

## Snodgrass Urethroplasty for Mid and Distal Penile Hypospadias

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### Abstract

- Background** Hypospadias describes a urethral opening proximal to the normal position at the glandular tip (anywhere on the ventral surface) and it is considered the most common penile anomaly. There are many surgical modalities for reconstruction but with different success. The goal of modern hypospadias repair is to achieve functionally as well as cosmetically normal looking glans, meatus and phallus. Snodgrass urethroplasty was introduced in 1974 with more reliable creation of a normal appearing meatus.
- Objective** To see the short-term results of tubularized incised plate urethroplasty as described by Snodgrass in mid and distal penile hypospadias.
- Methods** This is a prospective study for evaluation of fifty male children with age ranged from one to ten years with penile hypospadias (distal and mid shaft) were included in this study over a period from January 2008 to January 2016 in our pediatric surgical center.
- Results** The majority were between 2-4 years. Meatal stenosis (12%) and urethrocutaneous fistula (6%) were the most common complications encountered in this study. Inguinal hernia (8%) and undescended testis (10%) were the most common associated congenital anomalies with hypospadias.
- Conclusion** Snodgrass urethroplasty is simple, single stage operation in the management of mid and distal penile hypospadias with good cosmetic and functional results.
- Keywords** Hypospadias, Snodgrass technique, meatal stenosis, urethrocutaneous fistula.
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**List of abbreviation:** TIP = tubularized incised plate urethroplasty

### Introduction

The term hypospadias is derived from the Greek word (hypos) meaning under and (spadon) meaning rent or fissure <sup>(1)</sup>. It's one of the most common anomalies of male external genitalia in which, the penis is similar to the normal one except on the ventral aspect where the foreskin, the urethra, and urethral spongiosum are deficient <sup>(2)</sup>.

The ectopic external urethral meatus exists ventrally anywhere from the glans to the

perineum and according to this abnormal meatal location, hypospadias classified into: anterior (50%) involving glanular, coronal and subcoronal regions. Middle (30%) involving the distal penile, mid-shaft and proximal penile regions. Posterior (20%) involving the penoscrotal, scrotal and perineal region <sup>(3)</sup>.

Surgical repair of hypospadias has one of the most taxing problems for reconstructive surgeons, urologist and paediatric surgeons alike because of high complications rate <sup>(4)</sup>. The very fact that there are about 300 different operations to manage this tricky problem itself is testimony that no single operation is favored

by all surgeons and no single technique provides uniformly good results. One stage repair is naturally favored as it decreases number of hospitalizations and thus is economical<sup>(5,6)</sup>.

The aim of hypospadias surgical treatment with or without curvature of penis: 1- trying to bring the urethral opening at the tip of the glans, 2- achieving a regular and straight penis, 3- creating favorable conditions for a successful psychosexual life<sup>(7)</sup>. There are two windows of opportunity to perform surgery based on the following factors, namely the environment in which, the patient will be managed, the anesthetic risk and the psychological effect of genital surgery. There is an increasing trend to perform surgical correction between six months to 18 months of age. The second option is between three to four years of age i.e., before the boy starts school<sup>(8)</sup>.

Urethrocuteaneous fistula formation is the commonest complication of hypospadias repair, with reported incidence of 4-25%. The successful repair of this lesion depends on several basic principles. Various techniques have been described for fistula repair but with loupe magnification<sup>(5-7)</sup>.

This study aimed to see the short-term results of tubularized incised plate urethroplasty as described by Snodgrass in mid and distal penile hypospadias.

### **Methods**

A total of fifty boys with age ranged from one to ten years with penile hypospadias (distal and mid shaft) were included in this study over a period from January 2008 to January 2016 in our pediatric surgical center at Al-Imamein Al-Al-kadhimein Medical City. All cases with penoscrotal hypospadias and those with severe chordee were excluded from the study. All patients underwent the same surgical procedure, which is Snodgrass operation (TIP: tubularized incised plate urethroplasty). Total blood investigation including complete blood

count, blood group, bleeding time, prothrombin time, urea, sugar and creatinine in addition to abdominal ultrasound to exclude other associated congenital genitourinary tract anomalies were done prior to surgery. We exclude all boys with proximal hypospadias from this study.

Snodgrass operation was done under general anesthesia in a classic way with insertion of Foley's catheter of eight to ten French on the basis of patient age and size of the penis. All cases had dressing opened on the 7<sup>th</sup> day postoperatively and keeping the patient on oral antibiotics and local fucidin ointment for at least 10 days after surgery while Foley's was taken out on the 8th day and patient discharged from hospital. Patients were informed for follow up after one week of discharge to evaluate the state of wound and to see the urinary stream or any postoperative complications especially urethrocuteaneous fistula and meatal stenosis.

### **Results**

The Snodgrass (TIP) urethroplasty was performed in fifty boys with mid and distal penile hypospadias. The age of patients ranged from 1 to 10 years. There were 7 (14%) coronal, 19(38%) subcoronal, 16(32%) distal shaft and 8(16%) midshaft hypospadias. The most common type of hypospadias in this study was subcoronal type and occurred in 19 patients (38%) followed by distal shaft, which occurred in 16 patients (32%) as shown in table (1).

The most common age for operation was at age between two to four years accounting for 54% of total patients as shown in table (2).

There were also associated congenital anomalies with those patients with hypospadias, five (10%) of them were associated with undescended testis and four patients (8%) had inguinal hernia as shown in table (3).

**Table 1. Types of hypospadias**

Types	No. of patients	Percentage
Coronal	7	14%
Subcoronal	19	38%
Distal shaft	16	32%
Mid shaft	8	16%
Total	50	100%

**Table 2. Age distribution of children with Hypospadias underwent Snodgrass operation**

Age	No. of patients	Percentage
1-2 year	6	12%
2-4 year	27	54%
4-6 year	12	24%
6-8 year	5	10%
Total	50	100%

**Table 3: Associated congenital anomalies**

Associated anomalies	No. of patients	Percentage
Undescended testes	5	10%
Inguinal hernia	4	8%
Congenital heart disease	1	2%
Omphalocele	1	2%
Scoliosis	1	2%

Early complications were seen in two patients in whom complete dehiscence did occur. The first child aged 2 years and the second aged three years. The repair was tried after six months with better results. Meatal stenosis

was the most frequent complication of Snodgrass operation in our series and happened in 6(12%) patients followed by Urethrocutaneous fistula (6%). As shown in table (4).

**Table 4. Complications after Snodgrass operation according to type of Hypospadias**

Types of Hypospadias	No. of patients	Wound dehiscence	Meatal stenosis	Urethrocutaneous fistula	Good cosmetic appearance
Coronal	7	0	1	0	6
Subcoronal	19	1	3	1	17
Distal shaft	16	1	1	1	15
Mid shaft	8	0	1	1	7
Total	50	2(4%)	6(12%)	3(6%)	45(90%)

## **Discussion**

Snodgrass technique for mid and distal penile hypospadias described has several advantages over other techniques for hypospadias. Mathew, onlay island pedicle flap procedure has widely used with minimal complications but the meatus appearing rounded like fish mouth in contrast to slit like of a normal meatus was their disadvantage. Meatal advancement and glanuloplasty was developed to correct meatus which had urinary stream going downward as its demerits.

The hypospadias does not present a major concern for the pediatric surgeon only because of its high incidence (1:300), but also because of its numerous variations, from the mildest forms to the most complex ones, where it is difficult even to distinguish the sex of patient on the basis of its external appearance at first sight. In this study, the meatus was vertically oriented and extended to the apex with straight voiding in 90% of them. This is in agreement with result of Acimi<sup>(9)</sup>, and that of O'Connor and Kiely<sup>(10)</sup>. Meatal stenosis was the most frequent complication in this study and it was seen in 12%, which is higher than that of Din et al.<sup>(11)</sup>, while it is lower than Qassim study who observed 20% incidence of meatal stenosis in his series<sup>(12)</sup>. In 2002, Lorenzo and Snodgrass concluded that failure to deeply incise the urethral plate too far distally can play an important role in developing stenosis<sup>(13)</sup>. It can be stated that meatal stenosis and its associated poor urinary stream is mainly due to technical error. To minimize this, urethral plate must be deeply incised and avoiding too far distal tabularization (not exceeding the mid-glanular point). Along term daily urethral dilatation, which started after removing the silastic urinary catheter after 10-14 days and continue for three months, this dilatation prevents or at least minimizes epithelial apposition enhancing the secondary rather than primary wound healing and these procedures will reduce incidence of meatal stenosis.

The other complications encountered by Snodgrass operation were urethrocutaneous fistula in (6%) and this complication was observed only in those patients with meatal stenosis suggesting that the impaired normal flow of urine due to stenosis produced back pressure which adversely affect the suture line that considered as a weak point enhancing the development of fistula. It is thought that preventing meatal stenosis in Snodgrass procedure significantly minimizes this complication. This complication was lower than the study of Thapa and Pun<sup>(14)</sup> who observed (10%) fistula and study of Uzair et al.<sup>(15)</sup> who observed (9.6%) urethral fistula, but it is higher than the result of Din et al.<sup>(11)</sup> who observed only 2% urethral fistula. The higher incidence of fistula in present study in comparison to other western studies like Cheng et al.<sup>(16)</sup> in USA may be due to development of sub-specialties like pediatric urology, pediatric plastic surgery and also due to strict sterile theatre environment, proper suture materials and proper instruments.

This study concluded that Snodgrass technique is simple, single stage operation in the management of distal and mid penile hypospadias and gives good functional and cosmetic result with low complications rate.

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## **Conflict of interest**

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## **References**

1. Zaontz MR, Packer MG. Abnormalities of external genitalia. *Pediatr Clin North Am.* 1997; 44(5): 1267-97.

2. Baskin LS, Erol A, Li WY, et al. Anatomical studies of Hypospadias. *J Urol.* 1998; 160(3 Pt 2): 1108-15. doi: [http://dx.doi.org/10.1016/S0022-5347\(01\)62711-3](http://dx.doi.org/10.1016/S0022-5347(01)62711-3).
3. Jains JE. *Essential of plastic surgery.* 1st ed. St. Louis, USA: Missary; 2009. p. 442-3.
4. Bleustein CB, Esposito MP, Soslow RA, et al. Mechanism of healing following Snodgrass repair. *J Urol.* 2001; 165: 277-9. doi: <http://dx.doi.org/10.1097/00005392-200101000-00078>.
5. Snodgrass WT, Lorenzo A. Tubularized incised plate urethroplasty for proximal Hypospadias. *BJU Int.* 2002; 89: 90-3.
6. Bakan V, Yildiz A. Dorsal double-layer dartos flap for preventing fistulae formation in the Snodgrass technique. *Urol Int.* 2007; 78(3): 241-4. doi: [10.1159/000099345](https://doi.org/10.1159/000099345).
7. Baskin LS, Duckett JW. Dorsal tunica albuginea plication for hypospadias curvature. *J Urol.* 1994; 151(6): 1668-71.
8. Manzoni G, Bracka A, Palminteric E, Mrrocco G. Hypospadias surgery: when, what and by whom? *BJU Int.* 2004; 94(8): 1188-95. doi: [10.1046/j.1464-410x.2004.05128.x](https://doi.org/10.1046/j.1464-410x.2004.05128.x).
9. Acimi S. Comparative study of two techniques used for distal Hypospadias repair: Snodgrass and Duplay operation. *Scand J Urol Nephrol.* 2011; 45(1): 68-71. doi: [10.3109/00365599.2010.526959](https://doi.org/10.3109/00365599.2010.526959).
10. O'connor KM, Kiely EA. Lessons learned using Snodgrass Hypospadias repair. *Ir J Med Sci.* 2006; 175(1): 37-9.
11. Din IU, Ullah O, Yunas M. Snodgrass repair of anterior hypospadias. *J Postgrad Med Inst.* 2008; 22: 13-6.
12. Qassim YN. Distal penile and midshaft hypospadias repair: Snodgrass urethroplasty versus tubularized plate (Thiersh-Duplay) urethroplasty. *Tikrit Med J.* 2012; 18(2): 73-80.
13. Lorenzo AJ, Snodgrass WT. Regular dilatation is unnecessary after tubularized incised-plate hypospadias repair. *BJU Int.* 2002; 89(1): 94-7.
14. Thapa B, Pun M. Snodgrass tubularized incised plate urethroplasty for distal and midpenile hypospadias. *Nepal Pediatr Soc.* 2014; 34(1): 29-33. doi: <http://dx.doi.org/10.3126/jnps.v34i1.8692>.
15. Uzair M, Ahmed M, Hussain M, et al. Frequency of Urethrocutaneous fistula following Snodgrass hypospadias repair in children. *J Postgrad Med Inst.* 2013; 27(1): 74-7.
16. Cheng EY, Vemulapalli SN, Kropp BP, et al. Snodgrass hypospadias repair with vascularized dartos flap: the perfect repair for virgin cases of hypospadias? *J Urol.* 2002; 168(4 Pt 2): 1723-6. doi: [10.1097/01.ju.0000026940.33540.31](https://doi.org/10.1097/01.ju.0000026940.33540.31).

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