

# An Observational Study between Snodgrass Urethroplasty and Modified Mathieu's Repair in the Management of Distal Penile Hypospadias.

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## ABSTRACT

**Background:** Objectives: An Observational Study Between Tubularized incised plate urethroplasty (Snodgrass) and Modified Mathieu's repair in the management of distal hypospadias. Study Design: An Observational And Comparative Study. Place and Duration: Department of general surgery GMC Srinagar from Jan 2015 to December 2016. **Methods:** A total of fifty patients, upto 15 years of age were included in the study. Patients of Distal Penile Hypospadias with significant chordae and history of previous surgery were excluded. Patients were selected in two groups, 25 each by randomization. In each group. Group I had Snodgrass and Group II had Modified Mathieu's repair. Operative time was noted for both the procedures separately. Patients were followed for subsequent outcome. Complications were noted as immediate postoperative (within 24 hours), delayed post-operative (within 72 hours) and on follow up. **Results:** The mean duration of surgery was significantly lower for Tubularized incised plate urethroplasty (Snodgrass) as compared to Mathieu's repair and the overall complications were more in modified mathieu's repair. **Conclusion:** The overall complication rate and operative time were significantly lower in Tubularized Incised Plate urethroplasty (Snodgrass), Therefore we recommend this repair as a primary treatment for distal penile hypospadias.

**Keywords:** Modified Mathieu's repair, Snodgrass urethroplasty, Urethrocutaneous fistula.

## INTRODUCTION

Hypospadias is an abnormal opening of external urethral meatus in male child at birth, and can be anywhere along the ventral side of shaft of the penis or perineum.<sup>[1]</sup> Hypospadias is a congenital defect due to incomplete Tubularization or fusion of the urethral plate leading to abnormal location of the meatus.<sup>[2]</sup> It is one of the common congenital anomalies occurring in approximately 1 in 200- 300 live male births.<sup>[3,4]</sup> Hypospadias are classified into Anterior(distal), Middle and Posterior(proximal) according to site of native meatus. The incidence of Anterior (distal) hypospadias is 71%, middle 16%, and posterior (proximal) 13%.<sup>[5]</sup> There are many surgical procedures for repair, and none of them is superior to the others.<sup>[6]</sup> There have probably been over 200 reported original methods of urethral reconstruction and they continue as modification of modifications. The aim of surgery in hypospadias is to achieve a functional penis with a normal cosmetic appearance. The commonest repairs to correct

Anterior (distal) hypospadias are the Thiersh-Duplay,<sup>[7]</sup> Mathieu,<sup>[8]</sup> Mustarde, Meatal Advancement and Glanuloplasty Incorporation (MAGPI) and Tubularized Incised Plate (TIP) urethroplasty.<sup>[9]</sup> Of these procedures Mathieu's and TIP urethroplasty have been widely practiced. The most frequent complications after Mathieu's repair are Urethrocutaneous fistula and meatal stenosis, which have been reported in up to 21% of patients. The meatal-based flap technique of Mathieu is the most popular technique for distal hypospadias repair and has withstood the test of time. However, the major drawback of the original Mathieu technique is the final appearance of the meatus (a smiling meatus that is not very terminal). In modified mathieu's repair, Y-V glanuloplasty helps to employ the Mathieu operation in all forms of distal hypospadias and gives a terminal, slit like meatus.<sup>[10]</sup> Snodgrass described a technique with a low complication rate for correcting distal hypospadias by tubularizing the incised urethral plate to create a vertical meatus.<sup>[11]</sup> In both Mathieu's and Tubularized Incised Plate Urethroplasty, urethral plate is used which makes the post repair appearance regarding glans shape and external meatus near to natural.<sup>[12]</sup> The present study was designed to compare the outcome of Tubularized Incised Plate urethroplasty and Modified Mathieu's repair.

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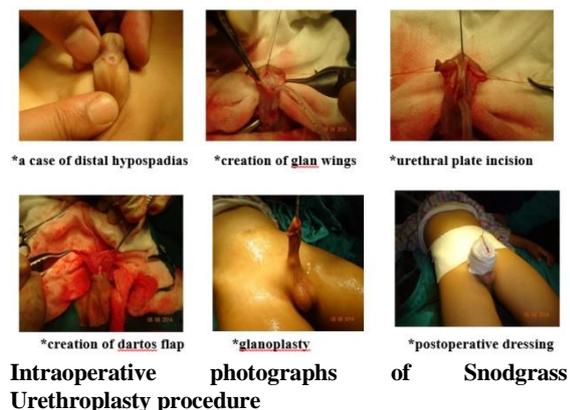
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**MATERIALS AND METHODS**

This study was conducted in department of surgery GMC, Srinagar from January 2015 to December 2016. All pediatric patients up to 15 years of age with distal hypospadias were included in our study. Redo and other types of hypospadias were excluded. The study includes 50 patients of distal hypospadias, 25 for each procedure. The decision to proceed with either Snodgrass or Modified Mathieu's was selected after randomization. Patients were followed for minimum 6 months to 2 years after surgery, 1st visit at one week, second after 2 weeks, 3 months and after 6 months.

**Procedure Details**

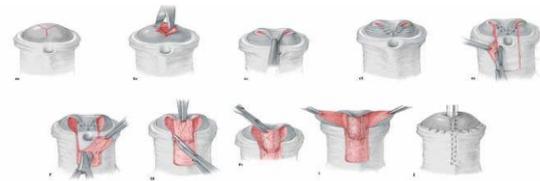
Tubularized Incised Plate (TIP) urethroplasty (SNODGRASS): For Tubularized Incised Plate Urethroplasty, a U-shaped incision was made, extending along the edges of the urethral plate up to the glans and to healthy skin 2 mm proximal to the meatus. Then an incision was added in midline of urethral plate from native meatus up to glans and the tube was made of local flaps created of urethral plate over a 8 Fr or 10Fr feeding tube using polyglycolic acid sutures. Glans wings were created. Neourethra was then covered with a vascularized subcutaneous (dartos) flap. A dartos layer harvested from the prepuce, preserving the vascular pedicle provides additional coverage of the new repair. The dartos flap is brought from the dorsum to the ventrum, through a button hole in the pedicle. The overlying skin is separated and discarded. Glans traverses through this buttonhole. This dartos tissue is then used to cover the entire neo-urethra and secured with 6-0 polyglactin sutures to Buck's fascia, skin mobilized from penile shaft is replaced up to coronal level. Tubularized Incised Plate urethroplasty (TIP) was described in 1994 by Snodgrass.<sup>[9]</sup>



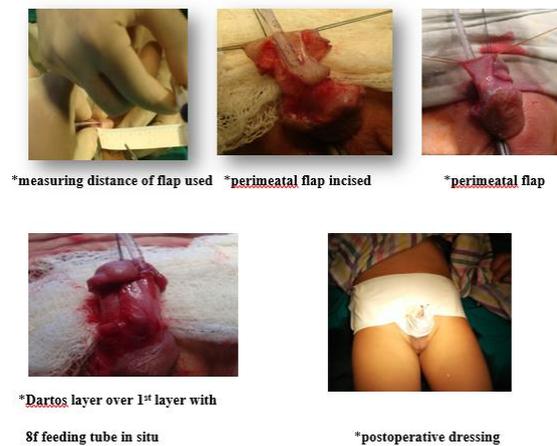
**Modified Mathieu's Repair**

The meatal-based flap technique of Mathieu is the most popular technique for distal hypospadias repair and has withstood the test of time. However, the major drawback of the original Mathieu technique is the final appearance of the meatus (a smiling meatus

that is not very terminal). The Y-V glanuloplasty helps to employ the Mathieu operation in all forms of distal hypospadias and gives a terminal, slit like meatus.<sup>[10]</sup>



A - j: Steps of Y-V glanuloplasty modified Mathieu technique. (a) Y incision (b) Elevation of the three flaps and coring to make a space for the neourethra (c, d) Y sutured as V with preservation of dog-ears (e) U-shaped flap (f) The flap is elevated, taking care to preserve its fascia (g) The dog-ear is excised from both lateral ends of the flap (h) Urethroplasty is performed in two layers (i) A V is excised from the tip of the flap (j) Meatoplasty and glanuloplasty.



**RESULTS**

**Table 1: Age distribution of patients**

Age (years)	Group 1		Group 2		P-value
	No.	%age	No.	%age	
≤5 Years	19	76	21	84	0.507#
6-10	5	20	4	16	
11-15	1	4	0	0	
Mean±SD	3.6±2.61		3.2±1.99		

#Statistically Non-significant Difference (P-value>0.05)

**Table 2: Comparison based on operative time in two groups.**

Operative time	Mean	SD	Range	P-value
Group 1	53.1	5.77	45-64	<0.001*
Group 2	63.2	7.82	49-75	

\*Statistically Significant Difference (P-value<0.05)

A total of 50 patients were studied, group 1(n=25) patients underwent TIP Urethroplasty and Group 2 (n=25) underwent modified mathieu's repair. Age ranged between (1-15) years as shown below.

Operative time in the two groups shows low operative time in Group 1 and statistically significant as shown in [Table 2] Immediate postoperative complications in study patients among two groups as shown in [Table 3]

**Table 3: Comparison of immediate postoperative complications in study patients among two groups.**

Immediate postoperative complications	Group 1		Group 2		P-value
	No.	%age	No.	%age	
Flap Flap Necrosis	1	4	3	12	0.602#
Haematoma Formation	2	8	2	8	1.000#
Wound Breakdown	0	0	1	4	1.000#

#Statistically Non-significant Difference (P-value>0.05)

Late postoperative complications were follows as shown in [Table 4]

**Table 4: Comparison of postoperative complications in study patients among two groups**

Postoperative Complications	Group 1		Group 2		P-value
	No.	%age	No.	%age	
Urethrocutaneous Fistula	3	12	5	20	0.699 #
Meatal Stenosis	2	8	3	12	0.637 #
Urethral Stricture	1	4	2	8	0.552 #
Late Onset Fistula	1	4	0	0	1.000 #
Testical Torsion	1	4	2	8	0.552 #
Urethral Diverticulun	1	4	0	0	1.000 #
Requirement for additional operation	3	12	5	20	0.702 #



\*Wound haematoma



\*Glans wound breakdown



\*Meatal stenosis



\*postoperative urethrocutaneous fistula

**Postoperative complications photos**

**DISCUSSION**

Hypospadias is one of the common congenital anomalies occurring in approximately 1 out of 200-300 live male births.<sup>[3,4]</sup> In 75% of cases abnormal meatus is situated in the glandular, coronal and distal part of the shaft. The surgical goal in patients with hypospadias is to construct a straight penis with meatus as close as possible to normal site and shape

to allow a forward directed stream and normal coitus. There have probably been over 200 reported original methods of urethral reconstruction and they continue as modification of modifications. Earlier most of the distal lesions were repaired with Mathieu's technique. Although this repair produced a glanular meatus, the opening was often rounded in contrast to the slit like appearance of a normal meatus. The major drawback of the original Mathieu technique is the final appearance of the meatus (a smiling meatus that is not very terminal).<sup>[12]</sup> The modified mathieu's (Y-V glanuloplasty) helps to employ the Mathieu operation in all forms of distal hypospadias and gives a terminal, slit like meatus.<sup>[10]</sup> This will include about 70 to 80 % of patients with hypospadias. The only contraindication is the presence of severe chordee distal to the hypospadiac meatus. They found satisfactory result with Modified Mathieu's urethroplasty and avoids the drawback of classical mathieu's (transverse rounded meatus that is not terminal). Rich et al incised the urethral plate in the midline to improve cosmesis of a hypospadias repair in 1989.<sup>[13]</sup> Later, in 1994, Snodgrass advanced this concept by extending the incision of the urethral plate from the meatus to the tip of the glans.<sup>[9]</sup> This maneuver allowed construction of a new urethra from the existing urethral plate. It was suggested that healing may occur through re-epithelialization of the relaxing incision without obvious scarring, allowing the incised edges to remain separated.<sup>[13]</sup>

Today TIP urethroplasty has become a preferred method for repairing distal hypospadias because of its versatility, to correct different meatal variants, the simplicity of the operative technique, low complication rate and reliable creation of a normal appearing glanular meatus.<sup>[15]</sup> Urinary diversion after hypospadias repair is a point of controversy. For urinary drainage, we used feeding tube 8/10f for 10 days. It has produced more satisfactory results and patient compliance than the urethral stents. Unfortunately, the ideal dressing for hypospadias repair remains elusive, to judge by the varieties of dressings currently in use. In our study we had kept soframycin soaked dressing around penis, and was removed after 48 hours. The operative time was shorter in snodgrass (53.1 mints) than modified Mathieu's group (63.2) mints with p value of (p-0.001).the association of operative time between the study groups were statistically significant. Hence the timing in the surgical procedure may predispose to choose this technique as it exposes to lesser anesthetics time and potential iatrogenic complications. In our study there were significantly high rate of fistula formation with Mathieu repair than in Snodgrass repair (20% vs 12%). Other complications like wound breakdown and meatal stenosis were more in modified mathieu's repair than snodgrass. Stricture formation is also slightly more common in Mathieu group (3.3% vs 2.2%). These

results are comparable with other similar studies.<sup>[17,18]</sup>

In another study,<sup>[18]</sup> the mean duration of surgery was found significantly lower for Snodgrass procedure than for Mathieu repair (75 vs. 115 minutes.  $P < 0.05$ ) with urocutaneous fistula more frequently in Mathieu repair.

Another study has shown the comparison and it has been concluded that the operative time and complication rate was less than Mathieu repair and had better cosmetic results producing a slit like normal looking meatus.<sup>[18]</sup>

## CONCLUSION

This study concludes that Tubularized Incised Plate urethroplasty is more effective and reliable method for constructing Neourethra in cases of distal hypospadias because of its less operative time and lower complication rate than modified Mathieu's repair, however both repair produce a slit like normal looking meatus.

## REFERENCES

1. Rasool M, Sheikh A.H, Tabassum S.A, Amin M: Hypospadias repair. Professional Med. J Dec 2007; 14(4):677-684.
2. Haq A, Akhtar N, Nilofer, Samiullah, Javeria: Comparative Study of Mathieu's and Snodgrass Repair for Anterior Hypospadias. J Ayub Med Coll Abbotabad 2006; 18(2).
3. Saied G, Gamal A: Versatility of Tubularized incised plate Urethroplasty. Afr. J Paediatr Surg 2009; 6:88-92.
4. Akmal M, Sial SHJ, Waseer M.H: Urethroplasty. Professional Med. J 2006; 13(4):615-620.
5. Moriquand P.D.E and Mure P.Y: Hypospadias. Pediatric Urology. Saunders, Philadelphia, pp 713-728, 2001.
6. Serrano DA, Pacheco Bru JJ, Domingues HC, Moragues E, et al: Hypospadias Repair using the Snodgrass Technique. Actas Urol Esp. 2007; 31(5):528-531.
7. Ross MD, David FF: Distal hypospadias repair by the modified Thiersch-Duplay with or without hinging the urethral plate. J Urol 1999;162:1156-8
8. Minevich E, Pecha BR, Wacksman J, Sheldon CA: Mathieu hypospadias repair. J Urol 1999; 162:2141.
9. Snodgrass WT: Tubularized incised urethral plate urethroplasty for distal hypospadias. J Urol 1994; 151: 464-5.
10. Hadidi AT1.et al: The slit-like adjusted Mathieu technique for distal hypospadias. J Pediatr Surg. 2012 Mar; 47(3):617-23. doi: 10.1016/j.jpedsurg.2011.12.030.
11. Erol A, Baskin LS, Li YW: Anatomical analysis of urethral plate: Why Preservation of the urethral plate is important in hypospadias repair.Br J Urol Int 2000; 85: 728-39.
12. Rabnowitz R. and Hulbert W.C: Meatal-based flap Mathieu procedure. Adult and Pediatric. Saunders, Philadelphia, pp 39-43, 1999.
13. Rich MA, Keating MA, Snyder H, Mc C III, Duckett JW. Hinging the urethral plate in hypospadias meatoplasty. J Urol 1989;142:1551-3.
14. Bleustein CB, Esposito MP, Soslow RA. Mechanism of healing following the Snodgrass repair.J Urol2001;165:277-9
15. Snodgrass WT, Lorenzo A. Tubularised incised plate urethroplasty for proximal hypospadias. BJUInt2002;89:90-3
16. İmamoğlu M.A.a · Bakırtaş H.b et al: Comparison of two methods--Mmathieu and Snodgrass--in hypospadias repair. Urol Int. 2003;71(3):251-4
17. Muhammad Shahzad Saleem, Mumtaz Rasool, Mudassar Saeed Pansota, Shafqat Ali Tabassum, et al. Comparative Study between Tubularized Incised Plate (Snodgrass) Urethroplasty and Reverse Flap (Mathieu's) Repair in Distal Hypospadias. Ann. Pak. Inst. Med. Sci. 2012; 8(2): 96-100
18. Oswald J, Komer LI, Riccabona M: Comparison of the perimeatal-based flap (Mathieu) and the tubularized incised-plate urethroplasty (Snodgrass) in primary distal hypospadias. Br J Urol Int 2000; 85: 725-727

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