



Ahmed T. Hadidi

Abbreviations

BXO	Balanitis xerotica obliterans
DYG	Double Y glanulomeatoplasty
SLAM	Slit-like adjusted Mathieu
TIP	Tubularized incised plate
UTI	Urinary tract infection

51.1 Introduction

The impact of hypospadias and its surgery continues through adulthood. Genital and psychosexual maturation can adversely impact how patients perceive the success of their surgery both functionally and cosmetically [1]. The majority of adults presenting to the surgeon with hypospadias-related problems have already had one or several unsuccessful hypospadias operations during childhood. Considering the large number of boys who are operated for hypospadias and the small number that present themselves in adult life with complications, it seems reasonable to assume that the majority of patients have had a good enough result not to seek revision surgery.

A. T. Hadidi (✉)
Hypospadias Center and Pediatric Surgery
Department, Sana Klinikum Offenbach, Academic
Teaching Hospital of the Johann Wolfgang Goethe
University, Offenbach, Frankfurt, Germany

However, there are still many adult patients with unsuccessful outcomes of hypospadias surgery but are fed up with unsuccessful surgery and they will seek surgical help only if they are confident that the treating surgeon will be able to help them based on the word of mouth and the experience of other adult patients.

The interested, experienced surgeon may still receive adults with no prior surgery and seek surgical help because of their own body image or because of their partners. Abnormal looking and/or functioning penis may force the person to avoid contact with the other sex for fear of embarrassment and disappointment. The author has received adults in their 40s and 50s, successfully married, and have children but still, deep inside, were unhappy with their body image.

51.2 Adults Are Not Big Children

Although the principles of hypospadias correction in adults are similar to the techniques used to correct hypospadias in children, adults are different from children. It is not wise to assume that as the adult penis is bigger, the operation should be easier and the chances of success should be higher.

Hollander et al. (1998) showed that *wound healing* and skin lacerations in children had a lower infection rate and more favorable cosmetic outcome than in adults [2]. Bhat et al. (2016) compared the outcome of tubularized incised

plate (TIP) procedure in 60 adults and 60 children and concluded that the complication rate was higher in adults than in children [3].

Another important difference is *erection*. Erection will stretch the wound and urethroplasty suture lines and may cause a gap between the urethral edges and also between skin edges increasing the chances of fistula and wound dehiscence.

The *pressure of urine expulsion* from the bladder is another important factor. The adult bladder has a thicker and stronger muscle wall than in children and the high pressure of urine flow in adults can be damaging to the new reconstructed urethra during the healing process.

51.3 Tips and Tricks When Operating on Adults

Based on the abovementioned observations and experience with hypospadias operations in adults over the past 25 years, the author has modified his approach when operating in adults with regard to the following points:

- The use of thicker *suture material* to close the skin and subcutaneous tissues: In adults, the author uses polyglactin (Vicryl) 6/0 for urethroplasty and polyglactin (Vicryl) 5/0 and 4/0 instead for closure of fascia, protective layers, and skin.
- The use of very *wide catheters* for the urethroplasty: The author routinely uses catheter size F12 or F14 in children. In adults he uses catheter size F26–F30. As it is not always available in most hospitals, he reconstructs the new urethra over two catheters together inside the urethra (F12 + F16 or F18) to be replaced by a catheter size F16 at the end of operation.
- Longer period of *urinary diversion*: For distal hypospadias, the author leaves a transurethral catheter up to 3 days in children or in adults. For complicated proximal hypospadias in children, the author may use urinary diversion up to 2 weeks and may double the time (up to

4 weeks) in adults with complicated, proximal hypospadias with severe scarring.

- Several *protective layers* to cover the urethroplasty are needed. The author usually uses four protective layers to cover urethroplasty in adults as compared to two protective layers in children.
- Adults tend to bleed much more than in children. If the surgeon decides to use tunica vaginalis flap as a protective layer, it may be advisable to leave a drain in the scrotum for 2–3 days to avoid huge hematoma in the scrotum (Fig. 51.1).
- The use of *anti-erection medications* for 3 weeks after adult hypospadias operations. The patient is clearly instructed to refrain from sexual activity for at least one and half months (Chap. 40).

51.4 Classification of Hypospadias in Adults and Their Management

Ching et al. (2010) [4] proposed a classification for adult hypospadias based on the status of previous surgery and the quality of the tissues (Fig. 51.2).



Fig. 51.1 Huge hematoma in the scrotum following the use of tunica vaginalis flap as a protective intermediate layer without drainage. Immediately after surgery, everything looked good. During the night, a huge hematoma developed (©Ahmed T. Hadidi 2022. All Rights Reserved)

- *Category I:* Adults who have undergone multiple surgeries with significant scarring and tissue loss
- *Category II:* Patients who present with delayed complications after initially successful childhood repair
- *Category III:* No previous surgery

51.5 Presentation

Barbagli et al. (2006) reviewed 60 adult patients presenting over a 10-year period [5]; Ching et al. (2010) reported their experience with 55 patients

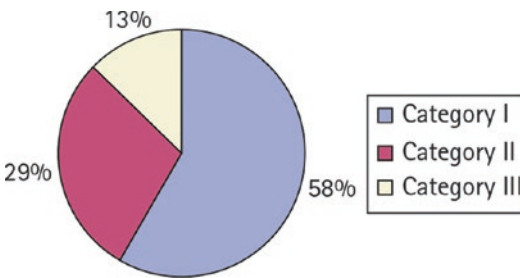


Fig. 51.2 Category system for adult hypospadias patients (from Ching, C.B., Wood, H.M., Ross, J.H., Gao, T. and Angermeier, K.W. (2011), “The Cleveland Clinic experience with adult hypospadias patients undergoing repair: their presentation and a new classification system,” *BJU International*, 107: 1142–1146, ©2010, with permission from Wiley and Sons)

over 16 years [4] (Fig. 51.3); Myers et al. (2012) reviewed 50 adult patients over 20 years [6]; Hoy and Rourke (2016) reported their experience with 93 adults who presented to their center over a 10-year period [1]. In other words each referral center received less than 10 patients per year. The commonest four presentations are shown in Table 51.1.

51.6 Operative Technique

In the abovementioned four studies [1, 4–6], about 50% of patients had their problem solved in one-stage repair (however, that included fistula excision, meatotomy, hair ablation among flaps and inlay grafts). About 50% were corrected as multiple stage procedure and complication rate was 25–33%. One may assume that those with complicated proximal hypospadias are likely to require two-stage procedures and suffer more complications.

There were two interesting observations in those four studies [1, 4–6]: persistent or recurrent chordee was the fourth commonest presentation in two series after stricture, fistula, and residual hypospadias. It is worth noticing that the mean age of the patients was 30–37 years. This may have two explanations: the presence of some curvature was not a major concern for those adults

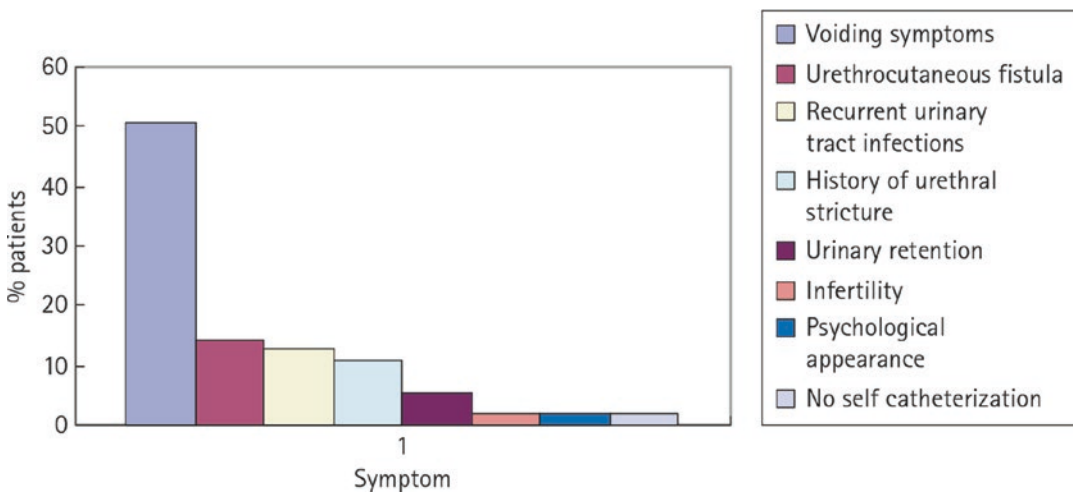


Fig. 51.3 Initial presenting complaint (from Ching, C.B., Wood, H.M., Ross, J.H., Gao, T. and Angermeier, K.W. (2011), “The Cleveland Clinic experience with adult

hypospadias patients undergoing repair: their presentation and a new classification system,” *BJU International*, 107: 1142–1146 ©2010 with permission from Wiley and Sons)

Table 51.1 The number of patients and commonest four presenting symptoms in four major studies on hypospadias surgery in adults [1, 4–6]. Ching et al. included spraying in voiding symptoms. *UTI* urinary tract infection (©Ahmed T. Hadidi 2022. All Rights Reserved)

	Barbagli (2006)	Ching (2011)	Myers (2012)	Hoy (2017)
Duration of study	10 years	16 years	20 years	10 years
Number of patients	60	55	50	93
Commonest four presentations	Stricture 56% Residual hypospadias 43% Fistula 30% Meatal stenosis 18%	Voiding symptoms 82% UTI 36% Chordee 24% Infertility 24%	Stricture 72% Fistula 24% Residual hypospadias 14% Chordee 14%	Stricture 53% Fistula 20% Spraying 20% UTI 19%

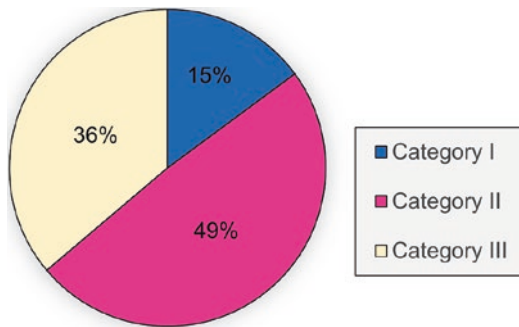


Fig. 51.4 There were 47 adult patients who required hypospadias-related surgery in the Hypospadias Center classified into three categories (©Ahmed T. Hadidi 2022. All Rights Reserved)

and/or that older techniques that incised and excised the hypoplastic urethral plate have better long-term outcome than the newer approach of dorsal plication.

The second interesting observation was that the percentage of *balanitis xerotica obliterans (BXO)* in unoperated adults in the Ching et al. series was much higher than in adults

presenting with complications after hypospadias surgery.

51.7 Management of Adult Hypospadias in the Hypospadias Center, Frankfurt, Germany

Between 2014 and 2020, 47 adults (older than 18 years) with hypospadias were operated on in the Hypospadias Center by the author. This included 7 with severe scarring after several unsuccessful operations (category I), 23 who had previous surgery but still had adequate healthy skin and tissues (category II), and 17 with no prior surgery (category III) (Fig. 51.4). Complication rate was 15% in the form of glans dehiscence (3), fistula (2), wound dehiscence (2), and meatal stenosis (1).

The following include examples of adult presentations and their management (Figs. 51.5, 51.6, 51.7, 51.8, 51.9, 51.10, 51.11, 51.12, and 51.13).



Fig. 51.5 A 28-year-old presenting with failed distal repair. The patient had adequate skin and the slit-like adjusted Mathieu (SLAM Chap. 22) technique was used successfully (©Ahmed T. Hadidi 2022. All Rights Reserved)



Fig. 51.6 A 30-year-old patient presenting with failed distal repair. The DYG technique (Double Y Glanulomeatoplasty, Chap. 19) was used successfully (©Ahmed T. Hadidi 2022. All Rights Reserved)



Fig. 51.7 A 25-year-old man presenting with ugly meatus and spraying of urine. Advancement and meatoglanuloplasty (Chap. 28) was used successfully (©Ahmed T. Hadidi 2022. All Rights Reserved)



Fig. 51.8 A 30-year-old patient presenting with grade II rotation (90°). Fisher's dartos flap was used successfully (Chap. 46) (©Ahmed T. Hadidi 2022. All Rights Reserved)

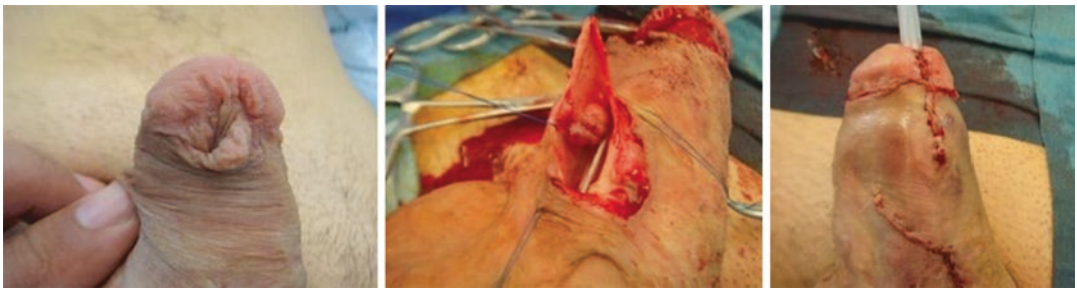


Fig. 51.9 A 26-year-old man presenting with failed proximal hypospadias and urethral diverticulum. A distal SLAM (slit-like adjusted Mathieu, Chap. 22) and proximal Thiersch urethroplasty (Chap. 24) were used successfully (©Ahmed T. Hadidi 2022. All Rights Reserved)



Fig. 51.10 A 25-year-old presenting with severe chordee. Chordee excision was performed (Chap. 8) and the available skin was thinned as a graft and urethroplasty was performed in the second stage 6 months later (©Ahmed T. Hadidi 2022. All Rights Reserved)



Fig. 51.11 A 29-year-old man presenting with severe stricture, severe scarring, and urine retention which was relieved by suprapubic catheter. The scarring was excised and buccal mucosal graft was applied (Chap. 40). Six

months later urethroplasty was performed around two catheters with total circumference of F30 (©Ahmed T. Hadidi 2022. All Rights Reserved)



Fig. 51.12 An 18-year-old who underwent 30 operations including several flaps, bladder mucosa, and buccal mucosa graft and presenting with severe stricture, severe scarring, and frequent urinary tract infection. He was on

antibiotics 6 months every year. The scarring was excised and buccal mucosal graft was applied. Six months later urethroplasty was performed around catheter F28 (©Ahmed T. Hadidi 2022. All Rights Reserved)

51.7.1 Failed Distal Hypospadias**51.7.2 Ugly Glans****51.7.3 Adult Rotation****51.7.4 Failed Proximal Hypospadias with Diverticulum****51.7.5 Adult with Severe Chordee****51.7.6 An Adult with Stricture and Severe Scarring****51.7.7 An Adult with Severe Stricture After 30 Operations****51.7.8 An Adult with Chordee and Severe Scarring After Six Operations****51.8 Conclusion**

Adults with complications following childhood hypospadias surgery are a major challenge with high failure rate for reoperative surgery. The

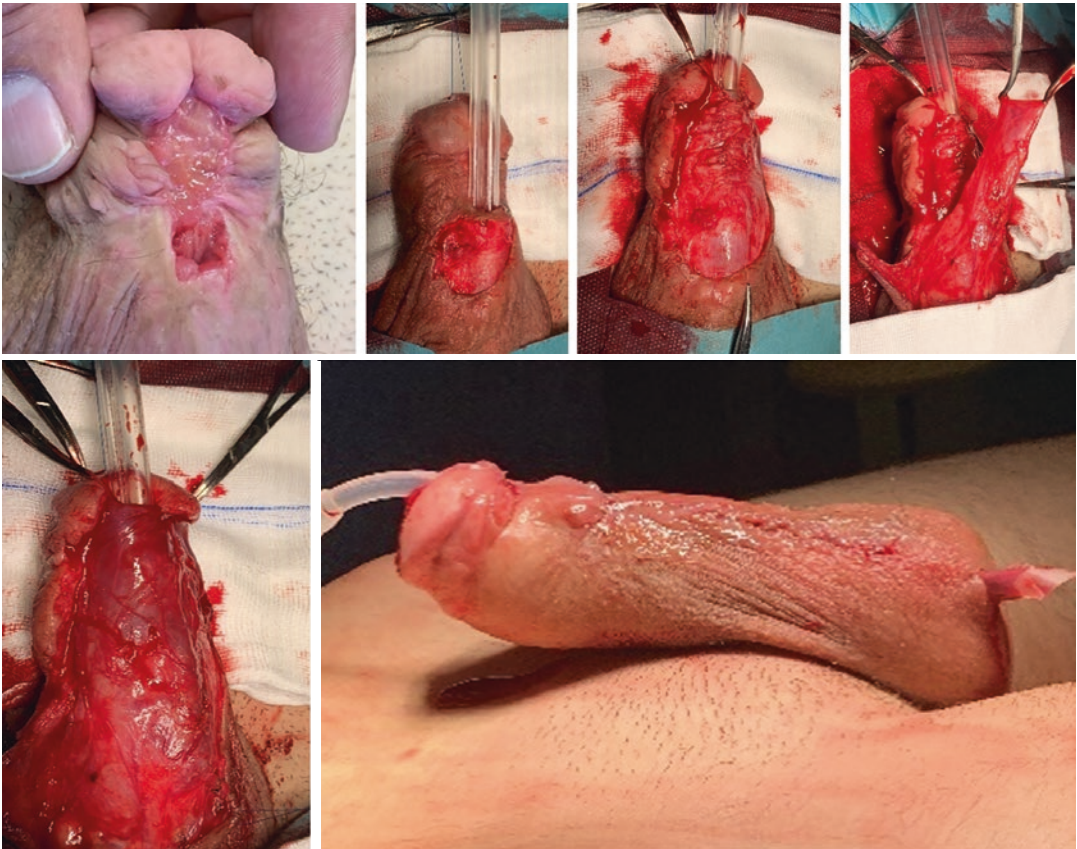


Fig. 51.13 A 19-year-old who underwent six operations in different countries including two buccal mucosal graft. It was felt that the urethral plate was hard and fibrous and a third buccal mucosa may be associated with high risk due to the unhealthy fibrotic bed. The scar tissue was excised and a Thiersch technique was used around two

catheters (F30) with protective layer from tunica vaginalis. Adults tend to bleed a lot in the scrotum; therefore a scrotal drainage was needed for 3 days. The patient still has some curvature to be sorted out later (©Ahmed T. Hadidi 2022. All Rights Reserved)

surgeon must perform detailed preoperative assessment and identify the source of healthy epithelium as well as the source of healthy, well vascularized fascial coverage. Two-stage repair is usually required in patients with proximal hypospadias with severe scarring and persistent curvature.

References

1. Hoy NY, Rourke KF. Better defining the spectrum of adult hypospadias: examining the effect of childhood surgery on adult presentation. *Urology*. 2017; <https://doi.org/10.1016/j.urology.2016.07.057>.
2. Hollander JE, Singer AJ, Valentine S. Comparison of wound care practices in pediatric and adult lacerations repaired in the emergency department. *Pediatr Emerg Care*. 1998; <https://doi.org/10.1097/00006565-199802000-00004>.
3. Bhat A, Bhat M, Kumar V, Kumar R, Mittal R, Saksena G. Comparison of variables affecting the surgical outcomes of tubularized incised plate urethroplasty in adult and pediatric hypospadias. *J Pediatr Urol*. 2016; <https://doi.org/10.1016/j.jpuro.2015.09.005>.
4. Ching CB, Wood HM, Ross JH, Gao T, Angermeier KW. The Cleveland Clinic experience with adult hypospadias patients undergoing repair: their presentation and a new classification system. *BJU Int*. 2011; <https://doi.org/10.1111/j.1464-410X.2010.09693.x>.
5. Barbagli G, De Angelis M, Palminteri E, Lazzeri M. Failed hypospadias repair presenting in adults. *Eur Urol*. 2006; <https://doi.org/10.1016/j.eururo.2006.01.027>.
6. Myers JB, McAninch JW, Erickson BA, Breyer BN. Treatment of adults with complications from previous hypospadias surgery. *J Urol*. 2012; <https://doi.org/10.1016/j.juro.2012.04.007>.