysis by chart review and a standardized questionnaire of 19 consecutive patients with urethral strictures treated by two-staged urethroplasty with buccal-mucosa-graft or mesh-graft.

Results: Overall success rate was 84%. Mean follow up 11.2 months, mean length of graft 10 cm (3 cm-18 cm).

Urinary stress incontinence occurred in 3 patients (16%). No penile shortening occurred in 9 (47%), no deviation in 11 (58%). Two patients (11%) reported a disturbing alteration in glans sensitivity.

Regarding bother by both surgeries and the interval in between, 21% judged the first surgery as hardly or not bothersome. The time in between surgeries was hardly or not bothersome in 52% and the second surgery not or hardly bothersome in 26%.

Overall satisfaction with surgery was high (79%) and an improvement in QoL was reported by 63%.

Differences between the two groups did not reach statistical significance.

Conclusion: Two-staged urethroplasty is a viable therapeutic option in patients with severe spongiofibrosis. However, specific counseling for possible complications is of utmost importance.

Key Words: urethral stricture, staged reconstruction, quality of life, reconstruction

Introduction

Though an old principle, staged urethroplasty still has its role in current urethral reconstruction. Staged urethral reconstruction was already described by Russel in 1914¹ and later refined by Bengt Johanson.² Over the last decades, a number of single-staged techniques for urethral reconstruction have evolved, using oral mucosa or penile flaps as grafts, where

an excision and primary anastomosis cannot be performed. Despite good results with these techniques, recurrences occur, and the re-stricture rate rises with the number of previous urethroplasties.³ Hence, two-staged procedures still have their value in patients with severe spongiofibrosis, usually after multiple previous surgeries. Especially in long strictures with severe circumferential spongiofibrosis of the urethra, augmentation with a graft is not ideal, and substitution urethroplasty should be performed. Two-staged procedures have been proposed in these patients, as primary tubularization has a high stricture recurrence rate.^{4,5} For these patients, techniques using mesh graft (MG)⁶ have been described as well as the use of buccal mucosa graft (BMG).

Accepted for publication December 2014

Address correspondence to Dr. Daniel Pfalzgraf, Department of Urology, University Hospital Mannheim, Theodor-Kutzer-Ufer 1-3, 68167 Mannheim, Germany

As in these patients a functional corpus spongiosum is absent, urinary dribbling, problems at ejaculation and penile deviation can be expected. However, data on these complications and patient satisfaction and quality of life (QoL) for techniques currently used are limited. As these problems are most intensely experienced soon after surgery, these questions were addressed by a detailed questionnaire in our study on a short term follow up to assess bothersome results of surgery and changes in QoL after staged urethral reconstruction.

Material and methods

Patients

We relied on the data of 19 consecutive patients with complex bulbar or peno-bulbar urethral strictures who were treated with two-staged urethroplasty at our institution between January 2009 and October 2010. All surgeries were performed by one of two surgeons. A retrospective analysis of those patients was conducted by means of chart review and a detailed standardized questionnaire, sent to the patients at time of follow up.

The questionnaire consisted of questions regarding previous surgeries, postoperative recurrence rates, postoperative complications and the International Index of Erectile Function (IIEF-15) to assess sexual function after surgery. Moreover, the J-PROM, a patient-reported outcome measure tool⁷ was used. It assesses lower urinary tract symptoms, voiding and general and symptom-specific QoL for urethral stricture surgery and essentially derives from the International Consultation on Incontinence Questionnaire Male Lower Urinary Tract Symptoms (ICIQ MLUTS),^{8,9} the EuroQoL (EQ-5D) and the visual analogue score (EQ-VAS)¹⁰ and includes a separate LUTS-specific QoL question from the ICIQ MLUTSqol and Peelings voiding picture.¹¹ Due to its orientation towards urethral strictures and its wider range of questions, the J-PROM was preferred over the IPSS.

Stress incontinence was graded according to Stamey. Recurrence was defined as stricture recurrence on any postoperative RUG/VCUG or further instrumentation after urethroplasty.

Surgical technique

Urethral reconstruction was performed by two-staged urethroplasty with buccal mucosa graft (BMG) or mesh graft (MG). In the MG patients, the graft was harvested from the inner upper thigh.

For a successful two-staged stricture repair, complete excision of the scar tissue is of foremost importance, and for good graft take, a well-vascularized bed needs

to be prepared. Whenever applicable, BMG was used as a graft for urethral reconstruction. In complex pan-urethral strictures, or if BMG was not available, MG-urethroplasty was performed. The second stage surgery was performed 3 months after the first stage.

In both techniques a voiding cysturethrogram was performed 7 days after the second stage surgery and micturition allowed after catheter removal, if no extravasation was present.

Data assessment

All 19 patients received a standardized questionnaire inquiring for patient satisfaction, change in QoL by the surgery and functional outcome.

Data analysis

Statistical software SAS 9.0 (SAS Institute Inc., Cary, NC, USA) was used for all analysis. To assess the success rate, the Kaplan Meier method and log-rank test were used, differences in the scores between the two groups (BMG and MG) were assessed by Wilcoxon test, for p values the significance level was set at < 0.05.

Results

Between January 2009 and October 2010, 19 patients were treated by two-staged urethroplasty. BMG was used in 12 and MG in 7 patients. Median age at surgery was 43 years (interquartile range 34-53.5, range 17-59), mean follow up 11.2 months (range 5-22). Table 1 gives an overview on patient baseline and procedural characteristics including previous surgeries.

Etiology of the primary stricture could not be assessed in all cases, but hypospadias accounted for nearly half of the strictures (9/19; 47%), a history of transurethral surgery and Lichen sclerosus for 11% respectively.

Long strictures of more than 6 cm were found in 16 patients (84%), the remaining 3 (16%) had intermediate stricture length of 2 cm-6 cm. Stricture localization was penile in 13 patients (68%) and bulbar and peno-bulbar in 3 respectively (16%).

The success rate was 84% in this group, two recurrences occurred after BMG, one after MG. Thus, success rate for two-staged BMG was 83%, for MG 86%. Differences in recurrence rates between the BMG group and the MG group showed not statistical significance (p = 0.86 on log-rank test).

As postoperative complications, a urinary tract infection was found in 8 patients (42%), detected by routine urinary culture. All of these patients were treated with antibiotics (Clavien-Grade II). No other complications were observed.

TABLE 1. Patient baseline and procedural characteristics and overall satisfaction and quality of life

	BMG n (%)	MG n (%)	Totals n (%)	p value
No. patients	12 (63)	7 (37)	19 (100)	
Median age (range)	31 (17-54)	55 (35-59)	43 (17-59)	
No. localization				0.2979
Bulbar	3 (25)	1 (14)	3 (16)	
Bulbo-penile	1 (8)	3 (43)	3 (16)	
Penile	8 (67)	3 (43)	13 (68)	
No. previous dilations	10 (83)	7 (100)	17 (90)	0.4914
1x	3 (25)	2 (29)	5 (26)	
2x-5x	2 (17)	3 (43)	5 (26)	
> 5x	5 (42)	2 (29)	7 (37)	
No. previous DVUI	7 (58)	7 (100)	14 (74)	0.2188
1x	2 (17)	1 (14)	3 (16)	
2x-5x	4 (33)	4 (57)	8 (42)	
> 5x	1 (8)	2 (29)	3 (16)	
No. previous urethroplasties	6 (50)	3 (43)	9 (47)	0.8653
1x	3 (25)	1 (14)	4 (21)	
> 1x	3 (25)	2 (29)	5 (26)	
Success rate	10 (83)	6 (86)	16 (84)	0.8937
Overall satisfaction				0.7570
Satisfied or very satisfied	9 (75)	6 (86)	15 (79)	
Indifferent	1 (8)	0	1 (5)	
Dissatisfied	2 (17)	1 (14)	3 (16)	
Quality of life (QoL)				0.2297
Strong improvement	5 (42)	3 (43)	8 (42)	
Improved	1 (8)	3 (43)	4 (21)	
Unchanged	3 (25)	0	3 (16)	
Slightly reduced	2 (17)	0	2 (11)	
Severely reduced	1 (8)	1 (14)	2 (11)	

BMG = buccal mucosa graft; MG = mesh graft; DVIU = direct visual internal urethrotomy

Urinary symptoms and urinary continence

For the ICIQ MLUTS score according to the J-PROM, the BMG group showed a median of 5.5 out of 24 (range 0-17), the MG group 3 (range 0-8); there was no statistical difference ($p = 0.18$).

Table 2 gives an overview on the frequency of post void dribbling sorted by surgical technique. Of note is the number of patients experiencing urinary post void dribbling often or nearly always; this complaint was reported in one of seven patients (14%) after MG urethroplasty and in two of eleven (18%) after BMG. However twelve patients (63%) milk the urethra after voiding (58% after BMG, 71% after MG).

Urinary stress incontinence occurred in three patients (16%), all after bulbar urethroplasty.

Sexual function

The results regarding penile deviation and shortening as well as on changes in glans sensitivity and the results of the sub-categories of the IIEF-15 questionnaire with the p values for differences between groups are shown in Table 2.

Ejaculation was reported to be normal after surgery by 13 (68%) and slightly reduced in strength in 5 (26%).

Surgery's influence on health-related QoL

In general, health-related QoL at the time of follow up was reported to be excellent in 2 patients (10%), very good in 5 (26%), good in 7 (37%), reduced in 4 (21%) and poor in 1 (5%).

TABLE 2. Results of the patient questionnaire on voiding and sexual function with the p values for differences between groups

	BMG n (%)	MG n (%)	Totals n (%)	p value
Urinary dribbling				0.3062
Never	3 (25)	2 (29)	5 (26)	
Rarely	5 (42)	1 (14)	6 (32)	
Sometimes	1 (8)	3 (43)	4 (21)	
Often	0	0	0	
Nearly always	3 (25)	1 (14)	4 (21)	
Penile curvature				0.3955
None	7 (58)	4 (57)	11 (58)	
Slight	3 (25)	2 (29)	5 (26)	
Moderate	2 (17)	0	2 (11)	
Severe	0	1 (14)	1 (5)	
Penile shortening				0.3456
None	6 (50)	3 (43)	9 (47)	
Slight	6 (50)	3 (43)	9 (47)	
Moderate	0	1 (14)	1 (5)	
Strong	0	0	0	
Glans sensitivity				0.1187
Normal	3 (25)	6 (86)	9 (47)	
Altered (not disturbing)	7 (58)	1 (14)	8 (42)	
Altered (disturbing)	2 (17)	0	2 (11)	
Ejaculatory function [†]				0.3108
Normal	9 (75)	4 (57)	13 (68)	
Slightly reduced in strength	3 (25)	2 (29)	5 (26)	
Moderately reduced in strength	0	0	0	
Severely reduced in strength	0	0	0	
IIEF-15 sub-group	Score (interquartile range)	Score (interquartile range)	Maximum score	p value
Erectile function	27 (25.75-30)	13 (3.5-22.5)	30	0.36
Orgasmic function	10 (9.5-10)	9 (5-10)	10	0.44
Sexual desire	7.5 (5-9)	8 (6.5-9)	10	0.13
Intercourse satisfaction	11 (9.75-13.25)	1 (0.5-5.5)	15	0.2
Overall satisfaction	8.5 (7.75-10)	4 (2-4)	10	0.06

BMG = buccal mucosa graft; MG = mesh graft

[†]one patient was not sexually active and did not answer the question

Overall, satisfaction with the surgery was high with 79% (15/19) of patients satisfied or very satisfied. Only 16% (3 patients.) were dissatisfied. These comprise two with stricture recurrence; in the third, the reason for dissatisfaction is unknown. An improvement in QoL after both surgeries was found in the majority of cases, Table 1. A slight and a serious reduction were observed in 10% (2 pts.) respectively, two of whom had a stricture recurrence.

All patients were asked, how bothersome both surgeries and the time in-between the surgeries were. While only 21% judged the first surgery as hardly or not at all bothersome, most patients (47%) found it a little wearing. However, the remaining 32% found it bothersome or very bothersome. The time in between the two surgeries was hardly or not at all bothersome for 52%, 16% found it a little wearing and the remaining 32% bothersome or very bothersome. As for

the second surgery, 37% found it bothersome, no one very bothersome and 36.8% somewhat wearing. The remaining 26% found it not at all or hardly bothersome.

On the EQ-5D score, both the BMG and the MG groups showed a median of 5 out of 15 (range 5-8), (no statistical difference, $p = 0.25$).

Discussion

Two-staged urethral reconstruction is a relatively old principle of stricture treatment that has mostly been overcome by one-stage techniques like EPA or BMG onlay or inlay. Short bulbar strictures are easily managed with EPA. However, in penile or long bulbo-penile strictures it can lead to penile shortening and deviation. As single-staged tube urethroplasties show relatively high complication rates in hypospadias reconstruction^{4,5} and graft augmentation can only be performed if viable urethral tissue can be found along the strictured part, two-staged procedures can play a vital role in urethral reconstruction.^{12,13} Moreover, in their review on the treatment of anterior urethral stricture Patterson and Chapple suggested two-staged urethral reconstruction with BMG after complete excision of scar tissue to provide the best results in patients with penile stricture,¹⁴ mainly promoted by a series including 39 patients with two-staged repair and an initial success rate of 83%.¹⁵ However, data on staged urethroplasties' impact on functional results and QoL are limited. As in patients requiring a two-staged urethroplasty a functional corpus spongiosum is absent, complications like urinary dribbling, problems at ejaculation and penile deviation can be expected. The main focus of our study was bothersome results of surgery as well as change in QoL in patients with two-staged urethroplasty. To assess this, the J-PROM⁷ was used, a patient reported outcome measure, that has now been used to prospectively evaluate single staged urethroplasty.¹⁶

Urinary continence

A known bother after urethral reconstruction is post void urinary dribbling after augmentation urethroplasty.³ Data on staged reconstruction are more limited, though it can be expected to occur more often due to a lack of supportive tissue such as corpus spongiosum in substitution urethroplasty. In our group, the number of patients experiencing urinary dribbling often or nearly always was reported in 14% patients after MG urethroplasty and 18% after BMG, Table 1. This is well within the reported range for augmentation urethroplasty, though a higher rate than after single stage urethroplasty could have

been expected, due to the lack of a functional corpus spongiosum in staged procedures. Wood et al³ reported dribbling to occur at a 5 year follow up in 17% of patients after dorsal BMG and 21% after ventral BMG. Urinary stress incontinence occurred in 16% of patients, all of which had received a bulbar urethroplasty. This number is considerably higher than the incontinence rate for single staged bulbar urethroplasty, which is 0%-8%. Only after urethroplasty for radiotherapy induced bulbo-membranous strictures an incontinence rate of 40% is reported.¹⁷ However, from our data it remains unclear, whether all these incontinenes developed after staged reconstruction, or whether the multiple previous treatments compromised sphincteric function, with the stricture recurrence leading to pseudo-continenes.

Sexual function

To adjust for the influence of urethroplasty on sexual life of patients, apart from the IIEF-15, the patient was questioned on penile shortening and deviation, Table 2, as well as changes in glans sensitivity. Most patients (11/19, 58%) did not observe a postoperative deviation and penile shortening was rare as well. Data on penile shortening and deviation after single staged reconstruction are somewhat limited, but usually no change through surgery is reported.¹⁸ However, considering 9% curvature after mesh graft reconstruction in previous studies,¹⁹ our data for staged procedures seem comparably good. In glans sensitivity 10% (two patients) experienced a disturbing alteration of glans sensitivity. Though a high rate, this comes as no surprise when taking into account the extensive resection of scar tissue and spongiofibrosis in these patients.

For all domains of the IIEF-15 (erectile function, orgasmic function, sexual desire, intercourse satisfaction and overall satisfaction), there were no statistical differences between the two groups. However, statistical significance in small cohorts is a difficult subject and at least for overall satisfaction (mean 8.5 for BMG versus 4 for MG, $p = 0.06$), a difference between groups can be suspected and needs to be followed in a larger cohort.

Ejaculation was reported to be normal after surgery by 13/19 (68%). In a large cohort of patients with anterior urethral stricture disease, Nuss et al²⁰ reported sexual dysfunction in 11% of patients, of whom 37% experienced ejaculatory dysfunction. However, the influence of urethroplasty on ejaculatory function remains unclear, as Palminteri and co-workers¹⁸ reported an ejaculatory improvement in 12% of patients and a decreased ejaculatory flow in 4% of

patients after urethroplasty with dorsal plus ventral oral graft. Meanwhile, Palminteri and co-workers prospectively investigated the impact of ventral oral graft on sexual function in patients undergoing bulbar urethroplasty.²¹ For staged urethroplasty comparable data are still missing.

Surgery's influence on health-related QoL

General health-related QoL was good in this cohort at time of follow up. It was reported to be good or better in 14 patients (74%) and reduced in 4 (21%). To account for the special situation of staged reconstruction, patients were furthermore asked, how bothersome both surgeries and the time in between the surgery were. While only 21% judged the first surgery as hardly or not at all bothersome, the time between the two surgeries was still only judged hardly or not at all bothersome by 52%. Thus, extensive information about this demanding procedure and the time in between is mandatory and possible limitations in everyday life in-between the two surgeries must be addressed.

Overall, satisfaction with the surgery was high with 79% of patients satisfied or very satisfied. The dissatisfied patients comprise two with stricture recurrence. This emphasizes that even complex reconstruction shows good functional results and is well tolerated by patients. An improvement in QoL after both surgeries was found in the majority of cases. However, a reduction in QoL can also occur in some cases. On EQ-5D, there was no statistical difference between groups ($p = 0.25$).

Stricture repair

Considering the multiple previous surgeries in our patients with resulting difficult local conditions, the success rates of 83% for BMG and 86% for MG are good and – though on a relatively short follow up – comparable to that of other centers.¹⁵ Moreover, other studies for single-staged procedures for long strictures reported similar success rates. Pisapati et al²² found 87% without stricture recurrence for Asopa-technique at mean follow up of 42 months, and Elliott et al²³ a success rate of 90% with ventrally placed BMG onlay in bulbar strictures at mean follow up of 47 months.

Limitations

The lack of objective preoperative data on erectile function and continence are a limitation of this study, owed to the retrospective design. Moreover, assessment of penile deviation and shortening was based on subjective patients' interpretation. With regards to the stricture recurrence rates, another

limitation of the study is the relatively short follow up, as Blaschko et al²⁴ showed most recurrences in redo-urethroplasty to occur within the first 2 years. However, for assessment of complications, functional results and patient satisfaction and QoL, the short term follow up is an advantage, as these problems are most intensely experienced soon after surgery. Thus, an insight on the surgery's influence on health-related QoL and functional results was gained.

Future prospects

To further assess the surgeries influence on patients' QoL, prospective trials with larger cohorts are needed. For single staged urethroplasty, first prospective studies using a PROM have been conducted,¹⁶ but for staged urethroplasty data are still amiss. As of now, our data give an insight into patient's satisfaction with staged urethroplasties and on how bothersome the two surgeries and the time in-between are experienced, allowing for better counseling of patients awaiting staged reconstruction.

Conclusion

Two-staged urethral reconstruction is a viable therapeutic option in patients with severe spongiofibrosis and multiple surgeries. Usually, BMG can be used as substitute, but MG remains a last option in complex pan-urethral strictures or severe spongiofibrosis. However, as results regarding QoL show, extensive counseling on therapeutic options is required to adjust for the right therapeutic regimen in every patient with particular focus on impaired QoL in-between the two surgeries. □

References

1. Russell RH. The treatment of urethral stricture by excision. *Br J Surg* 1914;2(7):375-383.
2. Johanson B. [The reconstruction in stenosis of the male urethra]. *Z Urol* 1953;46(6):361-375.
3. Wood DN, Andrich DE, Greenwell TJ, Mundy AR. Standing the test of time: the long-term results of urethroplasty. *World J Urol* 2006;24(3):250-254.
4. Demirbilek S, Kanmaz T, Aydin G, Yucesan S. Outcomes of one-stage techniques for proximal hypospadias repair. *Urology* 2001;58(2):267-270.
5. Ghali AM, el-Malik EM, al-Malki T, Ibrahim AH. One-stage hypospadias repair. Experience with 544 cases. *Eur Urol* 1999; 36(5):436-442.
6. Schreiter F. [Two-stage urethra-plasty]. *Urologe A* 1998;37(1): 42-50.
7. Jackson MJ, Sciberras J, Mangera A et al. Defining a patient-reported outcome measure for urethral stricture surgery. *Eur Urol* 2011;60(1):60-68.

Staged urethroplasty: comparison of early functional results and quality of life in mesh graft and buccal mucosa technique

8. Donovan JL, Abrams P, Peters TJ et al. The ICS-'BPH' Study: the psychometric validity and reliability of the ICSmale questionnaire. *Br J Urol* 1996;77(4):554-562.
9. Donovan JL, Peters TJ, Abrams P, Brookes ST, de aa Rosette JJ, Schafer W. Scoring the short form ICSmaleSF questionnaire. International Continence Society. *J Urol* 2000;164(6):1948-1955.
10. The Euro-QoL Group. EuroQoL--a new facility for the measurement of health-related quality of life. *Health Policy* 1990;16(3):199-208.
11. Peeling WB. Diagnostic assessment of benign prostatic hyperplasia. *Prostate Suppl* 1989;2:51-68.
12. Johal NS, Nitkunan T, O'Malley K, Cuckow PM. The two-stage repair for severe primary hypospadias. *Eur Urol* 2006;50(2):366-371.
13. Ferro F, Zaccara A, Spagnoli A, Lucchetti MC, Capitanucci ML, Villa M. Skin graft for 2-stage treatment of severe hypospadias: back to the future? *J Urol* 2002;168(4 Pt 2):1730-1733; discussion 1733.
14. Patterson JM, Chapple CR. Surgical techniques in substitution urethroplasty using buccal mucosa for the treatment of anterior urethral strictures. *Eur Urol* 2008;53(6):1162-1171.
15. Andrich DE, Mundy AR. Substitution urethroplasty with buccal mucosal-free grafts. *J Urol* 2001;165(4):1131-1133; discussion 1133-1134.
16. Jackson MJ, Chaudhury I, Mangera A et al. A prospective patient-centred evaluation of urethroplasty for anterior urethral stricture using a validated patient-reported outcome measure. *Eur Urol* 2013;64(5):777-782.
17. Meeks JJ, Brandes SB, Morey AF et al. Urethroplasty for radiotherapy induced bulbomembranous strictures: a multi-institutional experience. *J Urol* 185(5):1761-1765.
18. Palminteri E, Berdondini E, Shokeir AA, Iannotta L, Gentile V, Sciarra A. Two-sided bulbar urethroplasty using dorsal plus ventral oral graft: urinary and sexual outcomes of a new technique. *J Urol* 185(5):1766-1771.
19. Kessler TM, Schreiter F, Kralidis G, Heitz M, Olianias R, Fisch M. Long-term results of surgery for urethral stricture: a statistical analysis. *J Urol* 2003;170(3):840-844.
20. Nuss GR, Granieri MA, Zhao LC, Thum DJ, Gonzalez CM. Presenting symptoms of anterior urethral stricture disease: a disease specific, patient reported questionnaire to measure outcomes. *J Urol* 187(2):559-562.
21. Palminteri E, Berdondini E, De Nunzio C et al. The impact of ventral oral graft bulbar urethroplasty on sexual life. *Urology* 2013;81(4):891-898.
22. Pisapati VL, Paturi S, Bethu S et al. Dorsal buccal mucosal graft urethroplasty for anterior urethral stricture by Asopa technique. *Eur Urol* 2009;56(1):201-205.
23. Elliott SP, Metro MJ, McAninch JW. Long-term followup of the ventrally placed buccal mucosa onlay graft in bulbar urethral reconstruction. *J Urol* 2003;169(5):1754-1757.
24. Blaschko SD, McAninch JW, Myers JB, Schlomer BJ, Breyer BN. Repeat urethroplasty after failed urethral reconstruction: outcome analysis of 130 patients. *J Urol* 2012;188(6):2260-2264.