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Original Article

Functional and Cosmetic Results of Hypospadias Surgery - A Single Center Experience in Bangladesh

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ABSTRACT

Background: Hypospadias surgery aims to achieve a functionally adequate urethra with a forward-directed urinary stream while maintaining satisfactory penile appearance. Postoperative functional and cosmetic outcomes may vary according to anatomical severity and other clinical characteristics. **Methods & Materials:** The observational study was done in the Department of Pediatric Surgery, Mugda Medical College, Dhaka, Bangladesh from January 2024 to January 2025 on 50 subjects having hypospadias surgery. The demographic characteristics, clinical data, operative parameters, and post-operative results were documented. Edema was scored according to the time taken to resolve and the subjects were followed for six months. The statistical analyses included Fisher's exact test and Welch's t-test. **Results:** The mean age was 6.35 ± 3.15 years. Distal hypospadias was present in 33 (66.0%) patients, mid penile hypospadias in 4 (8.0%), and proximal hypospadias in 13 (26.0%). At six months, 33 (66.0%) patients had a single urinary stream and good cosmetic appearance, while 17 (34.0%) had spraying urinary stream and not-good cosmetic appearance. Urethrocutaneous fistula developed in 17 (34.0%) patients, all of whom required re-operation. An unfavorable outcome was observed in 5 of 33 (15.2%) distal cases compared with 12 of 13 (92.3%) proximal cases ($p < .001$). Previous orthoplasty was associated with unfavorable outcome ($p = .004$), while marked early postoperative edema was strongly associated with unfavorable outcome ($p < .001$). Age, chordee, and broad operative procedure category were not significantly associated with outcome. **Conclusion:** Favorable functional and cosmetic outcomes were achieved in approximately two-thirds of patients. Proximal hypospadias was associated with markedly poorer six-month outcomes than distal hypospadias. Larger prospective studies with standardized cosmetic assessment and longer follow-up are required to confirm these findings.

Keywords: *Hypospadias; Urethroplasty; Urethrocutaneous Fistula; Functional Outcome; Cosmetic Outcome*

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INTRODUCTION

Hypospadias is one of the common congenital anomalies of the male external genitalia and is characterized by an abnormally positioned urethral meatus on the ventral aspect of the penis, which may be accompanied by ventral penile curvature and deficient ventral preputial development. The severity of the anomaly varies according to the anatomical position of the meatus and associated penile abnormalities. Approximately 70% of cases have been described as distal, while the remaining cases are located more proximally and are generally more complex [1,2]. Considerable geographic variation in the occurrence of hypospadias has been observed. In a nationwide Danish study, 9,189 verified cases were identified, of which 91.5% were distal and 8.5% were proximal, while the mean diagnostic prevalence during 2008–2018 was 774 per 100,000 newborn boys [3]. In China, a nationwide surveillance study identified 11,782 cases among 11,575,036 male births, corresponding to a prevalence of 10.18 per 10,000 male births, and 17.7% of cases were associated with other congenital anomalies [4]. Similarly, a multicountry South American analysis reported 4,537 cases among more than four million newborns, with an overall prevalence of 11.3 per 10,000 newborns [5]. These variations indicate that the reported burden is influenced by population characteristics, surveillance methods, and diagnostic practices. The principal objectives of hypospadias surgery are restoration of a functionally adequate urethra, production of a forward-directed urinary stream, correction of penile curvature, creation of an appropriately positioned meatus, and achievement of an acceptable cosmetic appearance. Surgical correction is commonly recommended during early childhood, particularly between 6 and 18 months of age, although repair is performed at considerably older ages in many low- and middle-income settings [1]. In an Ethiopian series of 277 children, the mean age at repair was 3.7 ± 3.5 years and only 35.4% underwent surgery within the recommended age range [6]. Despite advances in operative techniques, postoperative complications remain important determinants of surgical outcome. In a systematic review and meta-analysis of 44 studies involving 10,666 children with non-proximal hypospadias, urethrocutaneous fistula was found to be the most frequent complication, with a pooled incidence of 4.0%, while the overall complication rate was 8.0% [7]. In another retrospective study of 119 patients, fistula was recorded in 23.96% of distal and 30.43% of proximal cases, and prolonged urethral stenting was associated with an increased risk of fistula formation [8]. Assessment of hypospadias surgery has increasingly extended beyond the absence of fistula or stenosis. Functional outcome, urinary stream, penile straightness, meatal configuration, cosmetic appearance, and the need for further surgery have been recognized as important components of postoperative evaluation. In a long-term

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study of 187 patients, at least one complication was recorded in 24.6%, while cosmetic satisfaction was reported by 83% of children and 87% of parents; functional satisfaction assessed using the Hypospadias Objective Scoring Evaluation was reported in 89% and 92%, respectively [9]. Long-term assessment in adulthood has also demonstrated generally favorable urinary, sexual, and penile appearance outcomes, although a complication rate of 27% was recorded in one Italian cohort followed for 17–28 years after childhood repair [10]. A systematic review of cosmetic outcomes further showed that patient perceptions were heterogeneous and that validated assessment methods were inconsistently used across studies [11]. Evidence from Bangladesh remains comparatively limited and has largely focused on specific operative techniques and postoperative complications. In a recent Bangladeshi study of 54 evaluable patients with mid and distal penile hypospadias, urethrocutaneous fistula was observed in 9.25%, meatal stenosis in 5.5%, and residual chordee in 1.8% [12]. Another Bangladeshi comparative study reported fistula in 7 of 20 patients following conventional Snodgrass repair and in 1 of 20 following a modified technique [13]. Contemporary hospital data from Dhaka have also shown that hypospadias constitutes a substantial component of pediatric surgical practice, accounting for 31 of 265, 11.7%, pediatric surgical cases in one specialized center [14]. Therefore, evaluation of both functional and cosmetic outcomes in a local clinical setting remains relevant. The present study was undertaken to assess the functional and cosmetic results of hypospadias surgery at a single pediatric surgical center in Bangladesh.

METHODS & MATERIALS

This observational study was conducted at the Department of Pediatric Surgery, Mugda Medical College, Dhaka, Bangladesh. The study duration, including postoperative follow-up, was from January 2024 to January 2025, with January 2025 representing the end of the follow-up period. A total of 50 patients who underwent surgical treatment for hypospadias and completed follow-up within the study period were included. Demographic characteristics, anatomical type of hypospadias, associated clinical findings, operative procedure, and early postoperative findings were recorded. For analytical purposes, glandular, coronal, subcoronal, and distal penile hypospadias were categorized as distal; mid penile hypospadias was analyzed separately; and proximal penile and penoscrotal hypospadias were categorized as proximal. Postoperative edema was categorized according to the time required for resolution: mild edema was defined as edema subsiding within 5 days, moderate edema as edema subsiding within 6–7 days, and marked edema as edema subsiding within 8–10 days. Records documenting only “edema,” without specifying mild severity, were categorized as moderate edema. All patients were followed postoperatively at 14 days, 1 month, 3 months, and 6 months, and the final functional and cosmetic outcomes were assessed at the 6-month follow-up. Outcomes included urethrocutaneous fistula, urinary stream pattern, cosmetic appearance, and requirement for re-operation. Cosmetic appearance was recorded clinically as good or not good. For exploratory analysis, an unfavorable outcome pattern was defined as the concordant occurrence of urethrocutaneous fistula, spraying urinary stream, not-good cosmetic appearance, and re-operation; the remaining patients were categorized as having a favorable outcome. Continuous variables were summarized using mean ± standard deviation or median and interquartile range, as appropriate, while categorical variables were expressed as frequency and percentage. Fisher's exact test was used for categorical comparisons because of small cell frequencies, and Welch's t test was used for comparison of mean age between outcome groups. A p value $< .05$ was considered statistically significant.

RESULTS

A total of 50 patients who underwent surgery for hypospadias were included in the analysis. All patients completed postoperative follow-up at 14 days, 1 month, 3 months, and 6 months, and the functional and cosmetic outcomes presented below represent findings at the final 6-month assessment. Among the 50 patients, the mean age was 6.35 ± 3.15 years, with a median age of 6.0 years and a range of 1.5–13.0 years. Most patients were aged 5–9 years, 22 (44.0%). Regarding anatomical distribution, 33 (66.0%) cases were classified as distal, 4 (8.0%) as mid penile, and 13 (26.0%) as proximal. Chordee was documented in 9 (18.0%) patients, and 7 (14.0%) had a history of previous orthoplasty; all 7 had penoscrotal hypospadias (*Table I*).

Table I

Demographic and Clinical Characteristics of the Study Patients (n = 50).

Category	n (%) or value
Age group	
<5 years	17 (34.0)
5–9 years	22 (44.0)
≥10 years	11 (22.0)
Mean ± SD	6.35 ± 3.15
Median, IQR	6.0, 4.0–8.0
Range	1.5–13.0
Anatomical site	
Glandular	4 (8.0)
Coronal	11 (22.0)
Subcoronal	8 (16.0)
Distal penile	10 (20.0)
Mid penile	4 (8.0)
Proximal penile	6 (12.0)
Penoscrotal	7 (14.0)
Grouped anatomical location	
Distal	33 (66.0)
Proximal	13 (26.0)
Mid penile	4 (8.0)
Associated finding	
Chordee	9 (18.0)
Previous orthoplasty	7 (14.0)
Undescended testis	1 (2.0)
Hydrocele	1 (2.0)

Note. SD = standard deviation; IQR = interquartile range. For analytical purposes, glandular, coronal, subcoronal, and distal penile hypospadias were grouped as distal; mid penile hypospadias was analyzed separately; proximal penile and penoscrotal hypospadias were grouped as proximal. All 7 patients with penoscrotal hypospadias had a history of previous orthoplasty.

Regarding surgical management, urethroplasty was performed in 44 (88.0%) patients, while one additional patient, 2.0%, underwent urethroplasty with herniotomy. MAGPI and orthoplasty were performed in 2 (4.0%) and 3 (6.0%) patients, respectively. During the early postoperative period, mild edema was recorded in 21 (42.0%) patients, moderate edema in 14 (28.0%), and marked edema in 15 (30.0%) (*Table II*).

Table II
Operative Procedures and Early Postoperative Findings (n = 50).

Variable	n (%)
Operative procedure	
Urethroplasty	44 (88.0)
Urethroplasty with herniotomy	1 (2.0)
MAGPI	2 (4.0)
Orthoplasty	3 (6.0)
Early postoperative finding	
Mild edema	21 (42.0)
Moderate edema	14 (28.0)
Marked edema	15 (30.0)

Note. MAGPI = meatal advancement and glanuloplasty incorporated. The two records originally documented as conservative treatment were verified as urethroplasty and were analyzed accordingly. Mild edema subsided within 5 days, moderate edema subsided within 6–7 days, and marked edema subsided within 8–10 days.

At 6 months, a single urinary stream was observed in 33 (66.0%) patients, while 17 (34.0%) had a spraying urinary stream. Good cosmetic appearance was documented in 33 (66.0%) cases, whereas 17 (34.0%) had a not-good cosmetic appearance. Urethrocutaneous fistula occurred in 17 (34.0%) patients, and all 17 required re-operation. Accordingly, an overall favorable outcome pattern was observed in 33 (66.0%) patients (*Table III*).

Table III
Functional, Cosmetic, and Complication Outcomes at the 6-Month Follow-up (n = 50).

Outcome domain	Category	n (%)	95% CI
Late complication	Urethrocutaneous fistula	17 (34.0)	22.4–47.8
	No recorded fistula, stricture, or stenosis	33 (66.0)	52.2–77.6
Functional outcome	Single urinary stream	33 (66.0)	52.2–77.6
	Spraying urinary stream	17 (34.0)	22.4–47.8
Cosmetic appearance	Good	33 (66.0)	52.2–77.6
	Not good	17 (34.0)	22.4–47.8
Re-operation	Required	17 (34.0)	22.4–47.8
	Not required	33 (66.0)	52.2–77.6
Overall outcome pattern	Favorable	33 (66.0)	52.2–77.6
	Unfavorable	17 (34.0)	22.4–47.8

Note. CI = confidence interval. Outcomes were assessed at the final 6-month follow-up.

Among patients with distal hypospadias, fistula and the corresponding unfavorable functional and cosmetic outcome pattern were observed in 5 of 33 cases, 15.2%. In contrast, 12 of 13 patients with proximal hypospadias (92.3%) demonstrated the same unfavorable outcome pattern. A statistically significant difference was observed between distal and proximal hypospadias for fistula, urinary stream, cosmetic appearance, and requirement for re-operation, all $p < .001$ (*Table IV*).

Table IV
Functional and Cosmetic Outcomes at 6 Months According to Anatomical Location.

Anatomical location	N	Fistula, n (%)	Spraying stream, n (%)	Not-good cosmetic appearance, n (%)	Re-operation, n (%)
Distal	33	5 (15.2)	5 (15.2)	5 (15.2)	5 (15.2)
Proximal	13	12 (92.3)	12 (92.3)	12 (92.3)	12 (92.3)
Mid penile	4	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
p-value, distal vs. proximal		<.001	<.001	<.001	<.001

Note. Fisher's exact test was used to compare distal and proximal cases because of small expected cell frequencies; the 4 mid penile cases were analyzed separately and were not included in this comparison.

Regarding age, patients with a favorable outcome had a mean age of 6.83 ± 3.51 years compared with 5.41 ± 2.06 years among those with an unfavorable outcome, although the difference was not statistically significant, $p = .078$. No significant association was observed for chordee, $p = .141$, or procedure category, $p = .650$. Previous orthoplasty was present in 6 (35.3%) patients with an unfavorable outcome and 1 (3.0%) patient with a favorable outcome, p = .004. All 7 patients with previous orthoplasty had penoscrotal hypospadias. Marked early postoperative edema was documented in 15 of 17 patients, 88.2%, with an unfavorable outcome and in none of the 33 patients with a favorable outcome, $p < .001$ (*Table V*).

Table V
Exploratory Associations Between Clinical Factors and Overall Outcome at 6 Months.

Factor	Category or measure	Favorable outcome (n = 33)	Unfavorable outcome (n = 17)	Statistical test	p value
Age, years	Mean ± SD	6.83 ± 3.51	5.41 ± 2.06	Welch's t test	.078
Chordee	Present	8 (24.2)	1 (5.9)	Fisher's exact test	.141
Previous orthoplasty	Present	1 (3.0)	6 (35.3)	Fisher's exact test	.004
Procedure	Urethroplasty ± herniotomy	29 (87.9)	16 (94.1)	Fisher's exact test	.650
Early postoperative edema	Marked	0 (0.0)	15 (88.2)	Fisher's exact test	<.001

Note. SD = standard deviation. The unfavorable outcome represented the concordant occurrence of urethrocutaneous fistula, spraying urinary stream, not-good cosmetic appearance, and re-operation. Fisher's exact test was used for categorical comparisons. All 7 patients with previous orthoplasty had penoscrotal hypospadias; therefore, this association is confounded by anatomical severity.

DISCUSSION

The present study evaluated functional, cosmetic, and complication outcomes after hypospadias surgery at a single pediatric surgical center in Bangladesh. At the final 6-month follow-up, a favorable outcome pattern was observed in 33 (66.0%) patients, while 17 (34.0%) had an unfavorable outcome characterized by urethrocutaneous fistula, spraying urinary stream, not-good cosmetic appearance, and requirement for re-operation. A broadly comparable regional pattern was reported by Manzoor et al., in which 17 (56.7%) patients had excellent and 2 (6.7%) had good outcomes according to the Post-Hypospadias Repair Penile Score, giving a combined excellent/good proportion of 63.3% [15]. However, their structured scoring system was different from the binary functional and cosmetic classification used in the present study. A higher cosmetic success rate was reported by Neheman et al., where 102 (81.0%) patients achieved an optimal postoperative HOPE score [16]. This difference may partly reflect differences in case severity, operative technique, outcome definition, and the use of a validated cosmetic instrument. Urethrocutaneous fistula was recorded in 17 (34.0%) patients in the present study and represented the principal late complication. A very similar fistula frequency was reported by Gama et al., where 95 (34.3%) of 277 patients developed urethrocutaneous fistula [6]. In contrast, substantially lower rates have been reported in less severe anatomical groups. In the systematic review and meta-analysis by Wu et al., involving 10,666 children with non-proximal hypospadias, the pooled fistula incidence was only 4.0%, with an overall complication incidence of 8.0% [7]. Similarly, Mahmud et al. reported fistula in 5 (9.25%) of 54 evaluable Bangladeshi patients undergoing repair for mid and distal penile hypospadias [12]. These lower frequencies are not directly comparable with the present overall rate because proximal cases were excluded or under-represented in those populations. In the present study, all 17 patients with fistula also had spraying urinary stream, not-good cosmetic appearance, and required re-operation. Therefore, these endpoints represented a single concordant adverse pattern rather than four independent outcome events. Anatomical location showed the strongest association with outcome in the present study. Unfavorable outcomes were recorded in 5 of 33 (15.2%) patients with distal hypospadias compared with 12 of 13 (92.3%) patients with proximal hypospadias, $p < .001$. This direction of association is supported by several verified studies. Seguier-Lipszyc et al. found that meatal location remained the only significant independent clinical predictor of urethroplasty complications after multivariable adjustment [17]. Compared with subcoronal disease, shaft and proximal locations had adjusted odds ratios of 7.09 and 8.36, respectively. Similarly, Escolino et al. observed that a more proximal meatal position within a distal hypospadias cohort was associated with urethrocutaneous fistula, $p = .007$, and re-operation, $p = .02$ [18]. Among 493 patients with proximal hypospadias and severe chordee, Zhou et al. also found that preoperative meatal position remained associated with postoperative complications after multivariable analysis [19]. Thus, the anatomical gradient found in the present study is consistent with the broader evidence, although the 92.3% unfavorable rate among proximal cases was particularly high and should be interpreted in view of the small proximal subgroup of only 13 patients. Age was not significantly associated with the overall outcome pattern in the present study. The mean age was 6.83 ± 3.51 years among patients with favorable outcomes and 5.41 ± 2.06 years among those with unfavorable outcomes, $p = .078$. Similar findings were reported by Gama et al., where age at repair was not independently associated with postoperative complications, and by Zhou et al., where age at initial surgery was also not significantly associated with complications [6,19]. However, conflicting evidence has been reported. Escolino et al. found that age above 2 years was significantly associated with meatal or urethral stenosis and with re-operation [18]. Therefore, the present result indicates that an age association was not demonstrated in this cohort, rather than establishing that age has no influence on postoperative outcome. Chordee was documented in 9 (18.0%) patients, but its presence was not significantly associated with the overall outcome pattern, $p = .141$. This finding differs from studies in which the severity of curvature was assessed rather than simple presence or absence. Gama et al. found severe chordee to be independently associated with postoperative complications, adjusted OR 3.09, 95% CI 1.21–7.54 [6]. Similarly, the degree of penile curvature was identified as a predictor of cosmetic outcome by Neheman et al [16]. In the prospective study by Seguier-Lipszyc et al., chordee severity was associated with complications in univariate analysis but did not remain significant after adjustment for other anatomical factors [17]. These findings indicate that the degree of curvature may provide more prognostic information than a binary chordee variable. The absence of chordee grading in the present dataset may therefore have limited the ability to identify such an association. A history of previous orthoplasty was documented in seven patients; 6 (35.3%) were in the unfavorable-outcome group and 1 (3.0%) was in the favorable-outcome group, p = .004. Evidence from reoperative hypospadias supports the general observation that previously operated cases can have greater reconstructive complexity. Fihman et al. reported postoperative complications in 54 (71.0%) of 76 patients undergoing re-do hypospadias surgery, while 36 (47.4%) required additional operations [20]. Zheng et al. similarly reported complications in 12 (30.0%) of 40 patients undergoing staged oral mucosal graft urethroplasty for hypospadias reoperation, with poorer outcomes among patients whose original anomaly was more severe [21]. However, previous orthoplasty in the present study should not be considered equivalent to failed urethroplasty or “re-do” hypospadias. All seven patients with previous orthoplasty had penoscrotal hypospadias; therefore, the observed association should be regarded as exploratory and is strongly confounded by underlying anatomical severity. No significant association was found between the broad operative procedure category and overall outcome, $p = .650$. A similar absence of a significant association between

operative technique and individual postoperative complications was reported by Gabra et al [8]. Nevertheless, technique-specific evidence indicates that operative strategy may influence outcomes in selected patients. In severe proximal hypospadias, Zhu et al. reported success rates of 62.5% following one-stage repair and 88.57% following their staged approach [22]. The procedure variable in the present dataset was recorded mainly as urethroplasty without sufficient technical detail regarding urethral plate management, covering layers, grafts, flaps, or staging. Therefore, the present analysis cannot determine whether specific urethroplasty techniques differed in effectiveness. Marked early postoperative edema showed the strongest exploratory association apart from anatomical location. It was recorded in 15 of 17 (88.2%) patients with an unfavorable outcome and in none of the 33 patients with a favorable outcome, $p < .001$. However, none of the retained verified studies established marked postoperative edema as an independent predictor of urethrocutaneous fistula or poor cosmetic outcome. Edema may reflect greater tissue manipulation, local inflammation, impaired lymphatic drainage, tissue ischemia, or greater anatomical and operative complexity. Because marked edema occurred after surgery and may lie on the pathway between operative complexity and later complications, it should not be interpreted as a preoperative risk factor or as evidence of causality. The association observed in the present study should therefore be regarded as hypothesis-generating and requires confirmation in a larger prospective cohort with standardized grading of postoperative edema.

LIMITATIONS

The present study was limited by its single-center design, relatively small sample size, particularly the small proximal hypospadias subgroup, and a follow-up period limited to six months. Cosmetic outcome was assessed clinically as good or not good rather than with a validated objective scoring system, and the available data did not permit detailed comparison of specific urethroplasty techniques or adjustment for potential confounding factors. In addition, all patients with previous orthoplasty had penoscrotal hypospadias, preventing separation of the effect of previous orthoplasty from underlying anatomical severity.

CONCLUSION

The present study showed that favorable functional and cosmetic outcomes were achieved in 33 (66.0%) patients at six months following hypospadias surgery, while urethrocutaneous fistula, spraying urinary stream, not-good cosmetic appearance, and requirement for re-operation were observed in the same 17 (34.0%) patients. Unfavorable outcomes were substantially more frequent among patients with proximal hypospadias than among those with distal hypospadias, indicating an important association between anatomical severity and postoperative outcome. Previous orthoplasty and marked early postoperative edema were also associated with unfavorable outcomes; however, all previous-orthoplasty cases were penoscrotal, and these findings should therefore be interpreted cautiously because of anatomical confounding and the exploratory nature of the analyses. Careful assessment of anatomical severity, standardized postoperative evaluation, and longer-term follow-up may help improve evaluation of functional and cosmetic outcomes after hypospadias repair.

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CONFLICT OF INTEREST

None declared.

ETHICAL APPROVAL

The study was approved by the Institutional Ethics Committee.

REFERENCES

1. van der Horst HJR, de Wall LL. Hypospadias, all there is to know. Eur J Pediatr. 2017 Apr 1;176(4):435–41. doi:10.1007/s00431-017-2864-5
2. Halaseh SA, Halaseh S, Ashour M. Hypospadias: A Comprehensive Review Including Its Embryology, Etiology and Surgical Techniques. Cureus. 2022;14(7):e27544. doi:10.7759/cureus.27544 PubMed PMID: 36060359; PubMed Central PMCID: PMC9428502.
3. Leunbach TL, Berglund A, Ernst A, Hvistendahl GM, Rawashdeh YF, Gravholt CH. Prevalence, Incidence, and Age at Diagnosis of Boys With Hypospadias: A Nationwide Population-Based Epidemiological Study. J Urol. 2025 Mar;213(3):350–60. doi:10.1097/JU.0000000000004319 PubMed PMID: 39626694; PubMed Central PMCID: PMC12708034.
4. Zhiyu C, Yuyang G, Wenli X, Wenyan L, Zhen L, Jiayuan Z, et al. Epidemiology of hypospadias in China: A nationwide surveillance-based study, 2010–2020. Andrology. 2026;14(3):880–9. doi:10.1111/andr.70090
5. Fernández N, Pérez J, Monterrey P, Poletta FA, Bägli DJ, Lorenzo AJ, et al. ECLAMC Study: prevalence patterns of hypospadias in South America: multi-national analysis over a 24-year period. Int braz j urol. 2017;43:325–34. doi:https://doi.org/10.1590/S1677-5538.IBJU.2016.0002
6. Gama M, Abitew B, Abebe K. Clinical Profiles and Surgical Outcome of Hypospadias Repair at a Teaching Hospital in Ethiopia. Ethiop J Health Sci. 2022 May;32(3):613–22. doi:10.4314/ejhs.v32i3.18 PubMed PMID: 35813675; PubMed Central PMCID: PMC9214746.
7. Wu Y, Wang J, Zhao T, Wei Y, Han L, Liu X, et al. Complications Following Primary Repair of Non-proximal Hypospadias in Children: A Systematic Review and Meta-Analysis. Front Pediatr. 2020 Dec 9;8. doi:10.3389/fped.2020.579364
8. Gabra A, Beyari BM, AlNuwaiser SJ, Allaf SM, Alghanmi R, Alrayiqi R, et al. Outcomes of Hypospadias Repair Based on Surgical Techniques: A 4-Year Retrospective Study. Research and Reports in Urology. 2024 Dec 31;16:79–87. doi:10.2147/RRU.S451552 PubMed PMID: 38558857.
9. Ceccarelli PL, Lucaccioni L, Poluzzi F, Bianchini A, Biondini D, Iughetti L, et al. Hypospadias: clinical approach, surgical technique and long-term outcome. BMC Pediatr. 2021 Nov 26;21(1):523. doi:10.1186/s12887-021-02941-4
10. Bocchino AC, Cocci A, Pezzoli M, Elia A, Landi L, Mantovani A, et al. Long-term Functional, Sexual, and Cosmetic Outcomes in Adult Patients Who Underwent Hypospadias Repair During Childhood at a Highly Specialized Italian Pediatric Hospital. Urol Res Pract. 2024 Mar 1;50(2):127–33. doi:10.5152/tud.2024.24005 PubMed PMID: 39128083; PubMed Central PMCID: PMC11232063.
11. Adams J, Bracka A. Reconstructive surgery for hypospadias: A systematic review of long-term patient satisfaction with cosmetic outcomes. Indian J Urol. 2016;32(2):93–102. doi:10.4103/0970-1591.179178 PubMed PMID: 27127350; PubMed Central PMCID: PMC4831515.
12. Mahmud AA, Khan N, Uddin MB, Mokarabin M, Siddique MFH, Ali MS, et al. Outcome of Double Layer UrethroplastyWithout Flap in Mid and Distal Penile Hypospadias. Mymensingh Med J. 2025 Jan 1;34(1):106–12. PubMed PMID: 39739477.
13. Akan AB, Mondal SK, Mojmdar MRK, Islam MS, Mahammad N, Munmun UHD. Comparative study between snodgrass urethroplasty and modified snodgrass urethroplasty for distal penile hypospadias in terms of post-operative urethrocutaneous fistula formation. Int J Contemp Pediatr. 2022;9(10):880–883. doi:10.18203/2349-3291.ijcp20222413.
14. Jannat FT, Islam S, Islam MN, Nooruzzaman M, Chaudhary P, Amin MR. Spectrum of Pediatric Surgical Cases at a Private Pediatric Specialized Hospital in Bangladesh: A Retrospective Study. Cureus. 2026;18(3):e106236. doi:10.7759/cureus.106236 PubMed PMID: 42077754; PubMed Central PMCID: PMC13132795.
15. Manzoor A, Talat N, Adnan HM, Zia M, Aziz MA, Ahmed E, et al. Post-Hypospadias Repair Penile Score in Follow-Up Patients of Urethroplasty. Cureus. 2022 Apr 4;14(4). doi:10.7759/cureus.23816
16. Neheman A, Schwarztuch Gildor O, Shumaker A, Beberashvili I, Bar-Yosef Y, Arnon S, et al. Use of Validated Questionnaires to Predict Cosmetic Outcomes of Hypospadias Repair. Children. 2024 Feb;11(2):189. doi:10.3390/children11020189

17. Seguier-Lipszyc E, Beberashvili I, Shumaker A, Stav K, Neheman A. Appraisal of Clinical and Anthropometric Variables as Risk Factors for Urethroplasty Complication in Primary Hypospadias. Journal of Paediatrics and Child Health. 2025;61(9):1452–9. doi:10.1111/jpc.70138
18. Escolino M, Di Mento C, Carraturo F, Chiodi A, Del Conte F, Esposito G, et al. Anatomical and intraoperative predictors of surgical complications after distal hypospadias repair with foreskin reconstruction: a prospective study. World J Urol. 2025 Dec 4;44(1):21. doi:10.1007/s00345-025-06082-6
19. Zhou G, Wang R, Zhu W, Yin J, Yang Z, Li S. Risk factors for postoperative complications in children with proximal hypospadias with severe chordee who underwent urethral plate transection. International Journal of Urology. 2022;29(11):1310–4. doi:10.1111/iju.14986
20. Fihman M, Chertin L, Kocherov S, Jaber J, Chertin B, Dothan D. Re-do hypospadias surgery following failed previous repair: lessons learned over two decades of experience. Pediatr Surg Int. 2024 Nov 16;40(1):311. doi:10.1007/s00383-024-05896-6
21. Zheng D, Fu S, Li W, Xie M, Guo J, Yao H, et al. The hypospadias classification affected the surgical outcomes of staged oral mucosa graft urethroplasty in hypospadias reoperation. Medicine (Baltimore). 2017 Nov 27;96(47):e8238. doi:10.1097/MD.0000000000008238 PubMed PMID: 29381913; PubMed Central PMCID: PMC5708912.
22. Zhu X, Huang L, Wang J, Zhu H, Chen C, Wang L, et al. Comparative study of one-stage and the novel two-stage urethroplasty using the transected urethral plate and transverse preputial island flap (TPIF) for severe hypospadias: a single-center experience. Translational Pediatrics. 2021 Apr;10(4):84350–850. doi:10.21037/tp-20-392