

RESEARCH ARTICLE

# Surgical Management of Hypospadias at the Mbour Public Hospital

KOUKA SCN<sup>1\*</sup>, NDIAYE A<sup>1</sup>, THIAM NM<sup>1</sup>, DIOP M<sup>1</sup>, LY R<sup>1</sup>, SISSOKHO M<sup>1</sup>, CISSE M<sup>1</sup>, DIALLO Y<sup>1</sup>, SYLLA C<sup>1</sup>, YONGA D<sup>2</sup>

<sup>1</sup>Département d'Urologie – UFR des Sciences de la Santé – Université Iba Der Thiam de Thiès

<sup>2</sup>Department of pediatric surgery, Faculty of Health Sciences, University Iba Der Thiam of Thiès, Senegal

Received: 20 December 2023 Accepted: 29 December 2023 Published: 10 January 2024

**Corresponding Author:** Saint Charles Nabab Kouka, Département d'Urologie – UFR des Sciences de la Santé – Université Iba Der Thiam de Thiès, Senegal.

## Abstract

**Introduction:** Hypospadias is an abnormality of urethral meatus position located on the ventral face of the penis.

**Objective:** To determine the epidemiological and clinical characteristics and evaluate the therapeutic management of hypospadias patients operated on at Mbour hospital.

**Patients and Method:** We carried out a descriptive cross-sectional study in the urology department of Grand Mbour hospital over a period of 7 years from January 1, 2015 to November 30, 2021.

**Results:** We collected 31 cases of hypospadias during the study period. The average age of our patients was 4.4 years (Range: 4 months; 31 years). The hypospadias was anterior in 16 patients, mid shaft in 11 patients and posterior in 4 patients. The most used surgical techniques were that of Mathieu (35.5%) and Duckett (35.5%). The average duration of urinary drainage was 6.3 days. The average length of hospitalization was 5.39 days. Postoperative complications were found in 48.40% of patients including urethrocutaneous fistula (29%).

**Conclusion:** The management of hypospadias in our conditions requires an improvement of the technical platform in order to obtain better results.

**Keywords:** Hypospadias, Surgery, Drainage, Complications.

## 1. Introduction

The word “hypospadias” comes from the Greek roots “hypo” meaning below and “spade” meaning opening. Hypospadias can be defined as a hypoplasia of the tissues forming the ventral surface of the penis, causing a defect in the development of the tissues of the ventral part of the penis downstream of the division of the corpus spongiosum [1-3].

Three anomalies are found in a boy with hypospadias[4]:

- An ectopic connection of the urethral meatus on the ventral face of the penis;

- Hypoplasia of the corpus spongiosum and skin leading to a more or less pronounced “bend” of the penis;

- and a sapper’s apron foreskin characterized by excess skin on the dorsal face of the penis to which corresponds hypoplasia of the skin tissue on the ventral side.

The diagnosis of this malformation is essentially clinical and its treatment is surgical with numerous complications. The objective of this work was to highlight the diagnostic and therapeutic aspects of a series of hypospadias treated in our urology department in Mbour.

**Citation:** Kouka SCN, Ndiaye A, Thiam NM, *et al.* Surgical Management of Hypospadias at the Mbour Public Hospital. Archives of Urology. 2024;6(1): 01-07.

©The Author(s) 2024. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

## 2. Patients and Methods

This is a retrospective, descriptive study over a period of 7 years from January 1, 2015 to November 30, 2021. We studied the medical records of 31 cases of hypospadias treated in the urology department of the ThiernoMouhamadou Mansour Barro Hospital of Mbour. All patients operated on for hypospadias and with available medical records were included in this study.

Exclusion criteria were incomplete medical records and all cases of hypospadias initially treated in another department. Some patients did not systematically benefit from a preoperative urine cytobacteriological examination.

All our patients were operated on under general anesthesia with or without the use of surgical loops. The main surgical techniques used were:

- Systematic correction of the associated penile curvature;
- The Thiersch-Duplay technique which consists of tubulizing the urethral splint;
- The urethroplasty technique according to Mathieu which consists of cutting a rectangle of penile skin proximal and distal to and delimited by the ectopic meatus. The posterior part of the skin is mobilized to tubularize the neo urethra; or a rectangle of non-tubulated pedicled preputial mucosa which will be anchored to the edges of the urethral groove (Onlay urethroplasty technique);
- The urethroplasty technique according to Asopa Duckett which consists of a translation of a flap of vascularized preputial mucosa, tubulated around a urethral catheter then sutured at the level of the ectopic meatus had been carried out in cases where the urethral splint cannot be preserved because it is too hypoplastic;
- The Snodgrass technique which consists of longitudinally incising the urethral groove from the ectopic meatus to the glans which then allows it to be tubulated around a urethral catheter without tension.
- A complete mobilization of the urethra according to Koff;
- A meatoplasty and glanuloplasty by creating a mucous collar around the glans or by covering the neourethra with vascularized tissue (spongioplasty) and by reconstituting the skin sheath.

The thread used to perform the urethroplasty was 4/0 slow resorption monofilament or braided. The drainage method used was a Foley catheter or a suprapubic urinary diversion associated with a urethral catheter intubating the neourethra or an oro tracheal intubation catheter.

The operated patients were reviewed every 15 days for 2 months. Therapeutic results were judged according to the quality of straightening of the penis, the cosmetic appearance of the penis, the position of the new urethral meatus, the permeability of the urethra and the existence or not of a fistula.

The parameters studied were age at the time of surgical intervention, anatomical type of hypospadias according to the Duckett classification, associated anomalies, data from the operative notes (type of anesthesia, urethroplasty technique, mode urinary drainage), duration of hospitalization and treatment results. The data were entered into a database in Excel 2016 and analyzed with SPSS 26 software.

## 3. Results

The average age of the patients was 4.4 years (Range: 1; 31 years). The most represented age group was 1-3 years (54.8% of patients) (figure 1). Hypospadias was discovered by parents in 48.4% of cases or by a healthcare worker in 25.8% of cases (figure 2).

The hypospadias was of the glandular type in 4 cases (12.9%), balano-penile in 9 cases (29%) and anterior penile in 3 cases (9.7%), mid shaft in 11 cases (35.5%) and posterior penile in 4 cases (12.9%). Table 1 describes the distribution of patients according to anatomical type.

The physical examination revealed a ventral bend of the penis in 64.5% of patients (n=20), a "sapper apron" foreskin in 83.9% of patients (n=29) and stenosis of the meatus in 2 patients (6.5%). The other malformations associated with hypospadias were reported in Table 2. Karyotyping was performed in two patients and was normal (46,XY).

Therapeutic techniques used included Mathieu and Duplay techniques respectively in 11 patients (35.5%) and in 4 patients (13%) to treat anterior hypospadias. For mid shaft and anterior penile hypospadias, urethroplasty techniques according to Duckett and Onlay (n=3) were performed (table 3).

The urinary drainage method was performed by a transurethral catheter in 28 patients (90%) by 8 or 10 Fr Foley catheter, or by intubating the reconstructed urethra with an intubation catheter. The average

duration of urinary drainage was 6.3 days (Range: 2 days ; 21 days). The average length of hospitalization was 5.39 days (Range: 24 hours ; 14 days). The results were considered satisfactory in 51.6% of cases and postoperative complications were found in 16 patients

(48.4%). Urethro-cutaneous fistula and surgical wound breakdown were the main complications observed with 11 cases (35.5%) and 3 cases (9.6%) respectively.

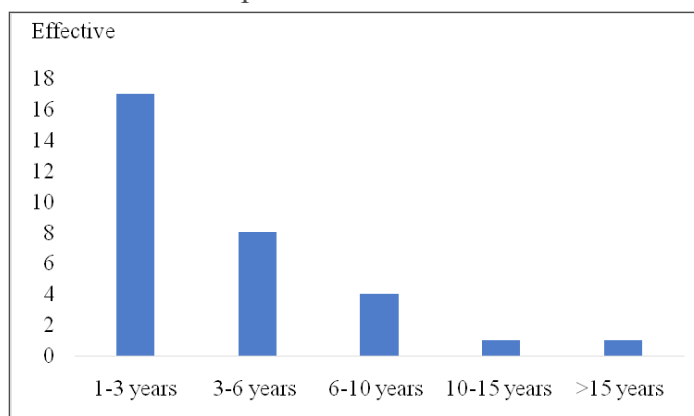


Figure 1. Distribution of the patients according age range

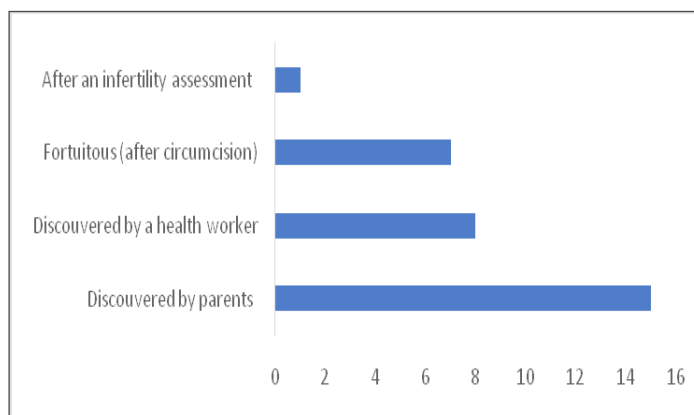


Figure 2. Distribution of the patients according to the circumstances of discovery

Table 1. Distribution of patients to the Duckett classification

Anatomical type	Effective	Percentage (%)
Glanular	4	12,9
Sub-coronal	9	29
Anteriorpenile	3	9,7
MidShaft	11	35,5
Posteriorpenile	4	12,9
Total	31	100

Table 2. Distribution of patients according to the associated malformations

Variables	Effective	Percentage(%)
Foreskininsapper apron	26	83,9
Yard sewing	20	64,5
Associated malformations	12	38,8
Unilateralcryptorchidism	3	9,7
Micropenis	2	6,5
MeatalStenosis	2	6,5
Process vaginalis	2	6,5
Oscillatingtesticle	1	3,2
Scrotal transposition	1	3,2
Vulviformeappearance of the scrotum+micropenis	1	3,2

**Table 3.** Distribution of patients to the surgical technique

Variables	Effective	Percentage (%)
Anterior hypospadias		
Mathieu	9	29
Mathieu + Snodgrass	2	6,5
Duplay	2	6,5
Duplay + Snodgrass	2	6,5
Koff + Snodgrass	1	3,2
Middle and posteriorHypospadias		
Duckett	11	35,5
Onlay	4	13

**Table 4.** Distribution of patients to the Type of complication

Type of complication	Effective	Percentage (%)
Urethro-cutaneousfistula(FUC)	11	35,5
Wound breakdown	3	9,6
MeatalSténosis	1	3,2
Total	15	48,4

## 4. Discussion

### 4.1 Epidemiology

In 7 years, we have recorded 31 cases of hypospadias operated on in our urology department at Grand Mbour hospital. Ndour et al [5] as well as Diaw et al [6], in Senegal, respectively collected 39 cases of previous hypospadias over a period of 5 years and 55 cases of hypospadias in 7 years.

The relative rarity of hypospadias in urological consultation in our study could be explained by the lack of awareness of this condition by our populations. In Western countries the frequency would be approximately 1 hypospadias in 300 male births and 1 in 80 to 1 in 100 in families where there is already a child carrying the anomaly [1].

The average age of our patients at the time of surgery was 4.4 years. This average age is relatively equal to that of Ndour et al [5] and Diallo et al [7]. On the other hand, it is lower than that of Diaw et al [6] which was 6 years. In Western series this average age is around 2 years [2-4,8-11]. For some authors, age at the time of surgery could be a factor that could influence the outcome of surgery [12,13].

## 5. Diagnosis

In our study, hypospadias was discovered by parents in 48.4% of cases and by a healthcare worker in 25.8% of cases. The incidental discovery at the referral forcircumcision was 22.6%. The circumstances of discovery in the study by Rimtebaye et al [ ] were fortuitous finding (23.6%) sitting urination (11.8%),

dysuria (5.9%), malformations reported by parents (41.2%). Hence the need to systematically consult any newborn after delivery by a well-trained healthcare worker.

The different forms of hypospadias are defined according to the position of the meatus, the appearance of the foreskin and the tissues of the ventral surface of the penis [1,4,14]. In the literature we distinguish between penoscrotal, perineal, penile and balanic forms [ ].

Hypospadias in its anterior form is one of the most common malformations in boys [4]. In our series, hypospadias was anterior in 51.3% of cases. The posterior form was only encountered in 4 patients(12.9%).

In the series by Ndiaye et al [14] hypospadias was anterior in 14 cases (34%), mid shaft in 12 cases (29%), and posterior in 15 cases (36%). In the study by Ndour et al., hypospadias was anterior in 24 cases (61.5%), mid shaft in 13 cases (33.3%) and posterior in 2 cases (5.2%).

The bend of the penis and excess preputial skin are inconsistent. Furthermore, in certain cases the hypospadias meatus can be observed with a normal foreskin. Also a bend can be isolated, without ectopy of the urethral meatus, but it is often associated with hypoplasia of the corpus spongiosum [4].

In our series the pathologies associated with hypospadias were cryptorchidism, umbilical hernia and inguinal hernia. This seems to confirm the data found in the literature [5-7, 15-17].

The cytobacteriological examination of urine was not systematically carried out preoperatively in our patients. This examination must be systematic in order to detect and treat a possible urinary infection before any intervention because its existence is a factor of failure

## 6. Treatment

The treatment of hypospadias is only surgical and aims to bring the meatus to the top of the glans, to give straightness to the erect penis and to obtain easy urination with a single, well-directed stream but also a good cosmetic appearance to the penis [4]. More than 300 operating techniques are reported in the literature [17]. Currently, most surgical teams agree on the one-stage treatment of hypospadias apart from posterior forms [3].

The position of the meatus, the extent of the curvature of the penis, the degree of hypoplasia of the ventral tissues, the width of the urethral plate and the size of the penis are determining elements to consider in order to predict the operating difficulties and the final result [4]. The surgical procedure involves several stages [1,4,18-20]:

- Straightening of the penis: correction of the curvature is done by dissection of the ventral side of the penis. Preservation of the urethral plate depends on its length and in posterior forms it is often necessary to cut it;
- Urethroplasty (reconstruction of the urethra) aims to position the urethral meatus at the top of the glans.
- Harmonious skin coverage of the penis, with posthectomy or reconstruction of the foreskin.

Degloving the penis releases skin adhesions between the sheath and the underlying elements. This allows the penile bend to be corrected with a confirmation by induced erection test [33]. If the bend persists, it is important to release the urethra from the ventral side of the corpora cavernosa.

If the bend is still not corrected after these 2 maneuvers, plication of the dorsal surface of the corpora cavernosa is then necessary [21]. For Ravasse et al. [22] as well as Minevich et al. [24], the Mathieu [25] procedure is the reference technique for treating anterior hypospadias because it causes few urethral complications. In our series, the median longitudinal incision of the urethral plate according to the Snodgrass technique [26] was made in 5 cases in association with urethroplasty according to the Duplay or Mathieu method [25,26].

In our series, Mathieu's technique was the most used followed by that of Duplay for the treatment of anterior hypospadias. These methods have been widely used for the treatment of cases of anterior hypospadias [7, 16-18].

Some authors recommend putting a Dartos layer over the urethral sutures to reinforce the watertight closure of the urethra [8,5]. For Ravasse et al. [21] Mathieu urethroplasty and Duplay urethroplasty have equivalent results with regard to the urethra. In our series, urethroplasty techniques according to Duckett [27] and Onlay [28] were used respectively in 11 patients (35.5%) and 4 patients (13%) to treat mid shaft penile and posterior penile hypospadias. Lyu et al. [29], comparing the tubulated Duckett preputial flap with the untubulated Onlay patch flap, noted a higher rate of fistulas and stenosis with the Duckett procedure.

In our series, we performed a one-stage urethroplasty for almost all of our patients (96.8%). Bankole Sapin et al. [29] performed a two-stage procedure in 19 patients (54.3%). Currently, most surgical teams agree on the one-stage treatment of hypospadias [4-15]. However, some authors [29] recommend a two stages approach for posterior forms: the first stage consisting of straightening the penis and the second stage consisting of performing a urethroplasty.

The suture recommended for performing urethroplasty is slow resorption monofilament polyglyconate thread 6/0 or at best 7/0 [20]. Most authors recommend the use of adequate surgical loops which guarantee better results [2, 4,16, 19, 20]. While some authors recommend suprapubic drainage, others opt for urethral drainage. Mitchel et al. [11] recommend a suprapubic urinary diversion associated with a urethral stent intubating the neourethra to reach the bladder. Indeed, deflation of the balloon is often incomplete and can lead to disunion of the sutures during its removal [].

The average duration of urine drainage in our series was 4 days. This drainage duration is still a source of controversy in the literature and varies between teams [4, 6, 8, 18, 19].

## 7. Therapeutic Results

In our series the therapeutic results were judged to be good in 51.2% of cases. The most common complications were urethrocutaneous fistula (UCF) and wound breakdown. Indeed, UCF remains one of the main complications of hypospadias surgery [4-6, 11, 20]. In the series by Ndour et al [5]

complications represented 53.8% of patients and UCF was estimated at 57.1% of cases. The fistula rate varies with the technique used [31]: it is 4% with the Mathieu technique, 15% in our hands with the Onlay urethroplasty technique [28].

## 8. Conclusion

The management of hypospadias in our working conditions is not yet satisfactory. Improving our results would involve raising the surgical technical level. Surgical treatment remains difficult and has inherent complications.

## 9. References

- Paparel P, Mure P, Margarian M, Feyaerts A, Mouriquand P. Approche actuelle de l'hypospade chez l'enfant. *Progrès en Urologie* (2001), 11, 741-751
- Moog R. Malformations congénitales de la verge. *EMC — Pédiatrie-Maladies Infectieuses* 2007;1—10 [4-083-D-40].
- Mure PY, Vigier S, Gorduza D, Demede D, Mouriquand P. Chirurgie des hypospades. *EMC — Techniques chirurgicales-urologie* 2011;1—17 [41—340].
- Boillot B, et al. Les malformations congénitales du pénis. *Prog Urol* (2013), <http://dx.doi.org/10.1016/j.purol.2013.01.022>
- Ndour O, Safari Karume P, Ndoeye NA, Faye A, Nour M, Ngom G, Ndoeye M. Evaluation of the management of hypospadias in the pediatric surgery center of aristide le dantec hospital in dakar: about 39 cases. *Revue Médicale des Grands Lacs* Vol6, No2, Juin 2015.
- Diaw EHM, Ndiaye M, Sow O, Ndiath A, Sarr A, Fall B, Sine B, Traore A, Ndong A et al. (2020) Hypospadias: Evaluation of Therapeutic Outcomes and Sexual Function in Adulthood in a University Hospital Setting. *Open Journal of Urology*, 10, 245-252.
- Diallo A, Bah I, Toure B, Ouendeno L, Balde I, Diallo M. L'hypospadias: aspects anatomo-cliniques et thérapeutiques au CHU de Conakry Guinée. *Andrologie* 2008;18(2):131- 36.
- Mosharafa A A ,Agbo-Panzo D, Priso R, Aubry E, Besson R.Cure d'hypospadias. La forme de la plaque urétrale a-t-elle une influence sur le résultat de l'intervention de Duplay-Snodgrass ? *Progrès en urologie* (2009) 19, 507—511. doi:10.1016/j.purol.2009.02.013.
- Moursy EE. Outcome of proximal hypospadias repair using three different techniques. *J PediatrUrol* 2010;6(1):45-53.
- Saafan HA. Two Stages repair of proximal hypospadias: Review of 33 cases. *Annals of Pediatric Surgery* 2010;6(2):89-92.
- Nezami BG, Mahboubi AH, Tanhaeivash R, Tourchi A, Kajbafzadeh AM. Hypospadias repair and glans augmentation using a modified Mathieu technique. *Pediatr Surg Int* 2010;26(3):299-303.
- Hensle T, Tennenbaum S, Reiley E, et al. Hypospadias repair in the adult population: adventures and misadventures. *J Urol* 2001;165:77—9.
- Snyder CL, Evangelidis A, Hansen G, St Peter SD, Ostelie DJ, Gatti JM, et al. Management of complications after hypospadias repair. *Urology* 2005;65:782—5.
- Ndiaye A, Sow Y, Sarr A, Thiam A, Faye ST, Ndour NS, Sine B, Zé-Ondo C, Sow O, Ndiath A et al. Hypospadias treatment by tubulated pedicled preputial island flap according to the Duckett technique: single-center experience in sub-Saharan Africa. *African Journal of Urology* (2021) 27:156 <https://doi.org/10.1186/s12301-021-00260-9>.
- Rimtebaye K, Kamadjou C, Moby Mpah EH, AgahTashkand AZ, Kaboro M, Ouchemi C, DankiSillong F, Niang L, Gueye SM. Aspects cliniques et thérapeutiques de l'hypospadias. A propos de 34 cas. *REVUE de Chirurgie d'Afrique Centrale (RECAC)* volume 2, numéro13 (supplément) Décembre2017.
- Mure PY, Vigier S, Gorduza D, Demede D, Mouriquand P. Chirurgie des hypospades. *EMC — Techniques chirurgicales-urologie* 2011;1—17 [41—340].
- Wu WH, Chuang JH, Ting YC, Lee SY, Hsieh CS. Developmental anomalies and disabilities associated with hypospadias. *J Urol* 2002;168(1):229-32.
- Leung AK, Robson WL. Hypospadias: an update. *Asian J Androl*2007;9(1):16-22.
- Mouriquand P, Mure PY. *Hypospadias Textbook of pediatric urology*. WB Saunders: Philadelphia; 2001. p. 713—28.
- Dodat H, Landry J-L, Szwarc C, Culem S, Murat FJ, Dubois R. Spongioplasty and separation of the corpora cavernosa for hypospadias repair. *BJU Int* 2003;91:528—31.
- Nesbit R.M. Congenital curvature of the phallus : report of three cases with description of corrective operation. *J. Urol.*, 1965, 93, 230-231.
- Ravasse P, Petit T, Delmas P. Hypospadias antérieur: Duplay ou Mathieu? *Prog Urol*2000;10(4):653-6.

23. Minevich E., Pecha B.R., Wacksman J., Sheldon C.A. Mathieu hypospadias repair : experience in 202 patients. *J. Urol.*, 1999, 162, 2142-2143. MATHIEU P. : Traitement en un temps de l'hypospadias balanique et juxta-balanique..*J. Chir.*, 1932, 39, 481-484.
24. Mathieu P. : Traitement en un temps de l'hypospadias balanique et juxta-balanique.. *J. Chir.*, 1932, 39, 481-484.
25. Snodgrass W.: Tubularized incised plate urethroplasty for distal hypospadias. *J. Urol.*, 1994, 151, 464-465.
26. Duplay S. : Sur le traitement chirurgical de l'hypospadias et de l'épispadias. *Arch. Gen. Med.*, 1880, 145, 257-263.
27. Duckett JW. The current hype in hypospadiology. *Br J Urol* 1995;76 Suppl 3:1-7.
28. Mollard P. Mouriquand P., Falfela T. : Nouvelle technique de traitement des hypospadias avec coudure par utilisation du lambeau en Onlay. *Prog. Urol.*, 1991 ; 1 : 305-311.
29. Lyu Y, Yu L, Xie H, Huang Y, Li X, Sun L et al (2019) Comparison of short- term complications between Onlay and Duckett urethroplasty and the analysis of risk factors. *Int UrolNephrol* 51(5):783–788
30. Bankole sapin R, Nandiolo r, Yao B, Tambo F, Vodi I, Mobiot L. Le traitement de l'hypospadias postérieur au CHU de Treichville (Abidjan) *Progrès en Urologie* (2007), 17, 860-862.
31. Merrot T, Teklali Y, Dodat H, Alessandri- ni P. Traitement de l'hypospadias antérieur: comparaison de la technique modifiée de Mathieu au Duplay (a propos de 849 enfants). *Ann Urol (Paris)* 2003;37(4):207-9. 17.
32. Koff S.A., B Rinkman J., Ulrich J., Deighton D. Extensive mobilization of the urethral plate and urethra for repair of hypospadias: the modified Barcat technique. *J. Urol.*, 1994, 151, 466-469.
33. Retik A.B., Keating M., Mandell J. Complications of hypo- spadias repair. *Urol. Clin. BN. Am.*, 1988, 15, 223-236.
34. Snyder CL, Evangelidis A, Hansen G, St Peter SD, Ostlie DJ, Gatti JM et al. Management of complications after hypospadias repair. *Urology* 2005;65(4):782-5.