

## SEVERE PROXIMAL HYPOSPADIAS REPAIR – ONE STAGE VERSUS TWO STAGE REPAIR

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### Abstract

**Background:** Proximal hypospadias repair represents a major challenge for the pediatric and urologist surgeons. Many patients suffer a high number of interventions with poor results. We describe our personal experience in surgical treatment of severe forms of hypospadias in the last 5 years and the progress being made from previous surgical techniques. **Material and methods:** We retrospectively reviewed the records of patients who underwent hypospadias repair between 2007 and 2011 and we selected only 15 patients with severe proximal hypospadias. Proximal hypospadias was considered as urethral opening defect which extends from the proximal third of the penile shaft to the perineum. The severity of proximal hypospadias was reassessed during surgery. The techniques of repair were transverse island preputial flaps and buccal mucosa grafts in one step and two steps respectively. All patients were followed for complications at 1, 3, 6 months and 1 year. **Results:** Mean age at first procedure was 5.6 years. 4 cases we previously operated on. Transversal preputial island flap was used in 11 patients. Mean operative time was 3 hours. No flap necrosis was encountered. 8 patients (72.5%) developed postoperative fistula which was closed after 6 months. Staged buccal mucosa urethroplasty was performed in 4 patients. **Complications after Bracka repair:** 1 case (25%) developed postoperative fistula, 2 cases (50%) had relatively narrow buccal mucosa graft requiring additional tissue for urethroplasty. **Conclusion:** In severe forms of hypospadias, both transverse preputial flap and buccal flap are good choices regarding long term results. Final outcome of hypospadias surgery can only be evaluated once the patient reaches adulthood.

### Background

Proximal hypospadias repair still represents a major challenge for the pediatric and urologist surgeons proven by the high number of surgical techniques available, none without complications. Many patients suffer a high number of interventions with poor function and esthetics results. One stage repair has the advantage of using skin that is unscarred from previous surgical procedures, with undisrupted blood supply (1) and decreased number of hospitalization days but it is also dependent on surgeons' expertise and family request. On the other hand, it is often

associated with re-interventions to correct complications in severe cases and poor cosmetic results. Two-stage repair is usually chosen in severe primary proximal hypospadias or revisional hypospadias.

The assessment of hypospadias severity is based on meatal position, quality of the urethra and urethral plate, and presence or absence of penile chordae (2). In general, hypospadias surgery involves three main steps: straightening of the penis (i.e., correction of chordae); reconstruction of the missing urethra (i.e., urethroplasty); and reconstruction of the tissues forming the ventral radius of the penis (i.e., glans, corpus spongiosum, and skin) (3). Hadidi (4) in his hypospadias classification recommends that "surgeons conduct both a preoperative assessment based on the clinical site of the meatus and an intraoperative assessment based on the position of the meatus after straightening of the penis".

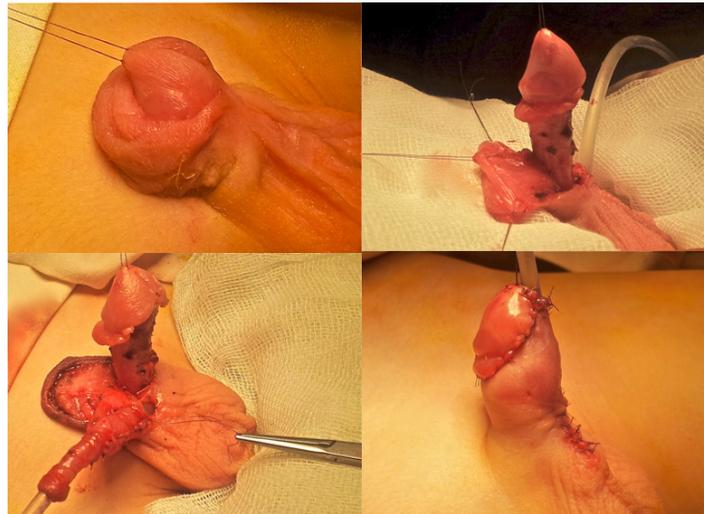
### Material and methods

We retrospectively reviewed the records of patients who underwent hypospadias repair between 2007 and 2011 to determine the location of the native meatus, type of repair and postoperative complications and we selected for our study only 15 patients with severe proximal hypospadias.

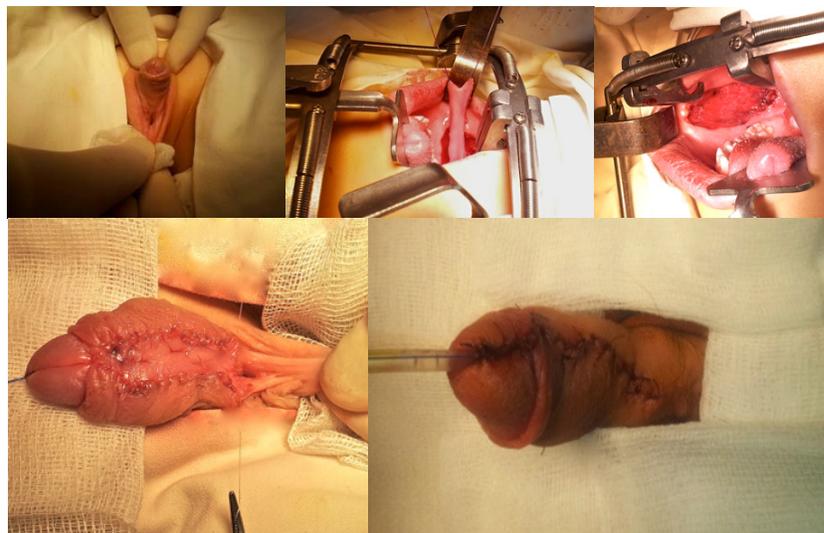
Proximal hypospadias was considered as urethral opening defect which extends from the proximal third of the penile shaft to the perineum during presurgical evaluation. The severity of proximal hypospadias was reassessed during surgery based on the presence of chordae and the need for a straightening procedure, the quality, location and width of the distal urethra after dissection, presence of hypoplasia of the ventral wall of the urethra, shallow or no urethral plate groove, small glans. We also included proximal hypospadias re-interventions because of the technical challenges they represent due to scarred local tissue and poor quality of local flaps.

The techniques of repair in our patients were: one stage transverse island preputial flaps used as a tube or onlay and two stage Bracka technique using buccal mucosa grafts (BMG) with ventral skin coverage as onlay and tube. For the transverse island preputial flap technique we used a tubularized/onlay pedicle flap of mucosal foreskin that was interposed between the ectopic meatus and the glans (figure 1).

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**Figure 1** a-d. urethroplasty with transverse island preputial flap. a: preop aspect; b: degloving the penis; c: neourethra from transverse preputial flap; d:postoperative aspect.



**Figure 2**, a-e. Scrotal hypospadias - surgical steps. a: preop. aspect; b: buccal mucosa graft harvesting; c: accurate hemostasis at the donor site; d: attaching the buccal graft at the recipient site; e: tubularization of the neo urethral plate, final aspect.

Buccal mucosa grafts were easy to harvest (figure 2-b) with clearly identification and preservation of the Stenon duct opening, performing accurate hemostasis at the donor site (figure 2-c), as wide as possible and attaching the center of the buccal graft at the recipient site for preparation of the urethral plate (figure 2-d). In the second stage – after 6 months - we performed the tubularization of the neo urethral plate (figure 2-e).

All patients were followed for complications at 1, 3, 6 months and 1 year respectively. We analyzed postoperative complications with respect to early complications (viability of the flap, hematoma, infections and wound dehiscence) and late complications (urethrocutaneous fistula, proximal strictures, meatal stenosis, recurrent UTIs, cosmetic dissatisfaction).

**Results**

From the total 15 patients with severe proximal hypospadias after the preoperative evaluation 5 had meatus opening at the proximal gland, 9 penoscrotal and 1 case was scrotal (table 1). At the time of surgery 13 patients required release of the moderate or severe chordae, 9 had shallow or no urethral plate groove and a full substitution of the missing urethra had to be performed, 7 had very thin urethral orifice at dissection, 5 patients had a small glans associated with small penis (we don't administer testosterone injections preoperatively) and in 6 patients ventral urethral wall was hypoplastic at catheterization (table 2).

Mean age at first procedure was 5.6 years. 4 cases were previously operated on: 1 patient had one failed intervention, 2 patients had 2 interventions and 1 patient 5 reinterventions after an initial Thiersch-Duplay technique.

Mean operative time was 3 hours. No infections, hematoma or flap necrosis was encountered in our cases. 8 patients (72.5%) developed postoperative fistula which was closed after 6 months. Most of the fistula occurred in cases

with transverse island preputial flaps used as a tube due to poor margin vascularization of the flap.

A 14 years old patient with scrotal hypospadias initially operated using a Thiersch-Duplay technique was admitted to our department after 5 interventions followed by repeated hair clew extraction from the neourethra. We gave up on this neourethra (Figure 3-a) and perform a 2 stage Bracka repair up to the proximal penile region (Figure 3-b,c,d,e,f) and finishing the neourethra using ventral skin (Figure 3-h,i,j,k).

Complications encountered after Bracka repair were: 1 case (25%) with postoperative fistula and 2 cases (50%) with relatively narrow buccal mucosa graft, requiring additional tissue for urethroplasty (table 4).

**Discussion**

Until 7 years ago, in our hospital the main surgical technique used in the repair of the severe proximal hypospadias was Thiersch-Duplay repair. Hair-bearing penoscrotal skin is now avoided in hypospadias reconstruction but was used in the past. When incorporated into the urethra, it may be problematic and can result in urinary tract infection or obstruction at the time of puberty. This generally requires cystoscopic depilation using a laser or cautery device or, if severe, excision of hair-bearing skin and repeat hypospadias repair. This was the case of one of our patients with 5 reinterventions.

Successful hypospadias surgery ensures a cosmetic penile appearance, voiding in the standing position and unhampered sexual function in adulthood. Despite great surgical interest in short-term functional and cosmetic results, and the incidence of problems such as fistula and stricture, there are only a few studies regarding the long-term outcome of hypospadias surgery compared with control subjects (5).

	No patients
Proximal penile	5
Penoscrotal	9
Perineal	1

**Table 1:** Anatomical location of the meatus before release of chordee

	No patients
Moderate/severe chordae	13
Shallow/no urethral plate groove	9
Very thin urethral orifice	7
Small/poor glans	5
Hypoplasia of the ventral urethral wall	6

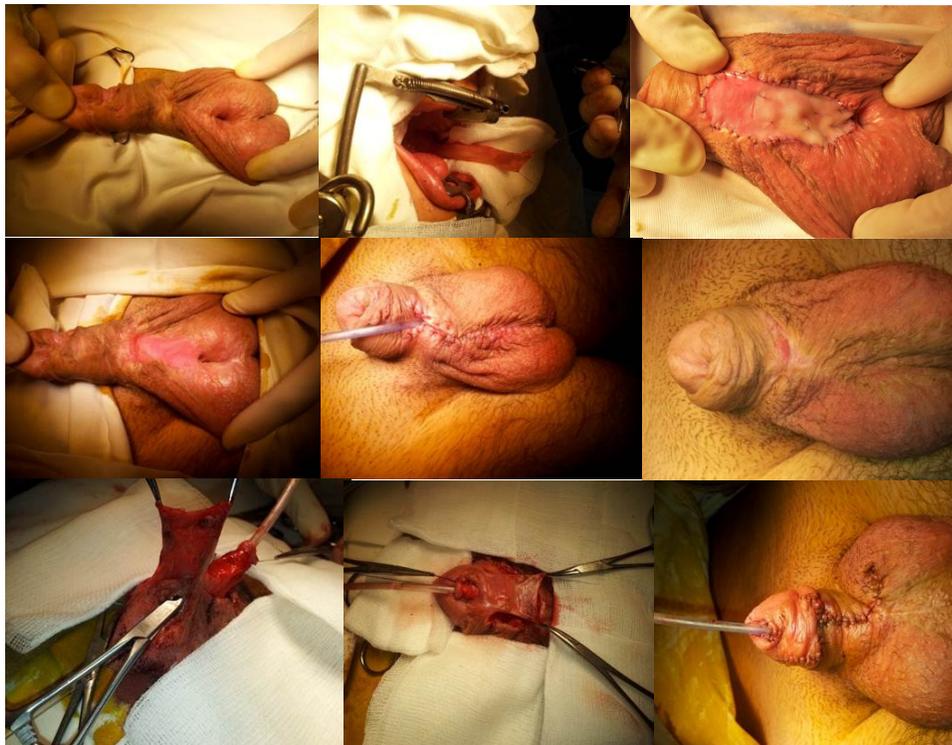
**Table 2.** Factors involved in determining the severity of the proximal hypospadias

	No of cases
Transversal preputial island flap onlay	4
Transversal preputial island flap tube	7
Buccal mucosa graft (BMG)	1
BMG with penile skin flap	3

**Table 3.** Types of surgical procedures

	One stage repair		Two stage repair
	No. Tubular	No. Onlay	No BMG
Infection	0	0	0
Necrosis	0	0	0
Wound dehiscence	5	1	0
Fistula	6	2	1
Meatal stenosis	2	1	0
Urethral stenosis	2	0	0
Recurrent UTIs	1	0	0
Cosmetic dissatisfaction	2	0	1

**Table 4.** Complications related to the surgical technique



**Figure 3. a-k.** Complex re-do staged urethroplasty for scrotal hypospadias.

Powell et al. compared the outcomes of flaps with grafts for the single-stage treatment of proximal hypospadias, confirmed that complication rates of vascularized flaps compared similarly to those of free grafts, and concluded that the use of vascularised flaps offered no advantages. They also showed that the incidence of postoperative fistulae was 10–32%, stricture 4–12%, and stenosis 0.4–3% (6).

In a previously reported North American survey, Cook et al. found that the preferred surgical procedure to correct proximal hypospadias without penile curvature was one-stage repair (TIP repair and onlay island flap repair were each preferred by 43% of participants). When considering the preferred surgical urethroplasty to correct proximal hypospadias with severe penile curvature, 40% of urologists in that study preferred the Duckett repair, 11% preferred the onlay island flap, and 3% preferred the TIP repair (7). What emerges from the interesting study of Springer and coauthors is consistently different [8]. The authors tried to identify actual international trends in the management of hypospadias by inviting pediatric urologists, pediatric surgeons, urologists, and plastic surgeons worldwide to participate in an anonymous multiple-choice online

questionnaire. Completed questionnaires were obtained from 377 participants from 68 countries. From the results, it appeared that two-stage repair was the preferred method to correct proximal hypospadias for 43.3–76.6% of participants, which is in contrast to the results of the North American survey in which one-stage procedure was the method of choice (7). This technique seems to represent a reliable solution when a full circumference urethroplasty is required or when the urethral plate is of dubious quality. It is particularly appropriate for severe hypospadias associated with a poor plate and chordee (8).

#### Conclusion

There is no single technique which is completely free from complications regardless of the apparent less severe preoperative assessment. Most types can be solved using one stage repair but on severe forms of hypospadias, both transverse preputial island flap and buccal mucosal graft are good choices regarding long term results. Final outcome of hypospadias surgery can only be evaluated once the patient reaches adulthood.

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