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Short communication

# Combined use of Mathieu and incised plate technique (Snodgrass technique) for repair of distal hypospadias in older children

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## KEYWORDS

Mathieu;  
Incised plate technique;  
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## Abstract

**Objectives:** To evaluate the results and complications after combined use of Mathieu and incised plate technique for management of distal hypospadias in older children.

**Patients and methods:** A total of 33 patients with primary distal penile hypospadias were operated upon using the Mathieu technique combined with deep urethral plate incision (Snodgrass technique). Each patient was evaluated according to the site of original urethral opening, original urethral stenosis, the presence and degree of chordee. The operative and postoperative results and complications were reported. Follow up of the patients was done weekly for 3 weeks postoperatively and then every month for at least 1 year.

**Results:** The mean age was  $6.5 \pm 2.5$  years (range 6–9 years). Bleeding was reported in one case. Wound infection was reported in two cases. Forcible slippage of stent occurred in one case. Meatal stenosis occurred in two cases and urethrocutaneous fistula occurred in one case. No urethral stenosis was reported in any of the patients.

**Conclusion:** Combined use of Mathieu and incised plate technique is suitable for primary distal hypospadias in older children with original meatal stenosis.

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## Introduction

In the 21st century, the single stage flip-flap procedure of Horton and Devine and the meatal based flap technique of Mathieu seem to be the most popular local flap techniques for distal types of hypospadias [1]. Mathieu technique is ideal for distal shaft, coronal or subcoronal hypospadias [2]. The ideal candidate for Mathieu operation should have a straight penis without chordee or with minimal chordee, and wide glanular groove is very important in order to perform a successful Mathieu repair. Any problems related to the width of the glanular plate can be resolved by the aid of hinging or

incising the urethral plate; however, this technique is usually associated with horizontal and rounded meatus that is cosmetically less acceptable [3].

Tubularized incised plate urethroplasty (TIP) is used to repair distal hypospadias when the urethral plate is deep, wide, and supple [4,5]. This technique has the advantage of providing a vertical slit-like meatus that is cosmetically acceptable. However meatal stenosis and fistula are major concerns after surgery of such type [6–8].

Combining the two techniques will add volume to the urethral plate and may solve the problem of meatal stenosis and fistula associated with the TIP technique and at the same time provide a vertical slit-like meatus that is cosmetically acceptable [9].

The purpose of this study was to evaluate the results and complications after combined use of Mathieu and incised plate technique for management of primary distal hypospadias in older children.

### Patients and methods

A total of 33 patients with primary distal hypospadias were included in this prospective study (20 cases coronal, 10 sub-coronal and 3 distal penile). Their age ranged from 6 to 9 years (mean  $6.5 \pm 2.5$  years). Exclusion criteria were: recurrent cases, severe chordee distal to the hypospadias meatus and midshaft and proximal shaft hypospadias. All patients underwent Mathieu repair combined with incision of urethral plate. The postoperative complications and results were reported.

### Surgical procedure (Figs. 1–4)

Under general anesthesia, 5-0 silk traction suture was placed on the dorsal part of the glans just distal to the preplanned site of neomeatus.

The distance between the tip of the glans and the site of the hypospadias opening was measured.

A 6 Fr nelaton catheter can be used as a tourniquet when needed.

A U-shaped incision was created according to the distance measured before. The width of the base end of the flap should be wider than the tip. Two lateral incisions were made distal to the original urethral including the glanular part.

A midline incision was made in the urethral plate from the original urethral meatus to the glans tip, involving the epithelial and sub-epithelial layers. Then urethroplasty was completed by on lay of the perimeatal-based skin flap over a 10F urethral catheter using vicryl 6-0 suture in a running subcuticular manner till the tip of the glans. Then the glanular wings were closed symmetrically over the neourethra using transverse mattress 6-0 vicryl sutures in two layers.

The penile shaft was covered by the available penile skin. Dressing was done with local gentamycin ointment on the surgical area, and the patients received antibiotics for 1 week.

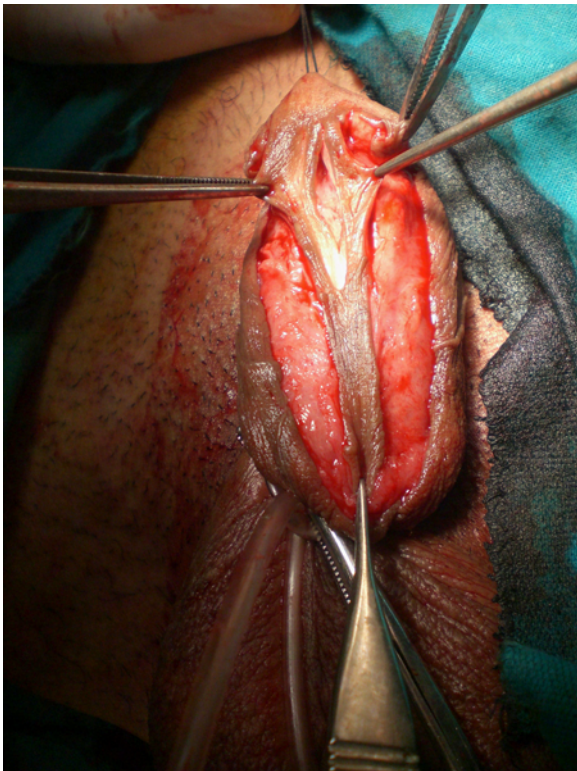
The patients were discharged with oral antibiotics on the same day. The dressing was removed 4–5 days after surgery. All patients were assessed after urethral catheter removal, daily for 3 days and then every week for 3 weeks followed by every 3 months for 1 year.



**Figure 1** Distal penile hypospadias.



**Figure 2** Creation of perimeatal based flap.



**Figure 3** Deep plate incision.

Operative time and early and late postoperative complications were recorded.

### Results

Thirty three patients were involved in this study. The mean age was  $6.5 \pm 2.5$  years (range 6–9 years). Mean operative time was  $100.0 \pm 10$  min.

Bleeding was reported in one case and resolved spontaneously with anti-bleeding measures. Wound infection was reported in two cases (6%) and needed frequent dressing and antibiotic injections.

Forcible slippage of stent by the patient at third day postoperatively occurred in one case which causes only urethral bleeding in the case mentioned above.

Regular analgesia (voltaren infantile suppository) was needed in one-third of cases (33%).

Meatal stenosis occurred in two cases (6%), and regular dilatation by nelaton catheter by the parents for 1 week was needed to solve the problem. Urethrocutaneous fistula occurred in one case (3%) which did not respond to regular dilatation of the external meatus and needed surgical correction 3 months later. No urethral stenosis or retention was reported in any of the patients.

The final urethral meatus was cosmetically acceptable by two-third of the parents with good urethral stream.

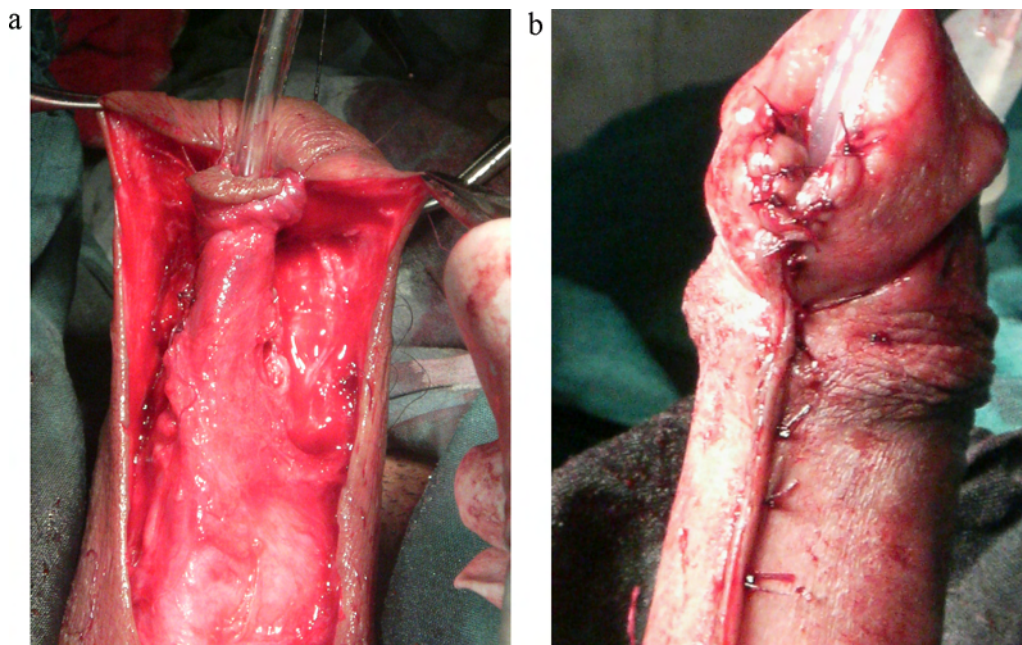
### Comment

Numerous surgical techniques have been developed to correct distal hypospadias.

In 1932 Mathieu described a single stage, meatal based flap technique to repair distal forms of hypospadias [2].

Tubularized incised plate (TIP) hypospadias repair described by Snodgrass proved to be applicable in all cases of distal hypospadias [10]. The complication rate of Mathieu technique is variable in different studies ranging from 4 to 15% [11].

Urethrocutaneous fistulae and meatal stenosis was 3.1% versus 0.7% in the combined TIP and Mathieu technique. Meatal stenosis and



**Figure 4** (a) Urethroplasty completed. (b) Glanuloplasty, closure of penile skin.

fistula formation after TIP procedure were more prominent in patients with a flat and narrow urethral plate [12–14].

In a randomized study, Aminsharif et al. reported a reduced incidence of meatal stenosis and urethrocutaneous fistula in the Mathieu-TIP group in comparison to the TIP group alone [9].

In our study, there was no urethral stenosis reported while meatal stenosis was reported in only two cases (6%). Urethrocutaneous fistula occurred in one case (3%); this can be explained by the fact that combining the two techniques will add volume to the urethral plate and also will facilitate glanuloplasty without tension and this should be considered in older children with distal hypospadias (as the case in our study) because they are at greater risk to develop urethral and meatal stenosis after TIP procedure than in younger children because the incised plate will need more time to be replaced by epithelium in older children [9,15].

In a similar study, El-Hadidi described the slit-like adjusted Mathieu technique (SLAM) for distal and midpenile hypospadias including adult patients up to 30 years old with satisfactory results with 3% complication rate [16].

The only drawback of combining the two techniques in our study was the need for more analgesia to relieve pain; however the advantages gained are more when considering this drawback.

So adding the TIP principles to the standard Mathieu procedure appear to be a helpful measure to reshape the urethral meatus and give a better functional and cosmetic result and decrease the incidence of meatal stenosis and fistula formation.

### Conclusion

Combined use of Mathieu and incised plate technique is suitable for distal hypospadias with original meatal stenosis with the advantages of less fistula formation, less meatal stenosis, and cosmetically acceptable external meatus.

### Conflict of interest

The authors disclose no financial conflict of interest.

### References

- [1] Devine Jr GJ, Horton CE. Hypospadias repair. *Journal of Urology* 1977;118:188–93.
- [2] Mathieu P. Traitement en un temps de l'hypospadias balanique et juxta balanique. *Journal De Chirurgie* 1932;39:481–4.
- [3] Rich MA, Keating MA. Hinging the urethral plate. In: Ehrlich RM, Alter GJ, editors. *Reconstructive and plastic surgery of the external genitalia. Adult and pediatric*. Philadelphia: Saunders; 1999. p. 63–5.
- [4] Snodgrass WT. Tubularized incised plate hypospadias repair: indications, technique and complications. *Urology* 1999;54:6–11.
- [5] Snodgrass WT, Lorenzo A. Tubularized incised-plate urethroplasty for hypospadias reoperation. *BJU International* 2002;89:98–100.
- [6] Shanberg AM, Sanderson K, Duel B. Re-operative hypospadias repair using the Snodgrass incised plate urethroplasty. *BJU International* 2001;87:544–7.
- [7] Borer JG, Bauer SB, Peters CA, Diamond DA, Atala A, Cilento BG, et al. Tubularized incised plate urethroplasty: Expanded use in primary and repeat surgery for hypospadias. *Journal of Urology* 2001;165(2):581–5.
- [8] Hakim S, Merguerian PA, Rabinowitz R, Shortliffe LD, McKenna PH. Outcome analysis of the modified Mathieu hypospadias repair: comparison of stented and unstented repairs. *Journal of Urology* 1996;156:836.
- [9] Aminsharif A, Taddayun A, Assadolahpoor A, Khezri A. Combined use of Mathieu procedure with plate incision for hypospadias repair: a randomized clinical trial. *Urology* 2008;72:305–8.
- [10] Snodgrass WT. Tubularized incised plate urethroplasty for distal hypospadias. *Urology* 1994;151:464–8.
- [11] Samuel M, Capps S, Worthy A. Distal hypospadias: which repair? *BJU International* 2002;90:88–91.
- [12] Snodgrass W, Koyle M, Manzoni G, Hurwitz R, Caldameo A, Ehrlich R. Tubularized incised plate hypospadias repair: results of a multicenter experience. *Journal of Urology* 1996;156:839–41.
- [13] Sozubir S, Snodgrass W. A new algorithm for primary hypospadias repair based on tip urethroplasty. *Journal of Pediatric Surgery* 2003;38:1157–61.
- [14] Buson H, Smiley D, Reinberg Y, Gonzalez R. Distal hypospadias repair without stents: is it better? *Journal of Urology* 1994;151:1059–963.
- [15] Aly HF. Combined use of Mathieu and incised plate technique for repair of distal hypospadias. *Annals of Pediatric Surgery* 2009;5(2):141–5.
- [16] Hadidi A. The slit-like adjusted Mathieu technique for distal hypospadias. *Journal of Pediatric Surgery* 2012;47(3):617–23.